



MINISTRY OF HEALTH MALAYSIA
PHARMACEUTICAL SERVICES PROGRAMME

MEDICINE PRICES MONITORING IN MALAYSIA 2020

SURVEY REPORT

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**Ministry of Health Malaysia
Pharmaceutical Services Programme**

MEDICINE PRICES MONITORING IN MALAYSIA

**Survey Report
2020**

**A publication of the
Pharmaceutical Services Programme
Ministry of Health Malaysia**

MEDICINE PRICES MONITORING IN MALAYSIA, 2020

2022

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CONTENTS

Title	Page
ACKNOWLEDGEMENT.....	iii
EDITORIAL TEAM	iv
PROJECT TEAM	vi
DATA COLLECTORS	vii
CONTENTS.....	x
LIST OF TABLES	xii
LIST OF FIGURES	xiv
LIST OF APPENDICES	xv
LIST OF ABBREVIATIONS.....	xviii
EXECUTIVE SUMMARY	1
1.0 INTRODUCTION.....	4
1.1 BACKGROUND	4
1.2 GEOGRAPHY, SOCIODEMOGRAPHIC AND ECONOMY	4
1.3 HEALTHCARE SYSTEM AND HEALTH EXPENDITURES	4
1.4 PHARMACEUTICAL SECTOR AND MEDICINES PRICING.....	6
1.5 MEDICINE PRICES MONITORING	8
2.0 OBJECTIVES.....	10
2.1 GENERAL OBJECTIVE.....	10
2.2 SPECIFIC OBJECTIVES	10
3.0 METHODOLOGY	11
3.1 SURVEY AREA/ZONE SELECTION	11
3.2 SAMPLE SELECTION	11
3.2.1 Public sector sample selection.....	12
3.2.2 Private sector sample selection	13
3.2.3 Back-up sample	13
3.3 MEDICINES SELECTION	13
3.4 DATA COLLECTION	24
3.5 DATA ANALYSIS.....	25
3.5.1 Availability.....	25

3.5.2	Price variation.....	25
3.5.3	Price comparison.....	25
3.5.4	Mark-up	26
3.5.5	Affordability.....	27
3.6	ETHICAL CONSIDERATION	27
4.0	RESULTS	28
4.1	MEDICINES AVAILABILITY	29
4.2	PRICE VARIATION.....	33
4.2.1	Procurement price variation in public and private sectors	33
4.2.2	Selling price variation in private sector	38
4.3	PRICE COMPARISON	41
4.3.1	Median procurement price comparison.....	41
4.3.2	Median selling price comparison.....	49
4.3.3	International procurement price comparison.....	53
4.3.4	International selling price comparison.....	62
4.4	PROCUREMENT TO SELLING PRICES MARK-UP IN THE PRIVATE SECTOR	65
4.5	AFFORDABILITY	71
5.0	DISCUSSION	78
5.1	MEDICINES AVAILABILITY	78
5.2	PRICE VARIATION.....	81
5.3	PRICE COMPARISON	83
5.3.1	Median procurement price comparison.....	83
5.3.2	Median selling price comparison.....	84
5.3.3	International price comparison	85
5.4	PRICE MARK-UPS	86
5.5	AFFORDABILITY	89
5.6	STUDY LIMITATIONS.....	92
6.0	CONCLUSIONS.....	93
7.0	RECOMMENDATIONS	94
	REFERENCES	96
	APPENDICES.....	106

LIST OF TABLES

Title	Page
Table 3.1 Survey area and cities.....	11
Table 3.2 Medicines selection criteria.....	14
Table 3.3 WHO/HAI Basket of medicines	17
Table 3.4 SDG Basket of medicines.....	19
Table 3.5 Single PRH Basket of medicines	21
Table 4.1 Number of facilities sampled, by survey area and sector	28
Table 4.2 Average medicines availability by product type, group, location and sector	31
Table 4.3 Ratio of median procurement prices in public and private sectors for WHO/HAI Basket.....	43
Table 4.4 Ratio of median procurement prices in public and private sectors for SDG Basket	45
Table 4.5 Ratio of median procurement prices in public and private sectors for Single PRH Basket.....	47
Table 4.6 Ratio of median selling prices in the private sector for WHO/HAI Basket.....	50
Table 4.7 Ratio of median selling prices in the private sector for SDG Basket	51
Table 4.8 Ratio of median selling prices in the private sector for Single PRH Basket.....	52
Table 4.9 Number of medicines (n) in procurement Price Ratio for originator products by sector	54
Table 4.10 Number of medicines (n) in procurement Price Ratio for generic products compared to SGB by sector	57
Table 4.11 Number of medicines (n) in procurement Price Ratio for Procurement Price Ratio for generic products compared to AGB by sector	60
Table 4.12 Number of medicines (n) in selling Price Ratio for originator products	62
Table 4.13 Number of medicines (n) in Selling Price Ratio for generic products compared to SGB and AGB	64
Table 4.14 Procurement to selling prices median mark-ups in the private sector by product type and basket of medicines.....	67
Table 4.15 Procurement to selling prices median mark-ups structure in the private sector, by procurement unit price range.....	70
Table 4.16 Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type of selected medicines.....	74

Table 4.17	Affordability of standard treatment as measured by number of days' wages in the private sector by disease and product type for WHO/HAI Basket.....	75
Table 4.18	Affordability of standard treatment as measured by number of days' wages in the private sector by disease and product type for SDG Basket	76
Table 4.19	Affordability of standard treatment as measured by number of days' wages in the private sector by disease and product type for Single PRH Basket	77

LIST OF FIGURES

Title	Page
Figure 3.1 Sample selection of facilities.....	12
Figure 4.1 Median procurement price variation by sector.....	33
Figure 4.2 Median procurement price variation for originator and generic products in: a) public sector b) private sector.....	34
Figure 4.3 Median procurement price variation in public sector facilities by product types: a) originator b) generic.....	36
Figure 4.4 Median procurement price variation in private sector facilities by product types: a) originator b) generic.....	37
Figure 4.5 Median selling price variation by product types	38
Figure 4.6 Median selling price variation by private sector facilities	39
Figure 4.7 Median selling price variation in private sector facilities by product types: a) originator b) generic.....	40
Figure 4.8 Procurement Price Ratio for originator products in public and private sectors	55
Figure 4.9 Procurement Price Ratio for generic products compared to SGB in public and private sectors.....	58
Figure 4.10 Procurement Price Ratio for Procurement Price Ratio for generic products compared to AGB in public and private sectors	61
Figure 4.11 Selling Price Ratio for originator products in the private sector.....	63
Figure 4.12 Selling Price Ratio for generic products compared to SGB and AGB in the private sector	64

LIST OF APPENDICES

Title	Page
Appendix I. Appointment Letter for Data Collectors.....	106
Appendix II. Data Collection Form.....	107
Appendix III. Offer Letter to Facilities.....	108
Appendix IV. Participation Consent Form.....	110
Appendix V. Number of facilities with the medicine (No.) and availability (%) , by facility type and sector for individual medicine for WHO/HAI Basket.....	111
Appendix VI. Number of facilities with the medicine (No.) and availability (%) , by facility type and sector for individual medicine for SDG Basket.....	116
Appendix VII. Number of facilities with the medicine (No.) and availability (%) , by facility type and sector for individual medicine for Single PRH Basket.....	120
Appendix VIII. Medicine availability according to range, by product type and sector for WHO/HAI Basket.....	125
Appendix IX. Medicine availability according to range, by product type and sector for SDG Basket.....	130
Appendix X. Medicine availability according to range, by product type and sector for Single PRH Basket.....	134
Appendix XI. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the public sector for WHO/HAI Basket.....	139
Appendix XII. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the public sector for SDG Basket.....	143
Appendix XIII. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the public sector for Single PRH Basket.....	146
Appendix XIV. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the private sector for WHO/HAI Basket.....	149
Appendix XV. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the private sector for SDG Basket.....	152
Appendix XVI. Number of facilities with the medicine (No.) and availability (%) , by product and facility type for individual medicine in the private sector for Single PRH Basket.....	154

Appendix XVII.	Medicine with procurement unit price variation ≥ 2 in the public sector, by basket and product type	156
Appendix XVIII.	Medicine with procurement unit price variation ≥ 2 in the private sector, by basket and product type.....	156
Appendix XIX.	Medicine with selling unit price variation ≥ 2 in the private sector, by basket and product type	157
Appendix XX.	Procurement Price Ratio for originator products in the public sector by basket: a) WHO/HAI Basket b) SDG Basket c) Single PRH Basket	159
Appendix XXI.	Procurement Price Ratio for originator products in the private sector by basket: a) WHO/HAI Basket b) SDG Basket c) Single PRH Basket	160
Appendix XXII.	Procurement Price Ratio for generic products compared to SGB in the public sector by basket: a) WHO/HAI Basket b) SDG Basket.....	161
Appendix XXIII.	Procurement Price Ratio for generic products compared to SGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket.....	161
Appendix XXIV.	Procurement Price Ratio for generic products compared to AGB in the public sector by basket: a) WHO/HAI Basket b) SDG Basket.....	162
Appendix XXV.	Procurement Price Ratio for generic products compared to AGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket	162
Appendix XXVI.	Selling Price Ratio for originator products in the private sector by basket: a) WHO/HAI Basket b) SDG Basket.....	163
Appendix XXVII.	Selling Price Ratio for generic products compared to SGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket.....	164
Appendix XXVIII.	Selling Price Ratio for generic products compared to AGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket.....	164
Appendix XXIX.	Procurement Price Ratio >1 for originator products in the public sector.....	165
Appendix XXX.	Procurement Price Ratio >1 for originator products in the private sector.....	166
Appendix XXXI.	Procurement Price Ratio >1 for generic products compared to SGB in the public sector.....	168
Appendix XXXII.	Procurement Price Ratio >1 for generic products compared to SGB in the private sector.....	169

Appendix XXXIII. Procurement Price Ratio >1 for generic products compared to AGB in the public sector.....	169
Appendix XXXIV. Procurement Price Ratio >1 for generic products compared to AGB in the private sector.....	171
Appendix XXXV. Selling Price Ratio >1 for originator products in the private sector.....	173
Appendix XXXVI. Selling Price Ratio >1 for generic products compared to SGB in the private sector.....	175
Appendix XXXVII. Selling Price Ratio >1 for generic products compared to AGB in the private sector.....	175
Appendix XXXVIII. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for WHO/HAI Basket.....	177
Appendix XXXIX. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for SDG Basket.....	182
Appendix XL. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for Single PRH Basket.....	186

LIST OF ABBREVIATIONS

%	Percentage	LPGW	Lowest-paid Government Worker
AGB	All generic brands available at reference countries	mcg	Microgram
APPL	Approved Product Purchase List	MCO	Movement Control Order
CIF	Cost, Insurance and Freight	mg	Milligram
CNS	Central Nervous System	ml	Millilitre
CPG	Consumer Price Guide	MMR	Measles, Mumps and Rubella Vaccine
CVD	Cardiovascular Disease	MNMP	Malaysia National Medicines Policy
DCA	Drug Control Authority	MOD	Ministry of Defence
EML	Essential Medicine List	MOF	Ministry of Finance
EPF	Employee Provident Funds	MOH	Ministry of Health
ERP	External Reference Price	MOHE	Ministry of Higher Education
GDP	Gross Domestic Product	MOHMF	Ministry of Health Medicines Formulary
GI	Gastrointestinal	MPR	Median Price Ratio
GIS	Geographic Information System	MSH	Management Science of Health
GPTP	Good Pharmaceutical Trade Practice	MSP	Manufacturer's Selling Price
HAI	Health Action International	MSOM	Malaysian Statistics on Medicines
HIRA	Health Insurance Review and Assessment	MyCC	Malaysia Competition Commission
HIV	Human Immunodeficiency Virus	NA	Not Available
HPV	Human Papillomavirus Vaccine	NCD	Non-communicable Disease
HTA	Health Technology Assessment	NDMA	N-nitrosodimethylamine
IPD	In-Patient Department	NEML	National Essential Medicine List
IQR	Interquartile Range	NHI	National Health Insurance
IRPs	International Reference Prices	NHIA	National Health Insurance Administration
iu	International Unit	NHIS	National Health Insurance Service
km	Kilometre	NIP	National Immunization Program
KPHU	"Kajian Pemantauan Harga Ubat"/ Medicine Prices Monitoring	NPRA	National Pharmaceutical Regulatory Agency
LP	Local Purchase	OOP	Out-of-Pocket

OPD	Out-Patient Department	SDG	Sustainable Development Goal
OTC	Over-the-Counter	SEP	Single Exit Pricing
PCV	Pneumococcal Conjugate Vaccine	SGB	Same generic brand in the reference countries
PPP	Purchasing Power Parities	SOCISO	Social Security Organization
PR	Price Ratio	Tab/cap	Tablet/capsule
PRH	Product Registration Holder	THE	Total Health Expenditure
Q25	25 th Percentile	TPA/ MCO	Third-Party Administrators and Managed Care Organisations
Q75	75 th Percentile	WHO	World Health Organization
R & D	Research and Development	WHO/ HAI	World Health Organization/ Health Action International
RM	Malaysian Ringgit	WPRO	Western Pacific Region
RUTF	Ready-to-use Therapeutic Food		

EXECUTIVE SUMMARY

Background: Over recent years, there has been an increasing trend in health expenditures worldwide, resulting from high pharmaceutical expenditures. Malaysia's two-tiered healthcare system has seen a similar trajectory with an increment in total pharmaceutical expenditure for the public and private sectors. Currently, medicine prices are not regulated by any specific Act in Malaysia. In the public sector, the price of medicines is indirectly contained by adhering to bulk procurement and tendering policies warranted by the Ministry of Finance (MOF). However, manufacturers, distributors, and retailers are free to offer pharmaceuticals at any price based on market forces in the private sector.

The unregulated pharmaceutical market in Malaysia causes significant price disparities between sectors and different healthcare service providers (e.g., private hospitals, clinics, and community pharmacies). Moreover, a lack of price transparency sustains the disparities and constrains consumers' access to affordable medicines. Several previous studies have also highlighted that medicine prices and mark-ups in Malaysia are higher than in other countries. Following that, the Ministry of Health (MOH) moved to establish continuous price monitoring strategies to understand medicine prices and their components along the supply chain. The findings are expected to assist policymakers in developing future pharmaceutical policies parallel to Malaysia National Medicines Policy (MNMP). Thus, this study aims to support future pricing policies and strategies towards improving access to medicines by generating meaningful information on the price, availability, and affordability of selected medicines in public and private health facilities.

Methodology: The study adopted a validated methodology developed by the World Health Organization/Health Action International (WHO/HAI). A nationwide cross-sectional survey was conducted among 146 premises, involving 35 public facilities, consisting of 18 MOH hospitals, 12 MOH health clinics, four university hospitals, and one military hospital. The remaining 111 facilities comprised 29 private hospitals, 32 private clinics, and 50 community pharmacies. A total of 110 medicines were selected, with 14 medicines from the global core list and an additional 39 from a national supplementary list in the WHO/HAI Basket, 33 medicines were in the Sustainable Development Goal (SDG) Basket, and 40 medicines were included in the Single Product Registration Holder (PRH) Basket. In addition, information on prices and availability was collected from the originator brand and generic equivalents, specific to strength and dosage form. Furthermore, the latest procurement prices in the public sector were collected according to the respective procurement method. Meanwhile, both the procurement and selling prices of medicines were collected on-facilities for the private sector.

Availability was represented by the percentage of facilities in which medicines were found on the data collection day. Price variation was computed as the ratio of the 75th percentile (Q75) to the 25th percentile (Q25) for procurement and selling prices. Price comparison relatively compared procurement and selling prices in different subgroups within and among the sectors and was illustrated as the price ratio. For an international price comparison, median procurement price and median selling price were compared to reference countries such as Australia, Taiwan, South Korea, Thailand, and South Africa. A percentage of price mark-up was determined by subtracting the selling price from the procurement price.

Affordability was determined by calculating the number of days' wages to purchase courses of treatment for common acute and chronic conditions.

Key findings:

Medicines availability: Overall, the average medicines availability for all baskets in the public sector (WHO/HAI: 79.1%; SDG: 72.4%; Single PRH: 56.3%) was higher than the private sector. In the private sector, average availability of medicines in the WHO/HAI Basket was found at a fairly high availability (53.1%), low and very low availability in the SDG Basket (38.6%), and the Single PRH Basket (26.3%), respectively. The average availability of generic products for WHO/HAI Basket and SDG Basket in public (WHO/HAI: 72.4%; SDG: 66.9%) and private sectors (WHO/HAI: 40.7%; SDG: 33.0%) was higher than the originator products (Public: WHO/HAI: 16.0%; SDG: 18.4%; Private: WHO/HAI: 32.1%; SDG: 23.1%). Meanwhile, in the Single PRH Basket, originator products were found at fairly high availability (56.3%) in the public sector. In contrast, both originator (26.3%) and generic products (24.3%) were found in the private sector at very low availability.

Price variation: There was almost no variation (WHO/HAI: 1.01; SDG: 1.01; Single PRH: 1.01) in procurement prices across all baskets in the public sector. However, there was a wide variation in the procurement price of generic products in the private sector for all baskets (WHO/HAI: 1.40; SDG: 1.41; Single PRH: 1.19). In terms of the median selling price, both originator (WHO/HAI: 1.32; SDG: 1.44; Single PRH: 1.25) and generic products (WHO/HAI: 1.67; SDG: 1.83; Single PRH: 1.30) had a wide variation across all baskets. Specifically, the private clinics had the largest variation in the procurement (SDG: 1.54) and selling (SDG: 2.00) prices of the generic products.

Price comparison: The median procurement price for matched pairs of medicines showed that originator products were procured at 5.54 times higher price than generic products for WHO/HAI Basket and SDG Basket. Overall, the private sector procured medicines at 1.52 to 2.35 times higher than the public sector for all baskets. Among public sector facilities, it was noted that the military hospital (WHO/HAI: 1.20; SDG: 1.16; Single PRH: 1.10) had slightly higher procurement prices than MOH hospitals. In addition, private hospitals procured medicines in WHO/HAI Basket and SDG Basket at a slightly higher cost than private clinics and community pharmacies.

In the private sector, originator products were sold two-fold more than generic products for the WHO/HAI Basket (2.91) and SDG Basket (2.60). Further price comparison ratio among facilities showed that private hospitals (WHO/HAI: 1.52; SDG: 1.57; Single PRH: 1.26) and private clinics (WHO/HAI: 1.33; SDG: 1.50; Single PRH: 1.26) had higher selling prices than community pharmacies for all baskets. The median procurement and selling price in Peninsular Malaysia was fairly similar for all baskets of medicines in both the public and private sectors.

For an international procurement price comparison, almost two-thirds of originator products were procured at a lower price than reference countries in the public sector; Whereas, almost 80.0% of originator products were procured at a higher price than reference countries in the private sector. For generic products compared with all generic brands available at reference countries (AGB), more than 60.0% of the medicines in the public sector for both WHO/HAI Basket (61.0 – 80.0%) and SDG Basket (81.0 – 100.0%) were procured at

lower prices than reference countries. Similar patterns were seen in the private sector procurement price. As for the selling price in the private sector, originator products are sold at a higher price and generic products at a lower price than reference countries.

Price mark-up: The in-patient (IPD) setting had a higher median mark-up than the out-patient (OPD) setting for the originator and generic products in all baskets. Among OPD setting facilities, the mark-ups for both originator and generic products were higher in private hospitals (Originator: WHO/HAI: 46.2%; SDG: 53.8%; Single PRH: 44.0%; Generics: WHO/HAI: 132.1%; SDG: 85.2%; Single PRH: 216.4%), compared to private clinics (Originator: WHO/HAI: 45.8%; SDG: 69.3%; Single PRH: 42.9%; Generics: WHO/HAI: 142.3%; SDG: 144.0%; Single PRH: 166.5%), than community pharmacies (Originator: WHO/HAI: 15.6%; SDG: 16.8%; Single PRH: 11.8%; Generics: WHO/HAI: 83.0%; SDG: 62.3%; Single PRH: 87.4%) for all baskets. In terms of mark-up structure, no regressive mark-up pattern was seen in all baskets.

