

'Medicine Prices in Ghana: A comparative study of Public, Private and Mission sector medicine prices.'

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Foreword

Scaling up access to medicines is a major challenge due to non availability and unaffordable medicine prices especially for newer products such as anti retroviral for the management of severely ill HIV/AIDS patients and artemisinin-based combination drugs for the treatment of malaria. Evidence available on the prices people pay for medicines though sketchy and scanty, suggests that poor people pay more for their medicines relative to their income. It is apparent that price differences exist for the same medicine in different parts of the country in Public health facilities as well as in the Private retail pharmacies. There are also extreme variations in prices of innovator brands and their generic equivalents. Various strategies have been outlined for influencing the price and availability of medicines to improve access, however before embarking on a policy to improve the affordability and availability of medicines, an understanding of how these prices are set is necessary that is from the manufacturers' selling price to the patient price. Reliable information is needed in order that more favourable purchasing agreements can be negotiated, domestic distribution better managed and pricing policies monitored.

Absence of a standard methodology has been a stumbling block in reliable drug price monitoring and comparison within countries and therefore the World Health Organization (WHO) and Health Action International (HAI) collaborated to develop a methodology which could be used at country level to measure the prices people have to pay for a selection of important medicines across the Public, Private retail pharmacies and other medicine outlets.

The Ministry of Health working through the Ghana Health Services and in collaboration with WHO and HAI GHANA carried out a medicines price survey using the new methodology which is designed for the collection and analysis of medicines prices in a standardized manner at a certain point in time. The survey is characterized by a standard list of medicines, a systematic sampling process, the use of international reference prices, comparison of innovator brand and generically equivalent medicines and the identification of the components making up the final price. The survey was one of eight (8) parallel surveys in eight (8) African countries and more than 40 surveys worldwide. Since the prices of medicines do not remain static, the survey can be repeated periodically to monitor medicine prices in order to inform policy.

It is hoped that this report would act as an advocacy document and form the basis for policy development, future policy review or policy change which will result in making medicines more affordable and available to a majority of the population

Maj. Courage E.K. Quashigah (Rtd.)
Hon. Minister for Health

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ADVISORY COMMITTEE

Madam Salamata Abdul-Salaam Acting Chief Director, Ministry of Health
Prof David Ofori-Adjei Director, Noguchi Memorial Institute of Medical Research, Legon
Dr Frank Nyonator Director, Policy, Planning, Monitoring and Evaluation Unit, Ghana Health Service
Mr Samuel Boateng Director, Procurement and Supplies Unit, Ministry of Health
Mr Felix D. Yellu Chief Pharmacist, Ghana Health Service
Mr Kofi Larbi Ministry of Trade and Presidential Special Initiative
The Chief Director Ministry of Finance and Economic Planning
Ms Sandra Baldwin Health Advisor, DFID, Ghana
Mrs Martha Gyansa-Lutterodt Deputy Programme Manager, Ghana National Drugs Programme, Ministry of Health
Dr Eddie Addai Policy, Planning, Monitoring and Evaluation Unit, MoH, Accra
Ms Edith Andrews NPO/EDM, WHO, Accra
Mrs Yvonne Nkrumah Ghana Food and Drugs Board, Accra
Mr Joseph Tamakloe Registrar General Department, Accra
Dr Gilbert Buckle Director Catholic Health Service (CDC/HAI Africa)

EXTERNAL TECHNICAL ASSISTANCE

Dr Gilles Forte
Mr Desta Abayneh
Mr Martin Auton

Ms Margaret Ewen
Ms Christa Cepuch
Ms Mebrat Woldetensaie

RESOURCE PERSONS FOR TRAINING OF FIELDWORK TEAM

Mr Ananga Yamyollia, Ghana Health Service
Ms Edith Andrews, EDM / NPO WHO Country Office
Mr Charles Allotey, Catholic Drug Centre / HAI Ghana
Mrs Martha Gyansa-Lutterodt, Ghana National Drugs Programme

REGIONAL/FIELDWORK DATA TEAMS

Ashanti Region

Mr Dominic Dobbin
Mr Dominic Otchere
Miss Naana Frempong
Ms Abena Aseidu Offei

Western Region

Mr S. T. Asamoah
Dr Robert A. Sagoe
Steven Essuman
Henry Hammond

Upper-East Region

Mr Akodam Karbo
Mrs Diana Awuni
Dr William Gudu
Mr Razak Abdulai

Greater Accra Region

Dr Tom Thompson
Ms Lydia Afoko
Rev Sr Veronica Amponsah
Isaac Annan

DATA ENTRY AND PROCESSING

Mrs Priscilla Eshun
Ms Lydia Afoko

REPORT WRITING

Ms Edith Andrews
Mr Ananga Yamyollia
Mr Charles Allotey
Mr Martin Auton
Mrs Martha Gyansa-Lutterodt

Executive Summary

Background: The Ministry of Health (MOH), through the Ghana National Drugs Programme (GNDP), and in collaboration with the World Health Organization (WHO) and Health Action International (HAI) Africa, carried out a field study to measure the prices of medicines in Ghana using an international standardized methodology developed by WHO and HAI.

Methods: Data on prices for fifty medicines (which included thirty medicines from a core list of medicines proposed by the standard methodology and twenty medicines frequently used for the top ten diseases in Ghana) were collected in the Public, Mission / NGO and Private-for-profit sectors in four regions: three were randomly selected while the Greater Accra Region was purposively selected as the host of the capital city.

Data was collected on availability and patient prices for the innovator brand, most sold generic equivalent (MSG), and the lowest priced generic equivalent (LPG) for each of the fifty medicines. Public and Mission sector procurement prices were also collected. Finally, the components which contribute to the final patient price were collected both for the Public and the Private sectors through structured interviews. The cost of usual treatment was calculated for some common diseases and was compared to the daily wage of the lowest paid government worker.

Results: The results revealed that in Ghana, where about 45% of the population live on less than one US dollar per day, and the lowest paid government worker earns only about one US dollar per day, the prices of medicines were high and unaffordable for many.

Further results of the study showed that there was no discernable relationship between the prices paid by patients and the procurement prices in the Public and Mission sectors.

The Mission sector patient prices were on average twelve percent higher than the Public sector patient prices; the Private sector prices were considerably higher still.

The prices of innovator brands were much higher than their generic equivalents. For a basic monthly treatment for peptic ulcer¹ in the Private Retail Pharmacy, for example, the price would require 86.6 days' wages for an innovator brand treatment and 10.9 days for treatment with its generic equivalent.

There was higher availability in Private Retail Pharmacy than in Public and Mission sectors. Availability was calculated for 39 medicines and it was found that for most (27 medicines), availability was less than 50% in the Public sector. Availability for 23 medicines was less than 50% in the Mission sector, while availability for 6 medicines was less than 50% in the Retail Pharmacy sector.

The percentage availability of innovator brands in the Public and Mission sectors was low, indicating a level of adherence to the policy of generic prescribing and dispensing in these sectors. Even though availability was generally higher in the Private Retail sector, prices were also relatively higher as noted above.

Duties, tariffs and markups significantly contributed to the final price of medicines (30-40% for taxes and tariffs, and 50-200% for markups).

Recommendations:

1. The government should implement its policy on generic prescribing and dispensing.
2. There is need to develop price guidelines for medicines for all sectors, and to enforce compliance with a maximum mark-up policy.
3. Policymakers should explore avenues for the establishment of an autonomous National Pooled Procurement System to cater for all sectors of the health system.
4. The government should encourage and support local manufacturing of essential medicines.
5. The findings of this survey should be used for a more in-depth review of policy options to improve access to medicines in general.

¹ Using ranitidine 150mg twice a day for 30 days (60 tablets)

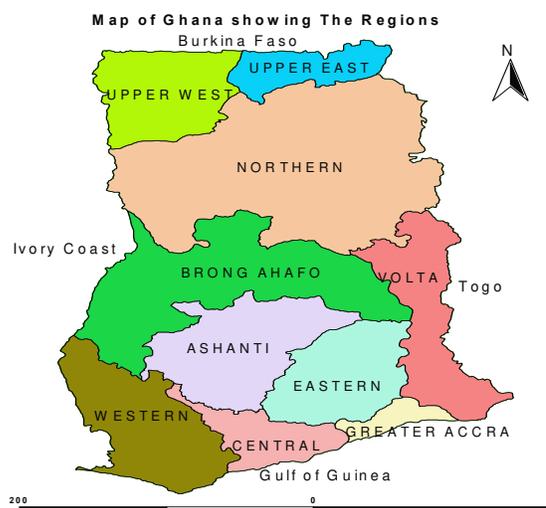
1.0 INTRODUCTION AND BACKGROUND

1.1 Country profile

Ghana is bordered on the east by the Republic of Togo, to the west by La Cote d'Ivoire, Burkina Faso to the North and to the South by the Gulf of Guinea. The total land area of Ghana is 238,533 km square with an Exclusive Economic Zone of 110,000 km square of the sea. There are two major weather seasons, namely the rainy and dry seasons (harmattan). The mean minimum temperature ranges from 21°C - 23°C and mean maximum temperature from 30°C - 35°C.

Ghana's population was estimated at 20.5 million in 2004. The level of fertility has remained very high, with a current rate of about 4.2². Infant mortality and under 5 mortality have worsened to 64 and 111³ deaths respectively per 1,000 live births compared to 57 deaths and 108 deaths in 1998 respectively. Ghana has a pyramidal age structure due to its large numbers of children below 15 years of age: 44% of the population is below age 15 while only 5% is above age 65. There are slightly more women (53%) than men (47%) in the overall population. Life expectancy at birth for a Ghanaian is estimated at 57.7 years: 55 years for males and 59.2 years for females.

Figure 1: Map of Ghana, showing the regions



² Ghana Demographic and Health Survey (1993, 1998, 2003)

³ Ghana Demographic and Health Survey 2003

The Ghana Living Standard Survey estimated that about 40%⁴ of Ghanaians are living below the national poverty line. Finally, Ghana was ranked 131 out of 177 countries in 2004's Human Development Index measure.

1.2 Demographic and health characteristics

Ghana has the full range of diseases normally endemic to a sub-Saharan African country. Common diseases include malaria, HIV and AIDS, pulmonary tuberculosis, pertussis, tetanus, measles, infectious hepatitis, trachoma, and schistosomiasis. Others include guinea worm, river blindness and sexually transmitted infections.

Malaria is still the number one killer among children, while acute respiratory infections, diarrhoea, malnutrition, anaemia, and measles continue to be major health challenges. These health problems account for about 50% of all childhood admissions to health facilities and for 30% of childhood deaths.

On the whole, however, Ghana's health conditions are improving. The result is reflected in the decline in infant mortality from 86 per 1,000 live births in 1989 to 64 per 1,000 in 2003, and maternal mortality ratio from 214 (2001) to 187 (2003).

The government's objective for 2004, as for the previous year, was to improve the health status of the Ghanaian population by ensuring efficiency in health delivery and increased access to health services as well as to ensure sustainable financial arrangements to protect the poor and the vulnerable. The major thrust of health care delivery in 2004 was in:

- Prevention and control of communicable diseases such as HIV and AIDS, malaria, tuberculosis and buruli ulcer;
- Improving emergency preparedness;
- Improving health service delivery;
- Providing financing arrangements to make health care affordable to all; and
- Implementing strategies for reducing the brain drain of key health personnel.

⁴ 4th Ghana Living Standard Survey (1998/99), Ghana Statistical Service, Accra

Table 1: Trend of sector-wide performance indicators (2001-2004)

| Indicators | BASELINE 2001 | PERF 2002 | PERF 2003 | PERF 2004 | 2004 Targets | TARGETS 2006 |
|---|---|--------------|--------------|--------------|-----------------|-----------------|
| <i>Objective: Improved Health Status</i> | | | | | | |
| Infant mortality rate | 57 | 55 | 64 | NA | NA | 50 |
| Under five mortality rate | 108 | 100 | 111 | NA | NA | 95 |
| Maternal Mortality ratio | 214 (93) | 204 | 187 | NA | NA | 150 |
| % Under five years who are malnourished (Wt/A) | 25 | NA | 22.1 | 29.9 | 22 | 20 |
| HIV sero prevalence among pregnant women | 2.9 | 3.4 | 3.6 | NA | 3.6 | 2.6 |
| <i>Objective: Improved Service Outputs and Health Service Performance</i> | | | | | | |
| <i>Performance of Clinical Care (Coverage and Quality)</i> | | | | | | |
| Outpatient visit per capita | 0.49 | 0.49 | 0.50 | 0.52 | 0.55 | 0.6 |
| Hospital admission rate / 1000 pop | 34.9 | 34.1 | 35.9 | 34.5 | 38 | 40 |
| Bed occupancy rate | 64.7 | 65.5 | 64.1 | 63.0 | 65 | 80 |
| # specialized outreach services | | | | 162 | 158 | |
| Tuberculosis Cure Rate | 47.9 | 55.1 | 61.0 | -- | 65 | 80 |
| TB Case Detection Rate | 61 | 59 | 58 | 56 | 55 | 65 |
| Under-Five Malaria case fatality rate | 1.7 | 1.9 | 3.7 | 2.8 | 1.2 | 1.0 |
| % Tracer drug availability | 70 | 80 | 93 | 87.5 | 90 | 95 |
| <i>Performance of Reproductive Health Services (Coverage and Quality)</i> | | | | | | |
| % FP acceptors (CPR) | 20.3 | 21 | 22.6 | 24.3 | 28 | 40 |
| % ANC coverage | 93.5 | 93.7 | 91.2 | 89.2 | 94 | 99 |
| % PNC coverage | 52.9 | 53.6 | 55.8 | 53.3 | 57 | 60 |
| % Supervised deliveries | 49.2 | | 51.9 | 53.4 | 60 | 60 |
| % Maternal audits to maternal deaths | <10 | 67 | 85 | 70.5 | 85 | 50 |
| <i>Performance of Preventive Services and Surveillance</i> | | | | | | |
| EPI coverage - DPT3 | 76.3 | 77.9 | 76 | 75 | 80 | 85 |
| EPI coverage - measles | 82.4 | 83.7 | 79 | 78 | 80 | 90 |
| # Guinea Worm cases | 4,739 | 5,611 | 8,290 | 7,275 | 5000 | 0 |
| AFP non polio rate | 2.8 | 2.3 | 1.4 | 1.5 | 3.5 | 4 |
| <i>Objective: Improved Level and Distribution Health Resources</i> | | | | | | |
| <i>Human Resources</i> | | | | | | |
| Population to Dr ratio | 22,811 | 22,193 | 17,489 | 17,615 | 20,500 | 16,500 |
| Population to Nurse ratio | 2,043 | 2,080 | 2,598 | 1,513 | 1,800 | 1,500 |
| <i>Health Infrastructure</i> | | | | | | |
| CHPS zones completed (functional CHPS zones) | 19 | 39 | 55 | 84 | 85 | 400 |
| <i>Finance</i> | | | | | | |
| % GOG budget on health budget / actual | NA / 8.7 | 7.6 / 9.3 | 9.5 / 9.1 | 8.2 / 8.2 | 9.4 / NA | 10 |
| % GOG Recurrent on health budget / actual | NA / 10.2 | 10.5 / 11.5 | 12 / 11.2 | 10.7 / 11.9 | 13.3 / NA | 15 |
| % GOG Recurrent on health, items 2+3 Budget / actual | NA / 8.1 | 12.1 / 5.9 | 7.5 / 6.9 | 6 / 5.4 | 6.6 / NA | NA |
| % Items 2+3 / 1+2+3 Budget / actual | NA / 16.2 | 30 / 13.1 | 16.1 / 13.2 | 16.4 / 11.4 | 11.3 / NA | NA |
| % spending on Districts and below, items 2+3 Budget / actual | 48.5 / XX | XX / 40.9 | 47.8 / 35.4 | 45 / 37.9 | NA | 43 |
| % Earmarked / total DP budget / actual | NA / 62.3 | 44.7 / 32.8 | 40.8 / 39.5 | 41.3 / 26.3 | NA | 40.9 / 40.9 |
| % IGF from Pre-payment | 3 | NA | NA | NA | NA | 20 |
| % Rec. from GOG+HF allocated to Private Sector | 1.2 | NA | NA | NA | NA | 2 |
| % Rec. on exemptions | 3.6 | NA | NA | NA | NA | 8 |
| Source | Ghana Health Sector HALF Year Report of the Programme of Work | | | | | |

1.3 Health system and structure

Medical services in Ghana are provided by the central government, local institutions, missionary institutions (Private-non-profit agencies), and a relatively small number of Private-for-profit practitioners. Mission hospitals represent a large percentage of health service provision, while Private Hospitals constitute less than 2 percent. In 1989, the construction of additional health centers was intensified to expand primary health care to about 60 percent of the rural community.

