Medicine Pricing, Availability and Affordability in THAILAND

Report of a survey conducted in Bangkok (Capital City), Phitsanulok (North), Suratthani (South), and Nakornrachaseema (Northeast).

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ABBREVIATIONS

Cap	Capsule
CIF	Cost, insurance and freight
HAI	Health Action International
IB	Innovator brand
INN	International non-proprietary name
Inh	Inhaler
Inj	Injection
IQR	Interquartile range
LPG	Lowest priced generic equivalent
MPR	Median price ratio
MSH	Management Sciences for Health
NEDL	National Essential Drug List
Susp	Suspension
Tab	Tablet
USD	United States dollars (also $)
VAT	Value added tax
WHO	World Health Organization

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Executive summary

Background:

A field study to measure the availability and prices of selected medicines was undertaken in Thailand during October and December 2006, using a standardized methodology developed by the World Health Organization and Health Action International.

Methods:

Medicine prices and availability were measured in health facilities and pharmacies in the capital city, Bangkok, and three randomly selected districts in each part of Thailand: Phitsanulok (North), Suratthani (South), and Nakornrachaseema (Northeast). Data on 43 medicines were collected in 20 public sector health facilities (20 hospitals) and 21 private pharmacies selected using a validated sampling frame. Two prices were recorded: the procurement price and the price charged to patients. For each medicine, data were collected for the innovator brand, and the most sold and lowest price generic equivalents at each facility. Medicine prices were expressed as median price ratios (MPRs) relative to a standard set of international reference prices (MSH 2005). Reference pries were available for 35 medicines. Availability was assessed for all 43 medicines. 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 in the public and private sector. Price components were assessed for 3 medicines. For each, data was collected for the innovator brand (imported) and 2 generics (locally produced).

Results:

In the public sector, the median availability of innovator brand and lowest priced generic medicines was 10% and 75% respectively. In the private sector, the median availability of each product type was 28.6%. The public sector procured predominantly generic products.

Overall the public sector procured generics and innovator brands at 1.46 and 3.3 times the international reference price, respectively. In the public sector, patients paid 2.55 times and 4.36 times the reference prices for the generics and innovator brands, respectively. Patient paid very high prices for some medicines, particularly innovator brands. In the public sector, patients paid about 32% more than the procurement prices for innovator brands, and about 75% more for generics. However, lowest priced generics were less than half the price of the innovator brands.

Overall, private pharmacies procured lowest price generics at 1.48 times the international reference prices, and innovator brands at 9.67 times the reference price. Lowest priced generics and innovator brands were sold to patients at 3.31 times and 11.6 times the reference prices, respectively. This represents a mark-up of about 20% for innovator brands and 124% for lowest priced generics. Innovator brands were nearly 4 times the price of lowest priced generics.

Overall, the private sector paid 67% more than the public sector when procuring innovator brands. The difference was 29% for lowest price generics. Patients paid 43% more for innovator brands from private pharmacies and 37% more for lowest priced generics.

Most treatments in the public sector required less than 1 day's wages if lowest priced generics were purchased by the lowest paid unskilled government worker. Purchasing innovator brands were less affordable e.g. a course of azithromycin required an additional 2.6 days work if the innovator brand is purchased rather than the lowest priced generic equivalent. In the private sector, some treatments with lowest priced generics required less than a day's wages (so were affordable). However, some treatments with innovator brands were not affordable. Medicines to treat HIV/AIDS were unaffordable, requiring between 4 and 25 days wages to purchase a month's supply.

In the public sector, cumulative mark-ups ranged from 20% to over 2000%. However, the data was based on the manufacturers selling price reported to the Thai FDA which may be inaccurate. Hospital mark-ups ranged from 28-41% for innovator brands and 20-317% for generics. In the private sector, cumulative mark-ups ranged from 37% to 900%. Wholesaler mark-ups ranged from 7-31% for generics and 0-2% for innovator brands. Pharmacy mark-ups (including tax) were 13-40% for innovator brands and 20-150% for generics.

Recommendations:

Based on the survey results, a review of policies, regulations and educational interventions that impact on the price and availability of medicines is needed. Of particular importance is the need to stimulate the acceptance and use of lower priced generics. Availability of essential medicines needs to increase, and prices need to come down so that treatments are more affordable especially for the poor.

CHAPTER 1

INTRODUCTION

Introduction

In 2006, the Office of Food and Drug Committee in corporation with the Faculty of Pharmacy, Mahidol University conducted a nationwide study on prices, availability and affordability of selected medicines in THAILAND. The main goal of the study was to document and compare the prices of medicines in the public and private health sector and to compare them with those in other countries.

This study was conducted based on the standardized methodology developed by the World Health Organization (WHO) and Health Action International (HAI) which allows for valid international comparisons. The WHO/HAI methodology is described in the manual "Medicine Prices: A new approach to measurement" (WHO/HAI, 2003) and is accessible on the HAI website: [1]

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

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

[1] http://www.haiweb.org/medicineprices/manual/documents.html

Country background[2]

The Kingdom of Thailand is situated in the continental Southeast Asia, just north of the equator, and is part of the Indochina Peninsula. The population of Thailand is 63.08 million (2003); almost all residents (99.3%) are of Thai nationality and the rest are of other nationalities such as Chinese, Myanmar and Lao.

For communication purposes, the Thai language is officially and commonly used for speaking and writing, while English tends to play a greater role particularly in the business sector. Most of Thai people are Buddhists (94.2%), followed by Muslims (4.6%) and others.

The National Economic and Social Development Board of Thailand has forecasted that the Thai economy will continue to grow in 2004 as a result of the recovery of global economy. The continuous implementation of the Government's economic growth stimulus measures and low-interest financing schemes will result in the economic growth remaining high at the 7% level, the inflation rate rising to 2.4%, and a current account surplus of US$8.7 billion or 5.3% of the gross domestic product (GDP).

77.8% of the Ministry of Health (MoPH) budget for 2002-2004 has been allocated for the implementation of the universal healthcare scheme and the health promotion programs at 6.4%.

The current National Economic and Social Development Plan specifies the vision of desirable Thai society that it is a strong society with a balance of three aspects, i.e. society of quality, wisdom/learning, and unity/solicitude.

Health Sector

The administrative structure of the MoPH is divided into two levels: central administration and provincial administration.

1. The Central Administration is composed of 10 agencies: (1) the Office of the Minister, (2) the Office of the Permanent Secretary for Public Health, and (3) eight departments in major clusters comprising the Department of Medical Services, the Department for Development of Thai Traditional and Alternative Medicine, the Department of Mental Health, the Department of Disease Control, the Department of Health, the Department of Health Service Support, the Department of Medical Sciences, and the Food and Drug Administration.

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[2] Wibulpolprasert S. Thailand Health Profile 2001-2004, Bureau of Policy and Strategy, Ministry of Public Health. Nonthaburi, Thailand. 2005

2. The Provincial Administration Public health agencies under the provincial administration are Provincial Public Health Offices, hospitals under the MoPH, District Health Offices, and health centers.

The present government has had a policy to restructure the management system of all health facilities so that they will be more independent and flexible like a public organization, but still under the government system. The details of such system are still under the development process.

Basic Information on Human Resources

Previously 70% of MoPH personnel were civil servants and 30% were permanent employees. Nearly all MoPH personnel (particularly of the Office of the Permanent secretary) are working in the **rural areas.** In the year 2003, there were 2,877 medical doctors, 979 dentists, 2,173 pharmacists and 10,927 professional nurses.

Health services

Health services in Thailand are classified into five levels according to the level of care as follows

1. Self-Care at Family Level. Services at this level include the enhancement of people's capacity to provide self-care and make decisions about health.

2. Primary Health Care Level. The primary health care services include those organized by the community in providing services related to health promotion, disease prevention, curative care and rehabilitative care. The medical and health technologies applied at this level are generally not so high, in response to community's needs and culture. Service providers are the people themselves, village health volunteers (VHVs) or other non-governmental volunteers.

3. Primary Care Level. Primary care is provided by health personnel and general practitioners (GPs). The universal coverage of health care policy of the present government aims to develop a holistic primary care system for all families across the country. In the near future, the entire holistic primary care system will be more effective and stronger. The components of the primary care system are as follows:

1) Community Health Posts. A community health post is a village level health service unit established specifically in remote areas, covering a population of 500 to 1,000, and staffed by only one community health worker (a permanent employee of MoPH). Services provided at this level include health promotion, disease prevention and simple curative care.

2) Health Centers. A health center is a subdistrict or village level health service unit - a first - line unit, covering a population of about 1,000 - 5,000, with health staff including a health worker, a midwife and a technical nurse. Services provided at this level include health promotion, disease prevention, and curative care. Health centre staff run health programes according to the standard operational procedures established by the MoPH, under the technical supervision and support of the community hospital.

3) Health Centers of Municipalities, Outpatient Departments of Public and Private Hospitals at All Levels, and Private Clinics. At these facilities, outpatient care is provided by physicians and other health professionals.

4) Drugstores. A drugstore is a healthcare unit at the primary care level that is operated by a pharmacist or someone who has been trained in basic pharmacy.

4. Secondary Care Level. Medical and health care at this level is managed by medical and health personnel with intermediate level of specialization. General and specialized medical facilities include the following:

1) Community hospitals. A community hospital is located in a district or minor-district with 10 to 150 inpatient beds, covering a population of 10,000 or more, and staffed by doctors and other health professionals. Generally, services provided are mostly curative care, compared to those at primary care facilities.

2) General or regional hospitals and other large public hospitals. A general hospital in this category is located in a provincial city or a large district town, equipped with 200 to 500 beds, while a regional hospital located in a provincial city has over 500 beds and medical specialists in all fields.

3) Private hospitals. Most private hospitals are operated as a business entity with both full-time and part-time staff, and clients are required to pay for services.

5. Tertiary Care. Medical and health services at this level are provided by medical specialists and health professionals. Tertiary care facilities include:

1) General hospitals

2) Regional hospitals

3) University hospitals and large public hospitals belonging to other ministries or local administrative organizations.

4) Large private hospitals have medical specialists in all specialties, mostly with over 100 beds.

The tertiary care facilities also provide primary care services.

During 1964-2000, Thais, life expectancy at birth substantially increased from 55.9 years to 69.4 years for males and 62.0 years to 74.1 years for females.

In 2025, it is expected that the life expectancy of Thai citizens will reach 74.8 years for males and 80.3 years for females.

Causes of Death

Overall, according to a death certificates analysis, the major and rising causes of death among Thai citizens are non-communicable diseases, accidents, and

HIV/AIDS (which is currently a major health problem of the country). The prevalence rates of communicable diseases, which used to be significant health problems, have been declining except for re-emerging diseases such as tuberculosis that is associated with HIV/AIDS.

For all age groups, the study revealed that the leading cause of death was the diseases of circulatory system (18.6% of all causes), more than half of which were due to cerebro-vascular diseases; the second leading cause was cancer and tumors (16.2%), nearly half of which were liver/bile-duct and lung cancers; the third leading cause was infectious diseases (15.5%), most of which were HIV infection particularly among teenage and young adult males, followed by tuberculosis; and the fourth leading cause was external causes among children and youths (12.4%), i.e. accidental drowning among school-age children and road traffic accidents among teenagers and adults, most of which were associated with motorcycles.

An analysis of the differences in causes of death in males and females revealed a proportion of 21.4% for the diseases of circulatory system and 16.5% for cancer/tumors in females and 18.2% for infectious diseases and 16.6% for the diseases of circulatory system in males, whereas external causes ranked third for males and fifth for females.

Pharmaceutical Sector

The pharmaceutical sector is regulated by the Office of Food and Drug Administration, the Ministry of Public Health. In 1981 the National Drug Policy started and was revised in 1993 which added policy in self support in pharmaceutical by local manufacturing and promotion of National Essential Drug List utilization.[3]

Classification of drugs[4]

According to the Drug Act of B.E. 2530 (1987), medicines are classified into two major groups: *modern* and *traditional drugs*.

3 Wibulpolprasert S. National Drug Policy in Thai Drug System, Health System Research Institute, Ministry of Public Health. Nonthaburi, Thailand 1994, page 63, 121-125.

4 http://wwwapp1.fda.moph.go.th/drug/eng/

Modern Drugs are further divided into four categories, namely 1) household remedies whose sales require no license; 2) ready-packed drugs that can be sold in drugstores by nurses or other medical professionals; 3) dangerous drugs; and 4) specially controlled drugs. Dangerous drugs can be bought without a prescription but must be dispensed by pharmacists. Drugs which may possess a potentially harmful effect on health, if misused, will be listed in the last category whose sales require a prescription.

Traditional drugs are those intended to be used in indigenous or traditional medical care as monographed in the official pharmacopoeia of traditional medicines or those declared by the Minister of Public Health as traditional medicines or those permitted to be registered as traditional medicines. The control and registration of drugs in this group are less stringent than those for modern drugs.

Laws and Regulations[5]

The Drug Act of B.E. 2510 (1967) is currently stilled in effect, whereas the new Drug Act of B.E.2546 (2003) is in the final stage of promulgation. Attempts to revise the Drug Act of B.E. 2530 (1987) are painstaking and time-consuming. When it becomes effective, many features will be changed accordingly, for example:

1. Types of medicines will be reclassified into 3 new categories: prescription-only, pharmacy-dispensing and household remedies.
2. Physicians will no longer be allowed to compound medicines for their patients.
3. Manufacturers who are unable to comply with the good manufacturing practices (GMP) principles can no longer proceed with the drug business.
4. The new law provides more flexibility for revising the GMP requirements. Under the new law, the GMP requirements may be revised and approved by the Drug Committee and declared by the Minister of Public Health; no need to get approval from the Parliament as required in the 1987 law.
5. Government-owned enterprises or agencies will no longer be exempted from the requirements of licensing and product registration.
6. Pharmaceutical products may be registered in either of the two channels: one for general medicines and the other for Thai traditional medicines.
7. Product Licenses must be renewed every five years.
8. The Drug Committee will be authorized to withdraw any drug products if later evidence proves that the products are not scientifically efficacious.

[5] http://www.fda.moph.go.th/eng/drug/laws.stm

9. The Food and Drug Administration will be able to declare certain charges for its services related to licensing, registration, dossier evaluation and approval processes, including expenses for testing the products.
10. Product liability will be implemented for the first time. Consumers may directly sue and get compensation from drug manufacturers if there is any serious harm occurring to them after consumption, provided that product indications are strictly followed.
11. The deviation of statements in advertisement from those permitted will have to be made known to the public through further apology advertisement along with the correct statements.
12. The amounts of fines will be increased up to tenfold, compared to the previous ones.
13. A pharmacist will be allowed to work in as many drugstores as he/she can.