Affordability: Generally, most originator products were less affordable as patients had to spend more than one day's wage. For example, Gefitinib 250mg Tablet for cancer treatment required more than two months' wage of the lowest-paid government worker (LPGW) and lowest minimum wage worker. Nevertheless, generic products were more affordable than originator products and required less than a days' wage of the LPGW and the lowest minimum wage worker.

Conclusions and recommendations: In general, the overall average medicines availability for WHO/HAI Basket, SDG Basket, and Single PRH Basket were fairly high in the public sector but lower for the SDG Basket and Single PRH Basket in the private sector. Generic products were widely available in public facilities in accordance with the MNMP. The free market in the pharmaceutical industry contributes to price variations and unregulated mark-ups, particularly in the private sector. Additionally, when compared internationally, procurement and selling prices in this sector were higher than in reference countries. High-priced originator products were typically less affordable than generic products for all baskets.

Current findings in pharmaceutical pricing show that there is a demand for comprehensive policies and regulations to regulate medicine prices. Future studies are encouraged to explore other medicine prices components and factors affecting pharmaceutical pricing, as well as to obtain the latest information, which is useful as a guide for future national pharmaceutical pricing policy. Corresponding to study findings, the current scenario in Malaysia and the MNMP aim to ensure access, availability, and affordability of medicines; the following recommendations are suggested for future pharmaceutical pricing policies:

1. Improve price transparency from stakeholders to promote fair pricing;
2. Improve access to medicines in the public and private sectors;
3. Provide fair pricing by reducing price variation among supply channels;
4. Improve procurement efficiency to obtain fairer prices;
5. Mark-ups and price regulation; and
6. Improve the affordability of medicines in the private sector.

1.0 INTRODUCTION

1.1 BACKGROUND

The cost of medicines contributes significantly to the health expenditures of developing countries. Generally, it accounts for an average of 24.9% (range 7.7% to 67.6%) of Total Health Expenditure (THE) (Lu et al., 2011). Therefore, high prices, especially for new medicines, are a significant burden on public healthcare systems and patients in developing countries (World Health Organization & Health Action International, 2008). Furthermore, in low-income countries, out-of-pocket (OOP) payments account for more than half of total health expenses, which impedes access to medicines and may lead to the impoverishment of a large number of people (Niëns et al., 2010; World Health Organization, 2020). Hence, fair pricing and effective financing are the essential elements of equitable medicines access and universal health coverage. Therefore, strategies for measuring, monitoring, and managing prices are important to promote access to medicines that correspond to public health needs (World Health Organization, 2021).

1.2 GEOGRAPHY, SOCIODEMOGRAPHIC AND ECONOMY

With a total land area of 330,524 square kilometres, Malaysia has thirteen states and three federal territories. The South China Sea separates the state into Peninsular Malaysia and East Malaysia. The population in 2020 was 32.6 million, comprised of three main races, namely Bumiputera (69.6%), Chinese (22.6%), Indians (6.8%), and other ethnic groups (1.0%) (Department of Statistics Malaysia, 2020a).

Since 2010, Malaysia's economic freedom has resulted in total trade accounting for approximately 130.0% of gross domestic product (GDP). Malaysia's economy has been on an upward trajectory since the Asian financial crisis of 1997-1998, averaging 5.4% growth since 2010, and is predicted to shift from an upper-middle-income to a high-income country by 2024 (The World Bank, 2021). However, the COVID-19 pandemic has affected the whole world, including Malaysia, and has impacted the country's economic growth trajectory. Several phases of the Movement Control Order (MCO) since 18 March 2020 to combat the spread of COVID-19 have led to reductions in operating hours and the closing of numerous economic sectors. As a result, Malaysia's economy declined by 5.6% in 2020, compared to 4.4% in 2019. In 2020, Malaysia's GDP at current prices was RM1,416.6 billion. Aside from that, the Gross National Income per capita also declined to RM42,503 from RM45,311 in 2019, resulting from deteriorating domestic economic activities and the external trade sector (Department of Statistics Malaysia, 2020b).

1.3 HEALTHCARE SYSTEM AND HEALTH EXPENDITURES

The Malaysian healthcare system is a two-tier system that consists of the public and private sectors. Public health services are financed through general funds and taxation managed by the Ministry of Finance (MOF) and provided by three different main ministries, namely the Ministry of Health (MOH), Ministry of Defence (MOD), and Ministry of Higher Education (MOHE) (Safurah et al., 2013). As the main provider of public healthcare services, the MOH has 144 hospitals and special medical institutions (to cater to 42,936 beds), 1,114 health

clinics (*Klinik Kesihatan*), and 1,771 rural clinics (*Klinik Desa*) (Ministry of Health Malaysia, 2020b). The MOH also plays an important role in the public sector by managing policy and health programmes to ensure standardisation in health service provision. On the other hand, the MOD has numerous military hospitals and medical centres collaborating with the MOH to provide public healthcare services, while the MOHE manages the university teaching hospitals (Safurah et al., 2013). Although the government runs all hospitals in the public sector, each one has its formulary:

- a) Hospitals, clinics, and special medical institutions under MOH:
 - The Ministry Of Health Medicines Formulary (MOHMF), which consists of 1,640 items, serves as a reference to control and encourage the rational and quality use of medicines in all MOH facilities.
 - This formulary ensures that medicine's procurement cost is adequately handled and that financial resources are used appropriately (Pharmaceutical Services Programme, 2021).
- b) Military hospitals under MOD:
 - Military hospitals refer to the "Formulari Ubat-Ubatan Perkhidmatan Kesihatan Angkatan Tentera Malaysia (FORSIHAT)".
 - It comprises 1,675 items, including halal pharmaceutical goods that promote Shariah Compliance Pharmacy Practice in Malaysian Armed Forces Health Services (Malaysia Competition Commission, 2017).
- c) University hospitals under MOHE:
 - Each university hospital formulary is unique and tailored to the institution's funding, medicines preferences, and approval in Drug and Therapeutics Committee Meeting (Pharmacy Department Hospital Canselor Tunku Mukhriz, 2022; University of Malaya Medical Centre, 2022).

Malaysia's healthcare system has evolved from a primarily public-funded system to a two-tiered one in which public and private healthcare spending are nearly equal. As of 2018, the public sector accounts for 52.0%, while the private sector accounts for 42.0% of THE (Ministry of Health Malaysia, 2018). Private hospitals and private clinics focusing on curative care services, as well as a large number of community pharmacies, are more prevalent in urban areas (Safurah et al., 2013). Currently, Malaysia has 208 private hospitals with a total capacity of 16,469 beds, 7,988 private medical clinics, and more than 2,000 community pharmacies available (Ministry of Health Malaysia, 2020b; Pharmaceutical Services Programme, 2020a). Private hospitals generally comprise specialist outpatient services, inpatient services, ambulatory care services, and emergency services supported by clinical and non-clinical support services (Private Medical Practice Control Division (CKAPS), 2019). Private hospitals offer a competitive consumer-driven healthcare facility to cater to patients who can afford to get personalized, with less waiting time, and probably more comfortable and exclusive medical care. Concurrently, private clinics offer a self-paying service at a reasonable cost to treat common illnesses and manage injuries, complementing the public sector's highly overloaded outpatient clinics (Quek, 2009).

Malaysian citizens generally have to pay a minimal cost to seek treatment and receive a supply of medicines from public health facilities. They only pay as low as RM1 or RM5 (for specialist clinics) for the outpatient visit, while they pay up to RM15 per day for the inpatient

stay at MOH facilities and receive medicines for free (Ministry of Health Malaysia, 2020d, 2020c). Meanwhile, university hospitals charge around RM5 to RM50 for an outpatient visit and RM1.50 to RM10 per week for the supply of medicines (Hospital Canselor Tuanku Muhriz, 2018; Hospital Universiti Sains Malaysia, 2020; Sultan Ahmad Shah Medical Centre, 2020; University of Malaya Medical Centre, 2020).

In contrast, the private sector is mainly funded by private health insurance, OOP by the consumer, private corporations, and non-profit institutions (Chua et al., 2010; Safurah et al., 2013). There are two types of health insurance, namely private and employee-based health insurance (also known as social security funds). The Social Security Organization (SOCSO) and the Employee Provident Funds (EPF) are the two main social security funds providing health coverage for private-sector employees. Private health insurance is voluntary for many people as it is useful mainly to cover private hospital costs (Safurah et al., 2013). Even though the government offers free healthcare services in the public sector, some people still prefer private services, contributing to the escalation of OOP expenditure (Ministry of Health Malaysia, 2018).

The Malaysia Health Expenditure Report 2018 described that the THE had increased 2.16-fold from RM27,774 million in 1998 to RM60,174 million in 2018 as the demand for better healthcare has been growing over the years (Ministry of Health Malaysia, 2018). Likewise, pharmaceuticals expenditure in public and private sectors showed a similar trajectory over the years. In 2017, the total pharmaceutical expenditure in MOH facilities increased by 13.0% to RM2,382 million, and private pharmacy expenditure (by function, sales through community pharmacies) increased 6.0% to RM2,922 million compared to the previous year (Ministry of Health Malaysia, 2018). This increasing health expenditure trend shows a positive sign for developing countries as it impacts economic growth, hence justifying the implementation of policies to promote health spending in order to produce a healthier and more productive society as well as support economic growth (Elmi & Sadeghi, 2012). However, heavily subsidised public healthcare spending will be unsustainable in the future (Songa et al., 2015; Yu et al., 2008). Additionally, as in 2018, OOP expenditures contributed 35.0% of total health expenditures and accounted for 72.6% of private-sector sources of financing. Moreover, around 60.0% of total private pharmaceutical use (including private hospitals and clinics) was paid by OOP (Ministry of Health Malaysia, 2018). As a result, a heavy reliance on OOP may lead to catastrophic financial and depriving health expenditures (World Health Organization, 2019b).

1.4 PHARMACEUTICAL SECTOR AND MEDICINES PRICING

The National Pharmaceutical Regulatory Agency (NPRA) was established to ensure the quality, efficacy, and safety of pharmaceutical, traditional and cosmetic products marketed in Malaysia. Meanwhile, the Drug Control Authority (DCA), an executive body of MOH, is the main drug regulatory authority in Malaysia that regulates the pharmaceutical product registration and licensing of importers, manufacturers, and wholesalers (National Pharmaceutical Regulatory Agency, 2020). The other main pharmacy division in the MOH consists of the Pharmacy Policy and Strategic Planning Division, Pharmacy Practice and Development Division, Pharmacy Enforcement Division, and Pharmacy Board Malaysia. All these divisions are responsible for the management of pharmacy services and policies in the

country. They also ensure the public has access to safe, efficacious, and quality pharmaceutical products, protecting their interests via enforcement of relevant legislation and ensuring rational use of medicines by both healthcare providers and consumers (Pharmaceutical Services Programme, 2019b).

MOH developed an efficient procurement and distribution system in the public sector by procuring medicines at a lower price through bulk procurement using Concession Company and national tender. There are three procurement methods stipulated by the procurement guidelines under the MOF as described below (Hassali et al., 2015; Ministry of Finance Malaysia, 2013):

- a) Supply by Concession Company
 - Medicines and non-medicines that are listed in the Approved Product Purchase List (APPL).
 - The price is revised at the national level every three years.
- b) National tender
 - Tenders are processed centrally by MOH for annual purchases above RM500,000.
 - Open tender.
 - Suppliers that won the tender will supply medicines at the contracted price and quantity for a period of 2 to 3 years.
- c) Local purchase (LP)
 - Procurement is done by an individual public institution/ hospital/ health clinic with prices valid at the point of purchase or for one year.
 - Items with a value of less than RM50,000 are procurable through direct purchase.
 - Items with a value of between RM50,000 and RM500,000 are procurable through quotation.

It is important to note that, currently, there is no price regulation on pharmaceuticals in Malaysia. Therefore, private-sector manufacturers, distributors, and retailers are free to offer pharmaceuticals at any price based on market forces (Hassali et al., 2015). Numerous studies have found Malaysian medicine prices and mark-ups were higher than international reference prices (IRPs) and in other countries (Babar et al., 2007; Hassali et al., 2012; Malaysia Competition Commission, 2017). Additionally, price discrimination against different private-sector healthcare providers leads to significant price disparity (Chong & Chan, 2014; Consumers Association of Penang, 2017). Price disparities and a lack of price transparency add constraints for consumers to access medicines at affordable prices (Malaysia Competition Commission, 2017). Rising pharmaceutical prices and price differentials in the private sector are constantly debated as barriers to accessing healthcare services. In addition, it drives the population to the public health sector, which provides free medication, causing immense pressure on the public health budget. Following that, MOH strongly moved to establish monitoring strategies in order to promote affordable prices in the public and private sectors.

1.5 MEDICINE PRICES MONITORING

The strategy is established through a survey known as Medicine Prices Monitoring in Malaysia, or “*Kajian Pemantauan Harga Ubat*” (KPHU). The survey was designed based on the guidelines in “Measuring medicine prices, availability, affordability and price components (second edition)” by Health Action International (HAI) and the World Health Organization (World Health Organization & Health Action International, 2008). The MOH plans to conduct this survey biennially to collect data on medicine prices, availability, affordability, and price components such as mark-up information in Malaysia. This study also parallels with the objectives of Malaysia National Medicines Policy (MNMP), which are to promote equitable access to and rational use of safe, effective, and affordable medicines by Malaysians (Ministry of Health Malaysia, 2012). Therefore, the availability and affordability of medicines are one of the main concerns to ensure the achievement of MNMP.

The previous study was conducted in 2017 and involved 50 essential medicines (WHO global core and supplementary lists) across six main survey areas in Malaysia. This study reported that the average availability of generics (74.8%) was higher than that of the originator brand name products (19.4%) in the public sector. In comparison, the private sector had higher availability of originator brands (52.2%) than generics (49.1%). Procurement prices in the public sector were up to 1.5 times the IRPs and 8.4 times in the private sector. A large price variation across medicines in the private sector was found in the study. Meanwhile, median retail mark-ups in private hospitals (originators 51.0%; generics 166.9%) were higher than in retail pharmacies (originators 22.4%; generics 94.7%). In terms of affordability, originator brands were unaffordable while generics were generally affordable (Pharmaceutical Services Programme, 2018). This finding strongly suggests a need for price regulation to ensure the affordability and accessibility of medicines for Malaysians.

For this reason, Medicine Prices Monitoring 2020 is crucial to evaluate Malaysia's pharmaceutical market structure. Moreover, the data collection is imperative to provide price trends and baseline data in order to evaluate the impact of pricing mechanisms and policies in the future. The findings of this survey will be used as a guide in future medicines pricing policies as there is a need to conduct continuous price monitoring with the aim of allowing medicine prices comparison since factors such as the market, products, and treatments change with time (Henry & Searles, 2012). Unlike the previous study in 2017, Medicine Prices Monitoring 2020 involved six main survey areas with an extended distance from the main MOH hospital. There were also additional medicines selected and categorised into three baskets of medicines, namely the World Health Organization/ Health Action International (WHO/HAI) Basket, the Sustainable Development Goal (SDG) Basket, and the Single Product Registration Holder (PRH) Basket, as well as inclusion of military hospital and private clinics in the sampling.

Each basket was classified to evaluate a different group of medicines according to its criteria. The WHO/HAI Basket consists of medicines in the global core and supplementary lists, almost similar to the previous study. The data collection allows the evaluation of price trends from the past years and international comparisons. On the other hand, the SDG Basket consisted of essential medicines and was collected to measure medicines access in primary healthcare across the country (World Health Organization, 2019a). Meanwhile, Single PRH

Basket involved only medicines registered with a single PRH and the data can be used as a baseline for future medicine pricing policy. The PRH is *“the company or corporate or legal entity in the field of pharmaceuticals who has been granted the marketing authorization.”* They are responsible for registration and all aspects of products, including quality and compliance with the marketing authorization conditions. The holder is subjected to legislation in the country that issued the marketing authorization, which typically means that the company must be locally incorporated in that country (National Pharmaceutical Regulatory Agency, 2021).

Medicines registered by the single PRH are typically new and are still on-patent (have active patent protection). Patents are intellectual property rights that allow the patent holder to prevent others from employing patented technology or processes without their permission throughout their market exclusivity (commonly 20 years). This term of patent enables them to generate an income stream and return their investment in the technology, which may be one of the reasons why medicine prices remain high (Malaysia Competition Commission, 2017; Morgan et al., 2020). Patent impact and high-priced medicines include non-communicable diseases, vaccines, antiretrovirals, and cancer medicines (Médecins Sans Frontières, 2017; World Health Organization, 2018). The price of cancer medicines is relatively high and has significantly grown in the absence of regulation, thus creating a need for pricing measures by the government (World Health Organization, 2018). Therefore, antiretroviral, cancer medicines, and vaccines were included in the Single PRH Basket to collect the price information in the current study.

This study aims to generate reliable information on the price, availability, and affordability of selected medicines in Malaysia's public and private pharmaceutical supply chains, which may support medicine pricing policies to improve access. The price monitoring system with reliable and up-to-date information provides comparative information on affordable medicine prices. The goal is to constantly identify the component that contributes significantly to final medicine prices and strengthen pharmaceutical policies that will improve the affordability of medicines.

2.0 OBJECTIVES

2.1 GENERAL OBJECTIVE

To generate reliable information on the availability, price, and price components of selected important medicines in public and private pharmaceutical supply chains in Malaysia.

2.2 SPECIFIC OBJECTIVES

In this study, there were three baskets of medicines, and each basket represented a different group of medicines, namely WHO/HAI Basket, SDG Basket, and Single PRH Basket. The specific objectives for each basket of medicines in this study were:

- i) To measure the **availability** of originator and generic medicines in the public and private sectors.
- ii) To describe the **variation** in the originator and generic medicine prices in the public and private sectors.
- iii) To **compare** the local medicine prices between subgroups and other reference countries' prices.
- iv) To describe the medicine prices **mark-up** in the private sector.
- v) To measure the **affordability** of medicines in the private sector.

3.0 METHODOLOGY

Medicine Prices Monitoring 2020 was a nationwide cross-sectional study. The methodology was adapted from WHO/HAI guidelines (2008) (World Health Organization & Health Action International, 2008) for measuring medicine prices, availability, affordability and price components. COVID-19 pandemic and MCO implementation extended the data collection duration from 1st September to 31st October 2020 at the selected states.

This study involved both public and private sector facilities. MOH hospitals, MOH health clinics, a military hospital, and university hospitals were selected from survey areas to represent the public health sector. Meanwhile, private hospitals, private clinics, and community pharmacies were sampled from nearby survey areas to represent the private health sector.

3.1 SURVEY AREA/ZONE SELECTION

Six survey areas were selected to represent the country. The capital city of Malaysia, known as Kuala Lumpur, was selected as the major urban centre and included as one of the survey areas. Another five additional major cities were identified as survey areas to represent the country. The six survey areas are listed in Table 3.1.

Table 3.1
Survey area and cities

Survey Area/Zone	City
1. Northern	Georgetown
2. Central	Kuala Lumpur
3. Southern	Johor Bahru
4. Eastern	Kota Bharu
5. Sarawak	Kuching
6. Sabah	Kota Kinabalu

3.2 SAMPLE SELECTION

For each survey area, five MOH health facilities, five private hospitals, five private clinics, and five community pharmacies were selected as the study sample. The study sample also included four university hospitals and one military hospital. Figure 3.1 illustrates the sample selection process.