Many modern medical facilities exist in Ghana, but these are not evenly distributed across the country.

1.4 Health care financing

In 1971, the Government of Ghana introduced the payment of user fees into Public health institutions. This decision was taken because it became clear that government alone could not continue to finance the total cost of providing free and comprehensive health services to the entire population. The user fees policy set lower fee levels for health centers as compared to hospitals in order to discourage the unnecessary use of hospital services and promote efficiency in the use of health facilities

In 1985 the government introduced the *revolving drug funds* concept and the *total cost recovery* for medicines as part of the user fees of Public health institutions.

Despite some arguments for increased efficiency and quality of services, user fees created a financial barrier to health services and resulted in inequities in access to health services and especially in access to medicines. The government recognizes that ensuring equitable, secure and sustainable access to essential medicines is a core element of the national strategy for improving health outcomes of the population.

One of the aims of Ghana's National Drug Policy is to establish a national pricing policy to stabilize medicines prices in the country in order to improve access.

In 2003 Parliament passed a law called Act 650, governing the establishment of the National Health Insurance Scheme (NHIS). The schemes are at an advanced stage and some commenced operation by June 2005. An NHIS medicines list has been developed and work is ongoing to develop a re-imburement medicines price list. It is hoped that the NHIS will bring relief for high out-of-pocket payments for medicines.

Currently the sources of funds for the health sector are the Government of Ghana through the regular budget (38.56%), HIPC inflows (5.94%), Internally Generated Funds from out of pocket payment to facilities (24.89%) and National Health Insurance Funds (7.95%).

Table 2: MOH Financial Performance (2001-2004)

| Indicators | 2001 | 2002 | 2003 | 2004 |
|---|------|------|------|------|
| % GOG budget spent on health | 8.7 | 9.3 | 9.1 | 8.2 |
| % GOG recurrent budget spent for health (all items) | 10.2 | 11.5 | 11.2 | 11.9 |
| % GOG recurrent health spending on items 2 & 3 | 8.1 | 5.9 | 6.9 | 5.4 |
| % non-salary items of GOG recurrent for health | 16.2 | 13.1 | 13.2 | 11.4 |
| % spending on district and below (items 2 & 3) | 48.5 | 40.9 | 35.4 | 37.9 |
| % of earmarked donor funds to total donor fund | 62.3 | 32.8 | 39.5 | 26.3 |
| Total health sector spending per capita USD | 6.3 | 8.1 | 10.5 | 13.5 |
| Recurrent Expenses | | | | |
| 1. Personal Emoluments (Item 1) | 42% | 44% | 45% | 40% |
| 2. Administrative Expenses (Item 2) | 13% | 13% | 9% | 11% |
| 3. Service Expenses (Item 3) | 35% | 24% | 29% | 29% |
| 4. Investment Expenditure (Item 4) | 9% | 19% | 17% | 21% |
| Total | 100% | 100% | 100% | 100% |
| % PE of total recurrent | 47% | 54% | 54% | 50% |

Source: Draft un-audited Financial Report December 31, 2004. Ministry of Health, Ghana

1.5 Medicines supply management

The MOH published its first Essential Medicine List (EML) with therapeutics guidelines in 1988. Since then the list has undergone reviews in response to new knowledge on medicines and diseases as well as changes in the epidemiology of disease in Ghana. The current EML and Standard Treatment Guidelines (STG) were reviewed in 2004.

The criteria used to guide the selection of medicines confine the circulation of essential medicines to specific and appropriate settings and levels of health care delivery. To achieve this, medicines have been grouped into the following categories:

| | |
|----------|--------------------------------|
| Level A | - Community |
| Level B1 | - Health Centre without Doctor |
| Level B2 | - Health Centre with Doctor |
| Level C | - District Hospital |
| Level D | - Regional / Teaching Hospital |
| Level SD | - Specialist Medicines |
| Level PD | - Programme Medicines |

Specialist Medicines are restricted for use by qualified specialists who may request for them. Programme Medicines are those used in Public Health programmes of the MOH and as such used within the guidelines of the specific programmes. The application of the list is adhered to in the Public sector; however in the Private sector often alternative medicines are prescribed, as long as they are registered with the Food and Drugs Board.

Ghana has a state system for medicines procurement in the Public sector, with a functioning Procurement Unit. Purchase of pharmaceuticals by the Central Medical Store (CMS) is both through international competitive bidding and purchasing from local Private suppliers. The Regional Medical Stores (RMS) and teaching hospitals are meant to procure medicines through the CMS and from the local Private sector. All the regional hospitals and facilities are, in turn, expected to procure from the RMS in their respective regions. While it is MOH policy for facilities to procure through the Public system, except in cases of unavailability, it has been observed that there are significant Private sector purchases at all levels.

Currently, lower level facilities are required to either provide their own transportation or pay for the transport of procured medicines. The CMS is now considering providing no-charge transportation to the RMS. Whether those savings will cascade to the facilities remains unclear. It should be noted that the Private sector provides free transportation to facilities engaging in Private sector procurement.

The growth and capacity of local pharmaceutical production is marginal. Local manufacture has been weighed down by the free market policy of the government and

lack of tax exemptions for raw materials thereby adversely affecting production and competition. A list of sixteen generic medicines has been mandated to be produced locally: these are not allowed to be imported into the country in order to give an incentive for local manufacturers.

2.0 STUDY DESIGN AND METHODOLOGY

2.1 Objectives of the study

- To investigate the prices that people pay for medicines
- To establish if the same medicines vary in price across different regions of the country
- To determine the variability in price between innovator brands and their generic equivalents
- To determine the various mark ups and how they contribute to retail prices
- To recommend appropriate strategies to influence the price and improve availability of medicines in the country

2.2 Methodology

2.2.1 Sampling

A multi stage sampling procedure was applied for the selection of regions, districts and sub-district health facilities, through a combination of purposive and random sampling. In order to ensure a fair representation of all regions in the survey, Ghana's ten regions were stratified into categories of socio-economic profile and agro-ecological zones, while the fourth zone was purposively selected as it hosts the capital city, Accra:

- Northern (Upper East, Upper West and Northern Region)
- Middle Belt (Brong Ahafo, Ashanti and Eastern Region)
- Coastal (Western, Central and Volta Regions)
- Greater Accra Region (purposively selected)

One region in each of the other three categories was randomly selected and this resulted in the selection of the Upper East Region, the Ashanti Region and the Western Region. A map indicating these sampled regions is found in [Appendix II](#).

Individual service providing institutions were surveyed and medicines prices were measured in the Public sector, the Private sector and the NGO / Mission sector.

For the Public sector site sampling, the regional hospital in each region was purposively chosen and six other district and sub-district facilities randomly selected to have seven Public sector facilities.

For the Private sector, seven pharmacies within 5-10 km radius of each of the selected Public health facilities were chosen. Seven Private-for-Profit hospitals / clinics and seven NGO / Mission facilities were selected within the same radius.

In a region where seven facilities for any sector were not obtained, additional facilities from the other sectors were surveyed. Therefore 28 outlets in each region were surveyed.

A total of 28 Public sector health facilities, 28 Mission / NGO health facilities, 28 Private-for-Profit hospitals / clinics (although data from these facilities were not analyzed) and 28 retail pharmacies in Greater Accra and the three randomly selected regions were targeted. This was to ensure that a sound statistical analysis could be performed, with the assumption that the selected medicines were widely available.

2.2.2 Selection of medicines to be included in the survey

The HAI / WHO core list of thirty medicines was adopted. The core list had been selected based on the global burden of disease; these relate to both acute and chronic common conditions causing significant morbidity and mortality. Most of these medicines are found on the WHO EML.

Twenty additional (supplementary) medicines were chosen for the survey, based on national disease patterns and registration status in Ghana. It was also necessary that the medicine, dosage form, and strength had an international reference price.

The core and supplementary medicine lists are found in Appendix III.

2.2.3 Data collection

A standardized data collection form (Appendix IV) was used and data collectors were trained in a three-day workshop to ensure the reliability and reproducibility of the survey. Pre-testing of the survey tools was undertaken during the training.

The survey team consisted of health personnel (pharmacists and medical officers) from the four regions included in the survey. Each team (one per region) had one supervisor and three data collectors. Data collection was completed in three weeks.

The availability of the selected medicines was measured at the time of data collection at both the selected facilities and outlets, and three products were surveyed for each medicine:

- Innovator brand (IB)
- Most sold generic equivalent (MSG)
- Lowest price generic equivalent (LPG)

The MSG was determined centrally (based on nationwide data) and the LPG was determined at each health facility or retail pharmacy at the time of data collection.

Public sector procurement prices were also surveyed at the Procurement Unit of the Ministry of Health and at the Catholic Drug Centre.

All prices were converted to US dollars using the exchange rate (buying rate) on 11 October 2004, the first day of the survey.

The components of medicine prices were also identified in order to make an estimate of the manufacturers' prices.

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

2.2.4 Limitations of the study

A limitation of this survey was the lack of assessment of quality of the products surveyed. Although registration by the Food and Drugs Board of Ghana has been used as a proxy indicator of quality, if ever the quality of medicines is considered an issue a different, specific study should be undertaken.

2.2.5 Explanation of terms

Median Price Ratio (MPR): Results on medicines prices gathered by the WHO / HAI survey are expressed as “Median Price Ratios” or MPRs. The MPR is a ratio of the local price divided by an international reference price (converted into the same currency). The reference price serves as an external standard for evaluating local prices, and all studies use the same reference prices to facilitate comparisons. The MPR results in this survey were based on reference prices taken from the 2003 Management Sciences for Health (MSH) International Drug Price Indicator Guide (<http://erc.msh.org/>). The MSH Guide consolidates information from recent price lists of large, non-profit generic medicine suppliers. These suppliers typically do not sell to individual Private pharmacies. Rather they sell in large quantities to governments and NGOs, and accordingly, prices in the MSH Guide tend to be low. They offer a very useful standard against which locally available products can be compared in any country.

Medians and Averages: As averages can be skewed by outlying values, median values were generally used (unless otherwise stated) as better representations of the midpoint values.

Quartiles and Percentiles: A quartile is a percentile rank that divides distribution into four equal parts. The range of values containing the central half of the observations, or the range between the 25th and 75th percentiles (e.g. the range including the values that

are up to 25% higher or down to 25% lower than the median), is called the inter-quartile range.

Affordability: Affordability was measured by the cost of treatment in relation to the income of the lowest paid government worker. According to the Ghana Universal Salary Structure effective 1st July 2004, the lowest paid government worker earned 9,348.30 Ghanaian Cedis, or slightly over USD\$1.00, per day.

3.0 RESULTS

Although the results reported are specifically for the list of medicines surveyed, they are likely to be illustrative of Ghana's entire essential medicines list, and thus should be able to be extrapolated to most medicines across the health sectors surveyed.

The findings are presented as follows:

- 3.1 Affordability
- 3.2 Patient prices in the Private Retail Pharmacies
- 3.3 Patient prices in the Public sector
- 3.4 Patient prices in the Mission sector
- 3.5 Comparison of medicines prices
 - 3.5.1 IB and LPG prices in Private Retail Pharmacies
 - 3.5.2 Medicine price variation within sectors
 - 3.5.3 Rural and urban price variation in the Public sector
- 3.6 Availability
- 3.7 Procurement prices
 - 3.7.1 Public procurement prices compared to patient prices
- 3.8 Price components
- 3.9 Comparison of Ghana prices and affordability with selected countries

3.1 Affordability

Affordability of treatment in nine conditions was measured. See [Appendix V](#) for the full list of conditions for which affordability calculations were made.

Results indicated ([Table 3A](#)) that it would take more wage days for a person to purchase medicines from the Private sector (3.9 days) than from the Mission sector (2.8 days) for Ghana's first line treatment of malaria (artesunate and amodiaquine).

For the treatment of severe hypertension requiring a combination of two or more medicines, the lowest paid government worker required similar days of wages to buy the atenolol and hydrochlorothiazide for a thirty-day treatment in all three sectors: 1.7 days in the Public and Mission sectors; and two days' wages in the Private Retail Pharmacy sector (Table 3B).

For the treatment of typhoid fever, the lowest paid government worker would require six days wages to buy the lowest price generic ciprofloxacin in all the sectors (Public, Private and Mission). (Table 3C)

Table 3A: Affordability for treatment of malaria in adults with combination of artesunate and amodiaquine

| Medicine | Total tabs per treatment | Treatment days | Public sector | | Private sector | | Mission sector | |
|-----------------------|--------------------------|----------------|-------------------------|-------------|-------------------------|-------------|-------------------------|-------------|
| | | | Median treatment price* | Days' wages | Median treatment price* | Days' wages | Median treatment price* | Days' wages |
| artesunate 100mg tab | 6 | 3 | | | 35000 | 3.6 | 23000 | 2.5 |
| amodiaquine 200mg tab | 9 | 3 | 3600 | 0.4 | 3000 | 0.3 | 3150 | 0.3 |
| combination treatment | | 3 | n/a | n/a | 36500 | 3.9 | 26150 | 2.8 |

*in Ghanaian Cedis

Table 3B: Affordability for treatment of hypertension in adults with atenolol and hydrochlorothiazide

| Medicine | Total tabs per treatment | Treatment days | Public sector | | Private sector | | Mission sector | |
|------------------------------------|--------------------------|----------------|-------------------------|-------------|-------------------------|-------------|-------------------------|-------------|
| | | | Median treatment price* | Days' wages | Median treatment price* | Days' wages | Median treatment price* | Days' wages |
| atenolol 50mg tab (LPG) | 30 | 30 | 13500 | 1.4 | 16000 | 1.6 | 12000 | 1.3 |
| hydrochlorothiazide 25mg tab (LPG) | 30 | 30 | 3000 | 0.3 | 4200 | 0.4 | 3600 | 0.4 |

*in Ghanaian Cedis

Table 3C: Affordability for treatment of typhoid fever with ciprofloxacin in adults

| Medicine | Total tabs per treatment | Treatment days | Public sector | | Private sector | | Mission sector | |
|-------------------------------|--------------------------|----------------|-------------------------|-------------|-------------------------|-------------|-------------------------|-------------|
| | | | Median treatment price* | Days' wages | Median treatment price* | Days' wages | Median treatment price* | Days' wages |
| ciprofloxacin 500mg tab (LPG) | 28 | 14 | 56000 | 6 | 56000 | 6 | 56000 | 6 |

*in Ghanaian Cedis

The graphs below also illustrate the affordability calculations using individual generic medicines in the three sectors (Figure 2) and using brands and generics (Figure 3).