Drug selection system[6]

Drug selection system in Thailand is approached at multi-level:

1. National drug selection
    a. Drug registration and revision of registered drugs by Thai FDA
    b. Drug selection by pharmaceutical entrepreneurs for registered in Thailand
    c. Selection of Orphan drugs
    d. Control of pharmaceutical chemicals
    e. Production or importing of non-registered drugs
2. Drug selection for the National Essential Drug List
3. Drug selection for healthcare institution
    a. Drug selection for public hospitals
    b. Drug selection for private hospitals

Both are performed by the Pharmacy and Therapeutic Committee at each hospital. All public hospitals employ the group purchasing program for drug procurement. This program started in 1987 and enlarged the program to all public hospitals in 1995.[7]

Drug distribution channels

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[6] Wibulpolprasert S. Drug Selection System in Thai Drug System, Health System Research Institute, Ministry of Public Health. Nonthaburi, Thailand 1994, page 215

[7] Wibulpolprasert S. Drug Procurement and Distribution System in Thai Drug System, Health System Research Institute, Ministry of Public Health. Nonthaburi, Thailand 1994, page 415

The patients at the hospitals will receive prescribed medicines through the hospital pharmacy department located within the hospitals. They rarely fill prescriptions at the pharmacies or drug stores. So the pharmacies or drug stores will serve only self-medication.[8]

In 2005, the total local pharmaceutical production was approximately 808 M US$ (29,686 M Bht.) which in 2003 was 723.5 M US$ (26,587 M Bht.). The amount of imported pharmaceutical products in 2005 was approximately 1,041 M US$ (38,255 M Bht.) while in 2003 was 630 M US$ (23,137 M Bht.) In comparison, in the year 2003 the percentage of local pharmaceutical production was 53.45% while imported pharmaceutical products was 46.53%, and in the year 2005 the percentage of local pharmaceutical production was reduced to 43.7% while imported pharmaceutical products was increased to 56.3%.[9]

In 2005 there were

1. Drug store
    a. 8801 Modern pharmacies
    b. 4528 OTC drug stores
    c. 640 Veterinary drug stores
2. Pharmaceutical manufacturer
    a. 166 Modern pharmaceutical manufacturer
    b. 879 Traditional pharmaceutical manufacturer
3. Pharmaceutical Importer
    a. 600 Importers for modern drug
    b. 172 Importers for traditional drug

Drug controlling system[10]

The system for controlling drug is composed of Pre-marketing Control (Licensing, Drug Registration), Control of Drug Advertisement, Post-marketing Control, and Re-evaluation of Pharmaceutical Products.

Pre-marketing Control

Licensing

The Drug Act requires that any person who wishes to sell, manufacture or import drugs into the Kingdom must obtain a license from the licensing

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[8] http://wwwapp1.fda.moph.go.th/drug/zone_search/files/sea001_b15.asp

[9] http://wwwapp1.fda.moph.go.th/drug/zone_search/files/sea001_d10.asp

[10] http://www.fda.moph.go.th/eng/drug/post.stm

authorities. The Drug Control Division is the licensing and registration authority for manufacturing, import and sale of drugs within Bangkok metropolis and its territories. Provincial Public Health Offices are the licensing authorities for manufacture and import of traditional drugs and sale of drugs in other provinces.

Applications for licenses must be submitted to the licensing authority. Their buildings and facilities will then be inspected. A License will be issued after the inspection has confirmed that the applicant has adequate capabilities of doing such business, and he/she can secure appropriate facilities and personnel for that purpose.

Licenses are issued, according to the business of the applicant, in nine different categories:

- License to manufacture modern medicines
- License to import modern medicines
- License to sell modern medicines
- License as a wholesaler of modern medicines
- License to sell modern medicines in sealed packages which are classified as neither dangerous nor specially-controlled medicines
- License to sell modern veterinary medicines in sealed packages
- License to manufacture traditional medicines
- License to sell traditional medicines
- License to import traditional medicines

Drug Registration

The registration process is necessary to ensure quality, safety and efficacy of the drugs being marketed in the country. Only authorized licensees are qualified to apply for product registration. Manufacturing plants, in which drug products are manufactured, are subject to inspection for GMP compliance.
According to the new Drug Act (expected to be enacted within 2003), a certificate of product registration is valid for five years as from the date of issuance. The process of drug registration will be carried out in 2 channels, which differ in degrees of control and dossier submission:

1. Registration of general medicines
2. Registration of Thai traditional medicines

Due to some differences in the requirements for dossiers to be submitted for product approvals, the general medicines will have to be further defined as:

- **Generics** whose registrations require only dossiers on product manufacturing and quality control along with product information;

- **New medicines** whose registrations require a complete set of product dossiers;
- **New generics** whose registrations require dossiers of bioequivalence studies in addition to the required dossiers for generics submission.

Generics mean pharmaceutical products with the same active ingredients and the same dosage forms as those of the original products, but manufactured by different manufacturers.

New medicines include products of new chemicals, new indications, new combinations or new delivery systems and new dosage forms.

New generics are medicines with the same active ingredients, doses and dosage forms as those of the new compounds registered after 1992.

The amended registration procedure for new drug products, adopted in August 1989, involves a two-year period of safety monitoring program. This means that new drug products will be firstly approved for use only in hospitals or clinics for at least two years. Then safety reports must be submitted for consideration as to whether general marketing should be allowed. Meanwhile, new generic products have to pass bioequivalence studies to assure comparatively therapeutic outcomes. The bioequivalence data must be submitted to the authorities as proofs of the product bioavailability along with product information and quality dossiers.

Quality assurance of drug safety and efficacy before marketing can undoubtedly be achieved through good manufacturing practices. Inspection of drug manufacturers and sampling of drug samples from manufacturers, importers or retail pharmacies for analyses by the regulatory authorities cannot effectively solve the problems encountered. Drug manufacturers, importers and distributors must establish their quality assurance systems according to the GMP guidelines to ensure that the drug products have and continue to have the quality as claimed.

The Thai FDA has begun campaigning on GMP compliance since 1984. Projects on development of local pharmaceutical industry up to internationally acceptable standards were part of the Sixth National Economic and Social Development Plan (1987–1991) and also of the Seventh Plan (1992–1996). The projects aimed to promote and support local drug manufacturers in implementing good manufacturing practices. The first guidelines of Thai Good Manufacturing Practices were published in 1987. Since then numerous workshops, seminars and conferences as well as consultative visits have been held or carried out to promote the guidelines adoption.

Control of Drug Advertisement

Drug information available to health-care professionals and consumers is as important as drug quality for the safe use of drugs. Drug advertisements and other promotional materials need to ensure truthfulness and non-exaggeration. Advertisements through any means must be approved by the authorities before actually being disseminated. Advertisements of prescription or pharmacy-dispensed medicines are permitted only to professionals but prohibited to the general public. Drugs in the household remedy category may be advertised directly to consumers or the general public.

The control of drug advertisements is presently focused on the increasing advertisements on the Internet. A majority (>85%) of such advertisements are being run without FDA permission. Due to the fast growing numbers of and difficulties in catching up with these advertisements, the monitoring of violation as well as guidelines and measures for the violation control must therefore be comprehensive and updated periodically.

Post-marketing Control

To further ensure quality, safety and efficacy of the approved drug products, the marketed products are regularly sampled for testing at the drug analysis laboratory of the Medical Sciences Department, Ministry of Public Health. In addition, contracts have been signed with some qualified laboratories of local universities to assist in solving the problems of drug quality. The surveillance tasks involve the following;

- Inspection of GMP compliance at manufacturing sites;
- Monitoring of manufacturing process changes to ensure no adverse effects on the safety or efficacy of the medicines;
- Monitoring of the use of marketed drugs for unexpected health risks, taking action if risks are detected by informing the public, investigating the cause and removing the drugs from the market;
- Receiving and handling of complaints;
- Safety monitoring program for new drugs;
- Re-evaluation of pharmaceutical products.

Re-evaluation of Pharmaceutical Products

Even though drugs have been strictly examined for their quality, efficacy and safety before being approved for marketing, chronological consumption data in a large population, new findings and pharmaceutical progress may later reveal very serious side effects that were not previously seen. A balance between efficacy/benefit and potential risks or serious adverse reactions is frequently questioned, especially those in combination. The Drug Committee in 1991 appointed a subcommittee to evaluate the registered products. Some criteria have been set and the evaluation process has been ongoing.

CHAPTER 2

METHODOLOGY

The survey of the price, availability and affordability of medicines in THAILAND was conducted using the standardized WHO/HAI methodology (WHO/HAI 2003). Data were collected during October and December 2006. Prices and/or availability data were collected for:
1. Public sector procurement prices
2. Public sector patient prices
3. Private sector procurement prices
4. Private sector patient prices

Selection of medicines

The WHO/HAI methodology specifies a core list of 30 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, and recommends a pack size, 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.

The Office of Food and Drug Administration, Ministry of Public Health decided to look at the prices of a number of essential medicines in the public sector and private pharmacies. A total of 43 substances were included in the survey. Of these, 26 medicines were on the WHO/HAI core medicines. The remaining four medicines were not available in Thailand. The replacement for the core list drugs was as follow:

WHO/HAI core list medicine	**Replacement medicine**
Artesunate 100 mg tablet	Artesunate 50 mg tablet
Hydrochlorothiazide 25mg tablet	Hydrochlorothiazide 50 mg tablet
Lovastatin tablet	Simvastatin 10 mg tablet
Pyrimethamine + Sulfadoxine tablet	Quinine sulfate 300 mg tablet

In total 17 medicines were added, as requested by Thai FDA, as a supplementary list. The list is attached as Annex 1. For each substance, three product types were surveyed, namely the:

- Innovator brand,
- Most sold generic equivalent, and
- Lowest price generic equivalent.

Data for the most sold generic has not been included in this report as the product was identified at each facility which was not in accordance with the WHO/HAI methodology.[11]

The prices were measured in health facilities and pharmacies in the capital city, Bangkok, and three randomly selected districts in each part of Thailand: Phitsanulok (North), Suratthani (South), and Nakornrachaseema (Northeast).

In each sector, two prices were recorded for each medicine:

- Procurement price
- Price charged to patients.

In the public and private facilities surveyed we also measured the availability of the medicines at the time of data collection.

The use of an international reference price for standardized international comparison is explained under "Results". In the survey we used median supplier prices (or buyer prices where supplier prices were not available) reported in Management Sciences for Health *International Drug Price Indicator Guide* for 2005. In the WHO/HAI Excel workbook that accompanies the manual, these reference prices were converted to Baht using the exchange rate (buying rate, Kasikorn Bank) on 2[nd]. October 2006, the first day of the survey as 37.78 baht per one US dollar. MSH prices were only available for 35 of the 43 medicines.

We also identified the components of a selection of medicine prices in order to make an estimate of the manufacturers' prices.

Finally, in order to find out what prices of medicines meant to the ordinary citizen, the costs of some common treatments were compared with the daily wage of the lowest paid unskilled government worker.

Selection of medicine outlets

In order to obtain the data, the sampling method described in the WHO/HAI manual for selecting a representative number of public health facilities and private pharmacies was employed. The samples in each province were: 1 central or provincial hospital, 4 community hospitals (not more than 3-hour driving distance from the central or provincial hospital), 5 private pharmacies (not more than 5 kilometers from the hospitals), and 1 Provincial Health Office. A total of 20 public sector health facilities (20 hospitals) and 21 private pharmacies were

[11] WHO/HAI no longer recommend surveying the most sold generic equivalent product.

surveyed. This sample would ensure that a sound statistical analysis could be performed if the selected medicines were widely available. The information from the Provincial Health Offices was used to check some of the data from community hospitals.

The sampling area for the survey is in Annex 2.
Figure 1 shows the sampling scheme for each province.

Figure 1 Sampling scheme for each province

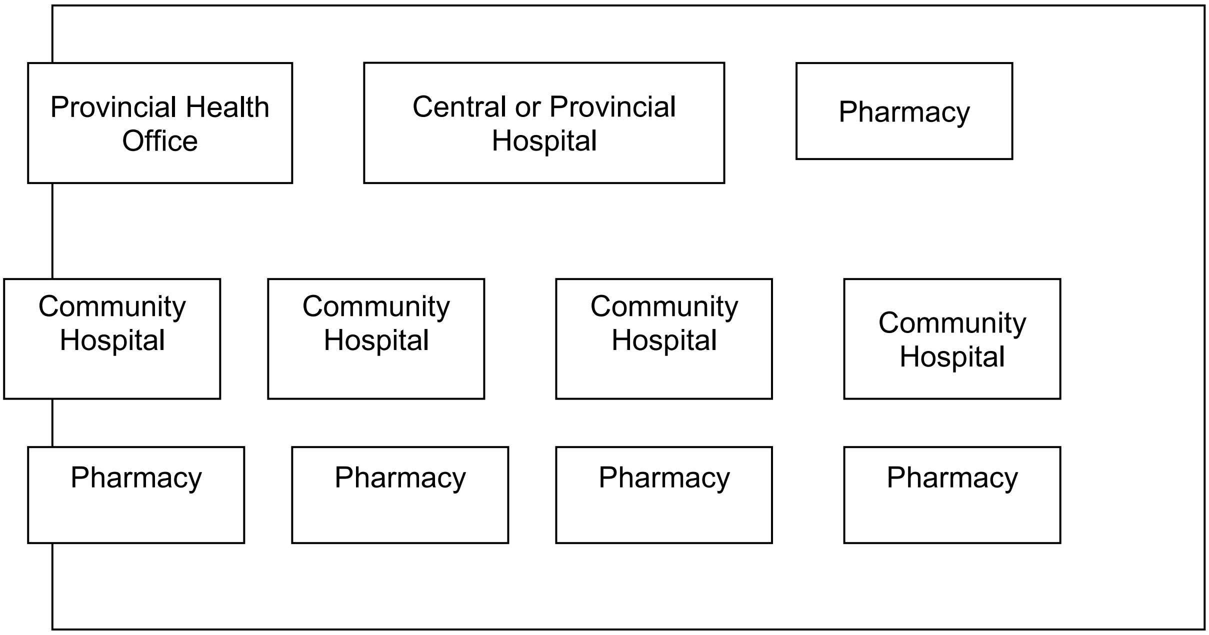
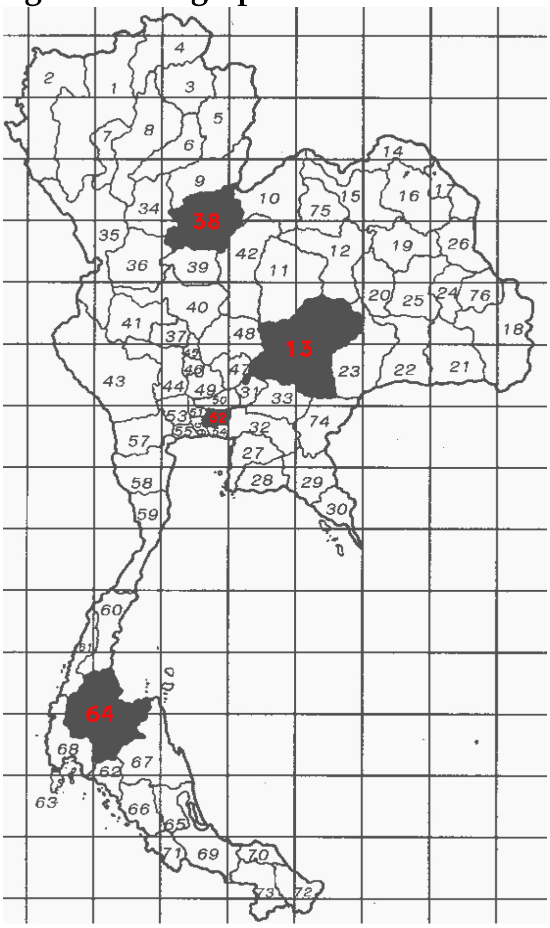


Figure 2. Geographic location of the four survey areas sampled in the survey



13 =Nakornrachaseema
38 = Phitsanulok
52 = Bangkok
64 = Suratthani

The methodology described in the manual would allow for more sectors to be included, such as the private not-for-profit (NGO) sector. But this sector was not included because it was small and fragmented in Thailand.