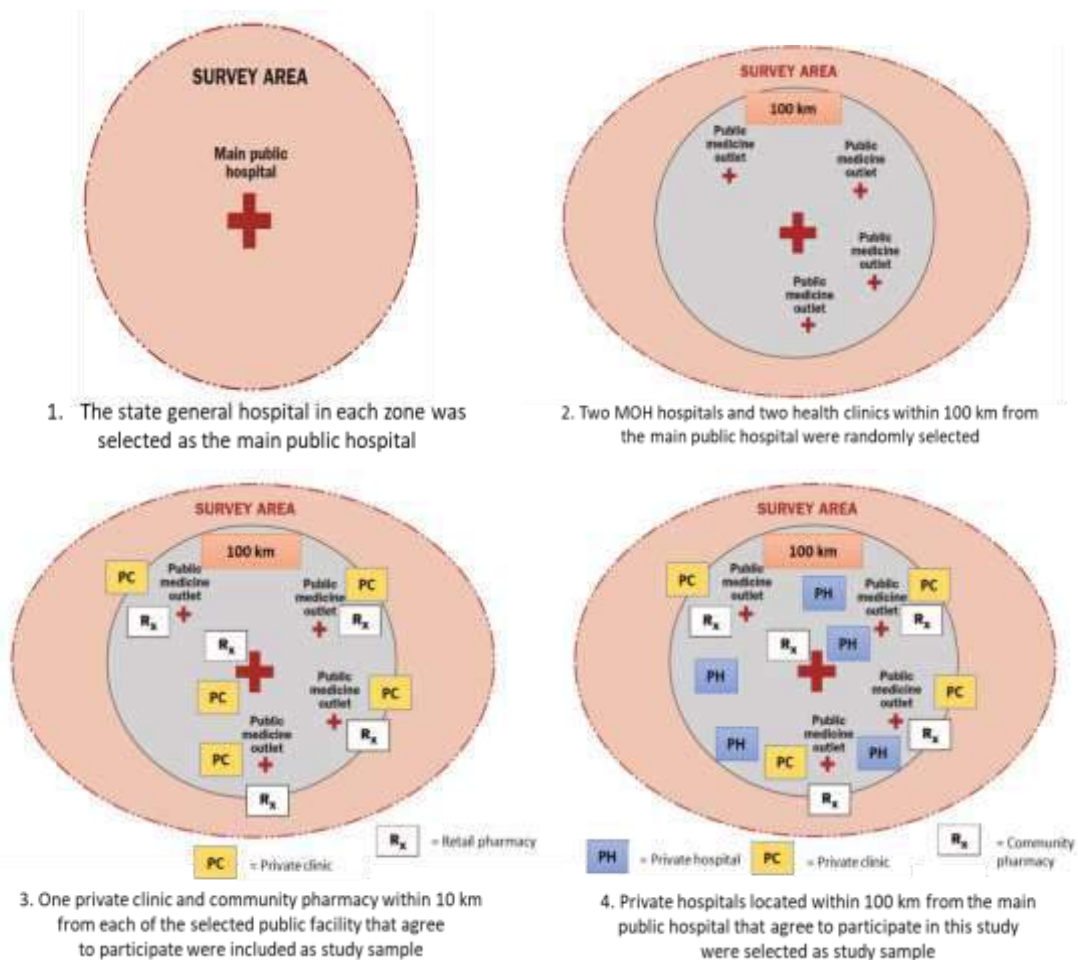
The study sample was selected within 100km from the main MOH hospital. The estimation of 100km from the main MOH hospital was determined to provide a sufficient number of facilities for randomisation from various geographical areas and optimised for appropriate representation of the six survey areas in the country.

As a result of the different geographical landforms and distribution of public and private facilities in East Malaysia, the additional public facilities were randomly selected from all MOH hospitals and health clinics listed in that area. The distance of the facility selection

might be more than 100km to illustrate the different geographical locations and settlements in East Malaysia. The Geographic Information System (GIS) available at <http://gis-kkm.moh.gov.my/webgis> was applied to guide the study sample selection (Ministry of Health Malaysia, 2020a).

Figure 3.1
Sample selection of facilities

Source: Images modified from World Health Organization, Health Action International. (2008). Measuring medicine prices, availability, affordability and price components. Geneva: World Health Organization.



3.2.1 Publicsector sample selection

The MOH state general hospital in was selected as the main MOH hospital for each survey area. Two MOH hospitals and two MOH health clinics (Types 1, 2, and 3) were randomly selected from a list of MOH health facilities within 100km from the main MOH hospital. The study also included four university hospitals and one military hospital.

3.2.2 Private sector sample selection

Enrolment of private facilities was voluntary. The facilities that provided the consent to participate were included in this study. Private clinics and community pharmacies located within 10km from the selected public facilities that agree to participate in this study will be selected as the study sample. One private clinic and one community pharmacy were selected for each selected public facility. If there were no private clinics and community pharmacies available within 10km of the selected public facility, the next nearest available facility would be selected. For private clinics, facilities that offer specific specialisation services (e.g., eye clinics, skin clinics, and paediatric clinics) were excluded from this study.

All private hospitals in the survey area were invited to participate in this study. The facilities that consent to participate in this study were included as the study sample. Children's hospitals, maternity and women's hospitals, and hospitals with fewer than 30 beds were excluded from this study. If fewer than five private hospitals were available within 100km of the selected public facility, all hospitals were included in the study sample.

3.2.3 Back-up sample

For each selected sample, the next closest facility was selected to serve as a backup facility when available. Data collectors surveyed the backup facility if fewer than 50.0% of the medicines on the Medicine Prices Data Collection form were available at the primary sample. No backup samples were listed for private hospitals due to their limited number.

3.3 MEDICINES SELECTION

A total of 110 medicines were selected in this survey. The medicines were divided into three baskets of medicines, namely the WHO/HAI Basket, the SDG Basket, and the Single PRH Basket according to the selection criteria listed in Table 3.2. The goal for each basket is as below:

- WHO/HAI Basket - to measure medicine prices, availability, affordability, and price components of the WHO global core list and supplementary list based on national interest.
- SDG Basket - to assess the availability and affordability of a set of essential medicines in health facilities.
- Single PRH Basket - to assess prices and availability of products registered with only Single PRH, which served as a baseline and guide for the early phase of future medicines pricing policy.

Among 110 medicines included in the survey, 53 medicines belonged to the WHO/HAI Basket, consisting of 14 global core list medicines suggested by WHO/HAI and 39 medicines as a national supplementary list. Another 33 medicines were categorised as the SDG Basket, and 40 medicines were surveyed for the Single PRH Basket. Some medicines were categorised into two baskets of medicines simultaneously.

Table 3.2
Medicines selection criteria

Medicines group	Selection criteria	Number of medicines
WHO/HAI Basket		
<ul style="list-style-type: none"> • Global core list 	<ul style="list-style-type: none"> • Based on WHO’s recommended medicines list^a to allow international comparisons 	14
<ul style="list-style-type: none"> • National supplementary list^b 	<ul style="list-style-type: none"> • National disease burden^c • Commonly utilised medicines in Malaysia^d • Commonly used medicines strength alternatives to those on the global core list • Commonly used therapeutic alternatives to those on the global core list • Commonly used oncology medicines were chosen based on a special interest 	39
SDG Basket	<ul style="list-style-type: none"> • Essential medicines from 2017 WHO Model List of Essential Medicines for acute and chronic, communicable and non-communicable diseases in the healthcare setting 	33
Single PRH^e Basket	<ul style="list-style-type: none"> • Medicines registered by only a single Product Registration Holder in Malaysia • National disease burden^c • Commonly utilised medicines in Malaysia^d • Medicines with top high expenditure in the country^d • Commonly used oncology medicines and vaccines in Malaysia^d 	40

PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO = World Health Organization; WHO/HAI = World Health Organization/Health Action International

^aTaken from World Health Organization, Health Action International. (2008). Measuring medicine prices, availability, affordability and price components with updates from <http://haiweb.org/what-we-do/price-availability-affordability/collecting-evidence-on-medicine-prices-availability/>

^bMedicines selected should be available at primary healthcare facilities. No more than for ‘hospital-only’ medicines were included on the supplementary list to provide sufficient price data for robust analysis.

^cBased Health Facts 2019, Ministry of Health Malaysia; Global Burden of Disease Profile: Malaysia, Institute for Health Metrics and Evaluation

^dBased on Malaysian Statistic on Medicines (MSOM) 2015-2016

^eAny Controlled Medicine where there is only one product with the particular active ingredient(s) at the particular strength, dosage form, formulation and combination registered in Malaysia by only one Product Registration Holder.

There were a few differences in the selection of medicines compared to the medicines included in the Medicine Prices Monitoring Survey 2017 (Pharmaceutical Services Programme, 2018) due to the availability of the product in the MOH facilities:

- a) Medicines that were removed in the current study:
 - Ranitidine 150mg Tablet (supplementary list) - discontinued from the market due to the detection of *N-nitrosodimethylamine* (NDMA) in Ranitidine.
 - Glibenclamide 5mg (supplementary list) - withdrawn from the MOHMF.
- b) Medicines that were switched/added in the current study:
 - Losartan 50mg - switched to the same angiotensin receptor blocker, Telmisartan 80mg Tablet.
 - Promethazine syrup - replaced with Celecoxib 200mg Capsule.
 - Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet, Insulin Glargine 300iu/3ml, and Imatinib Mesylate 100mg Tablet (supplementary list) - added because these items were commonly utilised in the country based on the Malaysian Statistic of Medicines (MSOM) (Pharmaceutical Services Programme, 2020b).

The basket of SDG medicines has been selected from the subset list of the WHO Model List of Essential Medicines 2017 and was used in primary healthcare (World Health Organization, 2019a). Twelve medicines in this basket were listed in the WHO/HAI Basket, while two medicines were listed in the Single PRH Basket.

- a) There were 36 medicines in the SDG Basket, but only 33 medicines were selected due to the unavailability of certain medicines in the MOHMF and/or pharmaceutical market in Malaysia, which are Ready-to-use therapeutic food (RUTF), Zinc Sulphate 20mg dispersible Tablet and Isoniazid 50mg, Pyrazinamide 150mg and Rifampicin 75mg.
- b) Medicines that were substituted in the current study:
 - Chlorhexidine Solution 4% - substituted with alternative Chlorhexidine Solution 5% and it was indicated in MOHMF as an antiseptic for the umbilical cord and skin disinfectant.

While for the Single PRH Basket, the selection of medicines was limited to medicines registered by only one PRH in Malaysia. The only generic product in this basket was Dextromethorphan, Phenylephrine & Triprolidine Syrup. Medicines that were not listed and available in the MOHMF but may be available in the private sector:

- Bilastine 20mg Tablet, Dextromethorphan, Phenylephrine & Triprolidine Syrup, Telmisartan 80mg & Amlodipine 5mg Tablet, Human Papillomavirus Vaccine (HPV) 9 valent, Pneumococcal Vaccine (PCV) 10 valent (Synflorix) and Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR & MMR II).

Each medicine was strength and dosage-form specific. Only data for the indicated dosage forms and strengths were collected to ensure comparable results. Additionally, data were collected according to the recommended pack size of each medicine, which is usually related to a standard treatment course. If the recommended pack size was unavailable, the next nearest pack size was chosen (for example, a pack of 28s was available instead of the recommended pack size of the 30s). If there was no data for the nearest pack size available, the next largest pack size was selected. The selection of pack size standardised the results by diminishing the influence of economies of scale when several pack sizes were available in the market. Tables 3.3, 3.4, and 3.5 show the WHO/HAI Basket of medicines, the SDG Basket of medicines, and the Single PRH Basket of medicines, respectively.

For each medicine, information on prices and availability was collected for either one or both of the following products, according to availability on the day of data collection/ Information on each medicine price and availability was collected for either one or both of the following product types based on the availability during data collection day:

- **Originator brand (also known as innovator brand):** The first authorised product for marketing worldwide was identified prior to data collection. This study included on-patent and off-patent originators (originator brand medicines with expired patents). Biologic products are products with active substances derived from a living organism (plant, human, animal, or microorganism) and may be produced by biotechnology methods and other cutting-edge technologies. They are also included as originator brand products (National Pharmaceutical Regulatory Agency, 2021).
- **Generic equivalent:** A product that is equivalent (same qualitative and quantitative composition in active ingredient and the same pharmaceutical form) to a currently registered product (originator) in Malaysia (National Pharmaceutical Regulatory Agency, 2021).

Table 3.3
WHO/HAI Basket of medicines

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
Global core list medicines recommended by WHO/HAI							
1	Salbutamol	0.1mg/dose	Inhaler	Asthma	B	APPL	1 inhaler (200 doses)
2	Metformin	500mg	Cap/tab	Diabetes	B	APPL	100
3	Bisoprolol	5mg	Cap/tab	CVD	B	LP	100
4	Captopril	25mg	Cap/tab	CVD	B	APPL	100
5	Simvastatin	20mg	Cap/tab	CVD	B	APPL	30
6	Amitriptyline ^b	25mg	Cap/tab	Depression	B	LP	100
7	Ciprofloxacin	500mg	Cap/tab	Infectious Disease	A	LP	10
8	Co-trimoxazole ^b	8mg + 40mg/ml	Suspension	Infectious Disease	B	LP	60ml
9	Amoxicillin ^b	500mg	Cap/tab	Infectious Disease	B	LP	100
10	Ceftriaxone ^d	1g/vial	Injection	Infectious Disease	A	APPL	1 vial (1gm)
11	Diazepam ^b	5mg	Cap/tab	CNS	B	LP	100
12	Diclofenac ^b	50mg	Cap/tab	Pain/Inflammation	B	LP	100
13	Paracetamol	24mg/ml	Suspension	Pain/Inflammation	C+	APPL	60ml
14	Omeprazole	20mg	Cap/tab	Ulcer	A/KK	APPL	14
National supplementary list medicines							
1	Gliclazide	80mg	Cap/tab	Diabetes	B	APPL	60
2	Insulin Glargine	300iu/3ml	Prefilled Pen	Diabetes	A/KK	Contract	1 unit: 3ml
3	Recombinant Synthetic Human Biphasic Isophane Insulin	100iu/ml	Penfill	Diabetes	B	Contract	1 unit: 3ml
4	Saxagliptin ^c	5mg	Cap/tab	Diabetes	A/KK	LP	28
5	Sitagliptin, Metformin ^{c,d}	50mg + 500mg	Cap/tab	Diabetes	A*	LP	56
6	Perindopril	4mg	Cap/tab	CVD	B	Contract	30
7	Hydrochlorothiazide	25mg	Cap/tab	CVD	B	APPL	30
8	Furosemide	40mg	Cap/tab	CVD	B	APPL	100
9	Amlodipine	5mg	Cap/tab	CVD	B	Contract	30
10	Enalapril	10mg	Cap/tab	CVD	B	Contract	30
11	Atenolol	100mg	Cap/tab	CVD	B	APPL	100
12	Metoprolol	100mg	Cap/tab	CVD	B	APPL	100
13	Telmisartan	80mg	Tab/cap	CVD	A/KK	Contract	30
14	Telmisartan, Amlodipine ^c	80mg/5mg	Cap/tab	CVD	A/KK	LP	30
15	Clopidogrel	75mg	Cap/tab	CVD	A*	Contract	30

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
16	Acetylsalicylic Acid, Glycine	100mg + 45mg	Cap/tab	CVD	B	LP ^d	30
17	Atorvastatin	20mg	Cap/tab	CVD	A/KK	Contract	30
18	Salmeterol, Fluticasone	50mcg + 250mcg	Inhalation powder	Asthma	A/KK	Contract	1 accuhaler (60 doses)
19	Fluoxetine ^d	20mg	Cap/tab	Depression	A	LP	30
20	Amoxicillin ^b	250mg	Cap/tab	Infectious Disease	B	APPL	100
21	Doxycycline	100mg	Cap/tab	Infectious Disease	B	APPL	100
22	Ciprofloxacin	250mg	Cap/tab	Infectious Disease	A	LP	10
23	Amoxicillin & Clavulanic acid	500mg + 125mg	Cap/tab	Infectious Disease	A/KK	APPL	14
24	Cefuroxime	250mg	Cap/tab	Infectious Disease	A/KK	APPL	10
25	Co-trimoxazole ^b	80mg + 400mg	Cap/tab	Infectious Disease	B	APPL	100
26	Sodium Valproate	200mg	Cap/tab	CNS	B	APPL	100
27	Chlorpheniramine	4mg	Cap/tab	Pain/ Inflammation	C	APPL	100
28	Celecoxib ^d	200mg	Tab/cap	Pain/ Inflammation	A	Contract	100
29	Loratadine	10mg	Cap/tab	Pain/ Inflammation	B	APPL	100
30	Mefenamic acid ^b	250mg	Cap/tab	Pain/ Inflammation	B	APPL	100
31	Prednisolone ^b	5mg	Cap/tab	Pain/ Inflammation	B	APPL	100
32	Pantoprazole ^b	40mg	Cap/tab	GI disorders	A/KK	Contract	14
33	Esomeprazole	20mg	Cap/tab	GI disorders	A*	Contract	14
34	Fluorouracil ^{b,d,e}	50mg/ml	Injection	Cancer	A*	APPL	1 vial (20ml)
35	Docetaxel ^{d,e}	40mg/ml	Injection	Cancer	A*	Contract	1 vial (2ml)
36	Trastuzumab ^{d,e}	440mg	Injection	Cancer	A*	Contract	1 vial (440mg)
37	Gefitinib ^{c,d,e}	250mg	Cap/tab	Cancer	A*	Contract	30
38	Imatinib Mesylate ^{d,e}	100mg	Tab/cap	Cancer	A*	Contract	60
39	Tenofovir Disoproxil Fumarate & Emtricitabine ^b	300mg + 200mg	Tab/cap	Retroviral disease	A/KK	Contract	30

APPL = Approved Product Purchase List; Cap/tab = capsule/tablet; CNS = Central Nervous System; CVD = Cardiovascular Disease; GI = Gastrointestinal; LP = Local purchase; MOH = Ministry of Health; MOHMF = Ministry of Health Medicines Formulary/Formulari Ubat Kementerian Kesihatan Malaysia (FUKKM); WHO/HAI = World Health Organization/Health Action International
 MOHMF Category is the prescriber category where medicines are authorized to be initiated by prescribers according to the following: A* = Consultant/Specialist for specific indication only; A = Consultant/Specialist; A/KK = Consultant/Specialist/Family Physician Specialist; B = Medical officer; C = Paramedical staff; C+ = Paramedical staff doing midwifery

^aCap/tab unless indicated otherwise

^bOriginal brand not available: Original brand data omitted

^cInnovator/On-patent medicines: Generic brand omitted

^dHospital-only medicines: Data may be excluded for Health Clinic/ Community Pharmacy

^eCancer hospital-only medicines: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology service

Table 3.4
SDG Basket of medicines

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
Essential list of medicines recommended by WHO List of Essential Medicines							
1	Amoxicillin ^b	500mg	Tab/cap	Infectious Disease	B	LP	100
2	Benzylpenicillin ^b	1mega unit (600mg)	Injection	Infectious Disease	B	APPL	1 vial:0.6gm
3	Ceftriaxone ^d	1g/vial	Injection	Infectious Disease	A	APPL	1 vial: 1gm
4	Gentamicin ^b	40mg/ml (2ml)	Vial	Infectious Disease	B	APPL	1 vial: 40mg/ml: 2ml
5	Gliclazide	80mg	Tab/cap	Diabetes	B	APPL	60
6	Metformin	500mg	Tab/cap	Diabetes	B	APPL	100
7	Recombinant Synthetic Human Insulin Short Acting	100iu/ml	Penfill	Diabetes	B	Contract	1 unit:3ml
8	Acetylsalicylic Acid & Glycine	100mg + 45mg	Tab/cap	CVD	B	Contract	30
9	Amlodipine	5mg	Tab/cap	CVD	B	APPL	30
10	Enalapril	10mg	Tab/cap	CVD	B	Contract	30
11	Frusemi de	40mg	Tab/cap	CVD	B	APPL	100
12	Simvastatin	20mg	Tab/cap	CVD	B	APPL	30
13	Artemether & Lumefantrine ^c	20mg + 120mg	Tab/cap	Malaria	B	LP	24
14	Artesunate ^c	60mg	Injection	Malaria	B	LP	1 vial:60mg
15	Beclomethasone ^b	100mcg/dose	Metered-dose Inhaler	Respiratory Diseases	B	APPL	1 unit:200 doses
16	Salbutamol	100mcg/dose	Metered-dose Inhaler	Respiratory Diseases	B	APPL	1 inhaler: 200 doses
17	Dexamethasone Sodium Phosphate ^b	4mg/ml injection	Injection	Pain/ Inflammation	B	APPL	1 amp: 4mg/ml (2ml)
18	Ibuprofen ^b	200mg	Tab/cap	Pain/ Inflammation	B	APPL	20
19	Paracetamol	24mg/ml	Suspension	Pain/ Inflammation	C+	APPL	60ml
20	Morphine ^{c,d}	10mg	Controlled Release Tablet	Pain/ Inflammation	A	LP	30
21	Fluconazole ^d	50mg	Tab/cap	Fungal Infection	A	LP	7
22	Nystatin ^b	100,000iu/ml	Suspension	Fungal Infection	B	LP	60ml
23	Ethinylestradiol & Levonorgestrel	30mcg + 150mcg	Tab/cap	Maternal Child Health	C+	LP	21
24	Folic Acid ^b	5mg	Tab/cap	Maternal Child Health	C+	APPL	100