Figure 2:

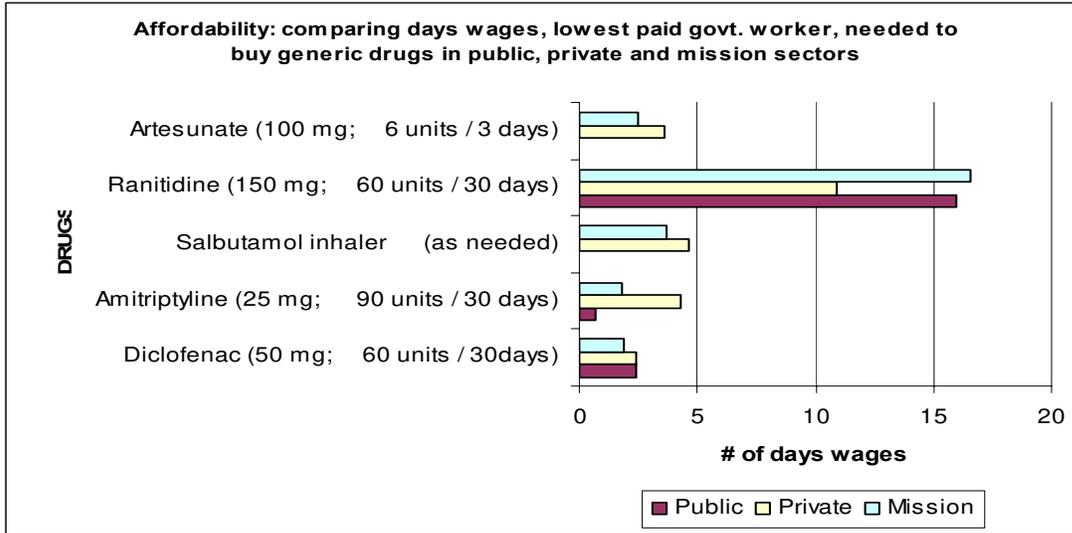
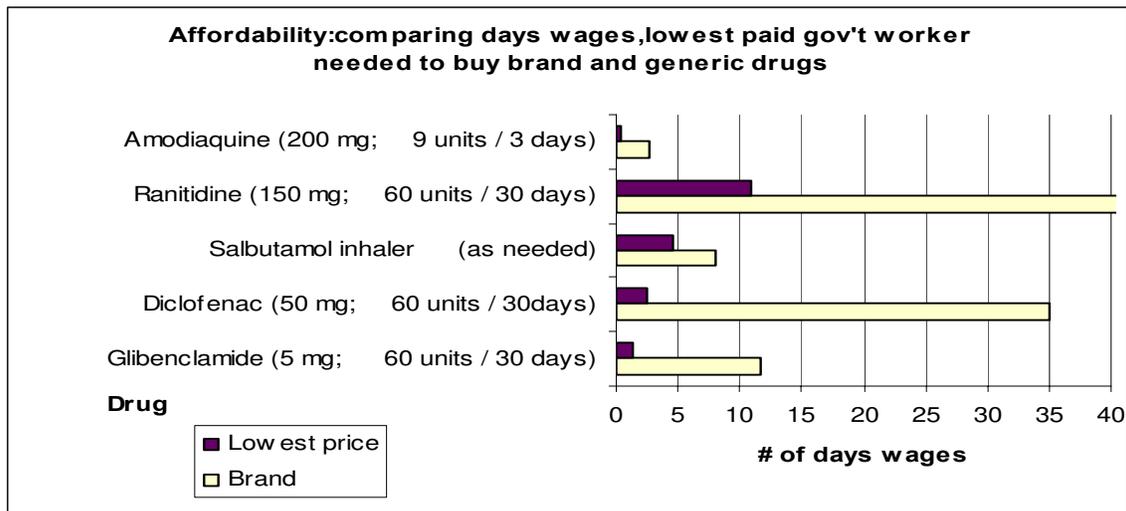


Figure 3:



3.2 Patient prices in the Private Retail Pharmacies

In the Private Retail Pharmacy sector the innovator brands were found to be priced at more than 18 times the IRP; fifty percent were in the range of 9.13 to 52.14 times the

IRP. Generic prices were lower: 50% of the LPGs cost between 2.04 and 7.00 times the IRP.

Table 4A: Summary of MPRs in Private retail pharmacies

| | Innovator Brand | Most Sold Generic | Lowest Price Generic |
|------------------------------|-----------------|-------------------|----------------------|
| Number of medicines included | 18 | 29 | 39 |
| Median MPR | 18.47 | 3.53 | 4.12 |
| 25%ile MPR | 9.22 | 2.05 | 2.04 |
| 75%ile MPR | 60.67 | 6.70 | 7.00 |
| Minimum MPR | 2.86 | 1.14 | 0.99 |
| Maximum MPR | 154.34 | 33.65 | 33.65 |

3.3 Patient prices in the Public sector

In the Public sector, the median MPR for the lowest priced generic for fifty medicines was 2.43, with an inter-quartile range of 1.35 to 5.11. Only three innovator brand medicines were found, although their prices were significantly higher.

Table 4B: Summary of MPRs in Public sector facilities

| | Innovator Brand | Most Sold Generic | Lowest Price Generic |
|------------------------------|-----------------|-------------------|----------------------|
| Number of medicines included | 3 | 8 | 30 |
| Median MPR | 14.91 | 2.30 | 2.43 |
| 25%ile MPR | 11.13 | 1.29 | 1.35 |
| 75%ile MPR | 40.93 | 4.38 | 5.11 |
| Minimum MPR | 7.35 | 1.14 | 0.08 |
| Maximum MPR | 66.94 | 7.05 | 23.17 |

3.4 Patient prices in the Mission sector

In the Mission sector, the median MPR of the lowest priced generic for fifty medicines was 2.75, with an inter-quartile range of 1.58 to 4.44. Brands were not found.

Table 4C: Summary of MPRs in Mission facilities

| | Innovator Brand | Most Sold Generic | Lowest Price Generic |
|------------------------------|-----------------|-------------------|----------------------|
| Number of medicines included | 0 | 14 | 35 |
| Median MPR | | 3.33 | 2.75 |
| 25%ile MPR | | 1.53 | 1.58 |
| 75%ile MPR | | 4.51 | 4.44 |
| Minimum MPR | | 1.00 | 0.77 |
| Maximum MPR | | 6.63 | 31.41 |

3.5 Comparison of medicine prices

Price comparisons between the three sectors indicated that, in general, the Public sector had lower prices than the Retail Pharmacy sector and similar prices to the Mission sector.

- Prices were found to be on average 65.9% more expensive in Private Retail Pharmacies than in the Public sector for the lowest priced generics
- Prices were found to be on average 49.8% more expensive in Private Retail Pharmacies than in the Mission sector for the lowest priced generics
- Prices were found to be on average 12.6% more expensive in Mission facilities than in the Public sector for the lowest priced generics

Two scenarios different from above were observed:

1. There were instances where prices of generics were *the same* as innovator brands. For example, some institutions sold innovator brands for a period of time but when they changed to generics, they failed to change the price.
2. There were instances where prices of generics were *higher* than innovator brands. For example, donations of innovator brands in Public and Mission institutions were priced very low.

3.5.1 Comparison of IB and LPG prices in the Private retail pharmacy sector

The prices of the innovator brand medicines were much higher than their equivalent generics. For the 17 medicines for which both IB and LPG were present within the Retail Pharmacy sector, the difference in price between innovator brands and lowest price generics ranged from 21% to 1360%.

On average, the IB price was 3.74 times the LPG price in this sector.

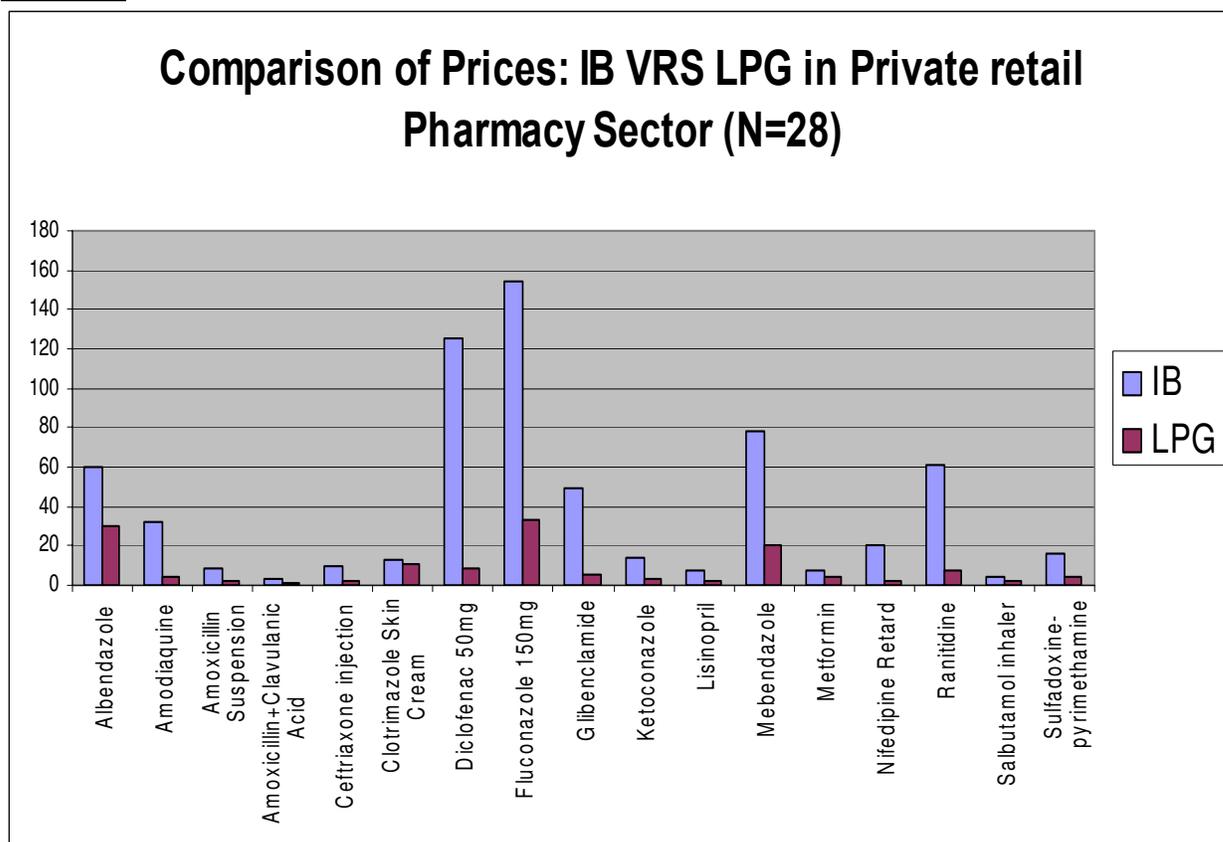
These differences are illustrated below in [Table 5](#) and [Figure 4](#).

Table 5: Percentage difference in price (using MPRs) between IB and LPG in the Private Retail Pharmacy sector

| medicine | Innovator Brand price | Lowest Price Generic price | Percent difference in price: IB vs LPG |
|------------------------|-----------------------|----------------------------|--|
| albendazole | 60.25 | 30.13 | 100 |
| amodiaquine | 32.1 | 3.78 | 750 |
| amoxicillin suspension | 9.07 | 1.86 | 387 |
| amox+clavulanic acid | 2.86 | 1.47 | 94 |
| ceftriaxone inj | 9.66 | 2.17 | 345 |
| clotrimazole cream | 13.01 | 10.75 | 21 |

| | | | |
|-----------------------------|--------|-------|------|
| diclofenac 50mg | 125.33 | 8.58 | 1360 |
| fluconazole 150mg | 154.34 | 33.65 | 359 |
| glibenclamide | 49.24 | 5.47 | 800 |
| ketoconazole | 13.43 | 3.13 | 329 |
| lisinopril | 7.13 | 1.88 | 280 |
| mebendazole | 78.31 | 20.21 | 288 |
| metformin | 7.56 | 4.41 | 71 |
| nifedipine retard | 20.64 | 2.6 | 695 |
| ranitidine | 60.81 | 7.66 | 694 |
| salbutamol inhaler | 4.34 | 2.48 | 75 |
| sulfadoxine - pyrimethamine | 16.29 | 4.36 | 273 |

Figure 4:



3.5.2 Medicine price variations within sectors

There were wide variations in prices for the same medicine within and between sectors, as illustrated below in Figures 5 - 7. As an example, generic mebendazole tablets were sold in some Public institutions at about thirty times the price in other Public institutions.

Figure 5:

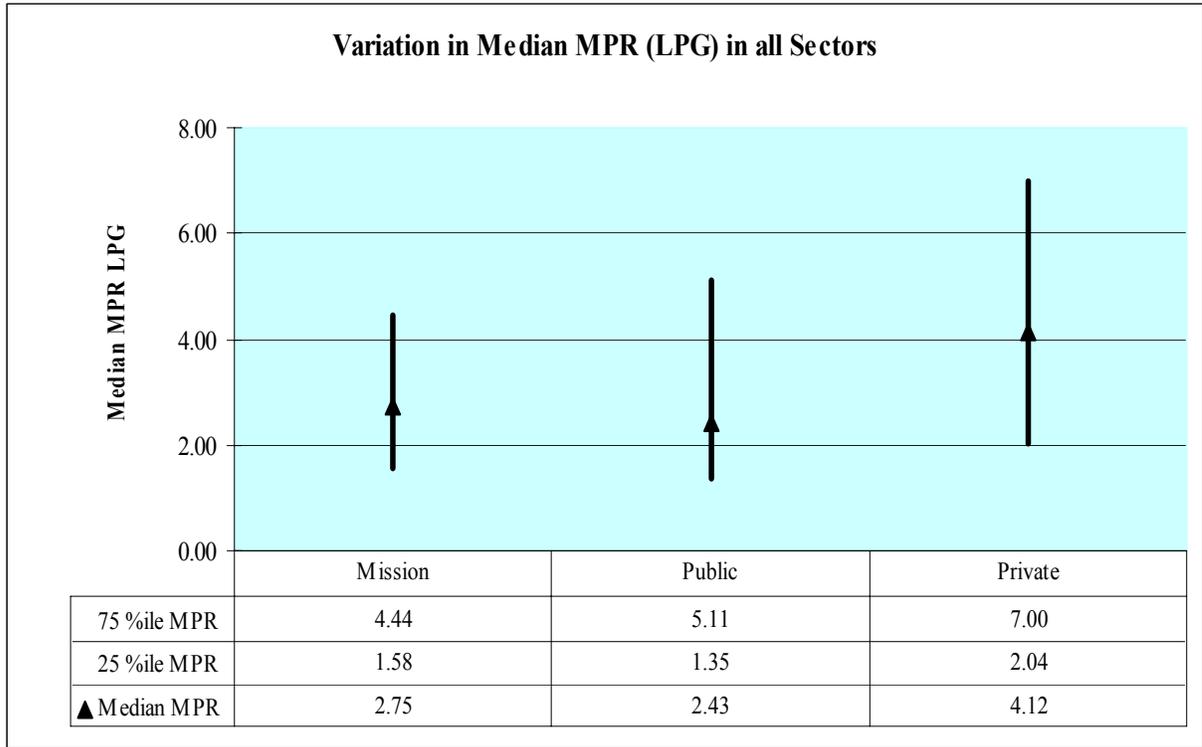


Figure 6:

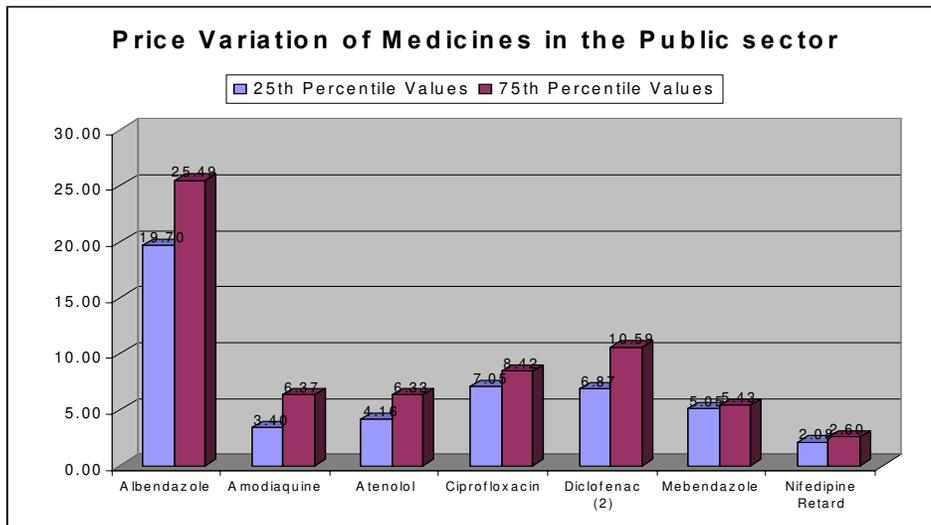
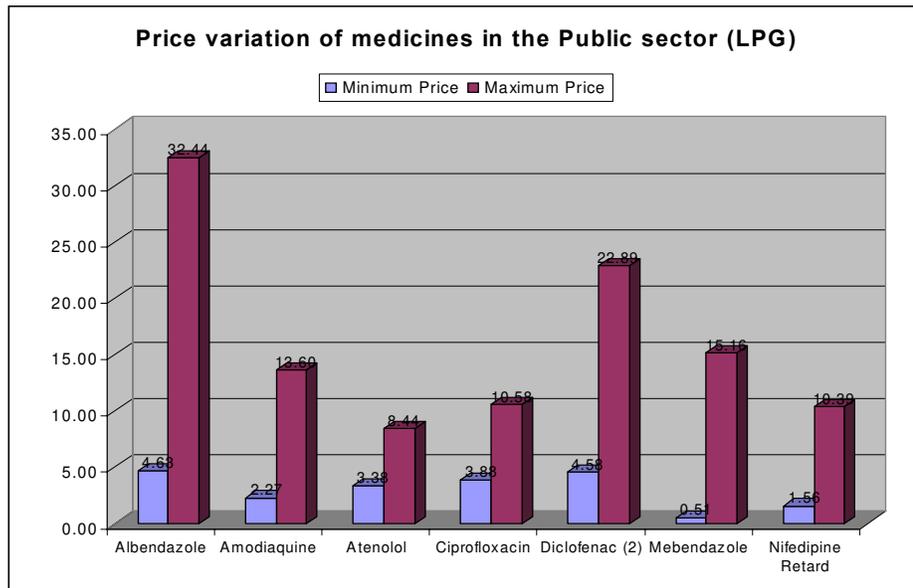


Figure 7:



3.5.3 Rural and urban medicine price variations in the Public sector

The Greater Accra Region, in which the capital Accra city is located, is the most urbanized area of the country. The Public Central Medical Stores and all the major wholesalers of medicines are located in this region. Conversely, the Upper East Region is more than 700 kilometers from the capital and is mainly a rural setting.