Data collection

The data on public procurement prices (tender prices) were collected at the public health facilities and the Provincial Health Offices. At the facilities we also checked the availability of the medicines and the prices that patients had to pay. Prices and availability in private pharmacies were obtained by visiting the selected pharmacies. Price components were identified by interviewing relevant bodies.

A standardized data collection form was used and data collectors were trained in a two-day workshop to ensure the reliability and reproducibility of the survey. A small pilot study was also undertaken.

The survey team in each province consisted of a pharmacist from the Provincial Health Offices, a pharmacist from the hospital and an assistant. Each team (one per district) had one supervisor who was the pharmacist from the Provincial Health Office. Area supervisors checked all forms at the end of each day of data collection. Data collection was completed in six weeks by December 2006.

Steps to survey

The survey of medicine prices involved the following steps.

1. Survey planning and preparation.
2. Gathering baseline information on the national pharmaceutical sector.
3. Identifying sectors for price comparisons.
4. Selecting geographical areas, health facilities, pharmacies and other medicine outlets in the chosen sectors for sampling.
5. Finalizing the selection of medicines for inclusion in the survey.
6. Training of data collectors and data entry personnel.
7. Collecting data on the prices and availability of medicines in the chosen health facilities and pharmacies.
8. Identifying the components of medicine prices.
9. Assessing affordability.
10. Data entry and processing.
11. Data analysis and interpretation.
12. Making international price comparisons.
13. Reporting the survey findings and advocacy.

The data collection form as described in the manual was employed – see Annex 3. This form was translated into the Thai language, editing the trade name (as some were different from the WHO/HAI manual.

In the workbook, a wholesale selling price column was added (which might represent the procurement price of the retail drug stores) so as to check the procurement price data obtained from the retail pharmacies.

Survey planning and preparation

Careful planning and preparation were essential before data collection commences, including:

- Selecting survey personnel: the survey manager, area supervisors, data collectors, data entry personnel and data analyst and the appointment of an Advisory Group

- Securing the technical and financial resources required
- Selecting sectors and geographical areas for inclusion in the survey
- Sampling health facilities, retail pharmacies and other medicine outlets
- Preparing a survey schedule
- Seeking endorsement for the survey.

Data Entry

Price data were 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.

Data analysis

All data obtained were analyzed automatically by the Excel workbook. It was found that if the reference price (MSH) was not recorded, the median price ratio (MPR) was not calculated. This was the case for 8 of the surveyed medicines that did not have a MSH reference price. However, availability is recorded for all 43 medicines surveyed.

In Thailand there is no central procurement office, whether at the national or provincial level. Therefore the number of procurement prices surveyed exceeded the number of columns on the data entry page. This was solved by unprotecting the programmed workbook and adding more columns.

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

For the price analysis, whether patient price or procurement price, medicines had to be found in at least 4 facilities/pharmacies for inclusion in the analysis. Medicine prices found during the survey were not expressed as currency units, but rather as ratios relative to a standard set of international reference prices:

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

The ratio was thus an expression of how much greater or less the local medicine price was to the international reference price e.g. an MPR of 2 would mean that the local medicine price is twice that of the international reference price. Median price ratios facilitate cross-country comparisons of medicine price data. Annex 4 contains sample of price data analysis.

The reference prices used were the 2005 Management Sciences for Health (MSH) reference prices, taken from the *International Drug Price Indicator Guide*. These reference prices were the medians of recent procurement or tender prices offered by for-profit and not-for-profit suppliers to international not-for-profit agencies for generic products. These agencies typically sell in bulk quantity to governments or large NGOs, and are therefore relatively low and represent efficient bulk procurement without the costs of shipping or insurance. There were no hard and fast rules in the interpretation of MPRs, however, local prices were generally considered acceptable when:

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

Results are presented for individual medicines, as well as for the overall 'basket' of medicines surveyed.

As averages can be skewed by outlying values, median values have been used in the 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 25th and 75th percentiles, is the interquartile range.

Finally, the affordability of treating several 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 (Baht/day 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) is generally considered affordable.

CHAPTER 3

RESULTS

The following analyses are presented.
1. Availability of medicines in the public and private sector outlets on the day of data collection
2. Public sector prices: procurement prices, patient prices, comparison of public sector patient prices with procurement prices
3. Private sector prices: procurement prices, patient prices, comparison of private sector patient prices with procurement prices
4. Comparison of prices in the public and private sectors: procurement prices, patient prices
5. Affordability of standard treatment regimens
6. Price components
7. International comparisons

Availability is based on all 43 medicines surveyed, whereas the price analysis is based on the 35 medicines, found in at least 4 outlets, that had reference prices.

1. Availability of medicines in the public and private sector outlets

Table 1.1 Median % availability, 43 medicines, public and private sector

Sector	Type	Median Availability
Public	Innovator Brand	10 %
	Lowest price generic	75 %
Private	Innovator Brand	28.6 %
	Lowest price generic	28.6 %

The median availability of innovator brand drugs was only 10% in the public sector, because most of the outlets stocked generic drugs rather than innovator branded drugs. The median availability of the generic equivalent drugs was 75% (Table 1.1) In the private sector, the availability of innovator brand drugs and lowest price generics was 28.6%.

Table 1.2 Availability of individual medicines in the public sector (generics unless otherwise stated)

Availability	Medicine
0%	
1-24%	artesunate, atorvastatin (IB), beclometasone inhaler, losartan (IB), mupirocin (IB)
25-49%	amoxicillin+clavulanic acid, azithromycin, captopril,

	ciprofloxacin, clopidrogel (IB), erythropoietin alpha inj, indinavir (IB), levodopa+benserazide, nifedipine retard
50-79%	budesonide aqueous nasal spray (IB), cetirizine, co-trimoxazole susp, hydrochlorothiazide, neviripine, phenytoin (IB), quinine sulfate, zidovudine
80%+	aciclovir, amitriptyline, amlodipine, amoxicillin, atenolol, carbamazepine, ceftriaxone inj, diazepam, diclofenac, enalapril, fluconazole, fluoxetine, fluphenazine inj, glibenclamide, lamivudine, metformin, omeprazole, ranitidine, rifampicin, salbutamol inhaler (IB), simvastatin

Table 1.2 lists the availability of individual medicines in the public sector outlets surveyed. Of note was the poor availability of beclometasone inhaler (15% innovator brand and 10% generic).

Medicines used to treat HIV/AIDS had poor availability in the public sector (except lamivudine) and were not found in any of the private pharmacies surveyed (see Table 1.3). Beclometasone inhaler had poor availability in the private sector, as did a number of other medicines important used to treat acute and chronic diseases.

Table 1.3 Availability of individual medicines in the private sector (generics unless otherwise stated)

Availability	Medicine
0%	artesunate, erythropoietin alpha inj, fluphenazine inj, indinavir, lamivudine, neviripine, zidovudine
1-24%	beclometasone inhaler (IB), captopril (IB), diazepam, quinine sulfate, rifampicin
25-49%	amoxicillin+clavulanic acid (IB), ceftriaxone inj, co-trimoxazole susp, levodopa+benserazide (IB)
50-79%	carbamazepine (IB), clopidrogel (IB), fluconazole, fluoxetine, hydrochlorothiazide, losartan (IB), mupirocin (IB), nifedipine retard, phenytoin (IB)
80%+	aciclovir, amitriptyline, amlodipine, amoxicillin, atenolol, atorvastatin (IB), azithromycin (IB) budesonide aqueous nasal spray (IB), cetirizine, ciprofloxacin, diclofenac, enalapril, glibenclamide, metformin, omeprazole, ranitidine, salbutamol inhaler (IB), simvastatin

2. Public sector prices

2.1 Public sector procurement prices

Table 2 Summary of procurement prices (median MPRs), public sector, 35 medicines

	Median MPR	25th Percentile	75th percentile
Innovator brand (n = 8)	3.3	1.65	7.68
Lowest price generic equivalents (n = 31)	1.46	0.80	2.26

Of the 35 medicines with an international reference price, price ratios were calculated for 8 innovator brands and 31 lowest price generics (when the products were found in 4 or more outlets). As shown in Table 2, overall the public sector procured generics at 1.46 times their international reference prices, and innovator brands at 3.3 times their international reference prices. The 25th and 75th percentiles for innovator brands were 1.65 and 7.68 times their international reference prices respectively. The 25th and 75th percentiles for lowest price generic equivalents were 0.80 and 2.26 times their international reference prices respectively.

Annex 5 lists public sector procurement prices (MPRs) for each medicine, innovator brand and lowest priced generic, and the 25th and 75th percentile values.

Some innovator brands were being procured at very high prices, such as captopril (MPR 12.10), phenytoin (MPR 11.08), azithromycin (MPR 6.54) and carbamazepine (MPR 4.67). Some generic products were also being procured at high prices, such as the azithromycin (MPR 3.07), captopril (MPR 2.88), and nifedipine retard (MPR 2.6).

For five medicines, both innovator brands and generic equivalents were being procured (captopril, phenytoin, carbamazepine, azithromycin and erythropoietin). Across these five medicines, the innovator products were nearly 3 times the price of the lowest priced generics.

2.2 Public sector patient prices

Table 3 Summary of patient prices (median MPRs), public sector, 35 medicines

	Median MPR	25th percentile	75th percentile
Innovator brand (n = 8)	4.36	2.03	9.86
Lowest price generic equivalents (n = 31)	2.55	1.45	3.32

As shown in Table 3, of the 35 medicines with reference prices, 8 innovator brands and 31 lowest price generic were found in at least 4 of the public sector facilities surveyed. Overall, lowest priced generics were 2.55 times the international reference prices, and innovator brands were 4.36 times the international reference prices. The 25th and 75th percentiles of innovator brand MPRs were 2.03 and 9.86 times their international reference prices. The 25th and 75th percentiles of lowest price generic equivalent MPRs were 1.45 and 3.32 times their international reference prices

Annex 6 lists public sector patient prices (MPRs), and the 25th and 75th percentile MPRs, for each medicine (innovator brand and lowest price generic equivalent).

Some innovator brand public sector patient prices were very high priced compared to the international reference prices, such as phenytoin (MPR 15.82), captopril (MPR 15.63), azithromycin (MPR 7.94) and carbamazepine (MPR 6.11). Lowest priced generics were sold to patients at 0.49 to 6.79 times their international reference prices. High priced generics included glibenclamide (MPR 6.79), phenytoin (MPR 5.75), amitriptyline (MPR 4.05) and captopril (MPR 4.36).

Across the five medicines found as both innovator brands and generic equivalents, the innovator brands were 2.2 times the price of the lowest priced generics.

2.3 Comparison of public sector patient prices with public sector procurement prices

Table 4. Median MPRs for medicines found in the public sector; procurement prices and patient prices

Type and number of	Median MPR	Median MPR	Difference (%)

medicines	Public **Procurement**	Public **Patient Prices**	Public sector patient prices to procurement prices
Innovator brand (n = 8)	3.3	4.36	32%
Lowest price generic equivalent (n = 31)	1.46	2.55	74.7%

Table 4 compares the price of medicines both procured and then sold to patients in the public sector. For 8 innovator brands, patients were paying 32% more than the government procurement price. Across 31 generics, patients were paying about 75% more than the government procurement price.

Annex 7 lists the percentage mark-up between the public sector procurement price and public sector patient price for individual medicines (innovator brands and lowest price generic equivalents). For innovator brands, the mark-ups ranged from 17% to 43%, and for lowest price generics the range was 0% - 325%. The mark-up was 0% for rifampicin.

3. Private sector prices

3.1 Private sector procurement prices

Table 5 Summary of procurement prices (median MPRs), private sector, 35 medicines

	Median MPR	25th Percentile	75th percentile
Innovator brand (n = 17)	9.67	4.36	18.32
Lowest price generic equivalents (n = 22)	1.48	0.94	1.91

As shown in Table 5, in the private sector lowest priced generic equivalents were procured at 1.48 times their international reference prices, and innovator brands at 9.67 times their international reference prices. The 25th and 75th percentiles for innovator brands were 4.36 and 18.32 times their international reference prices respectively. For the lowest priced generics, they were 0.94 and 1.91 times the international reference prices.

For the 15 medicines where both the innovator brand and generic equivalent were procured, innovator brands were about 8.5 times the price of the lowest priced generics.

ANNEX 8 lists procurement price ratios in the private sector for each medicine.

3.2 Private sector patient prices

Table 6 Summary of patient prices (median MPRs), private sector, 35 medicines

	Median MPR	25th Percentile	75th Percentile
Innovator brand (n = 17)	11.60	5.37	23.90
Lowest price generic equivalents (n = 22)	3.31	2.34	5.46

Overall, lowest price generic equivalents were sold to patients at 3.31 times their international reference prices, and innovator brands at 11.6 times their international reference prices. The 25th and 75th percentiles for innovator brands were 5.37 and 23.9 times their international reference prices respectively. The 25th and 75th percentile of the lowest price generic equivalent were 2.34 and 5.46 times their international reference prices respectively.

Across the 15 medicines found as both innovator brand and generic equivalent in the private sector, the innovator brands were about 3.9 times the price of the lowest priced generics.