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
Essential list of medicines recommended by WHO List of Essential Medicines							
25	Magnesium Sulphate ^b	50% in 10ml	Injection	Maternal Child Health	C	Contract	1 vial: 5ml (2.47gm)
26	Oxytocin ^b	10iu/ml	Injection	Maternal Child Health	B	APPL	1 vial: 1ml
27	Levothyroxine	50mcg	Tab/cap	Thyroid Disease	B	LP	100
28	Oral Rehydration Salt ^b	-	Sachet	Fluid & Electrolyte Replenishment	C	Contract	100 sachets
29	Fluoxetine ^d	20mg	Tab/cap	Depression	A	LP	30
30	Phenytoin	100mg	Tab/cap	CNS	B	APPL	100
31	Recombinant Human Erythropoietin Alpha ^d	2000iu/0.5ml	Injection	Kidney Diseases	A	Contract	1 prefilled syringe: 0.5ml
32	Efavirenz, Emtricitabine & Tenofovir ^b	600mg+ 200mg+ 300mg	Tab/cap	Retroviral disease	NA	NA	30
33	Chlorhexidine Solution 5% ^b	5%	Solution	Umbilical Cord Care	C+	APPL	500ml

APPL = Approved Product Purchase List; Cap/tab = capsule/tablet; CNS = Central Nervous System; CVD = Cardiovascular Disease; LP = Local purchase; MOH = Ministry of Health; MOHMF = Ministry of Health Medicines Formulary/Formulari Ubat Kementerian Kesihatan Malaysia (FUKKM); NA = Not Available; WHO/HAI = World Health Organization/Health Action International

MOHMF Category is the prescriber category where medicines are authorized to be initiated by prescribers according to the following: A* = Consultant/Specialist for specific indication only; A = Consultant/Specialist; A/KK = Consultant/Specialist/Family Physician Specialist; B = Medical officer; C = Paramedical staff; C+ = Paramedical staff doing midwifery

^aCap/tab unless indicated otherwise

^bOriginal brand not available: Original brand data omitted

^cInnovator/On-patent medicines: Generic brand omitted

^dHospital-only medicines: Data may be excluded for Health Clinic/ Community Pharmacy

^eCancer hospital-only medicines: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

Table 3.5
Single PRH Basket of medicines

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
1	Afatinib dimaleate ^{c,d,e}	30mg	Tab/cap	Cancer	A*	LP	28
2	Agomelatine ^{c,d}	25mg	Tab/cap	Mental Disorders	A*	LP	28
3	Apixaban ^{c,d}	2.5mg	Tab/cap	CVD	A*	LP	30
4	Artemether & Lumefantrine ^c	20mg + 120mg	Tab/cap	Malaria	B	LP	24
5	Artesunate ^c	60mg	Injection	Malaria	B	LP	1 vial: 60mg
6	Bilastine ^c	20mg	Tab/cap	Allergic Conditions	NA	NA	50
7	Budesonide & Formoterol ^c	160mcg + 4.5mcg	Inhaler	Respiratory Diseases	A/KK	Contract	1 unit: 120 doses
8	Capecitabine ^{c,d,e}	150mg	Tab/cap	Cancer	A*	LP	60
9	Cyclophosphamide ^{c,d,e}	1g	Injection	Cancer	A	LP	1 vial: 20mg/ml: 50ml
10	Dabigatran ^{c,d}	110mg	Tab/cap	CVD	A*	LP	30
11	Dextromethorphan, Phenylephrine & Triprolidine ^b	15mg/5ml + 5mg/5ml + 1.25mg/5ml	Linctus	Respiratory Diseases	NA	NA	120ml
12	Digoxin ^c	0.25mg	Tab/cap	CVD	B	APPL	240
13	Dydrogesterone ^c	10mg	Tab/cap	Maternal Child Health	A/KK	Contract	20
14	Enoxaparin Sodium ^c	4000/0.4ml	Injection	CVD	A/KK	Contract	1 syringe: 0.4ml
15	Fenofibrate ^c	145mg	Tab/cap	CVD	A*	LP	30
16	Insulin Aspart 30% & Insulin Aspart Protamine 70% ^c	30%/70% 100iu/ml	Prefilled Pen	Diabetes	A/KK	Contract	1 unit: 3ml
17	Insulin Detemir ^c	100iu/ml	Prefilled Pen	Diabetes	A/KK	LP	1 unit: 3ml
18	Lamivudine & Abacavir Sulphate ^{c,d}	300mg + 60mg	Tab/cap	Retroviral Disease	A*	LP	30
19	Leflunomide ^{c,d}	10mg	Tab/cap	Musculo-skeletal Disorders	A*	Contract	30
20	Mirtazapine ^{c,d}	15mg	Orodispersible Tablet	Mental Disorders	A*	LP	6
21	Nilotinib ^{c,d,e}	150mg	Tab/cap	Cancer	A*	Contract	112
22	Oxycodone HCl ^{c,d}	10mg	Controlled Release Tablet	Pain/ Inflammation	A*	LP	20
23	Quetiapine Fumarate ^{c,d}	50mg	Extended Release Tablet	Mental Disorders	A*	Contract	60
24	Raltegravir ^{c,d}	400mg	Tab/cap	Retroviral Disease	A*	Contract	60

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
25	Recombinant Human Erythropoietin Beta ^c	2000iu/0.3ml	Injection	Kidney Diseases	A	Contract	1 prefilled syringe: 0.3ml
26	Rituximab ^{c,d,e}	1400mg	Injection	Cancer	A*	LP	1 vial: 11.7ml
27	Sitagliptin & Metformin ^{c,d}	50mg + 500mg	Tab/cap	Diabetes	A*	LP	56
28	Telmisartan & Amlodipine ^c	80mg/5mg	Tab/cap	CVD	NA	NA	30
29	Tenecteplase ^c	10,000 units	Injection	CVD	A*	Contract	1 vial: 50mg (10ml)
30	Tiotropium Bromide Solution for Inhalation ^c	2.5mcg	Puff	Respiratory Diseases	A/KK	Contract	1 can: 4.0ml: 60 puff
31	Tolterodine ^c	4mg	Extended Release Tablet	Urinary Bladder Diseases	A*	Contract	30
32	Human Papillomavirus Vaccine (HPV) ^c 9 valent	1unit: 0.5ml	Injection	Vaccination	NA	NA	1 unit: 0.5ml
33	Human Papillomavirus Vaccine (HPV) ^c 4 valent	1unit: 0.5ml	Injection	Vaccination	C+	LP	1 unit: 0.5ml
34	Human Papillomavirus Vaccine (HPV) ^c 2 valent	1unit: 0.5ml	Injection	Vaccination	C+	Contract	1 unit: 0.5ml
35	Pneumococcal Vaccine polyvalent ^c	1unit: 0.5ml	Injection	Vaccination	A	LP	1 unit: 0.5ml
36	Pneumococcal Vaccine ^c 13 valent	1unit: 0.5ml	Injection	Vaccination	A*	LP	1 unit: 0.5ml
37	Pneumococcal Vaccine ^c 10 valent	1unit: 0.5ml	Injection	Vaccination	NA	NA	1 unit: 0.5ml
38	Measles, Combinations with Mumps and Rubella, Live Attenuated ^c (MMR II)	1unit: 0.5ml	Injection	Vaccination	NA	NA	1 unit: 0.5ml
39	Measles, Combinations with Mumps and Rubella, Live Attenuated ^c (Priorix)	1unit: 0.5ml	Injection	Vaccination	C+	APPL	1 unit: 0.5ml

No.	Name	Strength	Dosage form	Disease	MOHMF Category	Purchase Type (MOH)	Recommended Pack Size (Cap/tab) ^a
40	Measles, Combinations with Mumps and Rubella, Live Attenuated ^c (SM MMR)	1unit:0.5ml	Injection	Vaccination	NA	NA	1 unit:0.5ml

APPL = Approved Product Purchase List; Cap/tab = capsule/tablet; CVD = Cardiovascular Disease; LP = Local purchase; MOH = Ministry of Health; MOHMF = Ministry of Health Medicines Formulary/Formulari Ubat Kementerian Kesihatan Malaysia (FUKKM); NA = Not Available
 MOHMF Category is the prescriber category where medicines are authorized to be initiated by prescribers according to the following: A* = Consultant/Specialist for specific indication only; A = Consultant/Specialist; A/KK = Consultant/Specialist/Family Physician Specialist; B = Medical officer; C = Paramedical staff; C+ = Paramedical staff doing midwifery

^aCap/tab unless indicated otherwise

^bOriginal brand not available: Original brand data omitted

^cInnovator/On-patent medicines: Generic brand omitted

^dHospital-only medicines: Data may be excluded for Health Clinic/ Community Pharmacy

^eCancer hospital-only medicines: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

3.4 DATA COLLECTION

The two types of medicine prices that were collected are, namely:

- a) Wholesale price/procurement price:
 - The latest procurement prices for available medicines at the time of data collection for both public and private sectors.
 - Only prices for LP medicines were collected from MOH public facilities since medicine prices listed under APPL and national tendering were gathered from central public procurement prices. These procurement prices are fixed for MOH facilities.
 - Nevertheless, other than MOH facilities, all procurement prices were collected regardless of their procurement method.
- b) Selling price:
 - The prices on the price labels or tags at community pharmacies or selling prices at private hospitals and private clinics were collected in the private sector.
 - Private hospitals' selling prices include both (Out-Patient Department) OPD and (In-Patient Department) IPD settings.

A total of 109 pharmacists, consisting of MOH pharmacists (20 area supervisors and 84 data collectors), one pharmacist from MOD, and four pharmacists from university hospitals, were recruited as data collectors (Appendix I). During the COVID-19 pandemic, training was conducted virtually on the survey method, data collection, and data entry procedures prior to the data collection period. Data were then entered into the Microsoft Excel data collection form (Appendix II). Data entry was systematically checked for completeness of information, any suspected erroneous entries, and obvious outliers on all submitted data collection forms. Area supervisors were responsible for verifying questionable data by contacting the data collectors or pharmacists at the healthcare facilities.

Collections of price data were according to the medicines and brands available on the day of data collection. In the private sector, procurement and selling prices were collected based on the consent given by the participating facilities (Appendix III & IV). If the private facilities agreed to disclose only one of their prices, the information was used in procurement or selling price analyses but not in further mark-up analyses.

3.5 DATA ANALYSIS

In terms of price, the procurement price after any bonus or discount and the selling price after discount were used. All data were analysed with Microsoft Excel and STATA/IC version 14.0 and presented as the median, average, 25th percentile (Q25), 75th percentile (Q75), ratio, and percentage (%) of price changes in each sector. An inferential statistic was also performed in this study. A normality test using the Kolmogorov–Smirnov test was employed to check the data distribution and the results found that the data was not normally distributed. Hence, non-parametric statistical tests were used for group comparison. The Mann–Whitney test was applied to the variables with two independent groups, while the Kruskal–Wallis test was used for variables with three or more independent groups. A p-value of less than 0.05 was considered to be statistically significant.

3.5.1 Availability

The availability of individual medicines was reported as the percentage of facilities in which the medicine was found on the day of data collection. The WHO report classifies availability as follows: <30.0% = very low, 30.0 – 49.0% = low, 50.0 – 80.0% = fairly high, >80.0% = high (Gelders et al., 2006). Data on availability were analysed based on the expected medicines available in the facilities. For example, oncology medicines were excluded from MOH health clinics, the military hospital, private clinics, community pharmacies, and hospitals without oncology services.

3.5.2 Price variation

Price variation was measured as the ratio of the Q75 to the Q25 prices for both procurement and selling prices. Data from Q75 and Q25 were used to exclude outliers and the ratio allows for comparison across medicines using a standardised unit. The magnitude of the ratio was presented as the median and interquartile range (IQR) in the Whisker Plot, which is the range between Q25 and Q75. A larger ratio specifies a greater spread between the prices of more expensive and less expensive medicines (Gelders et al., 2006; Pharmaceutical Services Programme, 2018).

3.5.3 Price comparison

Price comparison was calculated by comparing prices in different subgroups within and among the sectors for both procurement and selling prices. Price comparison was illustrated as the price ratio. The price ratio was calculated by comparing the median price of one group with the median price of a reference group. A ratio of >1 denotes that the price of the comparator is more expensive than the reference group, while a ratio of ≤1 denotes that the price of the comparator is cheaper than the reference group (Pharmaceutical Services Programme, 2018).

As for an international comparison, WHO/HAI recommended comparing the median price with reference prices from Management Science for Health (MSH) (World Health Organization & Health Action International, 2008). However, the reference price in MSH was updated until 2015 (Management Sciences for Health, 2016). Therefore, unlike the previous study, this study adopted price comparison by comparing the median procurement price and

selling price to reference countries such as Australia (Li et al., 2019; World Health Organization & Health Action International, 2008), Taiwan, South Korea, Thailand, and South Africa. The selection criteria of reference countries include whether the countries are developed countries, the same GDP, the same region, or countries with established pricing policies. Prices for reference countries were obtained from the Pharmaceutical Pricing & Reimbursement database (PharmOnline International (POLI), 2021). Prices were reported as Price Ratio (PR), the ratio of the local median price to the reference country's price. $PR \leq 1$ indicates that the local median price is lower than other reference countries and $PR > 1$ indicates that the local median price is higher than reference countries. Reference prices for each country were converted to Malaysian Ringgit (RM) according to the median official conversion rate during the data collection period (Central Bank of Malaysia, 2021).

Of special note, Australia, Taiwan, South Korea, Thailand, and South Africa prices were compared with Malaysia's median procurement price. Malaysia's median procurement prices were compared with the reimbursement prices in Australia, Taiwan, and South Korea. Australia's reimbursement price was sourced from the Australian Pharmaceutical Benefits Scheme, a form of government subsidies for pharmaceuticals made available through government-supported insurance programmes (Australian Government Department of Health, 2021). The reimbursement prices from Taiwan were sourced from the reimbursement list regulated by the Taiwan National Health Insurance Administration (NHIA) (Chen et al., 2018). Similarly, the reimbursement prices from South Korea were sourced from South Korea's National Health Insurance (NHI) reimbursement list, regulated by Health Insurance Review and Assessment (HIRA) and the National Health Insurance Service (NHIS) (Kwon & Godman, 2017). As for Thailand, Malaysia's median procurement prices were compared with Thailand's procurement prices in the public hospital sourced from the Drug and Medical Supply Information Center, Ministry of Public Health (Ministry of Public Health Thailand, 2019; Ngorsuraches & Chaiyakan, 2015). Simultaneously, Malaysia's median procurement prices were compared with South Africa's Single Exit Pricing (SEP), representing the maximum procurement price in the private sector (Code for Africa, 2019).

However, Malaysia's median selling prices were only compared to those of Australia and South Africa as selling prices are limited for these two countries. Moreover, to understand the nature of pricing for generic products, the study used the approach of comparing prices of generic products within the same generic brand (SGB) and all generic brands available at reference countries (AGB).

3.5.4 Mark-up

The analysis of price mark-up was reported only for the private sector at the end of the pharmaceutical supply chain. Specifically, the percentage mark-up was calculated by subtracting the selling price to the procurement price of medicines. Generally, mark-up represents the additional charges and costs imposed to cover overhead costs, distribution charges, and a profit. It is also known as "gross profit" (World Health Organization, 2011).

3.5.5 Affordability

Affordability was calculated by the number of days' wages required to purchase selected courses of treatment for common acute and chronic conditions (World Health Organization & Health Action International, 2008). The daily salary of the Lowest-paid Government Worker (LPGW) was determined to be RM58.17 (Accountant General's Department of Malaysia, 2018; Public Service Department, 2006). This LPGW allows for international comparison. This study also included the daily lowest minimum wage of RM46.15 as determined by the Federal Government of Malaysia to represent the low-income population (Attorney General's Chambers, 2020). Treatment costs are generally considered affordable when patients only spend one days' wage or less (for a full course of treatment for an acute condition or a 30-day supply of medicines for chronic diseases) (World Health Organization & Health Action International, 2008).

3.6 ETHICAL CONSIDERATION

Facility information was kept confidential and no patient personal information was collected in this study. Aggregate data were presented without indicating specific facilities. Participating facilities remained anonymous. Ethical approval for this study was granted by the Medical Research and Ethics Committee of the Ministry of Health Malaysia with the National Medical Research Register number: NMRR--20-849-54191(IIR).

4.0 RESULTS

The key measures for each basket of medicines were:

- Availability: Results were illustrated in tables of average (%) availability across sectors (public and private); type of facilities; product types (originator vs. generic brand); group (global vs. supplementary list); location (Peninsular vs. East Malaysia) and percent (%) availability of individual medicines
- Medicine prices: median price variation (ratio of 75th/25th percentile) across sectors, product types and facilities were presented as whisker plot; price comparison (between subgroup) presented in tables; price ratio (ratio of median local prices to the reference countries) across sector and product types as presented in bar graph; and median mark-ups in the private sector across product types as presented in tables
- Affordability: number of days' wage required to purchase selected course of treatment by the LPGW and the lowest minimum wage in Malaysia presented in tables

A total of 146 public and private healthcare facilities were sampled in this study (Table 4.1). Out of the 146 facilities, 35 were public sector facilities, including 18 MOH hospitals, 12 MOH health clinics, four university hospitals, and one MOD representative to represent the military hospital. Meanwhile, 111 private facilities comprised of 29 private hospitals, 32 private clinics, and 50 community pharmacies were also sampled in this study.

Table 4.1
Number of facilities sampled, by survey area and sector

Survey Area/Zone	Public Sector				Private Sector			Total
	MOH Hospital	MOH Health clinic	Military hospital	University hospital	Private hospital	Private clinic	Community pharmacy	
1. North	3	2	0	0	5	5	9	24
2. Central	3	2	1	3	15	6	9	39
3. South	3	2	0	0	4	2	10	21
4. East	3	2	0	1	1	7	7	21
5. Sarawak	3	2	0	0	3	6	8	22
6. Sabah	3	2	0	0	1	6	7	19
Total	18	12	1	4	29	32	50	146
	35				111			

MOH = Ministry of Health

The majority of private clinics & community pharmacies consented to participate in the study were independent clinics and pharmacies.

4.1 MEDICINES AVAILABILITY

Table 4.2 illustrates the average medicines availability by product type, group, location, and sector. Overall, average medicines availability was fairly high in the public sector for all baskets (WHO/HAI: 79.1%; SDG: 72.4%; Single PRH: 56.3%), whereas in the private sector, only medicines in the WHO/HAI Basket were found at a fairly high availability (53.1%), with low and very low availability in the SDG Basket (38.6%) and Single PRH Basket (26.3%), respectively. Furthermore, there was a significant difference in the average medicines availability between the public and private sectors across all baskets ($p < 0.05$).

In the WHO/HAI Basket, the average medicines availability was fairly high in the public facilities ranging from 75.0% to 83.3%. This figure was contrary to the private sector, where the value ranges from 37.8% to 61.1%. We can see the similarity of results in the public and private facilities for the SDG Basket. The most fairly high availability in the public facilities accounted for 78.0% in MOH hospitals, while the very low availability of medicines in the private sector came from private clinics (26.3%). For Single PRH Basket, all public sector facilities had fairly high availability, with the highest availability in the military hospital (75.0%), followed by MOH hospitals (60.0%), university hospitals (57.4%), and MOH health clinics (54.5%). On the other hand, the average medicines availability was low in private hospitals (42.3%) and very low in both private clinics (9.2%) and community pharmacies (17.3%).

As presented in Table 4.2, there were sub-analyses to measure the availability of originator and generic products. In the public sector, the average medicines availability of generic products (WHO/HAI: 72.4%; SDG: 66.9%) was higher than the availability of originator products (WHO/HAI: 16.0%; SDG: 18.4%). A similar pattern was observed in the private sector for both baskets, with generic (WHO/HAI: 40.7%; SDG: 33.0%) having higher availability than originator products (WHO/HAI: 32.1%; SDG: 23.1%). Meanwhile, in the Single PRH Basket, originator products were found at fairly high availability (56.3%) in the public sector, whereas in the private sector, both originator (26.3%) and generic products (24.3%) were found at a very low availability. Statistical analysis conducted between sectors and across baskets of medicines revealed a significant difference ($p < 0.05$) between product types.