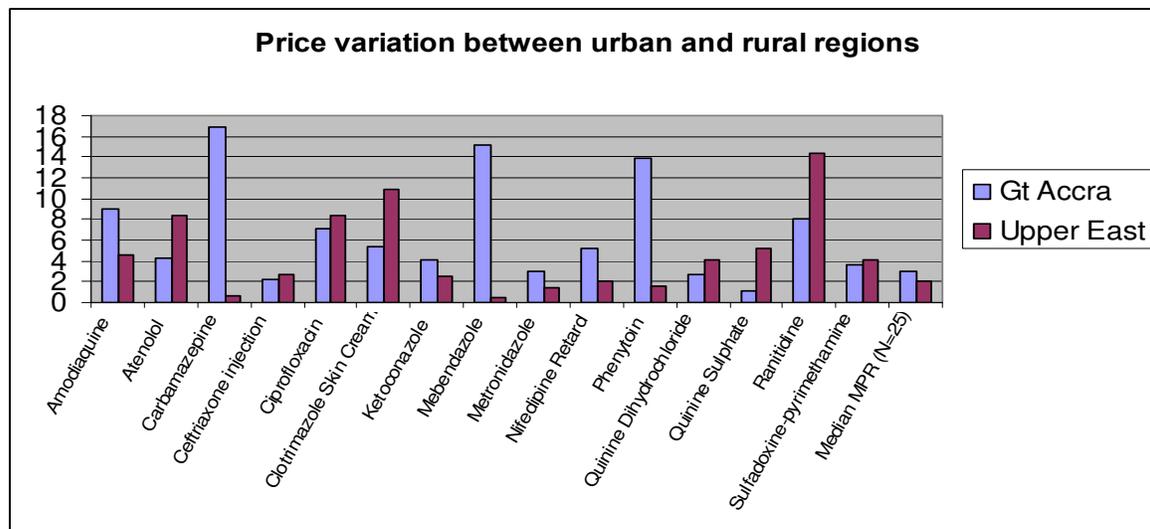
Public sector patient medicine price data from these two geographical areas were compared. The results are in Table 6 and Figure 8 below, for the 25 medicines found in both areas.

The median MPR was higher in the urban area than in the rural area. For the Public sector specifically, the MPRs indicated that prices in the urban area were on average one and a half times higher than prices in the rural area.

Table 6: Rural versus urban comparison of Public sector facility prices

| medicine | Median MPR (LPG) | |
|-----------------------------|-------------------------|---------------------------|
| | Gt Accra Region (urban) | Upper East Region (rural) |
| amitriptyline | 0.44 | 1.11 |
| amodiaquine | 9.06 | 4.53 |
| amoxicillin | 1.57 | 1.43 |
| amoxicillin suspension | 1.37 | 1.19 |
| atenolol | 4.34 | 8.44 |
| carbamazepine | 16.91 | 0.56 |
| ceftriaxone inj | 2.21 | 2.68 |
| chloramphenicol | 2.27 | 1.13 |
| ciprofloxacin | 7.05 | 8.42 |
| clotrimazole cream | 5.42 | 10.84 |
| cotrimoxazole suspension | 1.56 | 1.56 |
| diazepam | 0.64 | 0.96 |
| diclofenac (2) | 9.16 | 8.58 |
| ibuprofen | 1.34 | 1.34 |
| ketoconazole | 4.03 | 2.57 |
| mebendazole | 15.16 | 0.51 |
| metformin | 2.27 | 3.78 |
| metronidazole | 3.03 | 1.44 |
| nifedipine retard | 5.19 | 2.08 |
| phenytoin | 13.82 | 1.58 |
| quinine dihydrochloride | 2.75 | 4.12 |
| quinine sulphate | 1.05 | 5.26 |
| ranitidine | 8.11 | 14.41 |
| sulfadoxine – pyrimethamine | 3.71 | 4.15 |
| tetracycline | 1.21 | 1.52 |
| median MPR (n=25) | 3.03 | 2.08 |

Figure 8:



3.6 Availability

Availability of 39 of the core and supplementary medicines was determined on the day of data collection in the three sectors.

Out of the 39 medicines, 27 (70%) had availability less than 50% in the Public sector, 23 (60%) had availability less than 50% in the Mission sector, and 6 (20%) had availability less than 50% in the Retail Pharmacy sector. Thus, and as illustrated in Table 7A, the Private Retail Pharmacy sector had generally better availability than the Public and Mission sectors.

Availability of the IB, LPG and MSG formulations for three individual medicines (albendazole, mebendazole and amoxicillin+clavulanic acid) in the three sectors are further illustrated in Figures 9 – 11.

The trends revealed the best availability of the *LPG* in all sectors, but with the highest overall availability in the Private sector. In other specific cases, such as with mebendazole, the *brand* medicine also had the highest availability in the Private sector while the Public and Mission sectors showed poor availability of brands.

Table 7A: Comparison of % availability of 39 medicines in three sectors

| Medicine | % availability (for LPG) | | |
|--------------------------|--------------------------|----------------|-------------------------|
| | Public sector | Mission sector | Private retail pharmacy |
| acyclovir | 0.0 | 3.6 | 60.7 |
| albendazole | 25.0 | 28.6 | 82.1 |
| amodiaquine | 57.1 | 67.9 | 57.1 |
| amoxicillin | 92.9 | 96.4 | 96.4 |
| amoxicillin suspension | 89.3 | 85.7 | 96.4 |
| amox+clavulanic acid | 17.9 | 17.9 | 82.1 |
| artemether | 0.0 | 7.1 | 14.3 |
| artesunate | 7.1 | 21.4 | 42.9 |
| atenolol | 28.6 | 39.3 | 92.9 |
| beclomethasone inhaler | 0.0 | 0.0 | 3.6 |
| captopril | 3.6 | 14.3 | 46.4 |
| ceftriaxone injection | 21.4 | 32.1 | 50.0 |
| chloramphenicol | 85.7 | 89.3 | 96.4 |
| ciprofloxacin | 82.1 | 89.3 | 100.0 |
| clotrimazole cream | 14.3 | 50.0 | 78.6 |
| cotrimoxazole suspension | 85.7 | 92.9 | 92.9 |
| diazepam | 85.7 | 89.3 | 78.6 |

| | | | |
|------------------------------|-------------|-------------|-------------|
| diclofenac (2) | 85.7 | 71.4 | 92.9 |
| fluconazole (2) | 10.7 | 28.6 | 85.7 |
| glibenclamide | 39.3 | 67.9 | 92.9 |
| hydrochlorothiazide | 17.9 | 32.1 | 64.3 |
| ibuprofen | 85.7 | 82.1 | 89.3 |
| ketoconazole | 10.7 | 10.7 | 64.3 |
| lisinopril | 17.9 | 17.9 | 57.1 |
| mebendazole | 21.4 | 32.1 | 53.6 |
| metformin | 32.1 | 46.4 | 92.9 |
| metronidazole | 89.3 | 96.4 | 96.4 |
| naproxen | 14.3 | 32.1 | 71.4 |
| nifedipine retard | 92.9 | 75.0 | 100.0 |
| norfloxacin | 3.6 | 7.1 | 85.7 |
| nystatin pessary | 3.6 | 42.9 | 75.0 |
| omeprazole | 25.0 | 60.7 | 82.1 |
| phenytoin | 14.3 | 35.7 | 50.0 |
| quinine dihydrochloride | 17.9 | 25.0 | 25.0 |
| quinine sulphate | 21.4 | 42.9 | 32.1 |
| ranitidine | 14.3 | 32.1 | 75.0 |
| salbutamol inhaler | 10.7 | 35.7 | 50.0 |
| sulfadoxine – pyrimethamine | 46.4 | 85.7 | 96.4 |
| tetracycline | 96.4 | 78.6 | 96.4 |
| median % availability | 21.4 | 39.3 | 78.6 |

Figure 9:

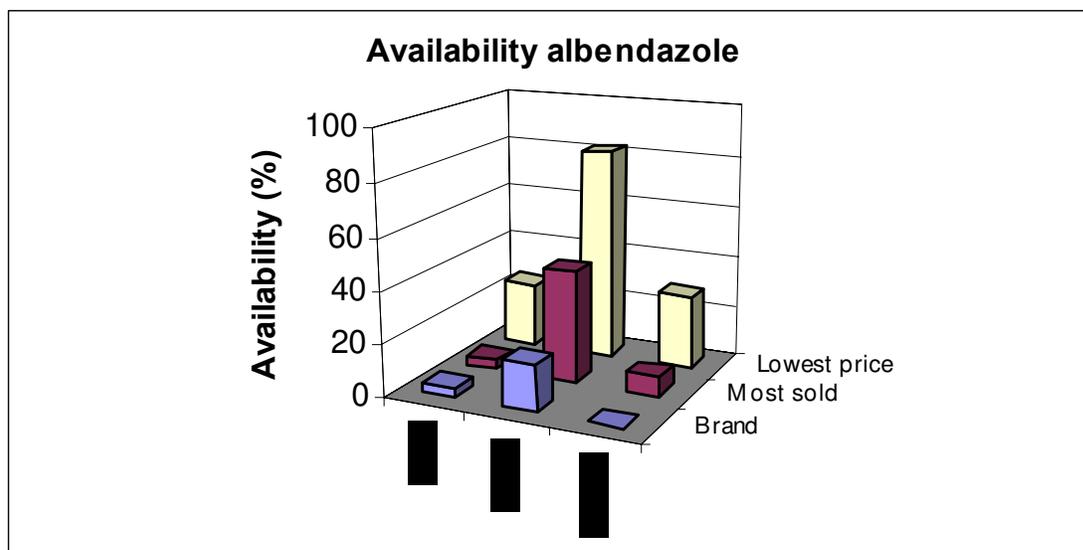


Figure 10:

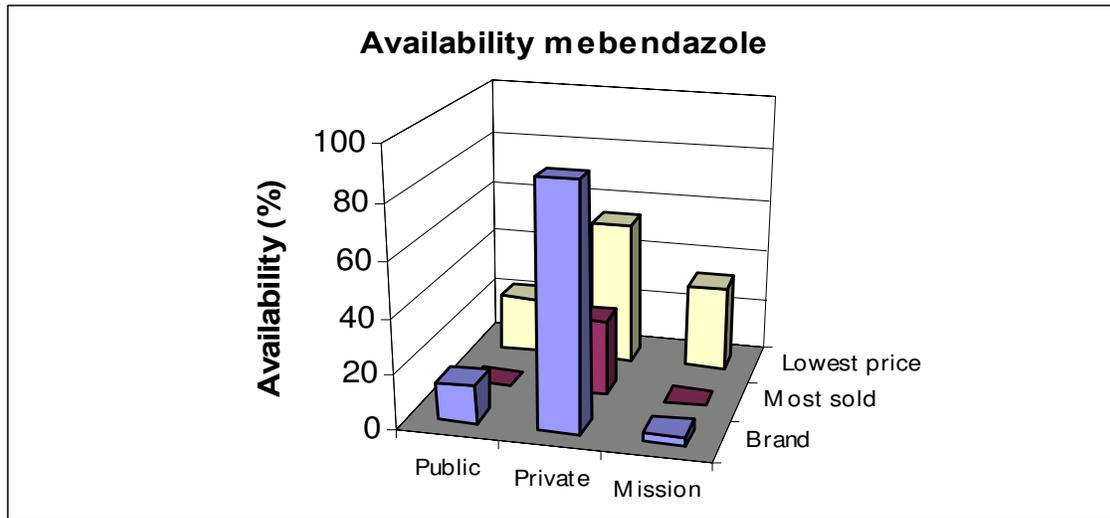
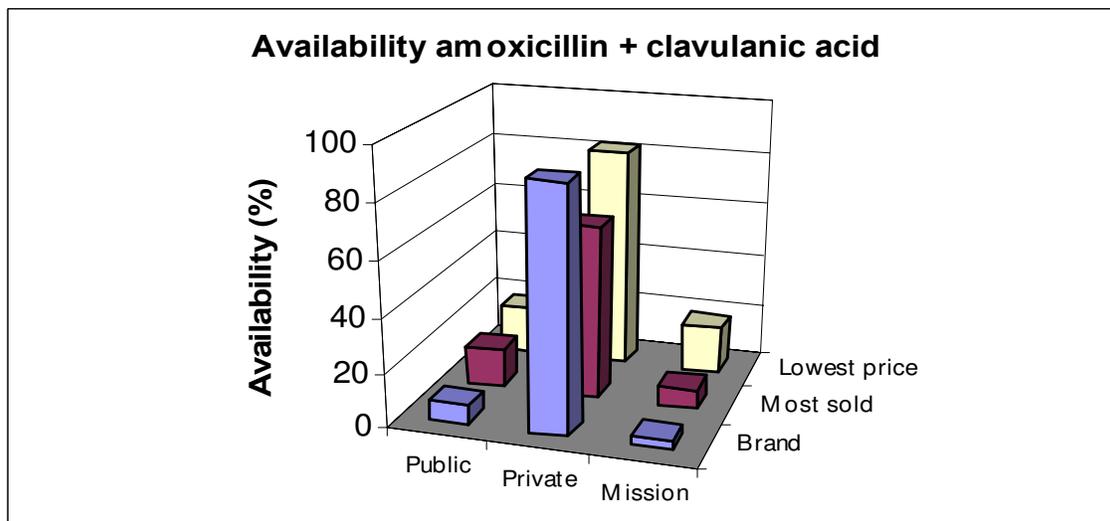


Figure 11:



There were significant variations of availability even within the same sector. Table 7B shows the variation in availability between urban and rural settings within the Retail Pharmacy sector; indeed availability varied similarly to the price differences.

Table 7B: Summary of median MPRs and availability in urban (Gt. Accra) and rural (Upper East Region) settings in the retail pharmacy sector (n=37)

| | Median MPR | % availability |
|---------------------------|------------|----------------|
| Gt Accra Region (urban) | 3.88 | 71.43 |
| Upper East Region (rural) | 4.15 | 92.86 |

3.7 Procurement prices

These prices were investigated for both the Public and Mission sectors.