Annex 9 lists the patient prices for 35 medicines in the private sector. The median price ratio, 25th percentile price, and 75th percentile price of each innovator brand and lowest price generic equivalent are presented. For the innovator brands, the MPRs ranged from 1.48 – 72.64 times their international reference prices, and lowest priced generics ranged from 1.15 – 7.35. Thus innovator brands showed greater variation across the private pharmacies surveyed.

Very high priced innovator brands included ciprofloxacin (MPR 72.64), diclofenac (MPR 30.54) aciclovir (MPR 29.71), atenolol (MPR 27.07), ranitidine (MPR 23.9) and glienclamide (MPR 20.36). High priced generics included hydrochlorothiazide (MPR 7.35), glibenclamide (MPR 6.79), nifedipine retard (MPR 6.16) and atenolol (MPR 6.02).

3.3 Comparison of private sector patient prices with private sector procurement prices

Table 7 Median MPRs for medicines found in the private sector; procurement prices and patient prices

Type and number of medicines	Median MPR Private	Median MPR Private	Difference (%) Private sector

	Procurement	Patient Prices	patient prices to procurement
Innovator brand (n=17)	9.67	11.60	19.96%
Lowest price generic equivalent (n = 22)	1.48	3.31	123.6%

Table 7 compares the price of medicines both procured and then sold to patients in the private sector. Across the 17 innovator brands, patients were charged about 20% more than the procurement price. Across the 22 lowest priced generics, the mark-up was about 124%.

Annex 10 lists the percentage mark-up between the private sector procurement price and private sector patient price for individual medicines (innovator brands and lowest price generic equivalents). For innovator brands, the mark-ups ranged from 8-47%, and for the lowest priced generics it ranged from 17-735%.

4. Comparison of prices in the public and private sectors

Table 8 Summary of procurement prices (median MPRs) for medicines found in both the public and private sectors

Type and number of medicines in both sectors	Median MPR **Public sector** procurement prices	Median MPR **Private sector** procurement prices	Difference (%) **Private to Public** procurement prices
Innovator brand (n = 5)	4.67	7.79	66.9%
Lowest price generic (n = 22)	1.15	1.48	28.6%

Table 8 compares procurement prices in the public and private sectors. As shown, overall the private pharmacies were buying innovator brand medicines at a price 67% higher than public sector facilities were buying them. Overall, lowest priced generics were being purchased by private pharmacies at 29% more than public sector facilities were purchasing them.

Annex 11 compares procurement prices between the public and private sector for individual medicines. For 9 medicines (lowest priced generics), the private sector was procuring at a lower price than the public sector: amitriptyline (-20%), amoxicillin (-5%), carbamazepine (-33%), co-trimoxazole susp (-27%), glibenclamide (-44%), hydrochlorothiazide (-53%), metformin (-9%), phenytoin (-4%) and rifampicin (-17%).

Table 9 Summary of patient prices (median MPRs) for medicines found in both the public and private sectors

Type and number of medicines in both sectors	Median MPR **Public sector** patient prices	Median MPR **Private sector** patient prices	Difference (%) **Private to Public** patient prices
Innovator brand (n = 5)	6.11	8.76	43.4%
Lowest price generic (n = 22)	2.42	3.31	36.6%

Results showed that overall, patient prices in the private sector were 43% and 37% more than patient prices in the public sector for innovator brands and lowest generic equivalents, respectively.

Annex 12 contains the comparison of prices to patients between the public and private sector. Most patient prices in the private sector were higher priced than in the public sector except glibenclamide LPG and phenytoin LPG (same price in both sectors), and metformin LPG was 33% cheaper in private pharmacies than in pubic sector outlets.

Comparing mark-ups in the public sector with those in the private sector (procurement to patient price) for individual medicines found in both sectors showed that the median mark-up for innovator brands (5 medicines) were similar i.e. 31% in the public sector and 22% in the private sector. The median mark-up for lowest priced generics (22 medicines) were also similar; 80% in the public sector and 96% in the private sector.

5. Affordability of standard treatment regimens

The affordability of treatment for 24 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 chronic diseases, the affordability of a 30-day supply of medicines was determined; for acute conditions it was a course of therapy (generally 7 days).

The list of 17 common conditions :

1. Adult respiratory infection
2. Diabetes
3. Hypertension
4. Gonorrhea
5. Anticonvulsants
6. Antiviral
7. Arthritis
8. Antimalarials
9. Paedriatic resp. infec.
10. Antidepressant
11. Asthma
12. Anxiolytic
13. Candidaemia
14. Schizophrenia
15. Anti HIV
16. Peptic Ulcer

The monthly salary of the lowest paid government worker was 5,230 Baht (salary 4,230 Baht plus special paid 1,000 Bhat) or 211.5 Baht per day. Table 10 illustrates the affordability of treatment in the public sector and the private sector for acute and chronic conditions.

As shown in Table 10, for a course of innovator brand amoxicillin caps to treat adult respiratory infection, the government worker would need to pay the equivalent of 0.6 days' wages to purchase a course of innovator brand therapy from private pharmacies. But for a course of the lowest price generic amoxicillin 0.2 days’ wages or less would be needed in either the private or public sector.

For a course of innovator brand azithromycin to treat adult respiratory infection, this patient would need to pay the equivalent of 4.8 days' and 5.3 days’ wages to purchase a course of therapy from the public and the private-for-profit sector health facilities respectively. But for a course of the lowest price generic azithromycin at the public and private-for-profit sector, the patient needed to pay 2.2 and 3.3 days’ wages to purchase a course of therapy.

It is important to bear in mind that these costs refer only to the medicine component of the total treatment costs. Consultation fees and diagnostic tests are additional, making the total cost to the patient is considerably higher.

For a one month course of glibenclamide to treat diabetes, a patient would need to pay 0.9 days' wages in the private sector for the innovator brand; and 0.3 days' wages if the lowest priced generic was purchased (from both public and private health sectors).

Medicines to treat HIV/AIDS were not affordable – ranging from about 4 to 24 days wages even when purchased in the public sector.

Table 10 Affordability of standard treatments

Medicine & Treatment	Product Type	Public sector: Median Treatment Price (Baht)	Public sector: Days' Wages	Private sector: Median Treatment Price (Baht)	Private sector: Days' Wages
1. Adult respiratory infection					
Amoxicillin	IB			133.88	0.6
250 mg*3 for 7 days	LPG	31.50	0.1	42.00	0.2
Azithromycin	IB	1015.00	4.8	1120.00	5.3
250 mg*2 for 7 days	LPG	455.00	2.2	700.00	3.3
Ceftriaxone injection	IB				
1 g daily for 7 days	LPG	213.85	1	420.00	2
2. Diabetes					
Glibenclamide	IB			180.00	0.9
5 mg*2 for 30 days	LPG	60.00	0.3	60.00	0.3
Metformin	IB			156.00	0.7
500 mg*2 for 30 days	LPG	90.00	0.4	60.00	0.3
3. Hypertension					
Amlodipine	IB			750.00	3.5
5 mg daily for 30 days	LPG	82.50	0.4	195.00	0.9
Atenolol	IB			270.00	1.3
50 mg daily for 30 days	LPG	30.00	0.1	60.00	0.3
Hydrochlorothiazide	IB			57.00	0.3
50 mg daily for 30 days	LPG	15.00	0.1	30.00	0.1
Nifedipine Retard	IB				
20 mg*2 for 30 days	LPG	171.00	0.8	300.00	1.3
Captopril	IB	645.00	3		
25 mg*2 for 30 days	LPG	180.00	0.9		
Enalapril	IB			510.00	2.4
20 mg daily for 30 days	LPG	45.00	0.2	75.00	0.4
Losartan	IB	825.00	3.9	1020.05	4.8
50 mg daily for 30 days	LPG				
4. Gonorrhea					
Ciprofloxacin	IB			73.00	0.3
500 mg dose	LPG	3.50	<0.1	5.25	<0.1
Azithromycin	IB	290.00	1.4	320.00	1.5

Medicine & Treatment	Product Type	Public sector Median Treatment Price (Baht)	Public sector Days' Wages	Private sector Median Treatment Price (Baht)	Private sector Days' Wages
250 mg*4	LPG	130.00	0.6	200.00	0.9
Rifampicin	IB				
300 mg*3	LPG	10.80	0.1	15.00	0.1
5. Anticonvulsants					
Carbamazepine	IB	270.00	1.3	420.00	2
200 mg*2 for 30 days	LPG	120.00	0.6	135.00	0.6
Phenytoin	IB	247.50	1.2	225.00	1.1
100 mg*3 for 30 days	LPG	90.00	0.4	90.00	0.4
6. Antiviral					
Aciclovir	IB			1375.00	6.5
200 mg*5 for 7 days	LPG	96.88	0.5	150.00	0.7
7. Arthritis					
Diclofenac	IB			360.00	1.7
25 mg*2 for 30 days	LPG	30.00	0.1	60.00	0.3
8. Antimalarials					
Artesunate	IB				
50 mg*3*4 for 5 days	LPG	1065.00	5		
Quinine sulfate	IB				
300 mg*2*3 for 7 days	LPG	94.50	0.4		
9. Paedriatic resp. infec.					
Co-trimoxazole	IB			52.50	0.2
suspension (8+40 mg/ml) 70 ml for 7 days	LPG	14.00	0.1	29.17	0.1
10. Antidepressant					
Amitriptyline	IB				
25 mg*3 for 30 days	LPG	67.50	0.3	90.00	0.4
Fluoxetine	IB				
20 mg daily for 30 days	LPG	45.00	0.2	82.50	0.4
11. Asthma					
Salbutamol inhaler (0.1	IB	160.00	0.8	180.00	0.9
mg/dose) 1 inhaler	LPG				
12. Anxiolytic					
Diazepam	IB				
5 mg daily for 30 days	LPG	15.00	0.1		
13. Candidaemia					
Fluconazole	IB				

Medicine & Treatment	Product Type	Public sector Median Treatment Price (Baht)	Public sector Days' Wages	Private sector Median Treatment Price (Baht)	Private sector Days' Wages
200 mg*stat then daily for 7 days	LPG	56.52	0.3	120.00	0.6
14. Schizophrenia					
Fluphenazine injection	IB				
25 mg/ml a month	LPG	30.00	0.1		
15. Anti-HIV					
Indinavir	IB	4950.00	23.5		
400 mg*2*3 for 30 days	LPG				
Lamivudine	IB				
150 mg*2 for 30 days	LPG	780.00	3.7		
Nevirapine	IB				
200 mg*2 for 30 days	LPG	1140.00	5.4		
Zidovudine	IB				
100 mg*5 for 30 days	LPG	1162.50	5.5		
16. Peptic Ulcer					
Ranitidine	IB			1170.00	5.5
150 mg*2 for 30 days	LPG	60.00	0.3	99.00	0.5
Omeprazole	IB				
20 mg daily for 30 days	LPG	48.75	0.2	150.00	0.7

Diseases rarely affect one person in a household. Table 11 illustrates the affordability of 4 treatments when the lowest priced medicines are purchased in the private sector. The lowest paid government worker would have to work 1.5 days to be able to afford these. Those on a lower income would have to work considerably more days to pay for the treatments.

Table 11 Affordability of treatments for a family with multiple conditions, private sector

Condition	Treatment	Type	Median Treatment Price	Days' Wages
Hypertension	Hydrochlorothiazide 50 mg daily for 30 days	LPG	30 baht	0.1
Diabetes	Glibenclamide 5 mg*2 for 30 days	LPG	60 baht	0.3
Asthma	Salbutamol inhaler 0.1 mg/dose	IB	180 baht	0.9

Resp. Infection	Amoxicillin 250 mg*3 for 7 days	LPG	42 baht	0.2
		Total	307 baht	1.5

6. Price components

The price components for medicines in the public and private sectors were measured, both imported and locally produced products, to study differences in mark-ups and to assess the impact of tariffs, taxes and mark-ups on the price the patient pays. In Thailand, the import duty for drugs is 10% but for some drug categories (HIV drugs) the import duty is waived.

Table 10 presents the price components of 3 medicines in the public and private sectors. For each medicine, data is given for 3 products: one imported product (innovator brand) and 2 locally produced generic equivalents (generics). Their trade names were replaced by alphabets A-I.

Drug 1 = Atenolol tab. 50 mg
Core list National Essential Drug group A
Antihypertension (Beta-Blocker)
Drug 2 = Diclofenac tab. 25 mg
Core list National Essential Drug group B
Anti-Inflammatory Analgesics (NSAIDS)
Drug 3 = Carbamazepine tab. 200 mg
Core list National Essential Drug group B
Anticonvulsants.

The Manufacturer's selling prices and imported price information were obtained from the Department of Drug Control, Thai FDA; the remaining data was collected from facilities as part of the survey.

Result are shown both as percentages for each component and cumulatively (total mark-up). The range of total mark-ups was high. A remark should be placed here on the reliability of prices reported to the Department of Drug Control, Thai FDA by the manufacturers and importers.

Drug 1:
"**A** drug" was imported at 0.65 baht per tablet, sold to public hospitals at 6.29 baht (+867.69%) and public hospitals sold to patients at 8.88 baht (+41.18%). This price includes tax. The total cumulative mark-up in the public sector was 1266% on the import price (if the prices reported to the Thai FDA are correct).

The product was sold to private wholesalers at 6.07 baht (+833.85%), the wholesalers sold to private pharmacies at 6.11 (+0.66%), and the pharmacies sold to patients at 8.57 (+40.26%). The total cumulative mark-up in the private sector was 1218%

"**B , C** drugs" were generic drugs. The manufacturer's selling prices were 0.23 and 0.15 baht. They were procured by public hospitals at 0.34 and 0.26 baht (+42.83% and 73.33%) and public hospitals sold each to patients at 1 baht (+194.12% and 284.62%) respectively. The total cumulative mark-ups in the public sector were 335% and 567%.
The products were also sold to private wholesalers at 0.61 and 1 baht (+165.22% and +566.67% mark-up). The wholesalers sold to pharmacies at 0.80 and 1.25 baht (+31.15% and 25%) and the pharmacies sold each to patients at 1.50 baht (+87.50% and 20%) respectively. The total cumulative mark-ups in the private sector were 552% and 900%.