As stated in the methodology, the WHO/HAI Basket comprised two medicine lists: the global core list, which includes medicines recommended by the WHO/HAI, and the supplementary list, which includes commonly used medicines in Malaysia. The average availability of medicine for the global core list (public: 78.1%; private: 53.6%) and supplementary list (public: 79.5%; private: 52.9%) was fairly high in the public and private sectors. Statistical analysis revealed that the average availability of medicines in the global core and supplementary lists was significantly higher in the public sector than in the private sector ($p < 0.05$).

Another factor being considered in the study is the location of healthcare facilities. In the WHO/HAI Basket, the average availability of medicines in the public sector was fairly high in Peninsular Malaysia (72.4%) and East Malaysia (74.7%). Similarly, a fairly high availability (50.1%) of medicines was noted in Peninsular Malaysia for the private sector, whereas East Malaysia had a low availability (44.4%). Meanwhile, in the SDG Basket, both Peninsular Malaysia (39.5%) and East Malaysia (36.3%) had low availability of medicines in the private

sector but a fairly high availability in the public sector for Peninsular Malaysia (69.1%) and East Malaysia (73.9%). On the other hand, in the Single PRH Basket, the public sector had a low availability of medicines in Peninsular Malaysia (39.9%) and East Malaysia (37.2%), while the private sector had a very low availability in both localities (Peninsular Malaysia: 22.1%; East Malaysia: 15.3%). Within each basket for the public and private sectors, the average medicines availability in Peninsular Malaysia and East Malaysia was almost similar. As a result, no significant difference in average medicines availability was found between localities for all baskets and sectors ($p>0.05$).

Table 4.2
Average medicines availability by product type, group, location and sector

Sector	No. of medicine ^a , n	Public					Public sector p-value*	Private				Private sector p-value*	Public: private sector p-value*
		MOH Hospital	MOH Health clinic	Military hospital	University hospital	All public		Private hospital	Private clinic	Community pharmacy	All private		
Number of facility^a		18	12	1	4	35		29	32	50	111		
Overall	53	80.8%	83.3%	75.0%	82.1%	79.1%		61.1%	37.8%	55.5%	53.1%		<0.05
Product type^b													
Originator	39	14.1%	9.8%	33.3%	19.3%	16.0%	<0.05	42.1%	8.5%	33.0%	32.1%	<0.05	<0.05
Generic	49	73.9%	80.3%	53.7%	73.0%	72.4%		37.7%	34.8%	46.2%	40.7%		<0.05
Group													
Global core list	14	79.0%	70.2%	83.3%	87.5%	78.1%	>0.05	68.0%	42.6%	52.0%	53.6%	>0.05	<0.05
Supplementary list	39	81.4%	86.8%	71.9%	80.1%	79.5%		58.0%	35.8%	57.0%	52.9%		<0.05
Location^c													
Peninsular Malaysia	53	76.6%	81.5%	75.0%	82.1%	72.4%	>0.05	61.0%	36.7%	57.3%	50.1%	>0.05	<0.05
East Malaysia	53	80.1%	86.9%	-	-	74.7%		61.8%	39.6%	51.4%	44.4%		<0.05
SDG Basket													
Overall	33	78.0%	69.3%	71.0%	77.3%	72.4%		56.3%	23.6%	37.9%	38.6%		<0.05
Product type^b													
Originator	16	20.2%	14.9%	27.3%	23.9%	18.4%	<0.05	34.5%	7.5%	25.6%	23.1%	>0.05	<0.05
Generic	29	72.2%	65.4%	60.7%	66.7%	66.9%		39.5%	21.7%	36.5%	33.0%		<0.05
Location^c													
Peninsular Malaysia	33	74.2%	65.5%	71.0%	77.3%	69.1%	>0.05	55.3%	21.5%	38.4%	39.5%	>0.05	<0.05
East Malaysia	33	80.7%	76.7%	-	-	73.9%		62.9%	27.0%	36.6%	36.3%		<0.05

Sector	No. of medicine ^a , n	Public					Public sector p-value*	Private				Private sector p-value*	Public: private sector p-value*
		MOH Hospital	MOH Health clinic	Military hospital	University hospital	All public		Private hospital	Private clinic	Community pharmacy	All private		
Single PRH Basket													
Overall	40	60.0%	54.5%	75.0%	57.4%	56.3%		42.3%	9.2%	17.3%	26.3%		<0.05
Product type^b													
Originator	39	60.0%	54.5%	75.0%	57.4%	56.3%		43.1%	9.3%	16.5%	26.3%		<0.05
Generic	1							10.3%	6.3%	44.0%	24.3%		
Location^c													
Peninsular Malaysia	40	55.9%	52.9%	75.0%	57.4%	39.9%	>0.05	42.4%	6.3%	19.5%	22.1%	0.095	<0.05
East Malaysia	40	55.9%	57.7%	-	-	37.2%		41.9%	14.0%	12.2%	15.3%		<0.05

MOH = Ministry of Health; PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
^aNumber listed is the total number of medicine and number of facilities in this study. Availability calculation is based on expected level of availability in the type of facility. Therefore, actual numbers may be different in the subgroup categories based on facility (Appendix V, VI, VII, VIII, IX, X, XI, XII, XIII, XIV, XV, XVI).

^bFacility may have both originator and generic medicines. Original or generic brands not available in Malaysia were omitted.

^cNumber of facility listed is the total number of facilities in both Peninsular Malaysia and East Malaysia. Actual number of facilities is available in Table 4.1.

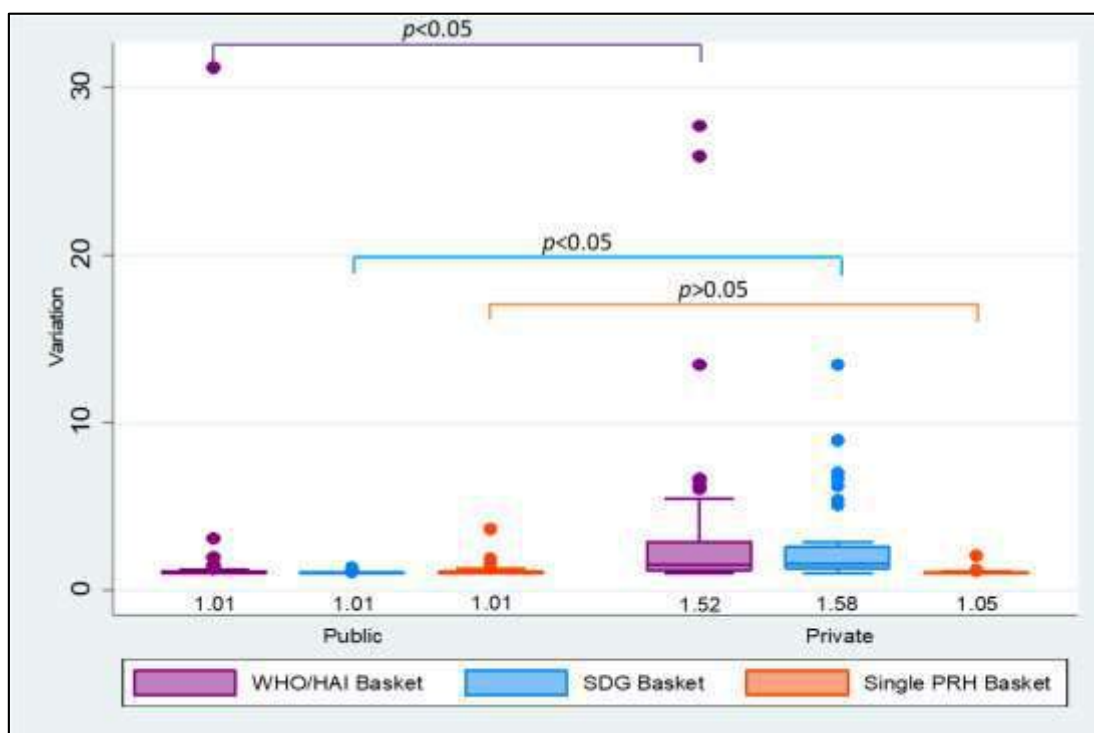
* Mann-Whitney

4.2 PRICE VARIATION

4.2.1 Procurement price variation in public and private sectors

Figure 4.1 shows the variation of procurement prices in the public and private sectors. The figure showed almost no variation for all baskets (WHO/HAI: 1.01; SDG: 1.01; Single PRH: 1.01) in the public sector. In contrast to this, substantial variation was found in the private sector for WHO/HAI Basket (1.52) and SDG Basket (1.58), with no variation in the Single PRH Basket (1.05). Further analysis showed a significant difference between the procurement price variation of the public and private sectors for the WHO/HAI Basket and SDG Basket ($p < 0.05$) but not in the Single PRH Basket.

Figure 4.1
Median procurement price variation by sector



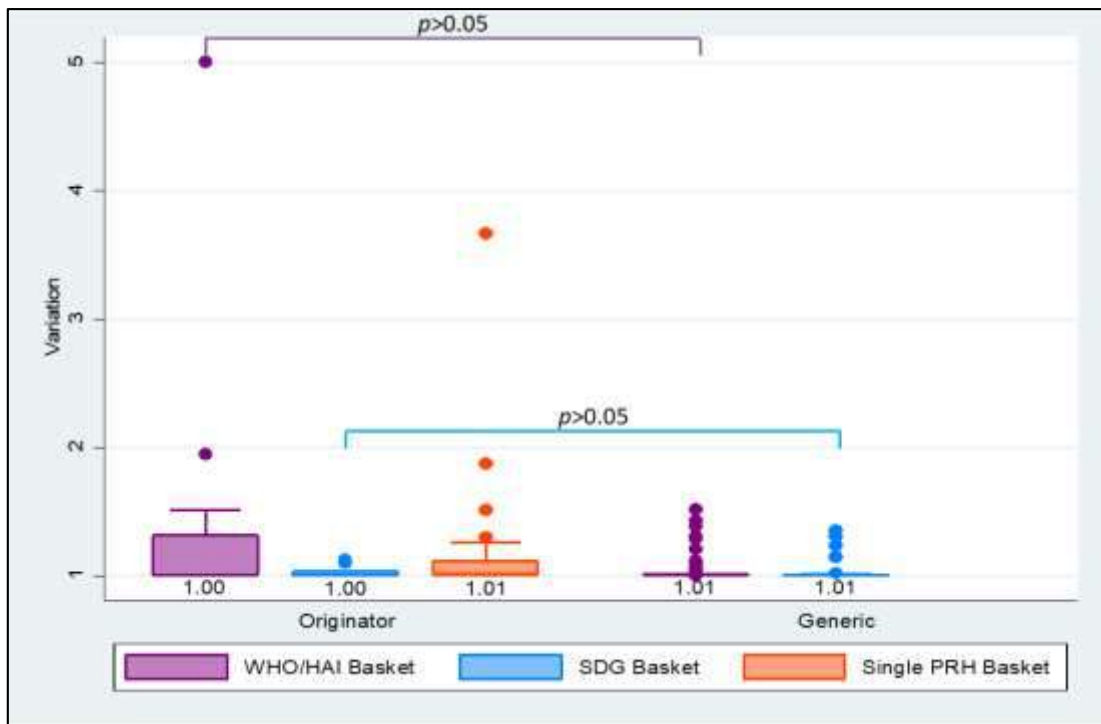
PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

* Mann-Whitney

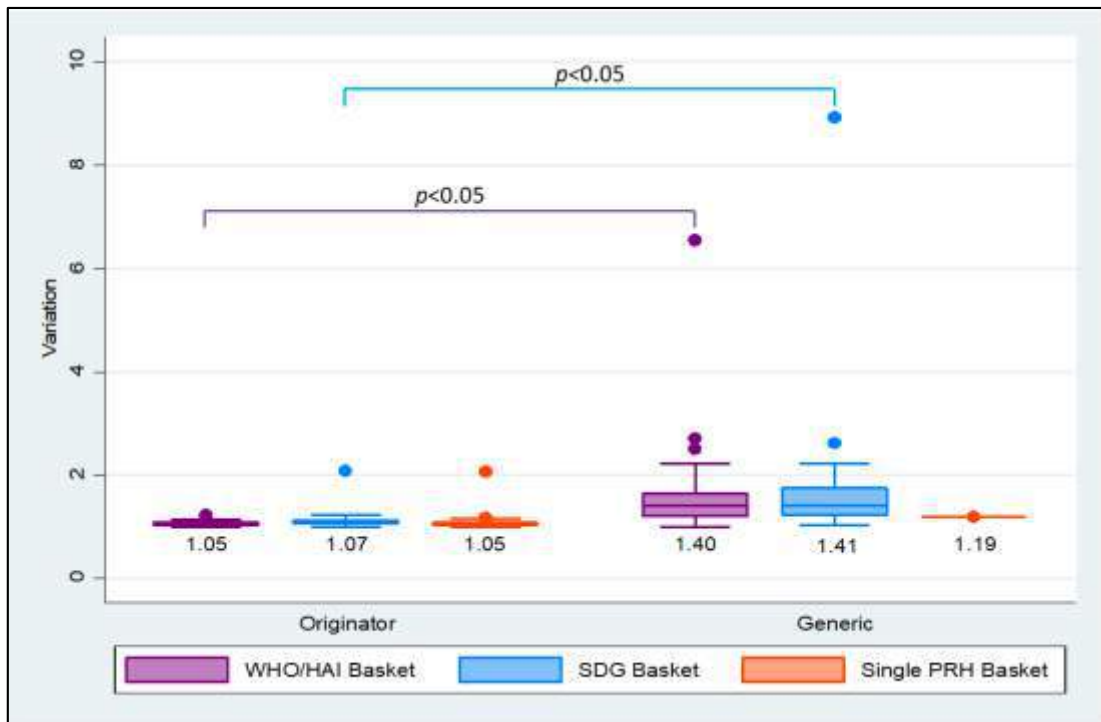
The median procurement price variation in the public sector did not reveal any variation across originator (WHO/HAI: 1.00; SDG: 1.00; Single PRH: 1.01) and generic products (WHO/HAI: 1.01; SDG: 1.01) for all baskets (Figure 4.2(a)). On the other hand, the analysis in the private sector showed that originator products for WHO/HAI Basket (1.05) and SDG Basket (1.07) showed a small variation, while wide variation was found in generic products for both baskets (WHO/HAI: 1.40; SDG: 1.41). Statistical analysis showed a significant difference in price variation between originator and generic products in the private sector for WHO/HAI Basket and SDG Basket ($p < 0.05$). Meanwhile, in the Single PRH Basket, generic products (1.19) had wider variation than originator products (1.05) (Figure 4.2(b)).

Figure 4.2
Median procurement price variation for originator and generic products in:
a) public sector b) private sector

a)



b)



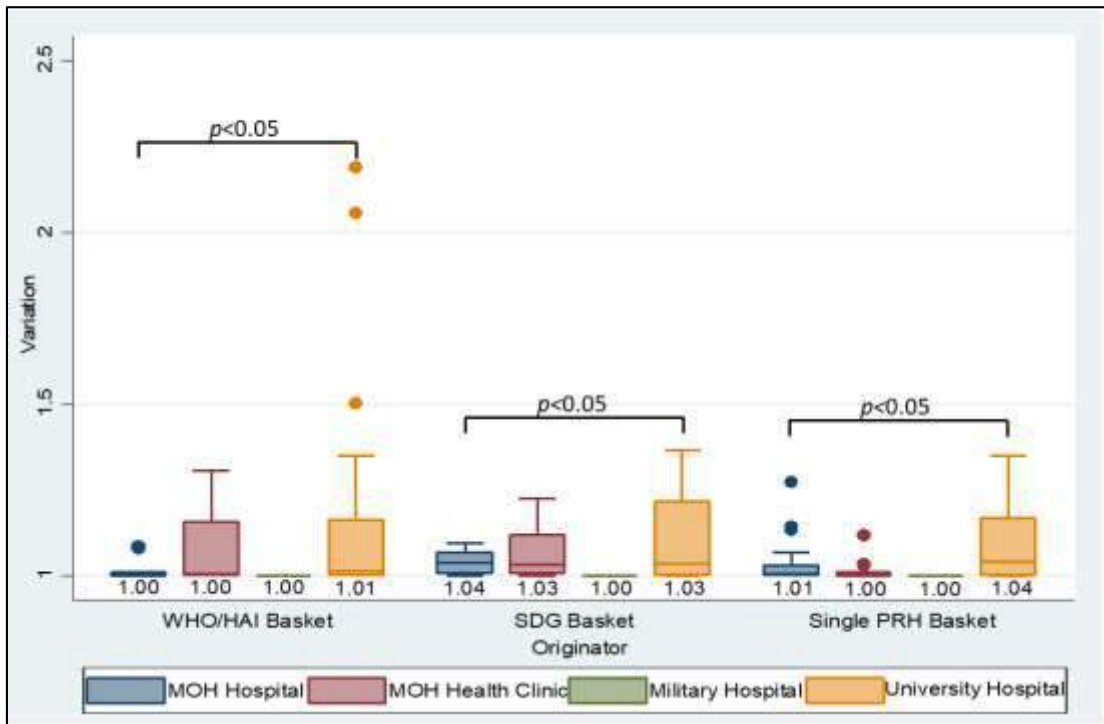
PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 * Mann-Whitney

Further analysis of public sector facilities indicated almost no price variation of originator products in all facilities for all baskets. However, a detailed analysis showed a significant difference in the price variation between the facilities of these three baskets (Figure 4.3 (a)). For generics, almost no variation was seen in the SDG Basket for MOH hospitals (1.01), MOH health clinics (1.00), a military hospital (1.00), and university hospitals (1.05). A similar pattern was observed in the WHO/HAI Basket for all facilities, except for university hospitals (1.15) which showed a small variation in the procurement price. For comparison purposes, there was a significant difference in the price variation between public facilities for WHO/HAI Basket and SDG Basket (Figure 4.3 (b)).

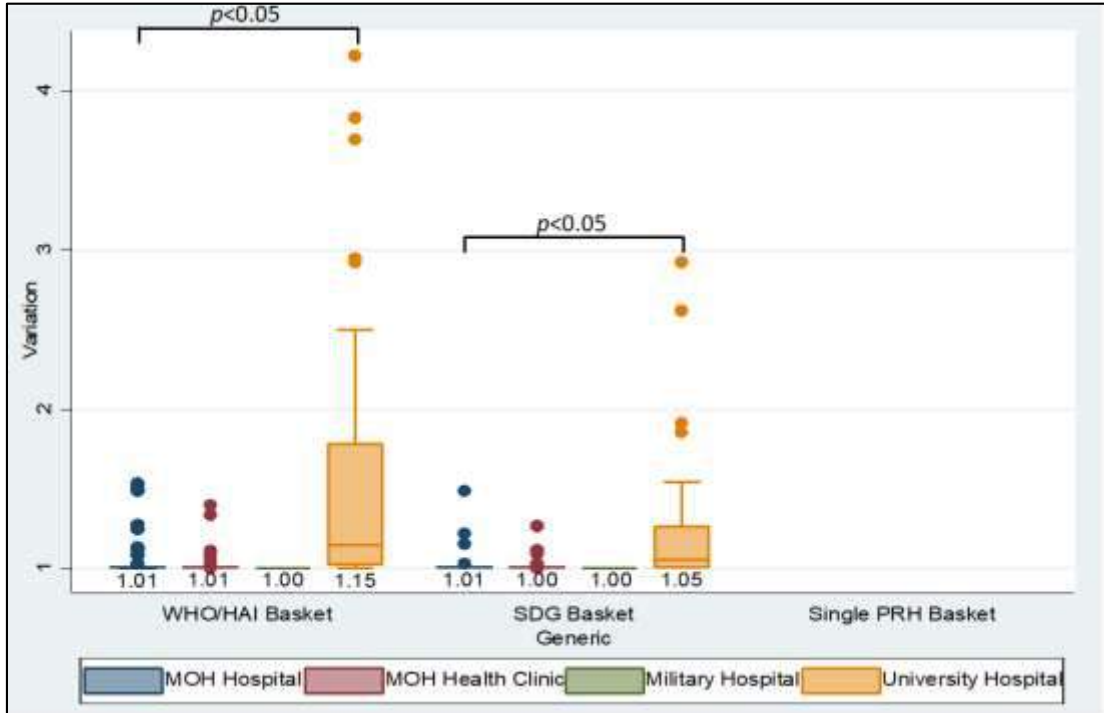
Figure 4.4 illustrates the variation in procurement prices in the private sector facilities by product types. Among the originator products, a small variation was found in private hospitals (WHO/HAI: 1.04; SDG: 1.05; Single PRH: 1.05), private clinics (WHO/HAI: 1.07; SDG: 1.10; Single PRH: 1.07), and community pharmacies (WHO/HAI: 1.05; SDG: 1.06; Single PRH: 1.03) for all baskets. However, a statistical analysis showed no significant difference in the price variation between these facilities for WHO/HAI Basket and SDG Basket, but a difference was significant in the Single PRH Basket. On the other hand, median procurement price for generic products showed a large variation in all private sector facilities for each basket, but no statistical difference was observed.