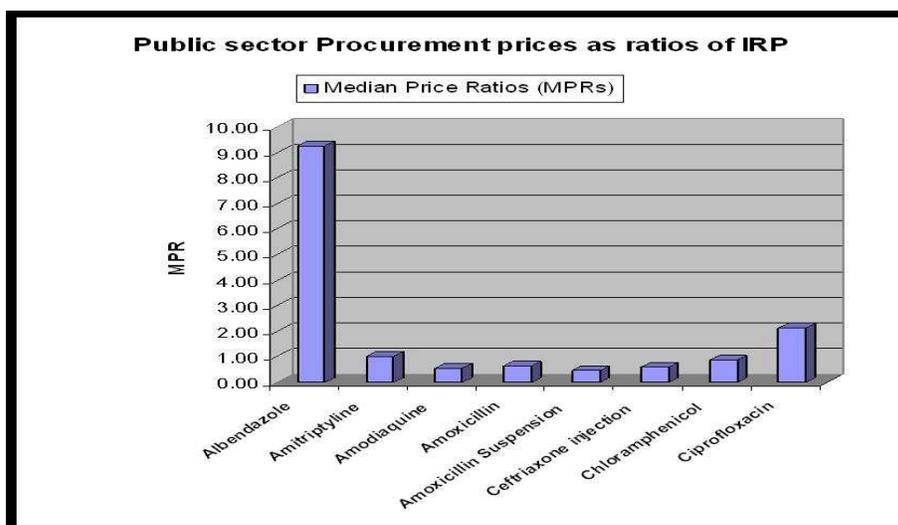
Table 8 below shows the procurement prices of the Ministry of Health Procurement Unit and the Catholic Drug Centre, as a ratio of the International Reference Prices. A ratio above 1 meant the procurement authority was buying at a price higher than what was available from some agents in the international market. Conversely a ratio below 1 meant the procurement authority was buying at a price lower than the international market price.

The MOH procurement unit MPR (for the LPG) was 0.95 for 26 medicines, meaning the median procurement price achieved was just under the IRP. It should be noted that the MPRs ranged from 0.43 (for salbutamol) to 9.27 (for albendazole) and seven (27%) out of the 26 medicines surveyed had median procurement prices more than twice the IRP.

Table 8: MPRs for 26 medicines found in the Public sector procurement unit

| Medicine | Median MPR (for LPG) |
|-----------------------------|----------------------|
| albendazole | 9.27 |
| amitriptyline | 1.00 |
| amodiaquine | 0.55 |
| amoxicillin | 0.65 |
| amoxicillin suspension | 0.45 |
| carbamazepine | 1.13 |
| ceftriaxone injection | 0.60 |
| chloramphenicol | 0.89 |
| ciprofloxacin | 2.12 |
| clotrimazole cream | 3.92 |
| cotrimoxazole suspension | 0.45 |
| diazepam | 0.80 |
| diclofenac (2) | 1.72 |
| fluphenazine injection | 5.76 |
| glibenclamide | 1.64 |
| ibuprofen | 0.81 |
| ketoconazole | 1.85 |
| mebendazole | 6.00 |
| metformin | 0.76 |
| metronidazole | 0.46 |
| nevirapine | 0.83 |
| nifedipine retard | 1.04 |
| phenytoin | 2.05 |
| salbutamol inhaler | 0.43 |
| sulfadoxine – pyrimethamine | 2.04 |
| tetracycline | 0.50 |
| median MPR | 0.95 |

Figure 12: MOH Public sector procurement prices as ratio of IRP



The Catholic Drug Centre (CDC) procurement MPR (for LPGs) was 1.31 for 22 medicines found, meaning that the median procurement price achieved was 31% above the IRP. This ranged from 0.63 (for omeprazole) to 17.95 (for fluconazole) and seven (32%) out of the 22 medicines surveyed had median procurement price more than twice the IRP.

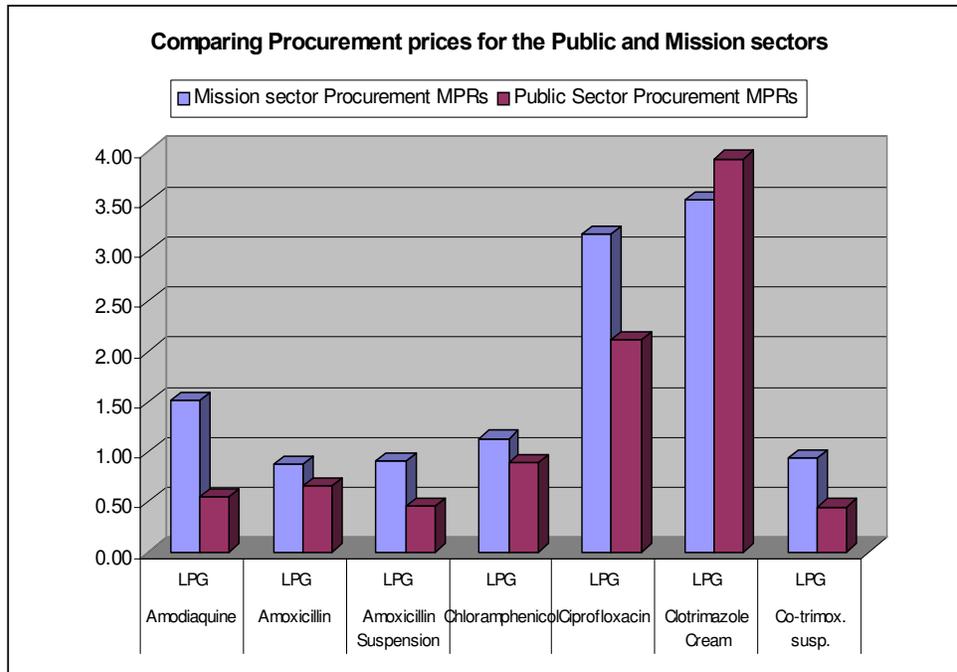
Table 9: MPRs for 22 medicines found in the CDC procurement unit

| Medicine | Median MPR (for LPG) |
|-------------------------------|----------------------|
| amodiaquine | 1.51 |
| amoxicillin | 0.88 |
| amoxicillin suspension | 0.91 |
| amoxicillin + clavulanic acid | 0.98 |
| chloramphenicol | 1.13 |
| ciprofloxacin | 3.17 |
| clotrimazole cream | 3.51 |
| cotrimoxazole suspension | 0.93 |
| diazepam | 1.19 |
| diclofenac (2) | 3.43 |
| fluconazole (2) | 17.95 |
| glibenclamide | 2.19 |
| hydrochlorothiazide | 1.44 |
| ibuprofen | 0.76 |
| ketoconazole | 3.36 |
| metformin | 1.00 |
| metronidazole | 0.77 |
| nifedipine retard | 0.91 |
| norfloxacin | 1.95 |
| nystatin pessary | 5.32 |

| | |
|--------------------|-------------|
| omeprazole | 0.63 |
| salbutamol inhaler | 1.59 |
| median MPR | 1.31 |

Overall, when comparing the prices obtained by CDC and the MOH Procurement Unit (for LPGs), the CDC prices were 44% higher for 16 medicines.

Figure 13: Comparison of MOH and CDC procurement prices for some medicines



3.7.1 Comparison of Public procurement prices to patient prices in all sectors

There was a significant difference between the prices paid by patients and the procurement prices in the Public and Mission sectors. Figures 14 and 15 show the prices for some specific medicines, and their corresponding Public procurement prices, in all the sectors. The mark-ups for Public and Mission prices (+119% and +127% respectively) were generally high.

Figure 14:

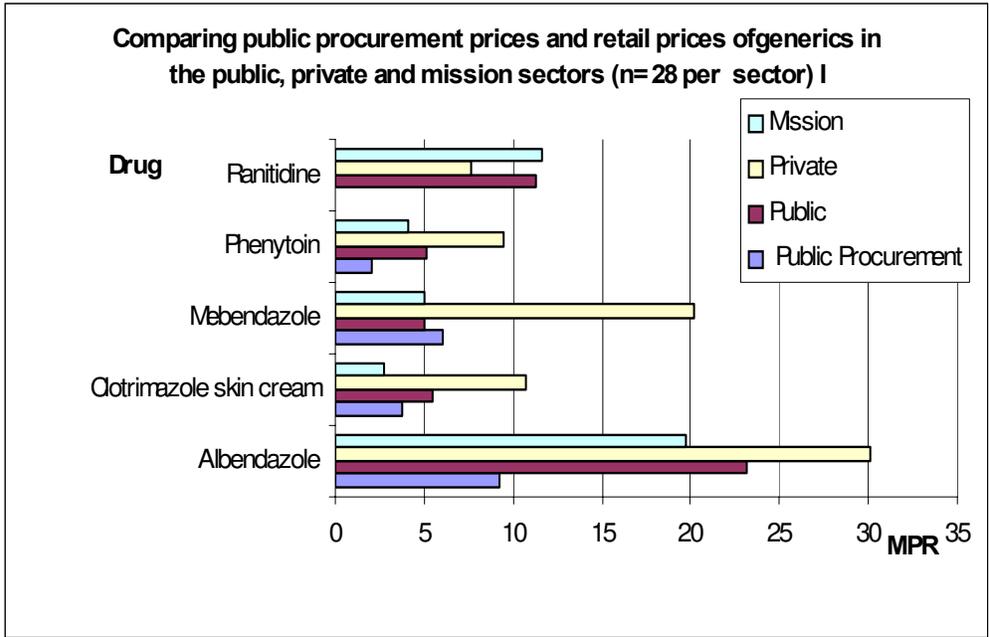
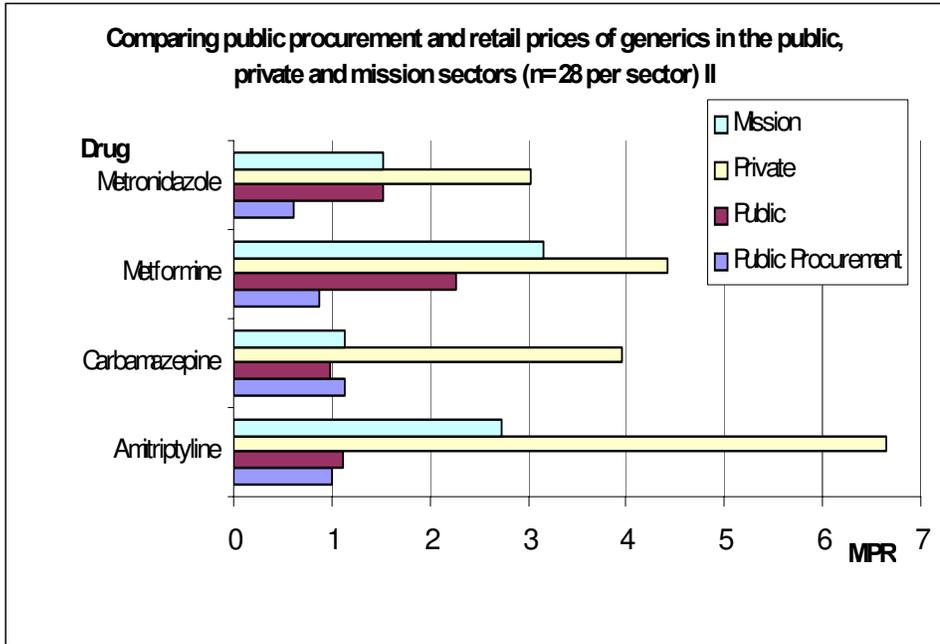


Figure 15:



3.8 Price Components

The components contributing to the final price, from procurement to the patient price, were investigated to study the differences in mark-ups and to assess the influence of tariffs, taxes and mark-ups on the prices patients pay for their medicines.

Tables 10 and 11 show the figures obtained in interviews with stakeholders. It is noted that the figures obtained as a result of the data analysis for the survey did not correspond to the declared wholesale and retail mark-up figures.

The mark-ups observed from the survey revealed wide variations for different medicines within the same sector, and across all three sectors. For example, the mark-up for patients on LPGs ranged from 177.8 - 246.3% in the Public sector, 27.35 - 387.6% in the Private sector, and 66.7 - 185.7% in the Mission sector. This is illustrated in Table 12.

Table 10: Private sector price components from interviews

| Tax / Charge / Mark-up | Investigation / interview | Cumulative build-up |
|----------------------------|---------------------------|---------------------|
| CIF | 100 | 100 |
| Import duty | 10 | 110 |
| VAT + NHIL | 15* | 126.5 |
| Port inspection | 1* | |
| ECOWAS levy | 0.5* | |
| Export development levy | 0.5* | |
| Network charges | 0.5* | 129.66 |
| Wholesale mark-up (30-40%) | 35 | 175.04 |
| Retail mark-up (30-40%) | 35 | 236.31 |
| Final cumulative | | 236.31 |

*on post import duty price

Table 11: Public sector price components from interviews

| Tax / Charge / mark-up | Investigation / interview | Cumulative build-up |
|-------------------------|---------------------------|---------------------|
| CIF | 100 | 100 |
| Import duty | 10 | 110 |
| VAT + NHIL | 15* | 126.5 |
| Port inspection | 1* | |
| ECOWAS levy | 0.5* | |
| Export development levy | 0.5* | |
| Network charges | 0.5* | 129.66 |
| Wholesale mark-up (20%) | 20 | 155.59 |
| Retail mark-up | 10 | 171.15 |
| Final cumulative | | 171.15 |

*on post import duty price

Table 12: Summary of calculated mark-ups for selected medicines

| Item | Public procurement | Public patient charge | Private patient charge | Mission patient charge |
|----------------------------|--------------------|-----------------------|------------------------|------------------------|
| Ciprofloxacin 500mg tab | 25.00% | 233.33% | 387.59% | 122.22% |
| Nifedipine retard 20mg tab | 4.11% | 177.78% | 216.53% | 185.71% |
| Cotrimoxazole suspension | 53.88% | 246.26% | 27.35% | 66.67% |
| Glibenclamide 5mg tablet | 16.67% | 233.33% | 150.00% | 106.25% |

Across the three sectors there was also a wide variation of mark-ups for the same item as shown for glibenclamide in Table 13.

Table 13: Calculated mark-up on the LPG of glibenclamide tab for all sectors

| Item | Public procurement | Public patient | Private patient | Mission patient |
|-----------------------------------|--------------------|----------------|-----------------|-----------------|
| Manufacturer pack price (Cedis) | 6000 | 6000 | 8000 | 8000 |
| Manufacturer pack size (# units) | 100 | 100 | 100 | 100 |
| Manufacturer unit price (MUP) | 60 | 60 | 80 | 80 |
| Ratio MUP to reference unit price | 1.64 | 1.64 | 2.19 | 2.19 |
| Sector median unit price (SMUP) | 70 | 200 | 200 | 165 |
| % mark-up: SMUP over MUP | 16.67% | 233.33% | 150.00% | 106.25% |

There was no apparent consistency in marking up prices in all sectors and on individual medicines. Figures 16 – 21 graphically illustrate the lack of uniformity in markups in all the sectors.