Drug 2:
"**D** drug" was the innovator brand and imported at 2.74 baht, sold to public hospitals at 4.49 (+63.87%) and public hospitals sold to patients at 5.75 baht (+28.06%). The total cumulative mark-up in the public sector was 109%.
The product was also sold to private wholesalers at 4.5 baht (+64.23%), the wholesalers sold to pharmacies at 4.5 baht (+0.0%), and the pharmacies sold to patients at 6 baht (+33.33%). The total cumulative mark-up in the private sector was 119%.
"**E, F** drugs" were generics whose manufacturer's selling prices were 0.24 and 0.20 baht. The products were sold to public hospitals at the same price (no mark-up) and public hospitals sold to patients at 1and 0.50 baht (+316.67% and 150.0%) respectively. The total cumulative mark-ups in the public sector were 317% and 150%.
The products were sold to private wholesalers at 0.95 and 0.33 baht (+295.83% and +65%), the wholesalers sold to pharmacies at 1.10 and 0.40 (+15.79% and 21.21%), and the pharmacies sold to patients at 1.50 and 1 baht (+36.36% and 150.00%) respectively. The total cumulative mark-ups in the private sector were 525% and 400%.

Drug 3:
"**G** drug" was the innovator brand. It was imported at a price of 2.69, sold to public hospitals at 3.44 (+27.88%), and then public hospitals sold to patients at 4.50 (+30.81%). The total cumulative mark-up in the public sector was 67%.

The product was sold to private wholesalers at 5.66 (+110.41%), the wholesalers sold to pharmacies at 5.75 (+1.59%), and the pharmacies sold to patients at 6.50 (+13.04%). The total cumulative mark-up in the private sector was 142%.

“**H, I** drugs” were generics; the manufacturer’s selling prices were 2.92 and 0.07 baht. They were sold to public hospitals at 2.92 and 1.6 baht (+0.0% and 2185.71%) and public hospitals sold to patients at 3.50 and 2.08 baht (+19.86% and 30%) respectively. The total cumulative mark-ups in the public sector were 207% and 2871%.
Only “Drug H” had data available for the private sector. It was sold to private wholesalers at 3 baht (+2.74%), the wholesalers sold to pharmacies at 3.20 (+6.67%) and the pharmacies sold to patients at 4 baht (+25%). The total cumulative mark-up in the private sector was 37%.

Table 12 Prices (Baht) and mark-ups for one imported and two locally produced products, public and private sectors

	Drug 1 Atenolol 50mg tab			**Drug 2 Diclofenac 25mg tab**			**Drug 3 Carbamazepine 200mg tab**		
Med. Name	A	B	C	D	E	F	G	H	I
Med.Type	Innovator	Generic	Generic	Original	Generic	Generic	Original	Generic	Generic
Manufacturer's selling price (set by manufacturer)		0.23	0.15		0.24	0.20		2.92	0.07
Imported price	0.65			2.74			2.69		
Public sector									
Difference: manufacturer's selling price to procurement price	867.69%	42.83%	73.33%	63.87%	0%	0%	27.88%	0%	2185.71%
The procurement price of hospital	6.29	0.34	0.26	4.49	0.24	0.20	3.44	2.92	1.6
The mark-up of hospital	41.18%	194.12%	284.62%	28.06%	316.67%	150%	30.81%	19.86%	30%
The retail price charged by the hospital	8.88	1	1	5.75	1	0.5	4.5	3.5	2.08
Total mark-up (%)	1266.15%	334.78%	566.67%	109.85%	316.67%	150%	67.29%	19.86%	2871.43%
Private sector									
Difference: manufacturer's selling price to procurement price	833.85%	165.22%	566.67%	64.23%	295.83%	65%	110.41%	2.74%	-
The procurement price wholesalers	6.07	0.61	1	4.5	0.95	0.33	5.66	3	-
The mark-up of wholesalers to pharmacies	0.66%	31.15%	25%	0%	15.79%	21.21%	1.59%	6.67%	-
The procurement price of pharmacies	6.11	0.8	1.25	4.5	1.1	0.4	5.75	3.2	-
The mark-up of pharmacies (including tax)	40.26%	87.5%	20%	33.33%	36.36%	150%	13.04%	25%	-
The retail price charged by the pharmacy	8.57	1.5	1.5	6	1.5	1	6.5	4	-
Total mark-up (%)	1218.46%	552.17%	900%	118.98%	525.00%	400%	141.64%	36.99%	

Summary of the price component.

In the public sector, the mark-ups were:

Innovator brand medicines (imported)		***Generic medicines (locally produced)***	
Imported price		Manufacturer’s selling price	
↓	27.88% to 867.69%	↓	0% to 2185.71%
The procurement price of hospital		The procurement price of hospital	
↓	Hospital mark-up 28.06% to 41.18%	↓	Hospital mark-up 19.86% to 316.67%
The retail price to patient		The retail price to patient	

In the private sector, the mark-ups were:

Innovator brand medicines		***Generic medicines***	
Imported price		Manufacturer’s selling price	
↓	64.23% to 833.85%	↓	2.74% to 566.67%
The procurement price paid by wholesalers		The procurement price paid by wholesalers	
↓	Wholesale mark-up 0% to 1.59%	↓	Wholesale mark-up 6.67% to 31.15%
The procurement price of pharmacies		The procurement price of pharmacies	
↓	Pharmacy mark-up 13.04% to 40.26%	↓	Pharmacy mark-up 20% to 150%
The retail price to patient		The retail price to patient	

7. International Price Comparisons

Table 13 lists public sector procurement prices (MPRs) in Thailand and three other countries in Asia, plus a high income country (United Arab Emirates), for a selection of medicines used to treat chronic and acute conditions.

Procurement prices in Maharashtra, India were cheaper (sometimes considerably) than in Thailand. Across these few medicines, with the exception of generic atenolol, Thai government procurement prices were higher than those paid by the UAE government.

Table 13 Comparison of public sector procurement prices (MPRs) for selected medicines in 5 countries

	Thailand 2006	Indonesia 2004	Malaysia 2004	India Maharashtra 2005	UAE 2006
	IB LPG	IB LPG	IB LPG	IB LPG	IB LPG
Atenolol	- 0.95	- -	- -	- 0.41	7.74 1.86
Ranitidine	- 0.46	- 8.43	- 3.01	- 0.35	6.79 0.38
Glibenclamide	- 2.44	- 4.56	- 0.6	- 0.38	4.21 1.4
Salbutamol inhaler	1.94 -	- -	- 0.77	- -	1.78 1.3
Amoxil	- 1.89	- 1.74	- 1.23	- 1.34	1.38 0.98
Ciprofloxacin	- 2.48	- 6.34	- -	- 1.1	44.04 1.2

Key: IB – Innovator brand LPG – lowest priced generic
Note: MPRs were not adjusted for differing reference prices & inflation/deflation

Private sector patient prices in Maharashtra were often substantially cheaper than in Thailand across all 6 medicines (Table 14). Prices varied across the other countries eg. innovator brand amoxil was nearly twice as expensive in Thailand than the Philippines , but Thai people paid less than Indonesians. For the lowest priced generics of amoxicillin, Indonesians paid less than Thai people; whereas Malaysians, Filipinos and people in UAE paid more.

Table 14 Comparison of private sector patient prices (MPRs) for selected medicines in 6 countries

	Thailand 2006	Indonesia 2004	Malaysia 2004	Philipp-ines 2005	India 2005	UAE 2006
	IB LPG	IB LPG	IB LPG	IB LPG	IB LPG	IB LPG
Atenolol	27. 07 6.02	75.07 20.44	33.98 9.57	47.73 14.83	5.80 3.39	41.49 20.13
Ranitidine	23.09 2.02	25.89 3.43	21.03 8.41	26.33 9.54	0.49 0.49	46.78 11.98
Glibenclamide	20.36 6.79	79.45 5.74	35.12 6.38	44.56 22.28	3.77 4.31	56.24 27.6
Salbutamol inhaler	2.96 -	4.99 -	2.70 1.48	3.33 2.52	0.94 0.93	4.63 2.78
Amoxil	11.48 3.60	15.22 2.31	- 4.57	6.90 4.78	4.62 5.10	32.44 10.66
Ciprofloxacin	72.64 5.22	90.08 7.78	111.63 16.46	44.84 15.51	4.49 2.67	121.9 51.73

Key: IB – Innovator brand LPG – lowest priced generic

Note: MPRs were not adjusted for differing reference prices, inflation/deflation and purchasing power.

CHAPTER 4

DISCUSSION

In 2006, the Office of Food and Drug Committee in corporation with the Faculty of Pharmacy, Mahidol University conducted a nationwide study of medicine prices, availability, affordability and price components for a selection of medicines in THAILAND. The main goal of the study was to document and compare the prices of medicines in the public and private health sector, and to compare them with those in other countries.

This study was conducted based on the standardized methodology developed by the World Health Organization (WHO) and Health Action International (HAI) which allows for valid international comparisons. The WHO/HAI methodology is described in the manual "Medicine Prices: A new approach to measurement" (WHO/HAI, 2003) and is accessible on the HAI website:
(http://www.haiweb.org/medicineprices/manual/documents.html).

Key findings:

1. Availability of medicines in the public and private sector on the day of data collection

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

The available of innovator brand drugs was 10% in the public sector while the availability of the lowest priced generics was 75%, because most of the outlets preferred to stock lower priced generic drugs rather than more expensive innovator brands. One explanation is the government health budget given to public hospitals. Public hospitals have to allocate their budget efficiently by purchasing lower priced generic drugs.

The availability of innovator brand in the private sector (28.6%) was higher than in the public sector but generics were far less available (75% in the public sector and only 28.6% in the private sector).

It should be noted that in the public sector, the sampling hospitals included tertiary care and secondary care institutions which are permitted by the Ministry of Health to stock different medicines to community hospitals. Thus the distribution of drugs is not identical across the different levels of care. In the private sector, retail pharmacies were sampled. Pharmacies in Thailand rarely dispense prescription drugs because patients tend to have prescriptions dispensed at hospitals. Hence the availability of the survey drugs was low in the private sector.

2. Public sector prices

The public sector procured predominantly generic products. Based on the median MPR, the public sector procured generics at 1.46 times their international reference prices, and innovator brands at 3.3 times their international reference prices. Both exceeded the acceptable level of MPR ≤ 1 as suggested by WHO/HAI. It was interesting to note that for salbutamol inhaler, which has been off patient for many years, only the innovator brand version was procured and at a high price (MPR 1.94). Much cheaper generics are available on the international market. For a few medicines, both high priced innovator brands and cheaper generics are being procured including azithromycin, captopril and erythropoietin alpha injection. Procuring only generics would improve efficiency.

Public sector patient prices were high. The public sector sold generics at 2.55 times their international reference prices, and innovator brands at 4.36 times their international reference prices. Mark-ups were approximately 32% for innovator brands and 75% for generics. This differential provides an incentive for the selling of lower priced products which ultimately benefits the patient (as patient prices of innovator brands were over twice the price of lowest priced generics).

3. Private sector prices

Overall, private sector procurement prices were 9.67 times the international reference prices for innovator brands and 1.48 times for lowest priced generics. A paired analysis (only medicines procured both as innovators and generics) showed that innovators were over 8 times the price of lowest priced generics.

Patient prices in the private sector are not controlled by the government. Across the surveyed medicines, private sector patient prices were 11.6 and 3.31 times the international reference price for innovator brands and lowest priced generics, respectively. Thus innovator brands were very high priced; lowest priced generics were more reasonably priced. Both the innovator brand and lowest priced generics of some medicines were high priced in the private sector e.g. atenolol, ciprofloxacin, diclofenac, glibenclamide, hydrochlorothiazide and phenytoin. Interestingly, many of these medicines had high patient prices in the public sector as well.

Mark-ups on the generic products were considerably higher than on innovator brands. However, patients benefited as the retail price of innovator brands were about 4 times the price of the lowest priced generic equivalents.

4. Comparison of prices in the public and private sectors

The paired analysis (only medicines procured by both sectors) showed private sector procurement prices were 67% more than public sector procurement prices for innovator brands (but only 5 medicines are included in the analysis). Across 22 generics, the paired analysis showed that private pharmacies were paying about 29% more for lowest priced generics than public hospitals. This would be expected given the greater purchasing power of hospitals.

Final patient prices of innovator brands in the private sector were 43% more than in the public sector. For lowest generics, patients paid 37% more when buying them from private pharmacies.

5. Affordability of standard treatment regimens

Most treatments in the public sector required less than 1 day's wages if lowest priced generics were purchased. Purchasing innovator brands were less affordable e.g. a course of azithromycin required an additional 2.6 days work if the innovator brand is purchased rather than the lowest priced generic equivalent. In the private sector, some treatments with lowest priced generics required less than a day's wages (so were affordable). However, some treatments with innovator brands were not affordable e.g. a course of innovator brand aciclovir requires nearly a week's salary. Medicines to treat HIV/AIDS were unaffordable, requiring between 4 and 25 days wages to purchase a month's supply.

6. Price components

Price components of 3 medicines on the National Essential Drug List were assessed. Each composed of one imported product (innovator brand) and 2 generic equivalents. The price components for medicines in the public and private sectors were measured to study differences in mark-ups in different settings.

In the public sector, the mark-up for the imported product sold to the hospitals ranged from about 28 - 868%, the mark-up of the hospitals were from 28 - 42%. For generics the mark-up in each level were from 0 - 2186% and 20- 317%. Across these few medicines, hospitals tended to apply higher mark-ups to locally produced generics (rather than imported products). One case was interesting – the hospital applied a mark-up of 285% on a generic purchased for 0.26 baht so that the patient price would be identical (1 baht) to a generic equivalent that was procured for 0.34 baht and subject to a 194% mark-up. The result is that the lower procurement price is not passed on to patients.

In the private sector, mark-ups for imported products sold to wholesalers ranged from 64-834%, wholesalers to pharmacies were from 0-1.6%, and the mark-up pharmacies charge patients ranged from 13 - 40%. For generics the mark-up at each level were 3- 567%, 7-31%, and 20-150%. As in the public sector, higher mark-ups tended to be applied to generics compared to innovator brands.

The high variation at the first level (difference between the manufacturer's selling price/import price to the hospital/wholesaler procurement price may be due to the unreliability of prices reported to the Department of Drug Control, Thai FDA. Mark-ups vary greatly, which means that the prices can be set up by convenience.

Taxes are charged on medicines but it was not possible to identify the amount. A customs duty of 10% is applied on a number of categories of medicines.

7. International price comparison

Prices, whether public procurement or private sector patient prices, varied across countries. However, Thai prices were often considerably higher than those in India. In a number of cases the Thai government was also paying higher prices than the government of the UAE (whose GDP is substantially higher).

More in-depth analysis considering the size of the markets; capabilities of the national pharmaceutical manufacturing sector; the effect of taxes, duties and mark-ups and economic indicators are 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 and availability survey provide insights into the availability, price, affordability and price components of medicines in THAILAND. 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 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. A limitation of the international comparison is that the generic products surveyed are not identical (although the innovator brands).