Figure 4.3
Median procurement price variation in public sector facilities by product types:
a) originator b) generic

a)



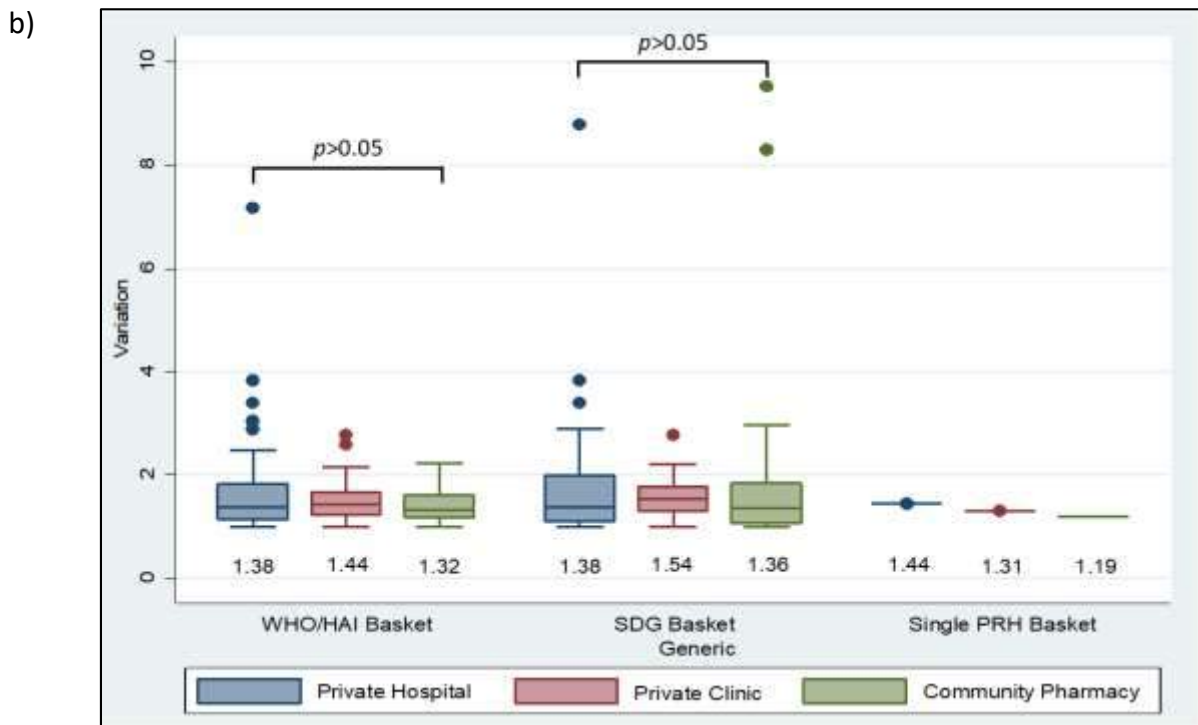
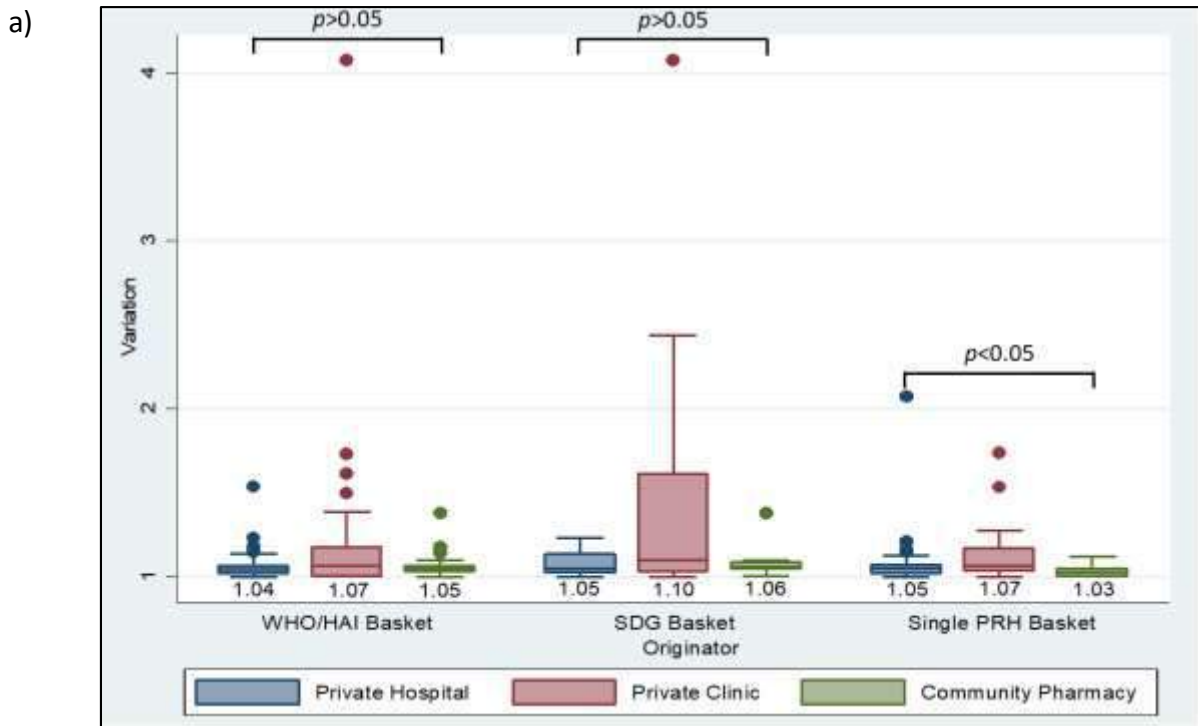
b)



MOH = Ministry of Health; PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

* Kruskal-Wallis

Figure 4.4
Median procurement price variation in private sector facilities by product types:
a) originator b) generic



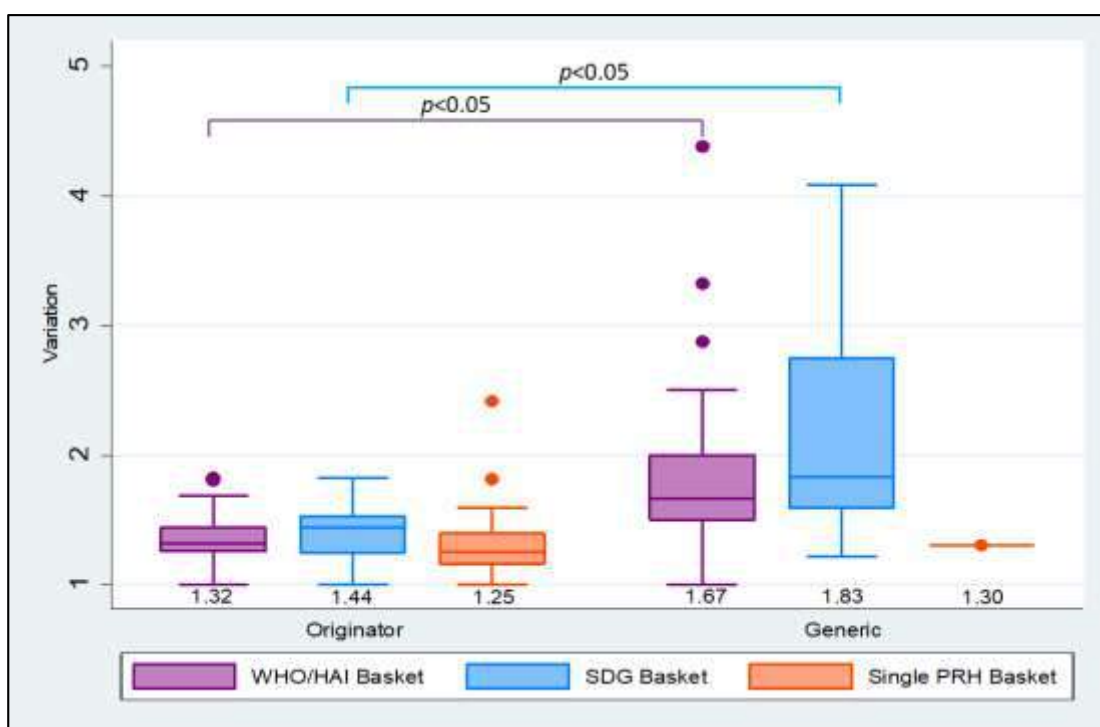
PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

* Kruskal-Wallis

4.2.2 Selling price variation in private sector

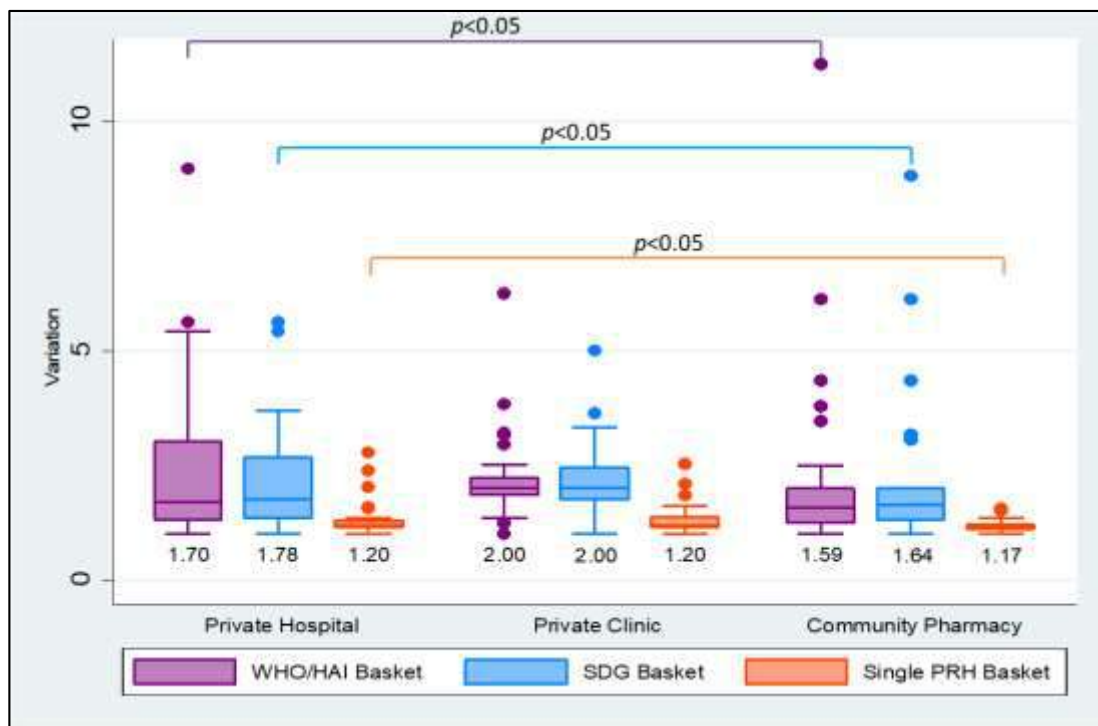
Based on median selling price variation (Figure 4.5), both originator (WHO/HAI: 1.32; SDG: 1.44; Single PRH: 1.25) and generic products (WHO/HAI: 1.67; SDG: 1.83; Single PRH: 1.30) had a wide variation for all baskets. Statistical analysis revealed a significant difference in price variation between originator and generic products for WHO/HAI Basket and SDG Basket ($p < 0.05$). Meanwhile, variation in private hospitals, private clinics, and community pharmacies was considerably wide, especially in the WHO/HAI Basket (1.70, 2.00, 1.59) and SDG Basket (1.78, 2.00, 1.64), with smaller variation in the Single PRH Basket (1.20, 1.20, 1.17) respectively (Figure 4.6). For comparison purposes, a significant difference in price variation was noted between the facilities for all baskets ($p < 0.05$).

Figure 4.5
Median selling price variation by product types



PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 * Mann-Whitney

Figure 4.6
Median selling price variation by private sector facilities

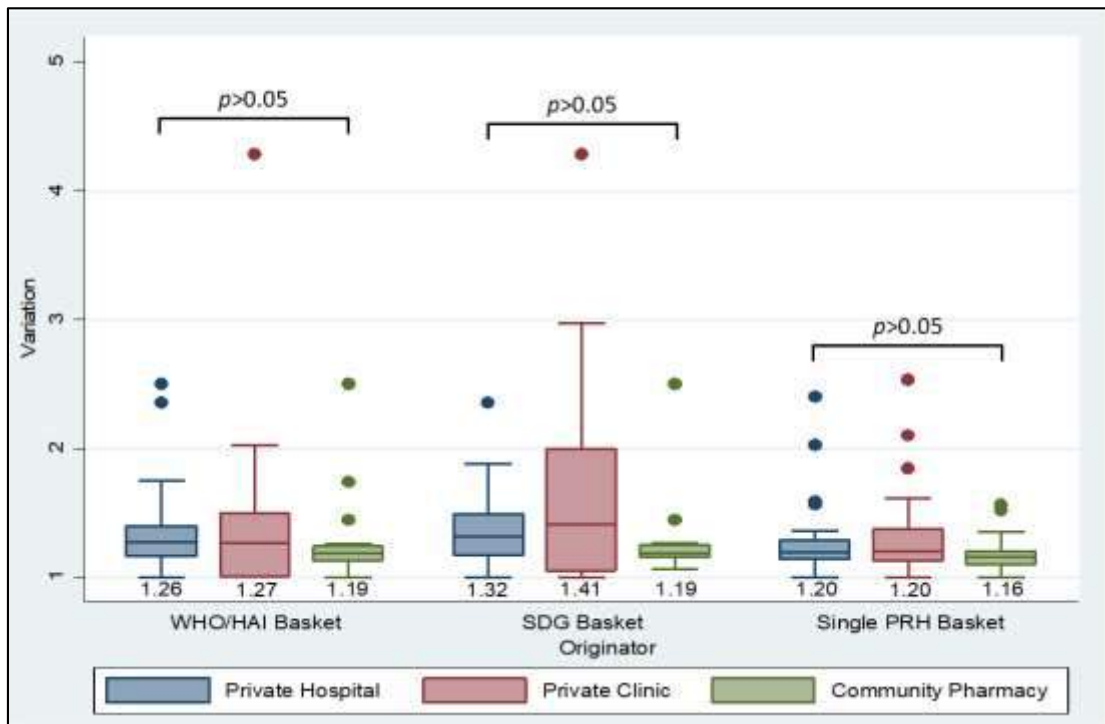


PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 * Mann-Whitney

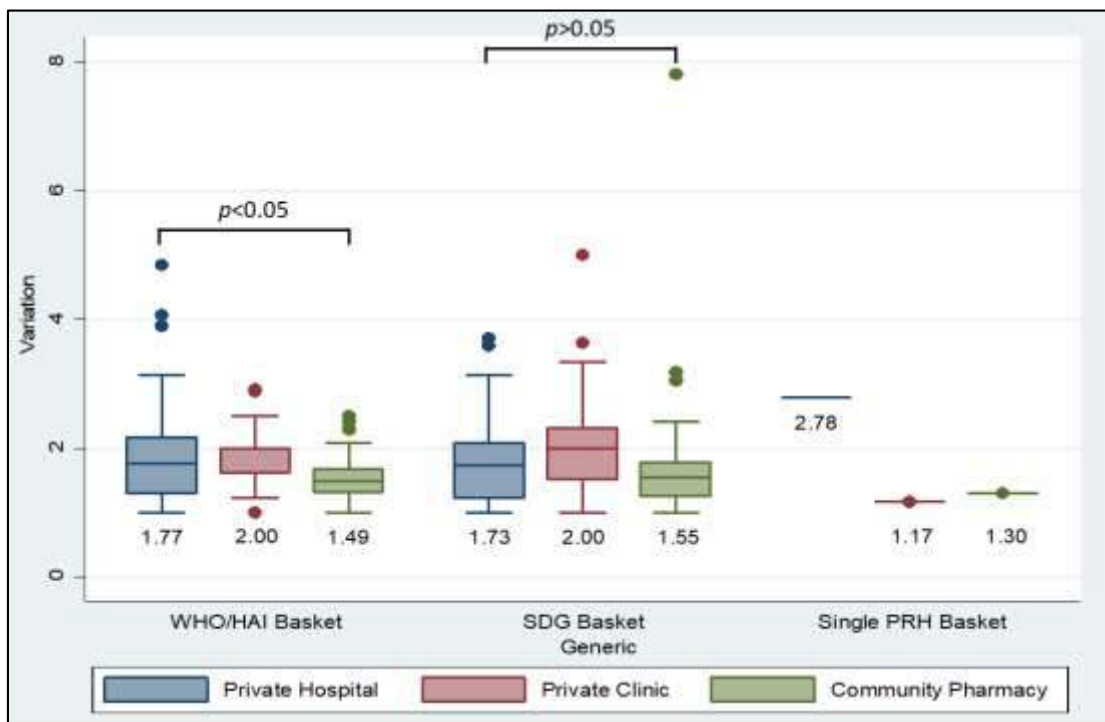
Further analysis of median selling price variation in the private sector facilities showed that originator products had a substantial variation in all facilities for all baskets; however, no significant difference in price variation was found among them. Generic products also indicated a similar pattern, with a varied price in private hospitals (WHO/HAI: 1.77; SDG: 1.73; Single PRH: 2.78), private clinics (WHO/HAI: 2.00; SDG: 2.00; Single PRH: 1.17) and community pharmacies (WHO/HAI: 1.49; SDG: 1.55; Single PRH: 1.30) for all baskets. Even though a significant difference was identified for the WHO/HAI Basket, there was no significance different in the price variation among the facilities in the SDG Basket observed.

Figure 4.7
Median selling price variation in private sector facilities by product types:
a) originator b) generic

a)



b)



PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 * Kruskal-Wallis

4.3 PRICE COMPARISON

4.3.1 Median procurement price comparison

Tables 4.3, 4.4, and 4.5 show the median procurement price ratio and comparison for matched medicines from the WHO/HAI Basket, SDG Basket, and Single PRH Basket in the public and private sectors. Overall, the procurement price for originator products in the WHO/HAI Basket and SDG Basket was 5.54-fold higher than generic products. In terms of price comparison, there was a significant difference between the procurement price of the originator and generic products ($p < 0.05$). The median procurement price ratio in the private sector was 2.19-fold, 2.35-fold, and 1.52-fold higher than in the public sector for baskets of WHO/HAI, SDG, and Single PRH, respectively. Further analysis regarding procurement price comparison between sectors showed a significant difference between private and public sectors for WHO/HAI Basket and SDG Basket ($p < 0.05$), but there was no difference for the Single PRH Basket.

Private hospitals procured medicines at 2.91, 2.93, and 1.51 times higher than MOH hospitals for baskets of WHO/HAI, SDG, and Single PRH, respectively. The price comparison analysis between private and MOH hospitals showed a statistically significant difference between these two facilities ($p < 0.05$). The median procurement price in private clinics was 1.41, 1.80, and 1.83-fold higher than the procurement price in MOH health clinics for all baskets. The finding supported that the price comparison between private clinics and MOH health clinics was statistically significant ($p < 0.05$). Another finding stated that median procurement prices in community pharmacies were 1.58, 2.16, and 1.76 higher than in MOH health clinics for WHO/HAI Basket, SDG Basket, and Single PRH Basket.