Figure 16:

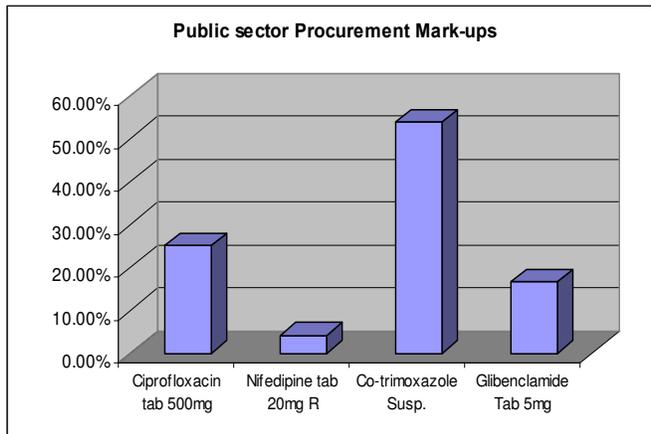


Figure 17:

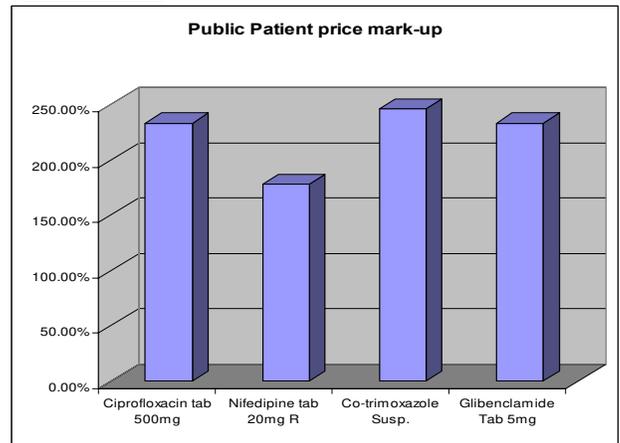


Figure 18:

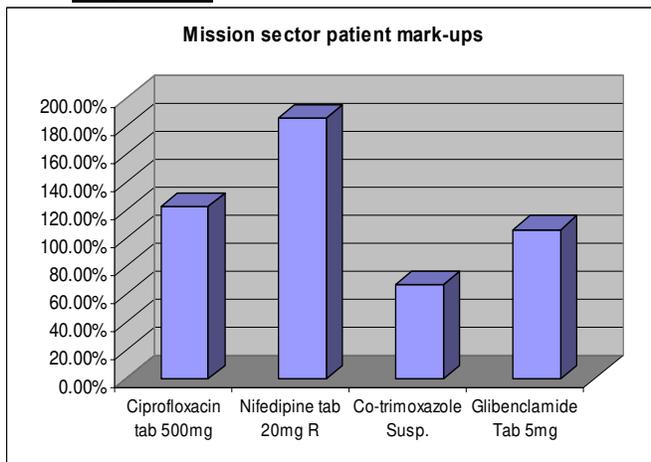


Figure 19:

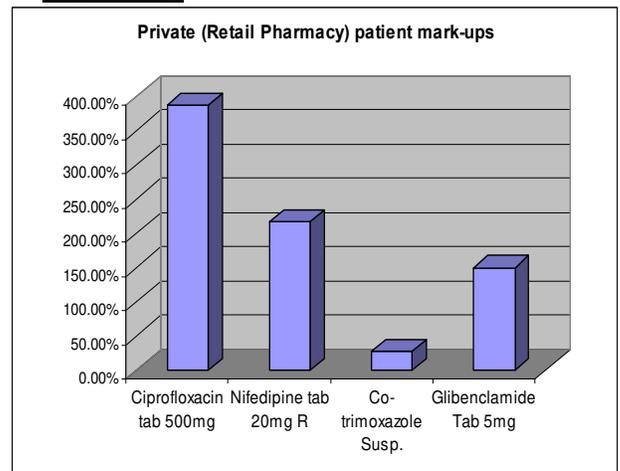


Figure 20:

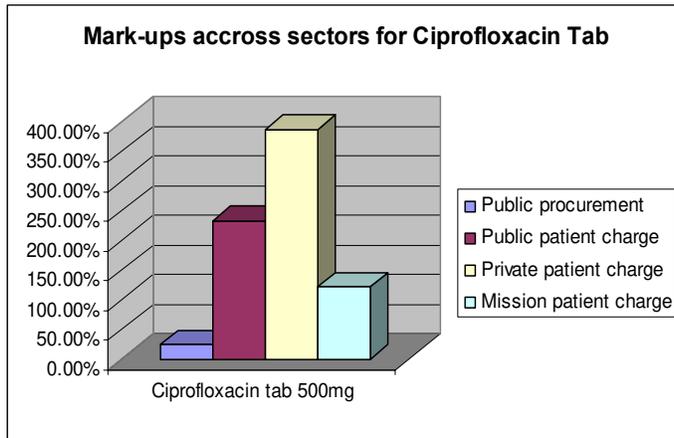
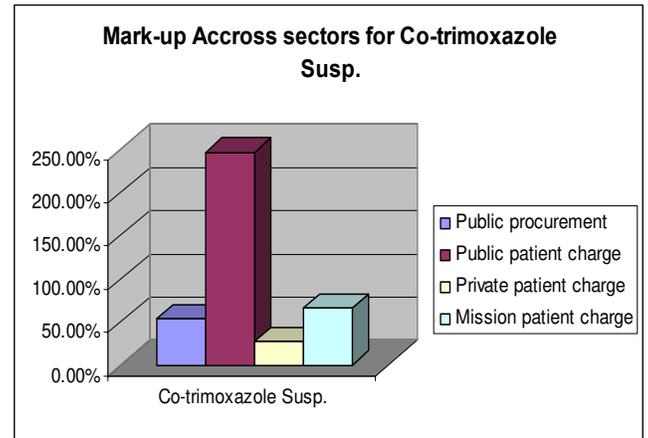


Figure 21:

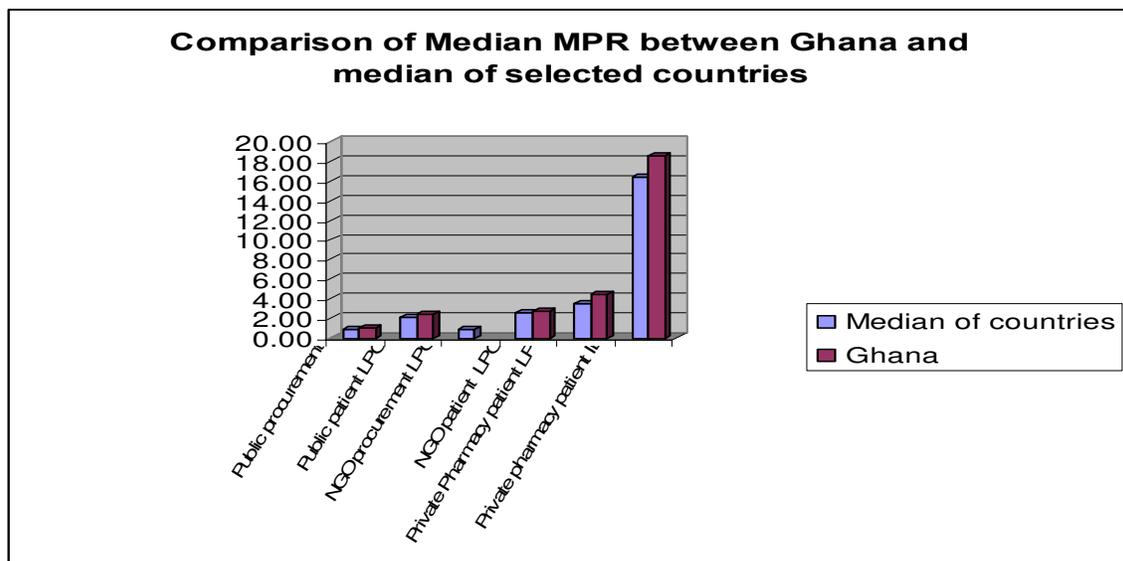


3.9 Comparison of Ghana prices and affordability with selected African countries

The price and affordability of medicines in Ghana was compared with those from a selection of African countries in which similar studies were conducted.

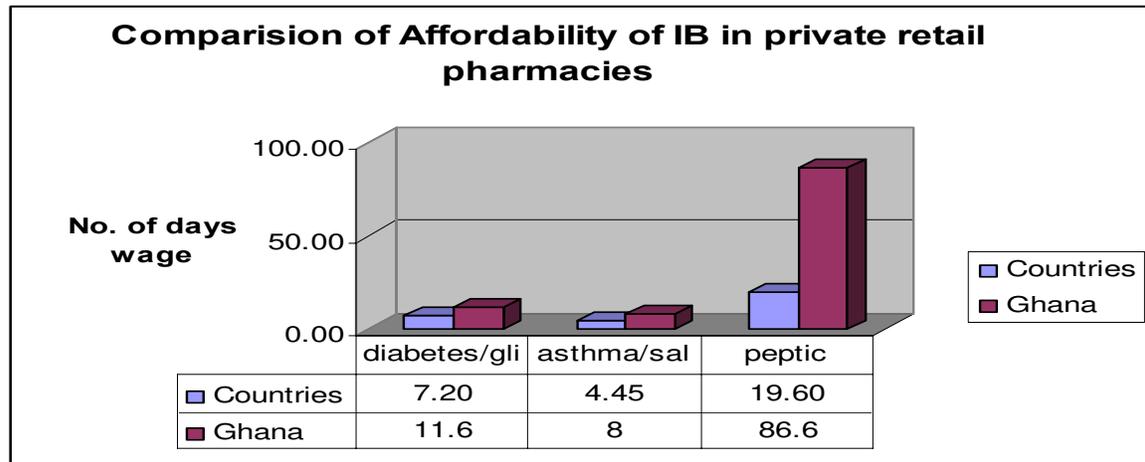
The Median MPR and affordability (expressed in number of days' wages) in eight African countries compared to that of Ghana (Figure 22) shows that the median price in Ghana was higher than the combined median price of the eight countries.

Figure 22:



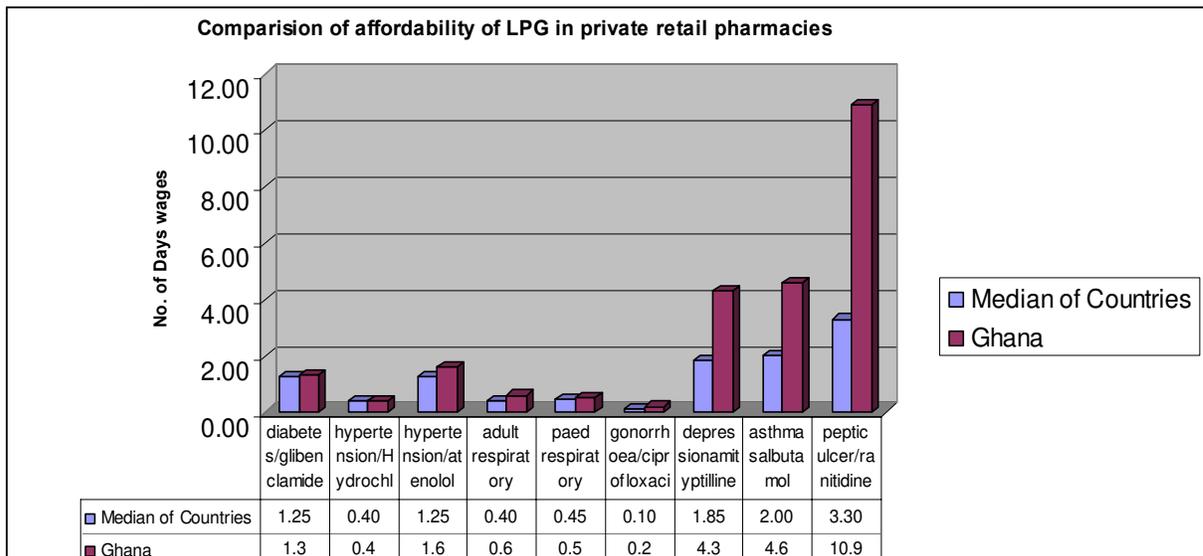
The number of days' wages which would be needed for the lowest paid government worker in Ghana to manage diseases like diabetes, peptic ulcer and asthma using the innovator brand medicines (glibenclamide, salbutamol inhaler and ranitidine respectively) were higher than the median days' wages required for the same worker in the other selected countries.

Figure 23:



Similarly, the comparison of LPGs (Figure 24) indicated that a higher number of days' wages would be needed in Ghana to treat these conditions. In general, it would be more expensive to treat diseases in Ghana than in many other African countries.

Figure 24:



4.0 DISCUSSION

4.1 Affordability and patient prices

The cost to the patients varied considerably depending on which sector they were using to seek treatment, and whether they would be purchasing branded or generic medicines. Although affordability was based on the wages of the lowest paid government worker, it must be acknowledged that many Ghanaians live on even less than these wages. Thus any medicine that the government worker would struggle to afford would be beyond the reach of many more.

Even many of the short term treatments (eg for acute diseases) would be difficult to afford for many Ghanaians. Using malaria as an example, the lowest paid government worker would require 3.9 days' wages to purchase the first line treatment of amodiaquine / artesunate from a Private Retail Pharmacy and 2.8 days' wages for the same medicines in the Mission sector. Furthermore, considering that malaria is endemic in the country (40% of outpatient visits are related to malaria), and the average number of episodes per person per year is about 3, the cumulative costs are clearly out of reach for many.

Many treatments for chronic conditions were also revealed to be simply unaffordable for the average Ghanaian; costs would become even more unacceptably high if the LPG was not available. This was the case in some of the facilities surveyed: at times only the brands were available. Indeed, the prices of brand medicines in nearly all cases were much higher than the LPG prices. For example (in the Private sector) the lowest paid government worker would require 86.6 days' wages to purchase a 30-day treatment of branded ranitidine for peptic ulcer, as compared to 10.9 days' wages if using the LPG ranitidine. Overall, the percentage difference in prices observed between brands and generics ranged from 21% to 1360% for 17 medicines when both IB and LPG were found in the Retail sector. (Thus if only the brand was available in the Retail sector, patients would have to pay up to 1360% more than they would had they been able to choose an LPG of the same medicine.)

Furthermore, in the common situation of a family size greater than five, when more than three members may get malaria three times a year and when at least one member may be suffering from one chronic condition (for example peptic ulcer, asthma or hypertension), it is obvious that such a family would not be able to afford the necessary medicines if earning below, or even equivalent to, the lowest government wage.

Generally, the lowest paid government worker would have to work for more days to be able to purchase medicines from the Private Retail sector than in both the Public and Mission sectors. Furthermore, prices were generally higher in the urban areas than in the rural areas.

Considering a situation where there is no alternative financing of medicines (such as the health insurance which was previously not available in Ghana), many families will suffer financial catastrophes when disease strikes. Indeed, other surveys have shown that family members have to borrow money or sell assets to pay hospital fees.⁵

It is relevant to note that the eventual implementation of the National Health Insurance Scheme (NHIS) may not have a significant impact on improving the financing of medicines in the country. For example (using local currency) a patient requires 36,500 Cedis per malaria episode, and the same person will be required to contribute a premium of 72,000 Cedis per year towards the NHIS. This will mean that with only two episodes of malaria the entire premium contribution will be used up by NHIS. Furthermore, the premium paid under the NHIS will also cover the contributor's children below the age of 18 years, one of the most vulnerable age groups for malaria. The malaria situation alone will have great implications on the sustainability of the NHIS and alternative financing must be considered.

Finally, although the prices of branded medicines were significantly higher than their generic equivalents, it was noted that some health facilities inflated the prices for generics to the same level as the brands. (For example, one facility sold generic glibenclamide at the

⁵ Review of Exemptions Policy 2003 (Draft)

price as its innovator brand.) This was possible where there was low availability of generic medicines, and indeed for many of the medicines surveyed, there seemed to be little generic competition. Therefore, the issue of making generics available in all sectors should be a primary focus of the health policy in Ghana because it is well known that where generics are highly available, the prices of their branded equivalents will often decrease significantly.

4.2 Availability and patient prices

As did price, so did availability also vary within the same sector. The availability in the Public sector was lowest (14.3%), thus theoretically driving people in need of medicine to the other sectors – availability was 75% in the Private sector and 32.1% in the Mission sector – where, again, the prices were generally much higher. If such people cannot afford the Private sector prices, they may go without medicines completely.

The low availability of medicines in the Public sector is unacceptable, as this is the sector where poor people would hope that some, if not all, of their costs would be covered. Factors contributing to the low availability must be considered and investigated, including inefficiency in the Public sector logistics management system, and inadequate financing.

4.3 Procurement and patient prices

The results indicate that, overall, the prices in the Mission procurement unit were higher than in the Public procurement unit (MPRs 0.95 and 1.3 respectively).