CHAPTER 5

Conclusion and Recommendations

In conclusion, the results of this preliminary analysis shows the reality of medicine prices both in public and private sectors which might be problematic:

1. The private sector procurement prices of some innovator brands (such as Ciprobay^{TN} at MPR 67.08 while the lowest priced generics were MPR 2.86) were very high despite the availability of generic equivalent products.

   <u>Suggestion:</u> *Price regulation should be exercise to both innovators with and without generic production. The government should set up the maximum price allowed for each drug.*

2. Many innovator brands and generics were procured by the government at high prices. Overall, the 75th percentile price for innovator brands was 7.68 times the international reference price, and 2.26 times for the lowest priced generics. Therefore, 25% of the medicines were above even these high prices.

   <u>Suggestion</u>: *The 75th percentile price should be the maximum price paid by the government.*

3. The inconsistency of the mark-ups in the public and private sectors might reflect the problem on government pricing system and regulation. This might lead to the problem of reimbursement by the third party payers.

   <u>Suggestion</u>: *There should be a regulation to control the percentage mark-up of drugs. But the percentage mark-up of drugs in private and public sector can be different because of different administration costs.*

4. Government procurement prices of some generics were low. The 25th percentile medMPR was 0.85 and the lowest MPR was 0.38. Too low prices could result in problems of quality and improvement of Thai local manufacturers in the future.

   <u>Suggestion:</u> *Should it be the time to look at the price procured in relation to the quality? The appropriate drug pricing strategy should be employed to create benefits rendered to both buyers and manufacturers.*

5. The percent mark up of innovator brands in the public sector is higher than in the private sector (31% to 22%) showing that the public sector gains more money selling innovator brands than the private sector.

   <u>Suggestion</u>: *The government should pass on low procurement prices to patients to improve access to more affordable treatments.*

Taxes and duties should not be applied to essential medicines.

6. The percent mark up of generic drugs in the public and private sectors are higher than innovator brands. But the prices of innovator brands are more than 4 times of generic drugs thus make the profit much higher in term of money.

   Suggestion: The percentage mark up should be regulated but vary according to the drug cost (regressive margins). The margin on high cost drugs should be lower than low cost drugs as an incentive for the dispensing of lower priced products.

7. The affordability of treatments for common diseases with lowest priced generics is generally less than 1 day wage, but many innovator brands are not affordable.

   Suggestion: Promotion of generic drugs should be strengthen to doctors as well as patients.

8. The price component study reveals the different styles of prices reported to

   the Thai FDA and the unreliability of the data.

   Suggestion: Some verification in reporting system should be performed

   Also prices, availability and affordability should be regularly monitored in Thailand.

Recommendations

There should be further research regarding:

1. The simulation of the situation where prices are regulated.
2. The feasibility of different pricing strategies employed for Thai drug list.
3. The impact of different pricing strategies on Thai healthcare finance, and pharmaceutical market.
4. The impact of price regulation on all stakeholders: consumers, drug stores, hospitals, manufacturers, healthcare finance, FDA regulators, and pharmaceutical business.

At policy level, if the drug price regulation in Thailand is categorized as a problem, the government should address all stakeholders to participate in this matter, including decision in pricing policy and health care financing policy. Appropriate pricing strategies should be employed to different drug groups.

The price regulation system should be implemented at every level of drug supply chain: manufacturers to hospitals/drug stores and hospitals/drug stores to patients. Price regulations, such as maximum selling prices, or maximum wholesale/retail mark-ups, should be implemented and enforced. The distribution chain should be analysed for efficiency, probity, competitiveness, and steps should be taken to correct bottlenecks: e.g. by contracting to private and not-for-profit logistics and security organizations. The distribution chain should be monitored and reported on regularly

It is suggested that a mix of policies are needed 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.

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 Public Health and others in improving the drug pricing systems. Broad debate and dialogue are now needed to identify how best different players can contribute to the prospect of rational drug pricing in Thailand.

Annex 1 : List of medicines surveyed

Med. No.	Medicine Name	Medicine Strength	Dosage Form	Target Pack Size	WHO/HAI Core List
1	Aciclovir	200 mg	cap/tab	25	yes
2	Amitriptyline	25 mg	cap/tab	100	yes
3	Amlodipine	5 mg	tab	30	no
4	Amoxicillin	250 mg	cap/tab	21	yes
5	Amoxicillin + Potassium clavulanate dry syrup	200 + 28.5 mg	millilitre	75	no
6	Artesunate	50 mg	cap/tab	12	no
7	Atenolol	50 mg	cap/tab	60	yes
8	Atorvastatin	10 mg	tab	30	no
9	Azithromycin	250 mg	cap	6	no
10	Beclometasone inhaler	0.05 mg/dose	dose	200	yes
11	Bunesonide aqueous nasal spray	64 mcg/dose	dose	120	no
12	Captopril	25 mg	cap/tab	60	yes
13	Carbamazepine	200 mg	cap/tab	150	yes
14	Ceftriaxone injection	1 g/vial	gram	1	yes
15	Cetirizine	10 mg	tab	30	no
16	Ciprofloxacin	500 mg	cap/tab	1	yes
17	Clopidrogrel	75 mg	tab	28	no
18	Co-trimoxazole suspension	8+40 mg/ml	millilitre	70	yes
19	Diazepam	5 mg	cap/tab	100	yes
20	Diclofenac	25 mg	cap/tab	100	yes
21	Enalapril	20 mg	tab	1000	no
22	Erythropoietin alpha inj.	4000 iu/vial	vial	6	no
23	Fluconazole	200 mg	cap/tab	30	yes
24	Fluoxetine	20 mg	cap/tab	30	yes
25	Fluphenazine injection	25 mg/ml	millilitre	1	yes
26	Glibenclamide	5 mg	cap/tab	60	yes
27	Hydrochlorothiazide	50 mg	cap/tab	30	no
28	Indinavir	400 mg	cap/tab	180	yes
29	Lamivudine	150 mg	tab	60	no
30	Levodopa + Benserazide(HCL)	200 + 50 mg	cap/tab	100	no
31	Losartan	50 mg	cap/tab	30	yes
32	Metformin	500 mg	cap/tab	100	yes
33	Mupirocin ointment	2%	gram	15	no
34	Nevirapine	200 mg	cap/tab	60	yes
35	Nifedipine Retard	20 mg	tab	100	yes
36	Omeprazole	20 mg	cap/tab	30	yes
37	Phenytoin	100 mg	cap	100	yes
38	Quinine sulfate	300 mg	tab	1000	no
39	Ranitidine	150 mg	cap/tab	60	yes
40	Rifampicin	300 mg	cap	100	no
41	Salbutamol inhaler	0.1 mg/dose	dose	200	yes
42	Simvastatin	10 mg	tab	30	no
43	Zidovudine	100 mg	cap/tab	150	yes

Annex 2 : List of survey areas

Province	Hospital		Drug Store	
	District	Community	Wholesale/Retail	Retail
Bangkok	1. Rardchavithee 2. Wachira 3. Pramongkutklao 4. Chulalongkorn King Memorial 5. Bangkok health station			1. Harngkaiyarpesad 2. Wichaipesad 3. Chumchonpesad 4. Rouenyar 5. M.T. Drug
Nakonlartchaseema	1. Maharad	1. Darnkuntod 2. Seekil 3. Sungnern 4. Pimine	1. Siampharmacy	1. Mheebin 2. Tanakit 3. Aousateung 4. Sombunpesad
Pitsanulok	1. Puttacinnalard	1. Prayuppalardnakornthai 2. Wangtong 3. Phompilarm 4. Bangrakum	1. Pitsanulokklangyar	1. Naresurn's pharmacy faculty 2. Seetong 3. Sahapanpesad 4. Por.pesad 5. Por.klangyar
Sularttanee	1. Sularttanee	1. Donsuk 2. Punpin 3. Kanjanadit 4. Barnnasarn	1. Klangyarpesad	1. Tekantueng 2. Rotepesad 3. Hongyarchumchon 4. Pesadmoror

Annex 3 :
MEDICINE PRICE DATA COLLECTION FORM

Province: Date:

Type of health facility:

 District Hospital Community Hospital
 Other……….

 Wholesaler Retailer

Name of health facility/pharmacy:

Address of health facility/pharmacy:

Distance in km from nearest town (population >50 000):

Condition of procurement price:

 Have Discount………………………% Have Bonus…….
…………………………

 Other…………………………………… Don't have

Condition of price to patient:

 Have Discount………………………% Have Bonus…….
…………………………

 Other…………………………………… Don't have

Name of manager of the facility:

Name of person(s) who provided information on medicine prices and availability (if different):

Data collectors:

Verification

To be completed by the area supervisor at the end of the day

Signed:

Date:

Most sold generic equivalent : determined at facility *Lowest price generic equivalent* : determined at facility

A	B	C	D	E	F	G	H	I	J
Generic name, dosage form, strength	Brand name(s)	Manufacturer	Available tick ✓ for yes	Pack size recom-mended	Pack size found	Procurement Price of pack found	Price from Wholesaler to Retailer	Unit price to patient (4 digits)	Comments
Aciclovir tab 200 mg	Zovirax	GSK		25				/tab	
Most sold generic equivalent				25					
Lowest price generic equivalent				25					
Amitriptyline tab 25 mg	Tryptanol	MSD		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Amlodipine tab 5 mg	Norvasc	Pfizer		10				/tab	
Most sold generic equivalent				10					
Lowest price generic equivalent				10					
Amoxicillin caps/tab 250 mg	Amoxil	SKB (GSK)		21				/tab	
Most sold generic equivalent				21					
Lowest price generic equivalent				21					

Amoxicillin + Potrassium clavulanate dry syrup (200 + 28.5 mg)	Augmentin	GSK		70 ml				/ml	
Most sold generic equivalent				70 ml					
Lowest price generic equivalent				70 ml					
Artesunate tab 50 mg	Arsumax	Sanofi		20*				/tab	ไม่มีในไทย
Most sold generic equivalent				20*					
Lowest price generic equivalent				20*					
Atenolol tab 50 mg	Tenormin	AstraZeneca		60				/tab	
Most sold generic equivalent				60					
Lowest price generic equivalent				60					
Atorvastatin tab 10 mg	Lipitor	Pfizer		10				/tab	
Most sold generic equivalent				10					
Lowest price generic equivalent				10					
Azithromycin cap 250 mg	Zithromax	Pfizer		6				/tab	
Most sold generic equivalent				6					
Lowest price generic equivalent				6					

Beclometasone inhaler 50 mcg/ dose	Becotide	GSK		1 inhaler: 200 doses				/dose	
Most sold generic equivalent				1 inhaler: 200 doses					
Lowest price generic equivalent				1 inhaler: 200 doses					
Budesonide nasal spray 64 mcg/dose	Rhinocort aqua	AstraZeneca		1 inhaler: 120 doses				/dose	
Most sold generic equivalent				1 inhaler: 120 doses					
Lowest price generic equivalent				1 inhaler: 120 doses					
Captopril tab 25 mg	Capoten	BMS		60				/tab	
Most sold generic equivalent				60					
Lowest price generic				60					

equivalent									
Carbamazepine tab 200 mg	Tegretol	Novartis		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Ceftriaxone inj 1 g powder	Rocephin	Roche		1 vial				/vial	
Most sold generic equivalent				1 vial					
Lowest price generic equivalent				1 vial					
Cetirizine tab 10 mg	Zyrtec	UCB pharma		10				/tab	
Most sold generic equivalent				10					
Lowest price generic equivalent				10					
Ciprofloxacin tab 500 mg	Ciprobay	Bayer		1				/tab	
Most sold generic equivalent				1					
Lowest price generic equivalent				1					
Clopidogrel tab 75 mg	Plavix	Sanofi-Aventis		14				/tab	
Most sold generic equivalent				14					
Lowest price generic equivalent				14					
Co-trimoxazole paed suspension (8+40) mg/mL	Bactrim	Roche		100 mL				/mL	
Most sold generic equivalent				100 mL					

Lowest price generic equivalent				100 mL					
Diazepam tab 5 mg	Valium	Roche		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Diclofenac tab 25 mg	Voltaren	Novartis		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Enalapril tab 20 mg	Renitec	MSD		10				/tab	
Most sold generic equivalent				10					
Lowest price generic equivalent				10					
Erythropoietin alpha 4000 IU inj.	Eprex	Novatec		6				/vial	
Most sold generic equivalent				6					
Lowest price generic equivalent				6					
Fluconazole caps/tab 200 mg	Diflucan	Pfizer		30				/tab	
Most sold generic equivalent				30					
Lowest price generic equivalent				30					
Fluoxetine caps/tab 20 mg	Prozac	Lilly		30				/tab	
Most sold generic equivalent				30					

Lowest price generic equivalent				30					
Fluphenazine decanoate inj 25 mg/mL	Modecate	Sanofi-Winthrop/ BMS		1 ampoule				/mL	ไม่มีในไทย
Most sold generic equivalent				1 ampoule					
Lowest price generic equivalent				1 ampoule					
Glibenclamide tab 5 mg	Daonil	HMR		60				/tab	
Most sold generic equivalent				60					
Lowest price generic equivalent				60					
Hydrochlorothiazide tab 25 mg	Dichlotride	MSD		30				/tab	
Most sold generic equivalent				30					
Lowest price generic equivalent				30					
Indinavir caps 400 mg	Crixivan	MSD		180				/caps	
Most sold generic equivalent				180					
Lowest price generic equivalent				180					
Lamivudine tab 150 mg	Epivir	GSK		60				/tab	
Most sold generic equivalent				60					

Lowest price generic equivalent				60					
Levodopa + Benserazide(HCL) tab 200 + 50 mg	Madopar	Roche		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Losartan tab 50 mg	Cozaar	MSD		30				/tab	
Most sold generic equivalent				30					
Lowest price generic equivalent				30					
Lovastatin tab 20 mg	Don’t collect this medicine price!								
Metformin tab 500 mg	Glucophage	Merck		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Mupirocin ointment 2%	Bactroban	GSK		5g				/g	
Most sold generic equivalent				5g				/g	
Lowest price generic equivalent				5g				/g	
Nevirapine tab 200 mg	Viramune	Boehringer I		60				/tab	
Most sold generic equivalent				60					

Lowest price generic equivalent				60					
Nifedipine Retard tab 20 mg	Adalat Retard	Bayer		100				/tab	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Omeprazole caps 20 mg	Losec	AstraZeneca		30				/caps	
Most sold generic equivalent				30					
Lowest price generic equivalent				30					
Phenytoin caps 100 mg	Dilantin	Pfizer		100				/cap	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Quinine sulfate tab 300 mg	N/A	N/A		1000				/tab	
Most sold generic equivalent				1000					
Lowest price generic equivalent				1000					
Ranitidine tab 150 mg	Zantac	GSK		60				/tab	
Most sold generic equivalent				60					
Lowest price generic equivalent				60					
Rifampicin cap 300 mg	Rimactane	Novartis		100				/cap	ไม่มีในไทย