Among the public sector facilities, the median procurement price ratio in the military hospital was slightly higher than in MOH hospitals (WHO/HAI: 1.20; SDG: 1.16; Single PRH: 1.10), while the median procurement price in university hospitals was almost similar to MOH hospitals. There was a statistically significant difference in the price comparison between the military and MOH hospitals for the WHO/HAI Basket ($p < 0.05$). However, among private facilities, private hospitals procured medicines at a slightly higher price than private clinics (WHO/HAI: 1.32; SDG: 1.25) and community pharmacies (WHO/HAI: 1.06; SDG: 1.06) for both WHO/HAI Basket and SDG Basket. The procurement price comparison revealed a statistically significant difference between the median procurement price in private hospitals and private clinics, as well as private hospitals and community pharmacies for WHO/HAI Basket and SDG Basket ($p < 0.05$). For the Single PRH Basket, the median procurement price ratio was relatively similar between private hospitals and private clinics with community pharmacies, as well as private clinics and community pharmacies. There was a statistically significant difference in the procurement price between private hospitals and community pharmacies as well as private clinics and community pharmacies ($p < 0.05$).

Of note, the median procurement price in Peninsular Malaysia was fairly similar for all baskets of medicines, specifically both in the public and private sectors. However, the procurement price comparison showed a statistically significant difference between prices in Peninsular Malaysia and East Malaysia for WHO/HAI Basket and SDG Basket ($p < 0.05$), particularly in the private sector.

The other comparison showed that the median procurement price ratio for originator products was 2.36-fold higher in the private sector than the public sector for the WHO/HAI Basket, 2.65-fold higher for the SDG Basket, and 1.52-fold higher for the Single PRH Basket. Nevertheless, the procurement price ratio for originator products between private hospitals, private clinics, and community pharmacies showed almost similar prices for all baskets. On the other hand, the median procurement price for generic products was procured at 1.54 and 1.79-fold higher in the private sector than public sector for WHO/HAI Basket and SDG Basket. Among private facilities, the median procurement price for generic products was procured at a similar price across all facilities. In terms of price comparison between facilities for originator products, the finding showed a significant difference in the procurement price between private hospitals and private clinics, as well as private hospitals and community pharmacies for all baskets ($p < 0.05$). The price comparison findings were similar for generic products, particularly for WHO/HAI Basket and SDG Basket ($p < 0.05$).

Table 4.3
Ratio of median procurement prices in public and private sectors for WHO/HAI Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Originator: Generic Product	33	31	5.54	2.63	7.27	<0.05
Private: Public Sector	53	28	2.19	1.24	4.50	<0.05
Military Hospital: MOH Hospital	33	8	1.20	1.00	1.88	<0.05
University Hospital: MOH Hospital	50	5	1.00	0.96	1.16	>0.05
Private Hospital: MOH Hospital	52	32	2.91	1.34	7.06	<0.05
Private Clinic: MOH Health Clinic	37	14	1.41	1.05	3.42	<0.05
Community Pharmacy: MOH Health Clinic	40	17	1.58	1.02	3.97	<0.05
Private Hospital: Private Clinic	43	16	1.32	1.03	2.90	<0.05
Private Hospital: Community Pharmacy	46	14	1.06	1.00	2.21	<0.05
Private Clinic: Community Pharmacy	43	0	1.00	0.86	1.08	>0.05
Peninsular: East Malaysia	53	6	1.00	0.99	1.23	<0.05
Public Sector						
Originator: Generic Product	14	7	2.10	1.00	14.63	<0.05
Peninsular: East Malaysia	51	0	0.99	0.99	1.00	>0.05
Private Sector						
Originator: Generic Product	32	27	4.16	2.56	6.60	<0.05
Peninsular: East Malaysia	50	3	1.04	1.00	1.19	<0.05

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Originator Products						
Private: Public Sector	22	15	2.36	1.41	3.59	>0.05
Private Hospital: Private Clinic	25	0	0.98	0.94	1.01	<0.05
Private Hospital: Community Pharmacy	30	0	1.00	1.00	1.02	<0.05
Private Clinic: Community Pharmacy	26	0	1.03	1.00	1.06	>0.05
Generic Products						
Private: Public Sector	44	15	1.54	1.02	2.83	<0.05
Private Hospital: Private Clinic	40	2	0.99	0.92	1.15	<0.05
Private Hospital: Community Pharmacy	39	3	1.01	0.95	1.31	<0.05
Private Clinic: Community Pharmacy	39	0	1.02	0.97	1.08	<0.05

MOH = Ministry of Health; Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

Table 4.4
Ratio of median procurement prices in public and private sectors for SDG Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Originator: Generic Product	15	13	5.54	2.37	7.13	<0.05
Private: Public Sector	33	19	2.35	1.38	3.55	<0.05
Military Hospital: MOH Hospital	22	5	1.16	1.00	1.85	>0.05
University Hospital: MOH Hospital	31	2	1.00	1.00	1.02	>0.05
Private Hospital: MOH Hospital	31	20	2.93	1.50	4.08	<0.05
Private Clinic: MOH Health Clinic	20	8	1.80	1.05	3.10	<0.05
Community Pharmacy: MOH Health Clinic	22	12	2.16	1.43	3.73	<0.05
Private Hospital: Private Clinic	21	5	1.25	0.94	1.70	<0.05
Private Hospital: Community Pharmacy	23	6	1.06	0.96	1.85	<0.05
Private Clinic: Community Pharmacy	21	2	1.06	0.78	1.14	>0.05
Peninsular: East Malaysia	33	3	0.99	0.30	1.13	<0.05
Public Sector						
Originator: Generic Product	6	2	0.98	0.84	3.27	<0.05
Peninsular: East Malaysia	32	0	0.99	0.99	1.00	>0.05

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Private Sector						
Originator: Generic Product	15	10	2.56	1.85	6.10	<0.05
Peninsular: East Malaysia	32	2	1.00	0.98	1.28	<0.05
Originator Products						
Private: Public Sector	10	6	2.65	1.36	4.20	<0.05
Private Hospital: Private Clinic	9	0	0.98	0.92	1.01	<0.05
Private Hospital: Community Pharmacy	13	0	1.00	0.95	1.02	<0.05
Private Clinic: Community Pharmacy	9	0	1.03	1.01	1.06	>0.05
Generic Products						
Private: Public Sector	29	12	1.79	1.33	2.90	<0.05
Private Hospital: Private Clinic	20	0	1.02	0.88	1.30	<0.05
Private Hospital: Community Pharmacy	21	0	1.01	0.95	1.31	<0.05
Private Clinic: Community Pharmacy	20	2	1.05	0.88	1.14	>0.05

MOH = Ministry of Health; Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

Table 4.5
Ratio of median procurement prices in public and private sectors for Single PRH Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Private: Public Sector	33	7	1.52	1.17	1.84	>0.05
Military Hospital: MOH Hospital	17	1	1.10	0.98	1.41	>0.05
University Hospital: MOH Hospital	29	1	1.03	1.00	1.17	>0.05
Private Hospital: MOH Hospital	29	3	1.51	1.26	1.76	<0.05
Private Clinic: MOH Health Clinic	8	3	1.83	1.57	2.58	<0.05
Community Pharmacy: MOH Health Clinic	8	2	1.76	1.51	1.90	>0.05
Private Hospital: Private Clinic	22	0	1.00	0.97	1.02	>0.05
Private Hospital: Community Pharmacy	23	0	1.00	0.97	1.02	<0.05
Private Clinic: Community Pharmacy	19	0	1.00	0.96	1.05	<0.05
Peninsular: East Malaysia	39	1	1.00	0.99	1.06	>0.05
Public Sector						
Peninsular: East Malaysia	30	1	1.00	0.99	1.00	>0.05
Private Sector						
Peninsular: East Malaysia	32	0	1.00	1.00	1.01	>0.05

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Originator Products						
Private: Public Sector	33	7	1.52	1.17	1.84	>0.05
Private Hospital: Private Clinic	21	0	1.00	0.97	1.02	<0.05
Private Hospital: Community Pharmacy	22	0	1.00	0.96	1.02	<0.05
Private Clinic: Community Pharmacy	18	0	1.00	0.96	1.02	<0.05
Generic Products						
Private Hospital: Private Clinic	1	0	1.35	1.35	1.35	>0.05
Private Hospital: Community Pharmacy	1	0	1.14	1.14	1.14	>0.05
Private Clinic: Community Pharmacy	1	0	0.84	0.84	0.84	>0.05

MOH = Ministry of Health; Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

4.3.2 Median selling price comparison

Tables 4.6, 4.7, and 4.8 illustrate the ratio of median selling prices in the private sector for WHO/HAI Basket, SDG Basket, and Single PRH Basket, respectively. Overall, the selling price of originator products was more than two times higher than generic products for WHO/HAI Basket and SDG Basket. Further analysis indicated that the price difference between product types was statistically significant for WHO/HAI Basket and SDG Basket ($p < 0.05$).

Albeit the price comparison analysis showed that there was a statistically significant difference in the selling price between Peninsular Malaysia and East Malaysia, particularly in the WHO/HAI Basket ($p < 0.05$), the median selling price ratio showed that the price was largely equivalent between both localities (1.00). Conversely, a slightly higher selling price comparison ratio was noted in Peninsular Malaysia for the SDG Basket (1.04) and the Single PRH Basket (1.01), but then there was no significant difference in the price found between these two localities.

Among private facilities, the WHO/HAI Basket showed that the selling price of private hospitals (1.22) was slightly higher than private clinics ($p < 0.05$). On the other hand, for SDG Basket and Single PRH Basket, the selling price was almost similar for both facilities (1.04; 1.01), respectively, but the price difference between the facilities was statistically significant in the SDG Basket only ($p < 0.05$). Further price comparisons among facilities showed that private hospitals (WHO/HAI: 1.52; SDG: 1.57; Single PRH: 1.26) and private clinics (WHO/HAI: 1.33; SDG: 1.50; Single PRH: 1.25) had higher selling prices than community pharmacies for all baskets. Statistical analysis revealed that the difference in prices between the facilities was statistically significant for all baskets ($p < 0.05$).

For WHO/HAI Basket and Single PRH Basket, originator products in private hospitals and private clinics showed almost similar selling prices (1.01). However, the price difference between these facilities was significant for the WHO/HAI Basket only ($p < 0.05$). On the other hand, in the SDG Basket, a slightly lower selling price was found in private hospitals compared to private clinics (0.92), and the comparison price between the facilities was noted to be significant ($p < 0.05$).

As for generic products, private hospitals sell them at a slightly lower price than private clinics for WHO/HAI Basket (0.92) and SDG Basket (0.94), respectively. However, a price comparison analysis showed that the price difference among the facilities was significant for the SDG Basket ($p < 0.05$), and no significant difference has been observed for the WHO/HAI Basket. Nonetheless, in the Single PRH Basket, the selling price in private hospitals was higher than in private clinics (1.38).

Of special note, for the originator and generic products, private hospitals (Originator: WHO/HAI: 1.30; SDG: 1.35; Single PRH: 1.26; Generic: WHO/HAI: 1.43; SDG: 1.33; Single PRH: 1.52) and private clinics (Originator: WHO/HAI: 1.24; SDG: 1.54; Single PRH: 1.26; Generic: WHO/HAI: 1.38; SDG: 1.48; Single PRH: 1.10) had higher selling prices than community pharmacies for all baskets. Further analysis showed that the price difference for originator products between the facilities proved significant for all baskets, but for generic products was found to be significant in the WHO/HAI Basket and SDG Basket only ($p < 0.05$).

Table 4.6
Ratio of median selling prices in the private sector for WHO/HAI Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Originator: Generic Product	32	25	2.91	2.07	3.98	<0.05
Private Hospital: Private Clinic	43	8	1.22	0.95	1.75	<0.05
Private Hospital: Community Pharmacy	46	12	1.52	1.28	2.01	<0.05
Private Clinic: Community Pharmacy	43	7	1.33	1.10	1.73	<0.05
Peninsular Malaysia: East Malaysia	50	2	1.00	0.97	1.11	<0.05
Originator Product						
Private Hospital: Private Clinic	26	0	1.01	0.93	1.07	<0.05
Private Hospital: Community Pharmacy	31	0	1.30	1.22	1.38	<0.05
Private Clinic: Community Pharmacy	26	1	1.24	1.14	1.41	<0.05
Generic Product						
Private Hospital: Private Clinic	40	1	0.92	0.83	1.10	>0.05
Private Hospital: Community Pharmacy	39	4	1.43	1.22	1.75	<0.05
Private Clinic: Community Pharmacy	39	5	1.38	1.23	1.79	<0.05

Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

Table 4.7
Ratio of median selling prices in the private sector for SDG Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Originator: Generic Product	15	10	2.60	1.76	3.68	<0.05
Private Hospital: Private Clinic	21	3	1.04	0.80	1.38	<0.05
Private Hospital: Community Pharmacy	23	8	1.57	1.32	2.70	<0.05
Private Clinic: Community Pharmacy	21	6	1.50	1.25	2.03	<0.05
Peninsular Malaysia: East Malaysia	32	1	1.04	0.90	1.22	>0.05
Originator Product						
Private Hospital: Private Clinic	10	0	0.92	0.79	1.01	<0.05
Private Hospital: Community Pharmacy	13	0	1.35	1.24	1.38	<0.05
Private Clinic: Community Pharmacy	9	1	1.54	1.22	1.76	<0.05
Generic Product						
Private Hospital: Private Clinic	20	0	0.94	0.71	1.01	<0.05
Private Hospital: Community Pharmacy	21	4	1.33	1.16	1.82	<0.05
Private Clinic: Community Pharmacy	20	5	1.48	1.21	1.93	<0.05

Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

Table 4.8
Ratio of median selling prices in the private sector for Single PRH Basket

	No. of medicines, n	No. of medicines with ratio ≥ 2	Median ratio	Q25 ratio	Q75 ratio	Price comparison p-value*
Overall						
Private Hospital: Private Clinic	22	0	1.01	0.92	1.08	>0.05
Private Hospital: Community Pharmacy	23	0	1.26	1.21	1.36	<0.05
Private Clinic: Community Pharmacy	19	1	1.25	1.14	1.33	<0.05
Peninsular Malaysia: East Malaysia	32	0	1.01	0.96	1.12	>0.05
Originator Product						
Private Hospital: Private Clinic	21	0	1.01	0.90	1.06	>0.05
Private Hospital: Community Pharmacy	18	1	1.26	1.20	1.35	<0.05
Private Clinic: Community Pharmacy	18	1	1.26	1.15	1.33	<0.05
Generic Product						
Private Hospital: Private Clinic	1	0	1.38	1.38	1.38	>0.05
Private Hospital: Community Pharmacy	1	0	1.52	1.52	1.52	>0.05
Private Clinic: Community Pharmacy	1	0	1.10	1.10	1.10	>0.05

Q25 = 25th percentile; Q75 = 75th percentile

*Mann-Whitney

4.3.3 International procurement price comparison

Procurement PR for the originator and generic products in Malaysia's public and private healthcare sectors was compared with reference countries. The number of originator medicines with price ratios of >1 and ≤ 1 among the total number of comparable medicines is as in Table 4.9, whereas the percentage was shown in Figure 4.8. The public sector price was not compared with prices in South Africa for all baskets as the database of single exit prices of medicines in South Africa applies to the private sector.

More than 70.0% of originator products in the WHO/HAI Basket were procured in the public sector at a lower price than in Taiwan (85.0%), South Korea (73.0%), and Thailand (89.0%), with an exception for Australia (43.0%). However, on average, 80.0% of the originator products from the same basket were procured at higher prices in Malaysia's private sector than in Australia (92.0%), Taiwan (82.0%), South Korea (85.0%), Thailand (60.0%) and South Africa (81.0%).

Percentages of originator products in the SDG Basket procured at a lower price than in Australia, Taiwan, and Thailand in the public sector was 60.0%, 100.0%, and 67.0%, respectively. There were no comparator products in the public sector from the SDG Basket available in South Korea. In contrast, the majority of the originator products in the SDG Basket were procured at higher prices in Malaysia's private sector than in Australia (82.0%), Taiwan (100.0%), South Korea (75.0%), Thailand (100.0%), and South Africa (92.0%).

Similar to WHO/HAI Basket and SDG Basket, more than 60.0% of the originator products in the Single PRH Basket were cost lower than in Australia (61.0%), Taiwan (60.0%), Thailand (74.0%), and South Korea (65.0%) in the public sector. On the other hand, 26.0% to 40.0% were procured at a higher price. Meanwhile, more than 70.0% of the originator products in the private sector were procured at higher prices in comparison with Australia (88.0%), Taiwan (73.0%), South Korea (76.0%), and South Africa (79.0%). Most of the originator products for all baskets in Malaysia were procured at a lower price than reference countries in the public sector, but had a higher procurement price in the private sector.

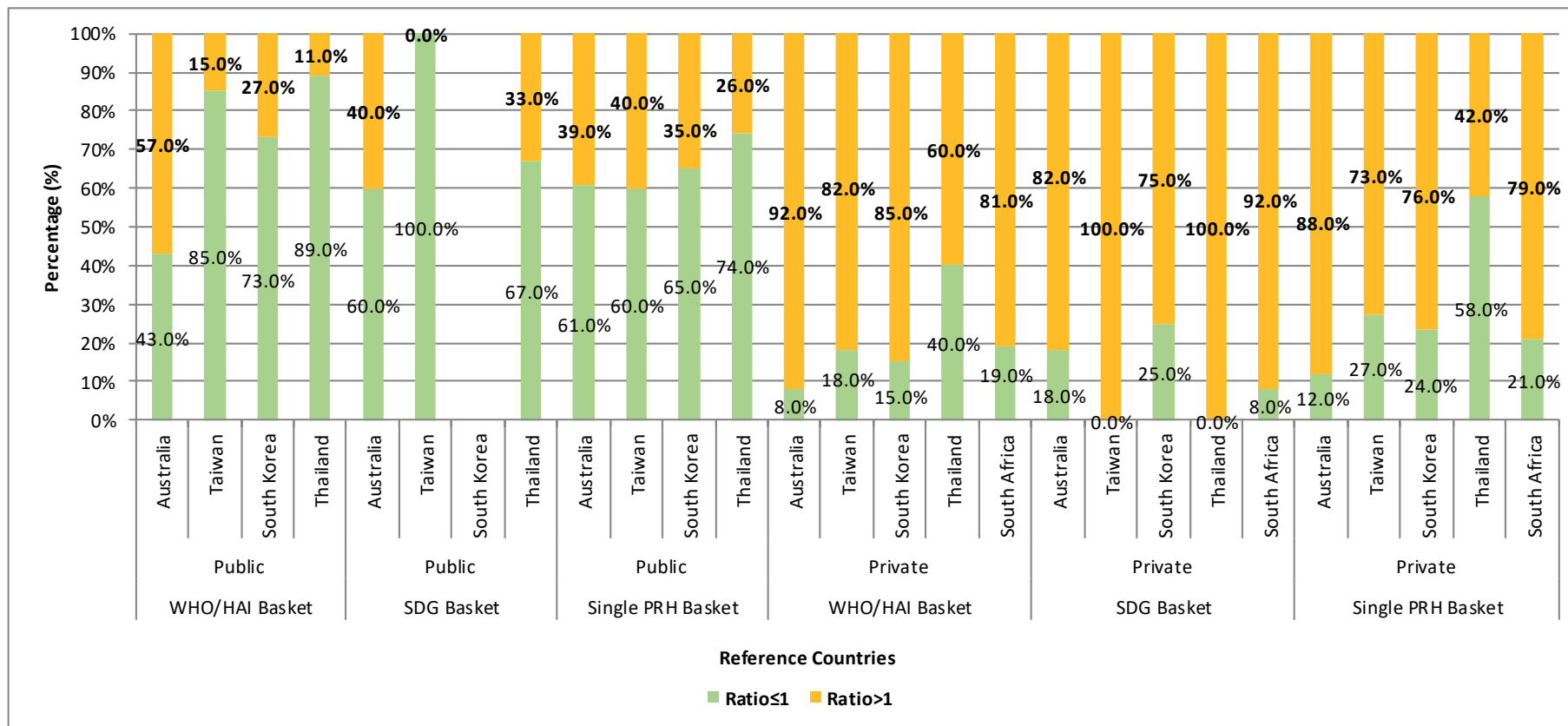
Table 4.9
Number of medicines (n) in procurement Price Ratio for originator products by sector

Sector Reference countries/ Basket	Public				Private				
	Australia	Taiwan	South Korea	Thailand	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket									
Total (N)	14	13	15	9	24	17	20	10	26
Ratio ≤1 (n)	6	11	11	8	2	3	3	4	5
Ratio >1 (n)	8	2	4	1	22	14	17	6	21
SDG Basket									
Total (N)	5	1	0	3	11	5	4	3	12
Ratio ≤1 (n)	3	1	0	2	2	0	1	0	1
Ratio >1 (n)	2	0	0	1	9	5	3	3	11
Single PRH Basket									
Total (N)	18	15	20	27	17	15	17	26	29
Ratio ≤1 (n)	11	9	13	20	2	4	4	15	6
Ratio >1 (n)	7	6	7	7	15	11	13	11	23

PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries

Figure 4.8
Procurement Price Ratio for originator products in public and private sectors



PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤ 1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio > 1 = Medicine prices in Malaysia is higher than prices in reference countries

This study analysed international price comparisons by comparing the prices of SGB and AGB in other reference countries to understand the pricing of generic products. Table 4.10 illustrates the number of medicines with price ratios of >1 and ≤ 1 in comparison to SGB, whereas the percentage was calculated and tabulated in Figure 4.9. In general, it was noted that half of the generic products were procured at higher prices than reference countries' SGB in both the public and private healthcare sectors.