The majority of medicines procured in both sectors fell below the International Reference Prices, however the fact that some items were much higher than the IRP indicated some inconsistencies in the procurement process. For example the procurement prices for ciprofloxacin tablets and clotrimazole cream were between 3 to 4 times the prices quoted in the international market, in both agencies. In one extreme case, the MOH procurement unit procured albendazole tablets at 9 times the IRP. Considering that the sample of medicines studied was very small compared to the total of items usually procured by these agencies (for example, the Public procurement usually procures large quantities of

nearly 400 medicines from Ghana's EML) the implications in terms of cost are highly significant. Procurement practices and limited sourcing must both be considered for improvement.

The differences between the patient prices in the Mission and Public sectors could not be easily generalized nor rationalized to the procurement prices; however they were similar and definitely lower than those found in the Private Retail Pharmacies.

The Private sector was not willing to share their procurement prices to enable a broader comparison, however considering that most importers in the Private sector have small capital and buy small quantities, it may be hypothesized that they were not procuring at cheaper prices.

4.4 Comparison with other countries

Even though the procurement prices in Ghana compare very well with international reference prices, the findings suggest that the final price of many medicines are relatively much higher, and less affordable, in Ghana than in other countries.

5.0 SUMMARY OF FINDINGS

The key findings of the study include the following:

- Medicines are generally unaffordable in the country. The majority of the population earn below the lowest paid government workers who already have to struggle to be able to afford treatment of various endemic conditions.
- There are inconsistencies and a lack of uniformity in the price markups for medicines in all sectors. This has resulted in high and varied patient prices across sectors and between brands and generics.
- Although individual duties and taxes on medicines are relatively low, their cumulative effect contributes to the high patient (final) price.
- A considerable number of medicines procured in the Public and Mission sectors are purchased at equal to or below the IRPs, indicating efficiency in procurement.

The few significant outliers (e.g. those medicines procured at prices above the IRP) offer opportunity for improvement.

- The low prices obtained by Public and Mission sector procurement were essentially not passed on to patients.
- The price to the patient was much lower in the Public than in the Retail (Private) Pharmacy sector.
- The prices of innovator brands were considerably higher than the prices of their generic equivalents.
- Although generics were more available than brands in all sectors, the overall availability of the list of medicines surveyed was very low in the Public and Mission sectors.

6.0 RECOMMENDATIONS

1. Import duties, taxes and port charges and facility markups contribute greatly to the price of medicines and therefore:

- Advocacy is needed for the government to reduce the taxes and tariffs on all essential medicines.
- The government should develop price guidelines for medicines for the Private and Public sector and enforce compliance with maximum mark-ups in all sectors.
- A medicines prices index should be developed in order to guide pricing, especially of essential medicines.

2. The government should effectively implement its policy on generic prescribing and dispensing.

3. There is need to undertake a knowledge, attitude, beliefs and practices survey to examine the extent to which generics will be accepted fully in all sectors. Advocacy should be undertaken to increase consumer awareness and acceptance of generic equivalents, and to stimulate generic prescribing.

4. Incentives should be introduced to encourage compliance with the generic policy; prescribers need motivation to prescribe medicines by their generic names.
5. Policymakers should explore avenues for the establishment of an autonomous National Pooled Procurement System to cater for all sectors of the health system to help ensure lower procurement prices.
6. Immediate alternative sources should be sought for procurement of the specific medicines found being procured at significantly higher prices than the IRPs.
7. Local manufacturing of essential medicines should be supported and encouraged; Interest rates on loans to suppliers and manufacturers (for importation of raw materials and equipment) should be reduced. Taxes and tariffs should be removed for imported raw materials and essential manufacturing equipment.
8. The process of registration and post market surveillance should be improved to ensure that quality generic medicines are available on the market; this would increase their acceptability.
9. The findings of this survey should be used for more in-depth review of broad policy options to improve access to medicines for all Ghanaians.
10. Regular surveys of medicine prices are needed to measure the impact of strategies, policy changes and other targeted interventions.
11. An extended survey should be undertaken to ascertain the reasons for the low availability of medicines, including generics, in the Public sector.
12. Despite the availability of more affordable generics in Ghana, there is still indication of high demands for innovator brands in the Private retail pharmacy as indicated by the relatively high availability in this sector. An in-depth study of the Private sector should be initiated to investigate prescribing practice and the preference for brands.

7.0 CONCLUSIONS

A pricing study of this nature cannot reveal the complete picture of the pharmaceutical sector, and access to medicines, in Ghana. However, it is hoped that the findings and recommendations of this report will be studied and will contribute to the ongoing examination of the pharmaceutical sector in Ghana in order to improve access to and affordability of medicines for all.

APPENDIX I: National Pharmaceutical Sector Form

Date: 09 July 2004

Population: 19.4 million

Rate of exchange (commercial “buy” rate) to US dollars on the first day of data collection: ₵8,900

Sources of information:

1. www.ghanaweb.com
2. Ghana Procurement and Supplies Directorate
3. Ghana National Drugs Programme
4. Ghana Food and Drugs Board
5. Ghana Pharmacy Council
6. Department of Health, Ghana National Catholic Secretariat

General information on the pharmaceutical sector

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

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

If yes, state total number of medicines on national EML: 456

If yes, year of last revision: 2000 and currently being reviewed

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

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

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

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

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

Are there incentives for generic prescribing or substitution? Yes No

*Public procurement*⁶

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

⁶ If there is a Public procurement system, there is usually a limited list of items that can be procured. Products procured on international tenders are sometimes registered in the recipient country only by generic names. Import permits to named suppliers are issued based on the approved list of tender awards. An open tender is one that is Publicly announced; a closed one is sent to a selection of approved suppliers.

If no, please specify if any other limitation is in force: **Products should be registered in the country**

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

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

Are the products purchased all registered? **Yes** **No**

Is there a local preference?⁷ **Yes** **No**

Are there Public health programmes fully implemented by donor assistance which also provide medicines? (e.g. TB, family planning, etc.) **Yes** **No**

If yes, please specify: **Family planning medicines / devices are fully implemented by donors**

*Distribution*⁸

Is there a Public sector distribution centre/warehouse? **Yes** **No**

If yes, specify levels: **Central Medical Stores, Regional Medical Stores, District Medical Stores**

Are there Private not-for-profit distribution centres? **Yes** **No**

If yes, please specify: **(Church Missions) Catholic Drug Centre and Depots**

Number of licensed wholesalers: **Not easily available**

Retail

| Approximate: | Urban | Rural | Overall |
|---|-------|-------|---------------|
| Number of inhabitants per pharmacy | n/a | n/a | 16,358 |
| Number of inhabitants per qualified pharmacist | n/a | n/a | 14,924 |
| Number of pharmacies with qualified pharmacists | n/a | n/a | 1186 |
| Number of medicine outlets with Pharm. technician | n/a | n/a | not available |
| Number of other licensed medicine outlets | n/a | n/a | 9814 |

*Private sector*⁹

Are there independent pharmacies? **Yes** **No** Number: **1186**

⁷ A local preference means that local companies will be preferred even if their prices are not the cheapest. Local preference is normally in the range of 10–20%.

⁸ The Public sector often has a central storage and distribution centre which may have at least one sublevel. The Private not-for-profit sector may be dominated by one type of NGO (e.g. church missions), but may also comprise others such as Bamako Initiative type projects, Red Cross or Red Crescent Society, Médecins Sans Frontières.

⁹ Retail outlets may be called pharmacies, medicine outlets, drug stores, chemists, etc. They may be run/owned by a qualified pharmacist (with diploma) or another category: e.g. pharmacy technician, or a lay person with short training.

Are there chain pharmacies? Yes No Number: n/a

Do doctors dispense medicines?¹⁰ Yes No
If yes, approximate coverage or % of doctors who dispense: **Not readily available**

Are there pharmacies or medicine outlets in health facilities? Yes No

Financing

(Give approximate figures, converted to US dollars at current exchange rate)

| Type of expenditure | Approximate annual budget |
|---|---|
| National Public expenditure on medicines including government insurance, military, local purchases in past year | USDS \$ 13, 836,180 (only Public expenditure on medicines) |
| Estimated total Private medicine expenditure in past year (out of pocket, Private insurance, NGO/Mission) | Not readily available |
| Total value of international medicine aid or donations in past year | Not readily available |

What percentage of medicines by value is imported? **Not readily available**

Government price policy

Is there a medicines regulatory authority? Yes No

Is pricing regulated? Yes No

Is setting prices part of market authorization/registration? Yes No

Do registration fees differ between:

Innovator brand and generic equivalents Yes No

Imported and locally produced medicines Yes No

Public sector

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

Central medical stores **20-25%**

Regional store **10%**

Other store (District Medical Store) **10%**

Public medicine outlet **10%**

Are there any other fees or levies? Yes No

If yes, please describe: **Import Duties 10%, Value Added Tax 12.5%, ECOWAS Levy 0.5%, Handling Charges 0.1-2.5%, Inspection Charges 1%**

Private retail sector

Are there maximum profit margins? Yes No

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

Wholesale **no fixed percentages**

Retail **20- 50%**

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

¹⁰ Many countries allow doctors to dispense and sell medicines.

Do patients pay professional fees (e.g. dispensing fee)? Yes No
If yes, please describe: **Consultation fees**

“Other” sector

Are there maximum profit margins? Yes No
If yes (if they vary, give maximum and minimum):
Wholesale **10-20%**
Retail **n/a**

Is there a maximum sales price? Yes No

Are there any health insurance, risk-sharing or prepayment schemes or revolving medicine funds? Yes No
If yes, please describe: **Social Health Insurance Scheme through Mutual Health Organizations, National Health Insurance, Private insurance schemes, revolving drug funds**

Are all medicines covered? Yes No
If no, state which medicines are covered (e.g. EML, Public health programmes): **EML and there is talk of developing an insurance reimbursement list**

Are some patients / groups of patients exempted, regardless of insurance coverage? (e.g. children < X yrs, war veterans) Yes No
If yes, please specify: **Pregnant women, children under five years, the aged (<70), paupers**

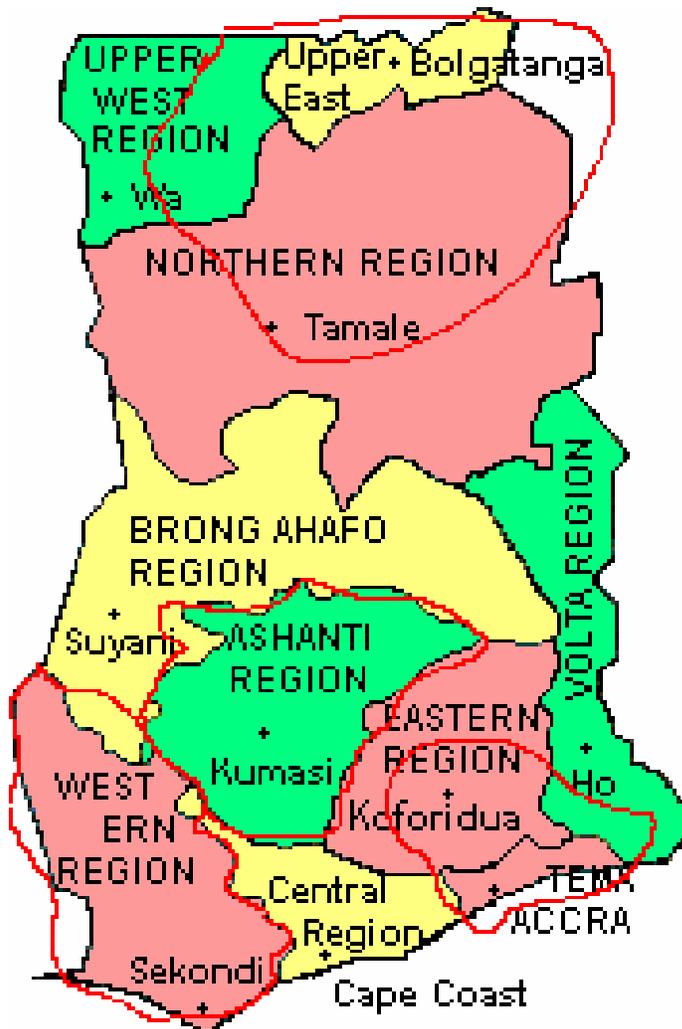
Estimated percentage of population covered: **Not readily available**

Is it official policy to supply all medicines free at primary health care level? Yes No
If no, are some free? Yes No
If yes, tick 3 all that apply:
 Tuberculosis
 Malaria
 Oral rehydration salts
 Family planning
 Others, please specify: **vaccines for children**

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

Are all medicines supplied free at hospitals? Yes No
If no, are some free? Yes No
If yes, please specify: **tuberculosis, family planning, and vaccines for children**

APPENDIX II: Study Areas



APPENDIX III: List of Medicines Surveyed

Core List of Medicines for Price Survey

| No. | Generic Name | Dose | Dosage Form | Medicine Category |
|-----|---------------------------|-----------------|-----------------|----------------------|
| 1 | Acyclovir | 200 mg | tablet | Antiviral |
| 2 | Amitriptyline | 25 mg | tablet | Antidepressant |
| 3 | Amoxicillin | 250 mg | capsule/tab | Antibacterial |
| 4 | Artesunate | 100 mg | tablet | Antimalarial |
| 5 | Atenolol | 50 mg | tablet | Antihypertensive |
| 6 | Beclometasone | 50 mcg/dose | inhaler | Antiasthmatic |
| 7 | Captopril | 25 mg | tablet | Antihypertensive |
| 8 | Carbamazepine | 200 mg | tablet | Antiepileptic |
| 9 | Ceftriazone | 1 g | injection | Antibacterial |
| 10 | Ciprofloxacin | 500 mg | tablet | Antibacterial |
| 11 | Co-trimoxazole | (8+40) mg/ml | paediatric susp | Antibacterial |
| 12 | Diazepam | 5 mg | tablet | Anxiolytic |
| 13 | Diclofenac | 25 mg | tablet | Anti-inflammatory |
| 14 | Fluconazole | 200 mg | tablet/capsule | Antifungal |
| 15 | Fluoxetine | 200 mg | tablet/capsule | Antidepressant |
| 16 | Fluphenazine decanoate | 25 mg/ml | injection | Antipsychotic |
| 17 | Glibenclamide | 5 mg | tablet | Antidiabetic |
| 18 | Hydrochlorothiazide | 25 mg | tablet | Antihypertensive |
| 19 | Indinavir | 400 mg | capsule | Antiviral |
| 20 | Losartan | 50 mg | tablet | Antihypertensive |
| 21 | Lovastatin | 20 mg | tablet | Serum lipid reducing |
| 22 | Metformin | 500 mg | tablet | Antidiabetic |
| 23 | Nevirapine | 200 mg | tablet | Antiviral |
| 24 | Nifedipine Retard | 20 mg | tablet | Antihypertensive |
| 25 | Omeprazole | 20 mg | capsule | Antacid |
| 26 | Phenytoin | 100 mg | tablet | Antiepileptic |
| 27 | Pyrimethamine+Sulfadoxine | (500+25) mg | tablet | Antimalarial |
| 28 | Ranitidine | 150 mg | tablet | Antacid |
| 29 | Salbutamol | 0.1 mg per dose | inhaler | Antiasthmatic |
| 30 | Zidovudine | 100 mg | capsule | Antiviral |