Most sold generic equivalent				100					
Lowest price generic equivalent				100					
Salbutamol inhaler 0.1 mg per dose	Ventoline	GSK		1 inhaler: 200 doses				/dose	
Most sold generic equivalent				1 inhaler: 200 doses					
Lowest price generic equivalent				1 inhaler: 200 doses					
Simvastatin tab 10 mg	Zocor	MSD		30				/tab	
Most sold generic equivalent				30					
Lowest price generic equivalent				30					
Sulfadoxine-pyrimethamine	Don’t collect this medicine price!								
Zidovudine caps 100 mg	Retrovir	GSK		100				/caps	
Most sold generic equivalent				100					
Lowest price generic equivalent				100					

ANNEX 4

List of procurement prices (MPRs), public sector, 35 medicines (4+ outlets)

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	Type	Median price ratio (MPR)	25th percentile	75th percentile
Aciclovir	200 mg	IB			
		LPG	1.05	0.84	1.59
Amitriptyline	25 mg	IB			
		LPG	2.02	1.97	2.02
Amlodipine	5 mg	IB			
		LPG	0.30	0.23	0.35
Amoxicillin	250 mg	IB			
		LPG	1.89	1.62	1.89
Artesunate	50 mg	IB			
		LPG	2.30	2.21	2.30
Atenolol	50 mg	IB			
		LPG	0.95	0.68	2.18
Azithromycin	250 mg	IB	6.54	6.44	7.23
		LPG	3.07	2.74	3.07
Beclometasone inhaler	0.05 mg/dose	IB			
		LPG			
Captopril	25 mg	IB	12.10	12.10	12.16
		LPG	2.88	1.77	3.42
Carbamazepine	200 mg	IB	4.67	4.65	4.67
		LPG	1.83	1.76	2.07
Ceftriaxone injection	1 g/vial	IB			
		LPG	0.40	0.36	0.56
Ciprofloxacin	500 mg	IB			
		LPG	2.48	1.37	2.85
Co-trimoxazole suspension	8 + 40 mg/ml	IB			
		LPG	1.13	1.13	1.13
Diazepam	5 mg	IB			
		LPG	0.76	0.76	0.77
Diclofenac	25 mg	IB			
		LPG	0.60	0.58	1.04
Enalapril	20 mg	IB			
		LPG	0.36	0.32	0.42
Erthyropoietin injection	4000 iu/ml	IB	1.40	1.37	1.44
		LPG	0.67	0.63	0.72
Fluconazole	200 mg	IB			

Generic name	Strength	Type	Median price ratio (MPR)	25th percentile	75th percentile
		LPG	1.14	1.14	1.14
Fluoxetine	20 mg	IB			
		LPG	1.16	0.98	1.16
Fluphenazine injection	25 mg/ml	IB			
		LPG	0.84	0.81	0.92
Glibenclamide	5 mg	IB			
		LPG	2.44	2.27	2.44
Hydrochlorothiazide	50 mg	IB			
		LPG	1.86	1.86	1.86
Indinavir	400 mg	IB	1.73	1.73	1.73
		LPG			
Lamivudine	150 mg	IB			
		LPG	2.29	2.29	2.29
Losartan	50 mg	IB	0.96	0.96	0.96
		LPG			
Metformin	500 mg	IB			
		LPG	0.85	0.73	0.85
Nevirapine	200 mg	IB			
		LPG	2.24	2.24	2.24
Nifedipine Retard	20 mg	IB			
		LPG	2.60	2.20	2.86
Omeprazole	20 mg	IB			
		LPG	0.38	0.36	0.47
Phenytoin	100 mg	IB	11.08	11.08	11.08
		LPG	2.40	2.22	2.62
Quinine sulfate	300 mg	IB	Not surveyed		
		LPG	1.54	1.54	1.54
Ranitidine	150 mg	IB			
		LPG	0.46	0.44	0.49
Rifampicin	300 mg	IB			
		LPG	1.93	1.93	2.15
Salbutamol inhaler	0.1 mg/dose	IB	1.94	1.75	2.27
		LPG			
Zidovudine	100 mg	IB			
		LPG	1.46	1.46	1.46

ANNEX 5

List of patient prices (MPRs), public sector, 35 medicines (4+ outlets)

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	Type	Median price ratio (MPR)	25th percentile	75th percentile
Aciclovir	200 mg	IB			
		LPG	2.09	1.38	3.38
Amitriptyline	25 mg	IB			
		LPG	4.05	2.70	5.40
Amlodipine	5 mg	IB			
		LPG	0.49	0.34	0.71
Amoxicillin	250 mg	IB			
		LPG	2.70	2.70	3.55
Artesunate	50 mg	IB			
		LPG	2.97	2.82	3.03
Atenolol	50 mg	IB			
		LPG	3.01	2.25	3.38
Azithromycin	250 mg	IB	7.94	7.83	8.60
		LPG	3.56	3.50	3.78
Beclometasone inhaler	0.05 mg/dose	IB			
		LPG			
Captopril	25 mg	IB	15.63	15.27	16.36
		LPG	4.36	3.34	4.36
Carbamazepine	200 mg	IB	6.11	6.11	6.45
		LPG	2.71	2.63	2.88
Ceftriaxone injection	1 g/vial	IB			
		LPG	0.68	0.46	0.85
Ciprofloxacin	500 mg	IB			
		LPG	3.48	1.74	3.68
Co-trimoxazole suspension	8 + 40 mg/ml	IB			
		LPG	1.43	1.37	1.52
Diazepam	5 mg	IB			
		LPG	3.15	3.15	3.15
Diclofenac	25 mg	IB			
		LPG	2.55	2.42	3.18
Enalapril	20 mg	IB			
		LPG	1.02	0.68	1.02
Erthyropoietin injection	4000 iu/ml	IB	1.64	1.57	1.75
		LPG	0.78	0.78	0.91
Fluconazole	200 mg	IB			

Generic name	Strength	Type	Median price ratio (MPR)	25th percentile	75th percentile
		LPG	1.47	1.46	1.63
Fluoxetine	20 mg	IB			
		LPG	1.84	1.53	1.84
Fluphenazine injection	25 mg/ml	IB			
		LPG	1.10	1.07	1.29
Glibenclamide	5 mg	IB			
		LPG	6.79	3.39	6.79
Hydrochlorothiazide	50 mg	IB			
		LPG	3.68	2.43	7.35
Indinavir	400 mg	IB	2.16	2.12	2.36
		LPG			
Lamivudine	150 mg	IB			
		LPG	2.97	2.86	2.97
Losartan	50 mg	IB	1.20	1.20	1.20
		LPG			
Metformin	500 mg	IB			
		LPG	2.30	1.42	2.30
Nevirapine	200 mg	IB			
		LPG	2.83	2.78	2.97
Nifedipine Retard	20 mg	IB			
		LPG	3.51	3.14	3.92
Omeprazole	20 mg	IB			
		LPG	0.72	0.67	0.97
Phenytoin	100 mg	IB	15.82	14.85	16.54
		LPG	5.75	3.96	6.11
Quinine sulfate	300 mg	IB	Not surveyed		
		LPG	2.16	1.96	2.16
Ranitidine	150 mg	IB			
		LPG	1.23	0.87	1.23
Rifampicin	300 mg	IB			
		LPG	1.93	1.93	2.15
Salbutamol inhaler	0.1 mg/dose	IB	2.61	2.30	2.78
		LPG			
Zidovudine	100 mg	IB			
		LPG	1.88	1.88	1.94

ANNEX 6
List of median price ratios (MPRs), mark-ups and availability in the **PUBLIC** sector

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
Aciclovir	200 mg	Yes	IB				5%
			LPG	1.05	2.09	99%	90%
Amitriptyline	25 mg	Yes	IB				5%
			LPG	2.02	4.05	101%	100%
Amlodipine	5 mg	No	IB				15%
			LPG	0.30	0.49	63%	80%
Amoxicillin	250 mg	Yes	IB				0%
			LPG	1.89	2.70	43%	100%
Artesunate	50 mg	No	IB				0%
			LPG	2.30	2.97	29%	20%
Atenolol	50 mg	Yes	IB				10%
			LPG	0.95	3.01	217%	80%
Azithromycin	250 mg	No	IB	6.54	7.94	21%	25%
			LPG	3.07	3.56	16%	25%
Beclometasone inhaler	0.05 mg/dose	Yes	IB				15%
			LPG				10%
Captopril	25 mg	Yes	IB	12.10	15.63	29%	20%
			LPG	2.88	4.36	51%	35%
Carbamazepine	200 mg	Yes	IB	4.67	6.11	31%	25%

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
			LPG	1.83	2.71	48%	80%
Ceftriaxone injection	1 g/vial	Yes	IB				15%
			LPG	0.40	0.68	70%	95%
Ciprofloxacin	500 mg	Yes	IB				10%
			LPG	2.48	3.48	40%	25%
Co-trimoxazole suspension	8 + 40 mg/ ml	Yes	IB				5%
			LPG	1.13	1.43	27%	75%
Diazepam	5 mg	Yes	IB				0%
			LPG	0.76	3.15	314%	100%
Diclofenac	25 mg	Yes	IB				15%
			LPG	0.60	2.55	325%	100%
Enalapril	20 mg	No	IB				5%
			LPG	0.36	1.02	183%	100%
Erthyropoietin injection	4000 iu/ml	Yes	IB	1.4	1.64	17%	25%
			LPG	0.67	0.78	16%	30%
Fluconazole	200 mg	Yes	IB				0%
			LPG	1.14	1.47	29%	100%
Fluoxetine	20 mg	Yes	IB				15%
			LPG	1.16	1.84	59%	85%
Fluphenazine injection	25 mg/ml	Yes	IB				0%
			LPG	0.84	1.10	31%	85%
Glibenclamide	5 mg	Yes	IB				5%
			LPG	2.44	6.79	178%	95%
Hydrochlorothiazide	50 mg	No	IB				10%
			LPG	1.86	3.68	98%	65%
Indinavir	400 mg	Yes	IB	1.73	2.16	25%	45%

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
			LPG				0%
Lamivudine	150 mg	No	IB				0%
			LPG	2.29	2.97	30%	85%
Losartan	50 mg	Yes	IB	0.96	1.20	25%	20%
			LPG				0%
Metformin	500 mg	Yes	IB				10%
			LPG	0.85	2.30	171%	100%
Nevirapine	200 mg	Yes	IB				10%
			LPG	2.24	2.83	26%	70%
Nifedipine Retard	20 mg	Yes	IB				0%
			LPG	2.60	3.51	35%	30%
Omeprazole	20 mg	Yes	IB				5%
			LPG	0.38	0.72	89%	100%
Phenytoin	100 mg	Yes	IB	11.08	15.82	43%	55%
			LPG	2.40	5.75	140%	40%
Quinine sulfate	300 mg	No	IB	Not surveyed			
			LPG	1.54	2.16	40%	75%
Ranitidine	150 mg	Yes	IB				10%
			LPG	0.46	1.23	167%	100%
Rifampicin	300 mg	No	IB				0%
			LPG	1.93	1.93	0%	100%
Salbutamol inhaler	0.1 mg/dose	Yes	IB	1.94	2.61	35%	90 %
			LPG				10%
Zidovudine	100 mg	Yes	IB				0%
			LPG	1.46	1.88	29%	70%

ANNEX 7 List of procurement prices (MPRs) private sector, 35 medicines (4+ outlets)

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	Type	Median price ratio (MPRs)	25th percentile	75th percentile
Aciclovir	200 mg	IB	22.08	21.72	22.55
		LPG	1.94	1.62	2.05
Amitriptyline	25 mg	IB			
		LPG	1.62	1.57	1.89
Amlodipine	5 mg	IB	3.75	3.69	3.89
		LPG	0.93	0.90	0.97
Amoxicillin	250 mg	IB	8.10	8.01	8.96
		LPG	1.80	1.22	2.34
Artesunate	50 mg	IB			
		LPG			
Atenolol	50 mg	IB	18.47	18.26	19.34
		LPG	3.61	3.38	3.76
Azithromycin	250 mg	IB	7.81	7.74	7.88
		LPG	4.69	3.94	5.34
Beclometasone inhaler	0.05 mg/dose	IB			
		LPG			
Captopril	25 mg	IB			
		LPG			
Carbamazepine	200 mg	IB	7.79	7.59	8.14
		LPG	1.22	1.04	1.76
Ceftriaxone injection	1 g/vial	IB			
		LPG	1.00	0.78	1.24
Ciprofloxacin	500 mg	IB	67.08	64.68	67.12
		LPG	2.86	2.36	3.81
Co-trimoxazole suspension	8 + 40 mg/ml	IB	4.36	4.29	5.29
		LPG	0.83	0.83	1.55
Diazepam	5 mg	IB			
		LPG			
Diclofenac	25 mg	IB	22.91	22.40	23.50
		LPG	0.94	0.56	1.48
Enalapril	20 mg	IB	10.31	10.11	10.39
		LPG	0.89	0.82	0.96
Erthyropoietin injection	4000 iu/ml	IB			
		LPG			
Fluconazole	200 mg	IB			
		LPG	1.82	1.42	2.42
Fluoxetine	20 mg	IB			

Generic name	Strength	Type	Median price ratio (MPRs)	25th percentile	75th percentile
		LPG	1.63	1.24	1.84
Fluphenazine injection	25 mg/ml	IB			
		LPG			
Glibenclamide	5 mg	IB	18.32	17.87	18.73
		LPG	1.36	0.81	2.55
Hydrochlorothiazide	50 mg	IB	9.67	9.45	9.87
		LPG	0.88	0.79	1.03
Indinavir	400 mg	IB			
		LPG			
Lamivudine	150 mg	IB			
		LPG			
Losartan	50 mg	IB	1.24	1.22	1.35
		LPG			
Metformin	500 mg	IB	3.22	3.17	3.30
		LPG	0.77	0.68	0.90
Nevirapine	200 mg	IB			
		LPG			
Nifedipine Retard	20 mg	IB			
		LPG	4.19	4.10	4.31
Omeprazole	20 mg	IB			
		LPG	1.29	1.11	2.26
Phenytoin	100 mg	IB	11.51	11.32	11.75
		LPG	2.30	2.26	2.34
Quinine sulfate	300 mg	IB	not surveyed		
		LPG			
Ranitidine	150 mg	IB	17.40	17.16	17.71
		LPG	0.95	0.93	0.98
Rifampicin	300 mg	IB			
		LPG	1.61	1.30	1.72
Salbutamol inhaler	0.1 mg/dose	IB	2.30	2.29	2.41
		LPG			
Zidovudine	100 mg	IB			
		LPG			

ANNEX 8
List of patient prices (MPRs), private sector, 35 medicines (4+ outlets)

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	Type	Median price ratio (MPRs)	25th percentile	75th percentile
Aciclovir	200 mg	IB	29.71	27.68	30.12
		LPG	3.24	2.70	4.32
Amitriptyline	25 mg	IB			
		LPG	5.40	5.40	10.80
Amlodipine	5 mg	IB	4.41	4.06	4.70
		LPG	1.15	1.06	1.32
Amoxicillin	250 mg	IB	11.48	9.45	12.49
		LPG	3.60	3.60	4.95
Artesunate	50 mg	IB			
		LPG			
Atenolol	50 mg	IB	27.07	24.72	30.08
		LPG	6.02	5.34	7.52
Azithromycin	250 mg	IB	8.76	8.76	9.13
		LPG	5.48	4.75	6.11
Beclometasone inhaler	0.05 mg/dose	IB			
		LPG			
Captopril	25 mg	IB			
		LPG			
Carbamazepine	200 mg	IB	9.50	8.82	9.50
		LPG	3.05	2.21	3.90
Ceftriaxone injection	1 g/vial	IB			
		LPG	1.33	1.33	1.50
Ciprofloxacin	500 mg	IB	72.64	71.65	74.63
		LPG	5.22	4.98	6.97
Co-trimoxazole suspension	8 + 40 mg/ml	IB	5.37	5.08	6.19
		LPG	2.98	2.36	3.58
Diazepam	5 mg	IB			
		LPG			
Diclofenac	25 mg	IB	30.54	27.36	31.18
		LPG	5.09	5.09	7.64
Enalapril	20 mg	IB	11.60	10.92	12.28
		LPG	1.71	1.36	2.05
Erthyropoietin injection	4000 iu/ml	IB			
		LPG			
Fluconazole	200 mg	IB			
		LPG	3.12	2.65	4.16

Generic name	Strength	Type	Median price ratio (MPRs)	25th percentile	75th percentile
Fluoxetine	20 mg	IB			
		LPG	3.37	3.06	5.51
Fluphenazine injection	25 mg/ml	IB			
		LPG			
Glibenclamide	5 mg	IB	20.36	20.36	23.75
		LPG	6.79	5.43	6.79
Hydrochlorothiazide	50 mg	IB	13.97	12.50	14.71
		LPG	7.35	3.68	7.35
Indinavir	400 mg	IB			
		LPG			
Lamivudine	150 mg	IB			
		LPG			
Losartan	50 mg	IB	1.48	1.39	1.53
		LPG			
Metformin	500 mg	IB	3.98	3.83	4.59
		LPG	1.53	1.53	1.84
Nevirapine	200 mg	IB			
		LPG			
Nifedipine Retard	20 mg	IB			
		LPG	6.16	5.54	6.16
Omeprazole	20 mg	IB			
		LPG	2.23	2.07	2.86
Phenytoin	100 mg	IB	14.39	14.39	14.39
		LPG	5.75	4.03	5.75
Quinine sulfate	300 mg	IB	Not surveyed		
		LPG			
Ranitidine	150 mg	IB	23.90	18.38	24.51
		LPG	2.02	1.84	2.45
Rifampicin	300 mg	IB			
		LPG	2.68	2.42	2.95
Salbutamol inhaler	0.1 mg/dose	IB	2.94	2.78	3.10
		LPG			
Zidovudine	100 mg	IB			
		LPG			

ANNEX 9
List of mark-ups and availability in the **PRIVATE** sector

IB Innovator brand; LPG Lowest priced generic
tab/cap unless otherwise stated

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
Aciclovir	200 mg	Yes	IB	22.08	29.71	35%	28.6%
			LPG	1.94	3.24	67%	100%
Amitriptyline	25 mg	Yes	IB				9.5%
			LPG	1.62	5.40	233%	81%
Amlodipine	5 mg	No	IB	3.75	4.41	18%	76.2%
			LPG	0.93	1.15	24%	95.2%
Amoxicillin	250 mg	Yes	IB	8.1	11.48	42%	28.6%
			LPG	1.8	3.60	100%	90.5%
Artesunate	50 mg	No	IB				0%
			LPG				0%
Atenolol	50 mg	Yes	IB	18.47	27.07	47%	61.9%
			LPG	3.61	6.02	67%	95.2%
Azithromycin	250 mg	No	IB	7.81	8.76	12%	90.5%
			LPG	4.69	5.48	17%	19%
Beclometasone inhaler	0.05 mg/dose	Yes	IB				4.8%
			LPG				0%
Captopril	25 mg	Yes	IB				4.8%
			LPG				0%
Carbamazepine	200 mg	Yes	IB	7.79	9.50	22%	76.2%
			LPG	1.22	3.05	150%	28.6%

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
Ceftriaxone injection	1 g/vial	Yes	IB				4.8%
			LPG	1.00	1.33	33%	33.3%
Ciprofloxacin	500 mg	Yes	IB	67.08	72.64	8%	23.8%
			LPG	2.86	5.22	83%	95.2%
Co-trimoxazole suspension	8 + 40 mg/ ml	Yes	IB	4.36	5.37	23%	28.6%
			LPG	0.83	2.98	259%	42.9%
Diazepam	5 mg	Yes	IB				0%
			LPG				14.3%
Diclofenac	25 mg	Yes	IB	22.91	30.54	33%	95.2%
			LPG	0.94	5.09	441%	100%
Enalapril	20 mg	No	IB	10.31	11.60	13%	19%
			LPG	0.89	1.71	92%	100%
Erthyropoietin injection	4000 iu/ml	Yes	IB				0%
			LPG				0%
Fluconazole	200 mg	Yes	IB				4.8%
			LPG	1.82	3.12	71%	57.1%
Fluoxetine	20 mg	Yes	IB				4.8%
			LPG	1.63	3.37	107%	47.6%
Fluphenazine injection	25 mg/ml	Yes	IB				0%
			LPG				0%
Glibenclamide	5 mg	Yes	IB	18.32	20.36	11%	90.5%
			LPG	1.36	6.79	399%	100%
Hydrochlorothiazide	50 mg	No	IB	9.67	13.97	44%	47.6%
			LPG	0.88	7.35	735%	71.4%
Indinavir	400 mg	Yes	IB				0%
			LPG				0%

Generic name	Strength	On Essential Medicines List	Type	Procurement MPR	Patient price MPR	% Mark-up	% Availability in facilities
Lamivudine	150 mg	No	IB				0%
			LPG				0%
Losartan	50 mg	Yes	IB	1.24	1.48	19%	66.7%
			LPG				0%
Metformin	500 mg	Yes	IB	3.22	3.98	24%	100%
			LPG	0.77	1.53	99%	85.7%
Nevirapine	200 mg	Yes	IB				0%
			LPG				0%
Nifedipine Retard	20 mg	Yes	IB				9.5%
			LPG	4.19	6.16	47%	52.4%
Omeprazole	20 mg	Yes	IB				14.3%
			LPG	1.29	2.23	73%	100%
Phenytoin	100 mg	Yes	IB	11.51	14.39	25%	66.7%
			LPG	2.30	5.75	150%	28.6%
Quinine sulfate	300 mg	No	IB	Not surveyed			
			LPG				9.5%
Ranitidine	150 mg	Yes	IB	17.4	23.09	33%	23.8%
			LPG	0.95	2.02	113%	95.2%
Rifampicin	300 mg	No	IB				0%
			LPG	1.61	2.68	66%	19%
Salbutamol inhaler	0.1 mg/dose	Yes	IB	2.30	2.97	29%	100%
			LPG				0%
Zidovudine	100 mg	Yes	IB				0%
			LPG				0%

ANNEX 10

Comparison of procurement prices (MPRs) in the public and private sector

Generic name	Strength	Type	Public sector MPR	Private sector MPR	Difference (%) Private to Public
Aciclovir	200 mg	IB		22.08	
		LPG	1.05	1.94	85%
Amitriptyline	25 mg	IB			
		LPG	2.02	1.62	-20%
Amlodipine	5 mg	IB		3.75	
		LPG	0.30	0.93	210%
Amoxicillin	250 mg	IB		8.10	
		LPG	1.89	1.80	-5%
Artesunate	50 mg	IB			
		LPG	2.30		
Atenolol	50 mg	IB		18.47	
		LPG	0.95	3.61	280%
Azithromycin	250 mg	IB	6.54	7.81	19%
		LPG	3.07	4.69	53%

Generic name	Strength	Type	Public sector MPR	Private sector MPR	Difference (%) Private to Public
Beclometasone inhaler	0.05 mg/dose	IB			
		LPG			
Captopril	25 mg	IB	12.10		
		LPG	2.88		
Carbamazepine	200 mg	IB	4.67	7.79	67%
		LPG	1.83	1.22	-33%
Ceftriaxone injection	1 g/vial	IB			
		LPG	0.40	1.00	150%
Ciprofloxacin	500 mg	IB		67.08	
		LPG	2.48	2.86	15%
Co-trimoxazole suspension	8 + 40 mg/ml	IB		4.36	
		LPG	1.13	0.83	-27%
Diazepam	5 mg	IB			
		LPG	0.76		
Diclofenac	25 mg	IB		22.91	
		LPG	0.60	0.94	57%
Erthyropoietin injection	4000 iu/ml	IB	1.40		
		LPG	0.67		
Enalapril	20 mg	IB		10.31	
		LPG	0.36	0.89	147%
Fluconazole	200 mg	IB			
		LPG	1.14	1.82	60%
Fluoxetine	20 mg	IB			
		LPG	1.16	1.63	41%
Fluphenazine injection	25 mg/ml	IB			

Generic name	Strength	Type	Public sector MPR	Private sector MPR	Difference (%) Private to Public
		LPG	0.84		
Glibenclamide	5 mg	IB		18.32	
		LPG	2.44	1.36	-44%
Hydrochlorothiazide	50 mg	IB		9.67	
		LPG	1.86	0.88	-53%
Indinavir	400 mg	IB	1.73		
		LPG			
Lamivudin	150 mg	IB			
		LPG	2.29		
Losartan	50 mg	IB	0.96	1.24	29%
		LPG			
Metformin	500 mg	IB		3.22	
		LPG	0.85	0.77	-9%
Nevirapine	200 mg	IB			
		LPG	2.24		
Nifedipine Retard	20 mg	IB			
		LPG	2.60	4.19	61%
Omeprazole	20 mg	IB			
		LPG	0.38	1.29	239%
Phenytoin	100 mg	IB	11.08	11.51	4%
		LPG	2.40	2.30	-4%
Quinine sulfate	300 mg	IB	Not surveyed		
		LPG	1.54		
Ranitidine	150 mg	IB		17.40	
		LPG	0.46	0.95	107%

Generic name	Strength	Type	Public sector MPR	Private sector MPR	Difference (%) Private to Public
Rifampicin	300 mg	IB			
		LPG	1.93	1.61	-17%
Salbutamol inhaler	0.1 mg/dose	IB	1.94	2.30	19%
		LPG			
Zidovudine	100 mg	IB			
		LPG	1.46		

ANNEX 11

Comparison of patient prices (MPRs) in the public and private sector

Generic name	Strength	Type	Public	Private	Difference (%) Private to Public
Aciclovir	200 mg	Brand		29.71	
		Lowest price	2.09	3.24	55%
Amitriptyline	25 mg	Brand			
		Lowest price	4.05	5.40	33%

Generic name	Strength	Type	Public	Private	Difference (%) Private to Public
Amlodipine	5 mg	Brand		4.41	
		Lowest price	0.49	1.15	135%
Amoxicillin	250 mg	Brand		11.48	
		Lowest price	2.70	3.60	33%
Artesunate	50 mg	Brand			
		Lowest price	2.97		
Atenolol	50 mg	Brand		27.07	
		Lowest price	3.01	6.02	100%
Azithromycin	250 mg	Brand	7.94	8.76	10%
		Lowest price	3.56	5.48	54%
Beclometasone inhaler	0.05 mg/dose	Brand			
		Lowest price			
Captopril	25 mg	Brand	15.63		
		Lowest price	4.36		
Carbamazepine	200 mg	Brand	6.11	9.50	55%
		Lowest price	2.71	3.05	13%
Ceftriaxone injection	1 g/vial	Brand			
		Lowest price	0.68	1.33	96%
Ciprofloxacin	500 mg	Brand		72.64	
		Lowest price	3.48	5.22	50%
Co-trimoxazole suspension	8 + 40 mg/ml	Brand		5.37	
		Lowest price	1.43	2.98	108%
Diazepam	5 mg	Brand			
		Lowest price	3.15		
Diclofenac	25 mg	Brand		30.54	

Generic name	Strength	Type	Public	Private	Difference (%) Private to Public
		Lowest price	2.55	5.09	100%
Enalapril	20 mg	Brand		11.60	
		Lowest price	1.02	1.71	68%
Erthyropoietin injection	4000 iu/ml	Brand	1.64		
		Lowest price	0.78		
Fluconazole	200 mg	Brand			
		Lowest price	1.84	3.37	83%
Fluoxetine	20 mg	Brand			
		Lowest price	1.84	3.06	66%
Fluphenazine injection	25 mg/ml	Brand			
		Lowest price	1.10		
Glibenclamide	5 mg	Brand		20.36	
		Lowest price	6.79	6.79	0%
Hydrochlorothiazide	50 mg	Brand		13.97	
		Lowest price	3.68	7.35	100%
Indinavir	400 mg	Brand	2.16		
		Lowest price			
Lamivudin	150 mg	Brand			
		Lowest price	2.97		
Losartan	50 mg	Brand	1.20	1.48	23%
		Lowest price			
Metformin	500 mg	Brand		3.98	
		Lowest price	2.30	1.53	-33%
Nevirapine	200 mg	Brand			
		Lowest price	2.83		

Generic name	Strength	Type	Public	Private	Difference (%) Private to Public
Nifedipine Retard	20 mg	Brand			
		Lowest price	3.51	6.16	75%
Omeprazole	20 mg	Brand			
		Lowest price	0.72	2.23	210%
Phenytoin	100 mg	Brand	15.82	14.39	-9%
		Lowest price	5.75	5.75	0%
Quinine sulfate	300 mg	Brand			
		Lowest price	2.16		
Ranitidine	150 mg	Brand		23.9	
		Lowest price	1.23	2.02	64%
Rifampicin	300 mg	Brand			
		Lowest price	1.93	2.68	39%
Salbutamol inhaler	0.1 mg/dose	Brand	2.61	2.94	13%
		Lowest price			
Zidovudine	100 mg	Brand			
		Lowest price	1.88		