Supplementary List of Medicines for Price Survey

| No. | Generic Name | Dose | Dosage Form | Medicine Category |
|------------|----------------------------|-------------|--------------------|--------------------------|
| 1 | Amodiaquine | 200 mg | tablet | Antimalarial |
| 2 | Amoxicillin | 25 mg/ml | paediatric susp | Antibacterial |
| 3 | Artemether | 50 | tablet | Antimalarial |
| 4 | Chloramphenicol | 250 mg | capsule/tablet | Antibacterial |
| 5 | Chlorphenamine | 4 mg | tablet | Antiallergic |
| 6 | Clotrimazole | 1% | cream | Antifungal |
| 7 | Diclofenac | 50 mg | tablet | Anti-inflammatory |
| 8 | Fluconazole | 150 mg | tablet/capsule | Antifungal |
| 9 | Hydrocortisone | 100 mg | injection | Antiallergic |
| 10 | Ibuprofen | 200 mg | tablet | Anti-inflammatory |
| 11 | Lisinopril | 10 mg | tablet | Antihypertensive |
| 12 | Mebendazole | 500 mg | tablet | Anthelmintic |
| 13 | Metronidazole | 200 mg | tablet | Antiamoebic/giardiasis |
| 14 | Penicillin Benzyl Procaine | 4 mu | injection | Antibacterial |
| 15 | Quinine Dihydrochloride | 300 mg/ml | injection | Antimalarial |
| 16 | Quinine Sulfate | 300 mg | tablet | Antimalarial |
| 17 | Tetracycline | 1% | ophthalmic oint. | Antibacterial |
| 18 | Tetracycline | 250 mg | capsule | Antibacterial |
| 19 | Albendazole | 400 mg | tablet | Anthelmintic |
| 20 | Amoxicillin+Clavulanate | 500+125 | tablet | Antibacterial |

APPENDIX IV: Medicine Price Data Collection Form

Use one form for each health facility and pharmacy

Date: _____ Area number: _____

Name of town/village/district: _____

Name of health facility/pharmacy (optional): _____

Health facility/pharmacy ID (mandatory): _____

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

Type of health facility:

- Public Private retail pharmacy
 Other (please specify): _____

Type of price in Public and Private not-for-profit sector:

- Procurement price Price the patient pays

Name of manager of the facility: _____

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

Data collectors: _____

Verification (to be completed by the area supervisor at the end of the day)

Signed: _____

Date: _____

MEDICINE PRICE DATA COLLECTION FORM

Most sold: determined nationally

Lowest price: determined at facility

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|---------------|--------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| Aciclovir tab 200 mg | Zovirax | GSK | | 25 | | | /tab | |
| <i>Most sold generic equivalent</i> | | | | 25 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 25 | | | | |
| Albendazole tab 400 mg | Zentel | SKB | | 1 | | | /tab | |
| <i>Most sold generic equivalent</i> | Alben | SB Generics | | 1 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|---|---------------|-----------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| Amitriptyline tab 25 mg | Tryptizol | MSD | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Amitriptyline | COX | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Amodiaquine tab 200 mg | Camoquine | Parke Davies | | 10 | | | /tab | |
| <i>Most sold generic equivalent</i> | Amoquine | SB Generics | | 10 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 10 | | | | |
| Amoxicillin caps/tab 250 mg | Amoxil | SKB (GSK) | | 21 | | | /tab | |
| <i>Most sold generic equivalent</i> | Permoxyl | Ernest Chemists | | 21 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 21 | | | | |
| Amoxicillin P Susp. 25mg/ml | Amoxil | SKB (GSK) | | 1 | | | /ml | |
| <i>Most sold generic equivalent</i> | Permoxyl | Ernest Chemist | | 1 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |
| Amoxicillin+ Clavulanic acid tab (500+125) mg | Augmentin | SKB | | 14 | | | /tab | |
| <i>Most sold generic equivalent</i> | Amoksiclav | LEK | | 14 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 14 | | | | |
| Artemether tab 50 mg | Paluther | Rhone-Poulec | | 12 | | | /tab | |
| <i>Most sold generic equivalent</i> | Arthemedine | Kumming Pharm | | 12 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 12 | | | | |
| Artesunate tab 100 mg | Arsumax | Sanofi | | 20* | | | /tab | |
| <i>Most sold generic equivalent</i> | Arinate | Dafra Pharma | | 20* | | | | |
| <i>Lowest price generic equivalent</i> | | | | 20* | | | | |
| Atenolol tab 50 mg | Tenormin | AstraZeneca | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | Atenolol | Alpharma | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|-----------------|--------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| Beclometasone inhaler 50 mcg/ dose | Becotide | GSK | | 1 inhaler: 200 doses | | | /dose | |
| <i>Most sold generic equivalent</i> | | | | 1 inhaler: 200 doses | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 inhaler: 200 doses | | | | |
| Captopril tab 25 mg | Capoten | BMS | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | Captopril | Cox | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |
| Carbamazepine tab 200 mg | Tegretol | Novartis | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Carbamazepine | Subvick Ltd | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Ceftriaxone inj 1 g powder | Rocephin | Roche | | 1 vial | | | /vial | |
| <i>Most sold generic equivalent</i> | Powercef | Wockhardt | | 1 vial | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 vial | | | | |
| Chloramphenicol Cap 250 mg | Chlormycetin | Parke Davis | | 1000 | | | /caps | |
| <i>Most sold generic equivalent</i> | Chloramphenicol | M&G Pharm | | 1000 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1000 | | | | |
| Ciprofloxacin tab 500 mg | Ciproxin | Bayer | | 1 | | | /tab | |
| <i>Most sold generic equivalent</i> | C-flox | Intas Pharma | | 1 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |
| Clotrimazole skin cream 1% | Canesten | Bayer | | 1 | | | /gm | |
| <i>Most sold generic equivalent</i> | Belstaten | Belpharma | | 1 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|---------------|---------------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| Co-trimoxazole paed susp (8+40) mg/mL | Bactrim | Roche | | 100 mL | | | /mL | |
| <i>Most sold generic equivalent</i> | Nestrim | Ernest Chemists | | 100 mL | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 mL | | | | |
| Diazepam tab 5 mg | Valium | Roche | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Diazepam | Ernest Chemists | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Diclofenac tab 25 mg | Voltaren | Novartis | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Nefidenk | Denk | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Diclofenac tab 50 mg | Voltaren | Novartis | | 100 | | | | |
| <i>Most sold generic equivalent</i> | Diclomax | SB Generics | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Fluconazole caps/tab 200 mg | Diflucan | Pfizer | | 30 | | | /tab | |
| <i>Most sold generic equivalent</i> | | | | 30 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 30 | | | | |
| Fluconazole caps/tab 150 mg | Diflucan | Pfizer | | 1 | | | /tab | |
| <i>Most sold generic equivalent</i> | Lucon | Medreich | | 1 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |
| Fluoxetine caps/tab 20 mg | Prozac | Lilly | | 30 | | | /tab | |
| <i>Most sold generic equivalent</i> | | | | 30 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 30 | | | | |
| Fluphenazine decanoate inj 25 mg/mL | Modecate | Sanofi-Winthrop/BMS | | 1 ampoule | | | /mL | |
| <i>Most sold generic equivalent</i> | | | | 1 ampoule | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 ampoule | | | | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|---------------------|---------------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| Glibenclamide tab 5 mg | Daonil | HMR | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | Glibenil | Ernest Chemists | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |
| Hydrochlorothiazide tab 25 mg | Dichlotride | MSD | | 30 | | | /tab | |
| <i>Most sold generic equivalent</i> | Hydrochlorothiazide | Ernest Chemists | | 30 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 30 | | | | |
| Ibuprofen tab 200 mg | Motrin | Pharmacia Upjohn | | 500 | | | /tab | |
| <i>Most sold generic equivalent</i> | Ibuprofen | M&G Pharmaceuticals | | 500 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 500 | | | | |
| Indinavir caps 400 mg | Crixivan | MSD | | 180 | | | /caps | |
| <i>Most sold generic equivalent</i> | Indinavir | Ranbaxy | | 180 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 180 | | | | |
| Ketoconazole tab 200 mg | Nizoral | Janssen Cilag | | 10 | | | /tab | |
| <i>Most sold generic equivalent</i> | Fungral | Medreich | | 10 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 10 | | | | |
| Lisinopril tab 10 mg | Zestril | AstraZeneca | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Lestril | Torrent | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Losartan tab 50 mg | Cozaar | MSD | | 30 | | | /tab | |
| <i>Most sold generic equivalent</i> | | | | 30 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 30 | | | | |
| Lovastatin tab 20 mg | Mevacor | MSD | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | | | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |
| Mebendazole 500 tab | Vermox | Janssen Cilag | | 1 | | | /tab | |
| <i>Most sold generic equivalent</i> | Deworm | Ernest Chemist | | 1 | | | | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|---------------|---------------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| <i>Lowest price generic equivalent</i> | | | | 1 | | | | |
| Metformin tab 500 mg | Glucophage | Merck | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Enaphage | Ernest Chemist | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Metronidazole tab 200 mg | Flagyl | Rhone-Poulenc | | 1000 | | | /tab | |
| <i>Most sold generic equivalent</i> | Metronidazole | M&G Pharmaceuticals | | 1000 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1000 | | | | |
| Naproxen tab 250 mg | Naprosyn | Roche | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Naprox | Ernest Chemists | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Nevirapine tab 200 mg | Viramune | Boehringer I | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | Nevirapine | Cipla | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |
| Nifedipine Retard tab 20 mg | Adalat Retard | Bayer | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Nepine SR | SB Generics | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Norfloxacin tab 400 mg | Noroxin | MSD | | 100 | | | /tab | |
| <i>Most sold generic equivalent</i> | Surflox | Medreich | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Nystatin Vaginal pessaries 100,000 iu | Mycostatin | BMS | | 12 | | | /pess. | |
| <i>Most sold generic equivalent</i> | Nystatin | Biomedicine | | 12 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 12 | | | | |
| Omeprazole caps 20 mg | Losec | AstraZeneca | | 30 | | | /caps | |
| <i>Most sold generic equivalent</i> | Losid-20 | Kina Pharma | | 30 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 30 | | | | |
| Phenytoin caps/tab 100 mg | Epanutin | Pfizer | | 100 | | | /tab | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|---|------------------|-----------------|---------------------------|-----------------------|-----------------|---------------------|-----------------------|----------|
| <i>Most sold generic equivalent</i> | Biopanutin | Biomedicine | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |
| Quinine Dihydrochloride Inj. 300 mg | | | | 10 | | | /ml | |
| <i>Most sold generic equivalent</i> | Quinine 2HCL | Medreich | | 10 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 10 | | | | |
| Quinine Sulphate tab 300 mg | | | | 500 | | | /tab | |
| <i>Most sold generic equivalent</i> | Quinine Sulphate | UK Generics | | 500 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 500 | | | | |
| Pyrimethamine + sulfadoxine tab (25+500) mg | Fansidar | Roche | | 3 | | | /tab | |
| <i>Most sold generic equivalent</i> | Malafan | Kina Pharma | | 3 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 3 | | | | |
| Ranitidine tab 150 mg | Zantac | GSK | | 60 | | | /tab | |
| <i>Most sold generic equivalent</i> | Ulticer | Medreich | | 60 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 60 | | | | |
| Salbutamol inhaler 0.1 mg per dose | Ventolin | GSK | | 1 inhaler: 200 doses | | | /dose | |
| <i>Most sold generic equivalent</i> | Salbutamol | UK Generics | | 1 inhaler: 200 doses | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1 inhaler: 200 doses | | | | |
| Tetracycline Cap 250 mg | | | | 1000 | | | /caps | |
| <i>Most sold generic equivalent</i> | Tetracin | Ernest Chemists | | 1000 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 1000 | | | | |
| Zidovudine caps 100 mg | Retrovir | GSK | | 100 | | | /caps | |

| Generic name, dosage form, strength | Brand name(s) | Manufacturer | Available? tick ✓ for yes | Pack size recommended | Pack size found | Price of pack found | Unit price (4 digits) | Comments |
|--|----------------------|---------------------|----------------------------------|------------------------------|------------------------|----------------------------|------------------------------|-----------------|
| <i>Most sold generic equivalent</i> | Zidovir | Cipla | | 100 | | | | |
| <i>Lowest price generic equivalent</i> | | | | 100 | | | | |

* Based on treatment of malaria in an adult around 70 kg with artesunate as single treatment: 4 mg/kg for 7 days (WHO Model Formulary, 2002)

APPENDIX V: Diseases Studied for Affordability Calculations

Diabetes

Hypertension

Adult Respiratory Infections

Pediatric Respiratory Infections

Gonorrhoea

Arthritis

Depression

Asthma

Peptic Ulcer

Adult Malaria

APPENDIX VI: List of Facilities Surveyed

1. Ashanti Region Institutions surveyed

| Public Institutions | Other Sector Institutions (Mission and NGO) | Private Retail Pharmacies |
|---|--|---|
| <p>Regional Hospital – 1. Kumasi South Urban (Ashanti Regional Hospital)</p> <p>District Hospitals – 2. Konongo Odumasi Hospital 3. Mankranso Hospital 4. Juaso Hospital</p> <p>Sub-District Institutions – 5. Mpasaaso H. Center 6. Manhyia Hospital 7. Ejisu Government Hospital</p> | <p>1. SDA Hosp., Asamang 2. St. Peter’s Hospital, Jacobu 3. Presby Hospital, Agogo 4. St. Martin’s Hospital Agroyesum 5. St. Patrick’s Hospital, Offinso 6. SDA Hsp., Dominase 7. St. Michael’s Hospital, Pramso</p> | <p>1. Rhema Pharma 2. Sarpharma 3. Kings and Royals Pharmacy 4. Stellex Pharmacy 5. Cyban Pharmacy 6. Benny Vee Pharmacy 7. Andy Pharma</p> |

2. Upper-East Region Institutions surveyed

| Public Institutions | Other Sector Institutions (Mission and NGO) | Private Retail Pharmacies |
|---|---|---|
| <p>Regional Hospital – 1. Bolgatanga Regional Hospital. Hosp.</p> <p>District Hospital – 2. War Memorial Hospital Navrongo 3. Sandema District Hospital</p> <p>Sub-District Institutions – 4. Zuarungu Health Centre 5. Garu Tempene Health Centre 6. Zebilla District Hospital 7. Bolga Urban Health Centre</p> | <p>1. Presby Hsp., Bawku 2. Tongo Health Centre (Presby) 3. Damongo Hsp., Damongo 4. St. Joseph’s Hsp., Jirapa 5. Binaba Anglican Hospital 6. Baptist Medical Centre Nalerigu 7. Wiaga Catholic Hospital, Builsa District</p> | <p>1. Chamalt Pharmacy 2. Ricky Pharmacy 3. Bencyn Pharmacy 4. Rash Pharmacy 5. Soynz Pharmacy 6. Valdi Pharmacy 7. Dartah Pharmacy</p> |

3. Western Region Institutions surveyed

| Public Institutions | Other Sector Institutions (Mission and NGO) | Private Retail Pharmacies |
|---|---|--|
| Regional Hospital – 1. Effia Nkwanta Hospital District Hospitals – 2. Tarkwa Hospital 3. Takoradi Hospital 4. Wassa Akropong Govt Hospital Sub-District Institutions – 5. Tikobo Health Centre 6. Huni Valley Health Centre. 7. Sefwi Bekwai Health Centre. | 1. St Damian Clinic , Fijai 2. St. Franis Xavier Hsp., Asankragwa 3. St. Martin De Porres Hsp., Eikwe 4. Siloam Gospel Clinic 5. St. John of God Hsp., Asafo 6. Ahmadiyya Muslim Hsp., Daboase 7. Nagel Memorial SDA Clinic | 1. Kabmore Chemists 2. Sambeus Chemists 3. Kendicks Pharmacy 4. Jemoz Pharmacy 5. Brakatu Pharmacy 6. First Stop Pharmacy 7. Westlink Chemists |

4. Greater Accra Region Institutions surveyed

| Public Institutions | Other Sector Institutions (Mission and NGO) | Private Retail Pharmacies |
|--|---|--|
| Regional Hospital – 1. Ridge Hospital District Hospitals – 2. Amasaman H.Centre 3. Tema General hospital 4. Ada-Foah Hospital Sub-District Institutions – 5. La Polyclinic 6. Kasseh Health Centre 7. Madina Health Centre | 1. Bator Catholic Hospital 2. St Dominic Hsp., Akwatia 3. Notre Dam Clinic., Nsawam 4. Holy Family Hsp., Nkawkaw 5. St. Martin's de Porres Hospital., Odumase 6. St. Joseph's Hsp., Koforidua 7. Salvation Army Clinic Anum | 1. John Lawrence Pharmacy 2. Pill Box 3. Fransright Pharmacy 4. ADS Pharmacy 5. Stellex Pharmacy 6. Chasca Pharmacy 7. Amicus Pharmacy |