The number of WHO/HAI Basket's generic products procured at a lower price in the public sector than SGB in Australia, Taiwan, and Thailand, were 25.0%, 50.0%, and 67.0%, respectively. There were no comparable SGB from the WHO/HAI Basket in the public sector of South Korea. In the private sector, the number of generic products procured at a higher price was 100.0%, 82.0%, 57.0%, and 43.0% compared to SGB in Australia, Thailand, Taiwan, and South Africa. On the other hand, all three products comparable to the South Korean market were cheaper in Malaysia's private market.

Meanwhile, for the SDG Basket, there was only one generic product comparable with SGB in Australia and Thailand in the public sector. However, there was no comparable SGB from the SDG Basket in Taiwan and South Korea. In the private sector, at least half of the generic products were procured at a lower price than SGB in Australia (50.0%), Taiwan (100.0%), and South Africa (80.0%). There was no comparable generic product from the SDG Basket with South Korea's SGB.

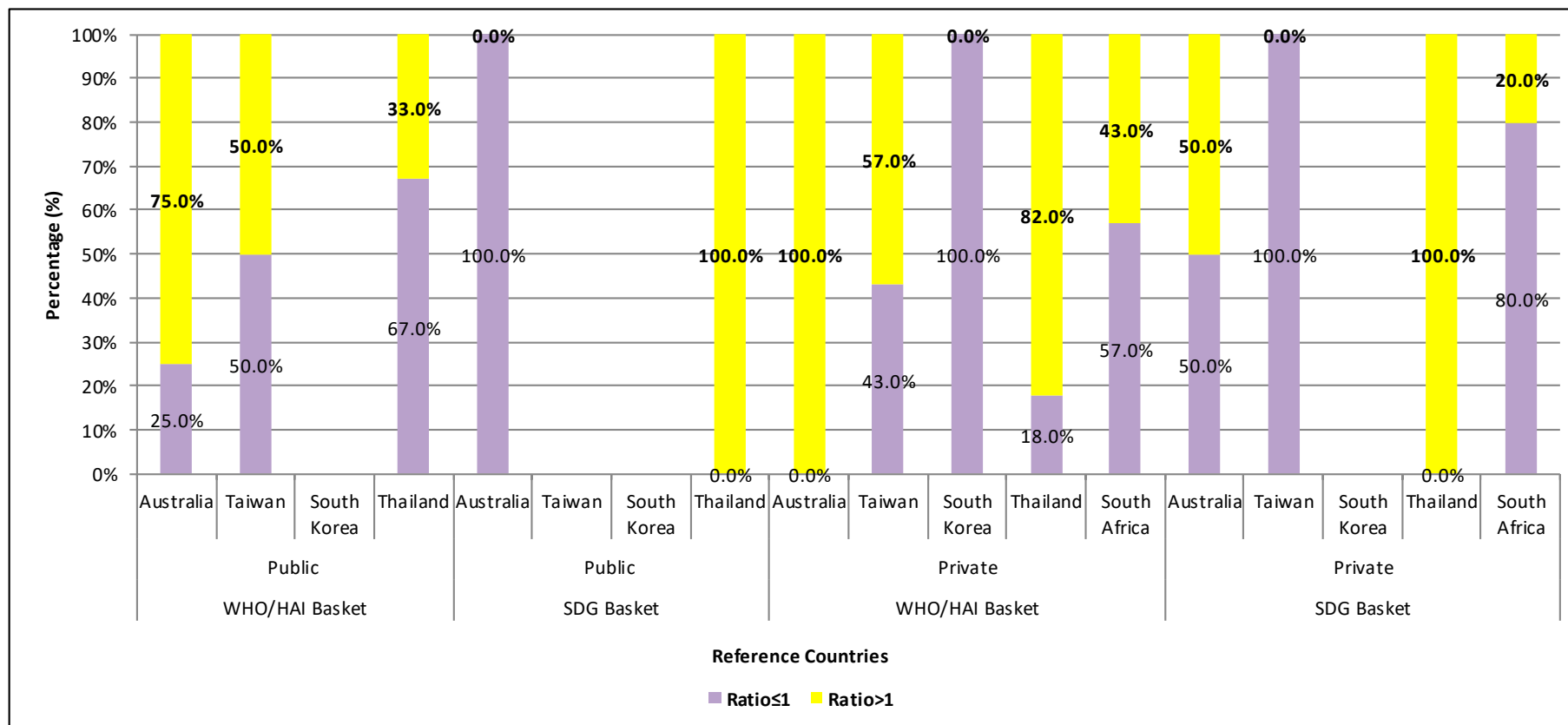
Table 4.10
Number of medicines (n) in procurement Price Ratio for generic products compared to SGB by sector

Sector Reference countries/ Basket	Public				Private				
	Australia	Taiwan	South Korea	Thailand	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket									
Total (N)	4	2	0	6	7	7	3	11	7
Ratio ≤1 (n)	1	1	0	4	0	3	3	2	4
Ratio >1 (n)	3	1	0	2	7	4	0	9	3
SDG Basket									
Total (N)	1	0	0	1	2	1	0	5	5
Ratio ≤1 (n)	1	0	0	0	1	1	0	0	4
Ratio >1 (n)	0	0	0	1	1	0	0	5	1

SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries

Figure 4.9
Procurement Price Ratio for generic products compared to SGB in public and private sectors



SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤ 1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio > 1 = Medicine prices in Malaysia is higher than prices in reference countries

Table 4.11 shows the number of medicines with price ratios of >1 and ≤ 1 for generic products as compared to AGB from reference countries, with the percentage was tabulated in Figure 4.10. In comparison with the AGB, more than 60.0% of the generic products from the WHO/HAI Basket in Malaysia's public sector were procured at a lower price than in Australia (61.0%), Taiwan (80.0%), and South Korea (75.0%). On the other hand, more than half of the generic products in the private sector was procured at higher prices than the AGB in Australia (61.0%), Thailand (86.0%), and South Africa (58.0%), respectively.

Similar to the WHO/HAI Basket, almost half of the generic products in the SDG Basket cost less in Malaysia's public sector than the AGB in reference countries. In the private sector, more than half of generic products was procured at lower prices as compared to AGB in reference countries, with a percentage of 50.0%, 50.0%, 75.0%, and 52.0% for Australia, Taiwan, South Korea, and South Africa, respectively. Conversely, all generic products were more expensive than Thailand's AGB (100.0%). In summary, generic products were procured at higher prices than reference countries' AGB in the private sector compared to the public sector.

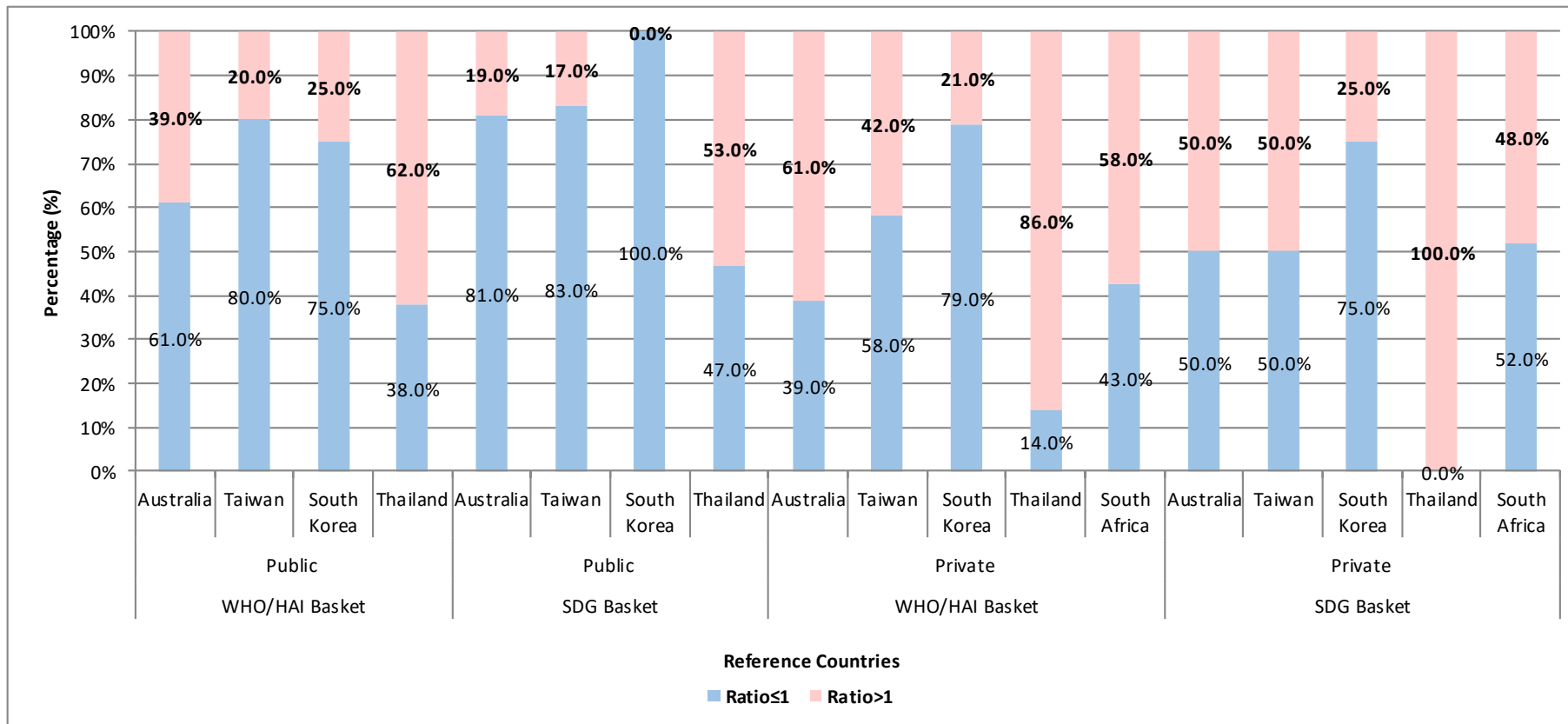
Table 4.11
Number of medicines (n) in procurement Price Ratio for Procurement Price Ratio for generic products compared to AGB by sector

Sector	Public				Private					
	Reference countries/ Basket	Australia	Taiwan	South Korea	Thailand	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket										
	Total (N)	33	30	32	37	33	31	34	37	40
	Ratio ≤1 (n)	20	24	24	14	13	18	27	5	17
	Ratio >1 (n)	13	6	8	23	20	13	7	32	23
SDG Basket										
	Total (N)	16	12	12	19	16	12	12	19	21
	Ratio ≤1 (n)	13	10	12	9	8	6	9	0	11
	Ratio >1 (n)	3	2	0	10	8	6	3	19	10

SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries

Figure 4.10
Procurement Price Ratio for Procurement Price Ratio for generic products compared to AGB in public and private sectors



SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

Ratio ≤ 1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio > 1 = Medicine prices in Malaysia is higher than prices in reference countries

4.3.4 International selling price comparison

The selling prices were only compared with Australia and South Africa, as these countries publish both selling and procurement prices. The published prices in the subscribed databases for Taiwan, South Korea, and Thailand are only comparable with procurement prices, equivalent to wholesale prices.

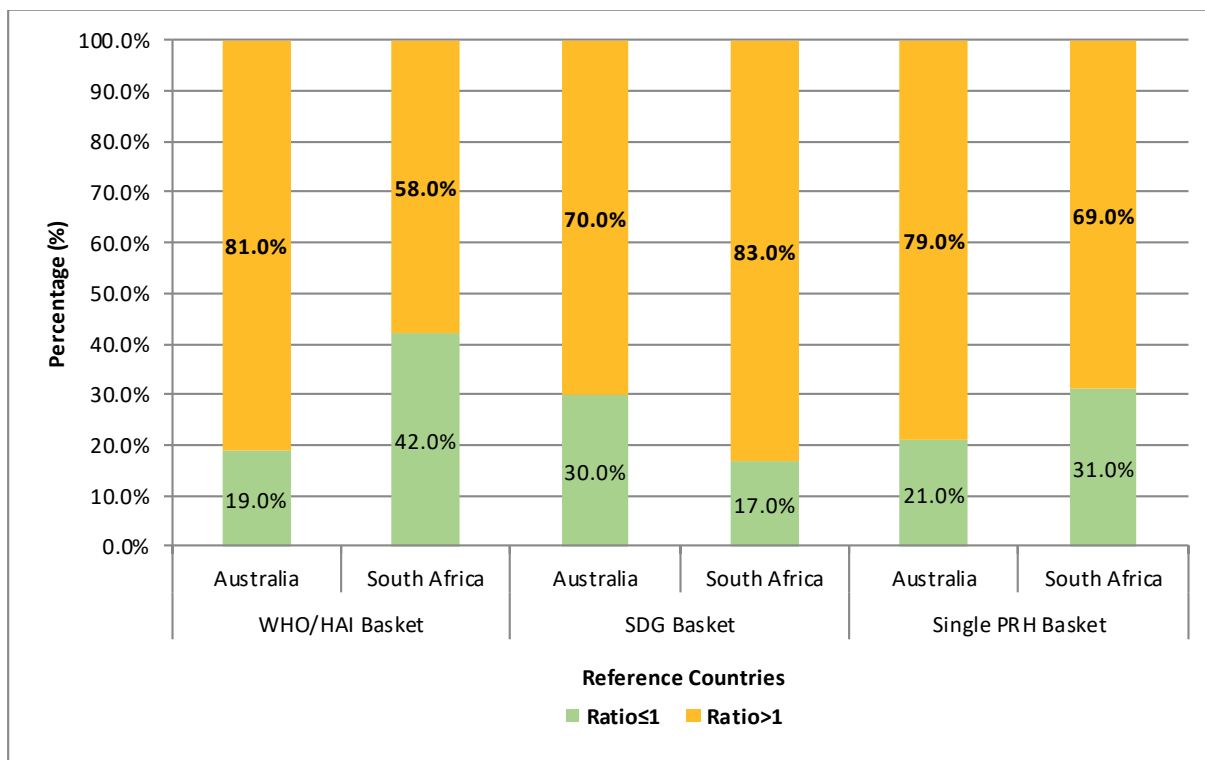
Table 4.12 shows the number of medicines in selling PR for originator products. The percentage indicates the number of medicines with a ratio of >1 and ≤1 compared to the total number of comparable medicines available in the respective reference countries, as shown in Figure 4.11. Overall, the majority of the originator products were sold at a higher price by Malaysia’s private sector as compared to Australia (WHO/HAI: 81.0%; SDG: 70.0%; Single PRH: 79.0%) and South Africa (WHO/HAI: 58.0%; SDG: 83.0%; Single PRH: 69.0%) across all baskets.

Table 4.12
Number of medicines (n) in selling Price Ratio for originator products

Basket	WHO/HAI Basket		SDG Basket		Single PRH Basket		
	Reference countries	Australia	South Africa	Australia	South Africa	Australia	South Africa
Total (N)		21	26	10	12	14	29
Ratio ≤1 (n)		4	11	3	2	3	9
Ratio >1 (n)		17	15	7	10	11	20

*PRH: Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries*

Figure 4.11
Selling Price Ratio for originator products in the private sector



*PRH: Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries*

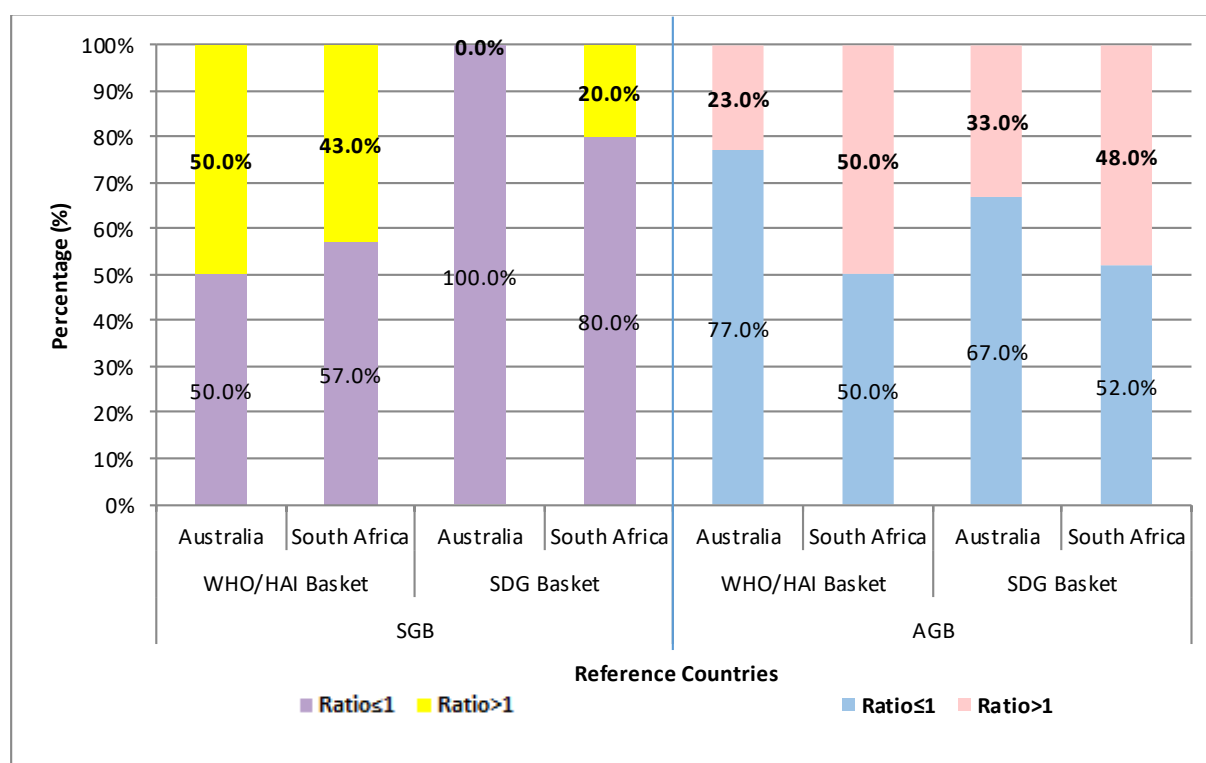
Table 4.13 illustrates the number of medicines with a price ratio of >1 and ≤1 for the generic products compared to SGB and AGB, whereas the percentage was tabulated in Figure 4.12. More than half of the generic products in the WHO/HAI Basket had lower selling prices in the private sector than SGB in Australia (50.0%) and South Africa (57.0%). Malaysia’s generic products in SDG Basket had higher prices than Australia’s SGB (100.0%) for one product that was being sampled. Compared with South Africa’s SGB, most local generic products were sold at a lower price (80.0%). More than 50.0% of generic products from the SDG Basket were sold at lower prices in public and private sectors than AGB in Australia and South Africa.

Table 4.13
Number of medicines (n) in Selling Price Ratio for generic products compared to SGB and AGB

Generic	SGB				AGB			
	WHO/HAI Basket		SDG Basket		WHO/HAI Basket		SDG Basket	
	Australia	South Africa	Australia	South Africa	Australia	South Africa	Australia	South Africa
Total (N)	6	7	1	5	30	40	12	21
Ratio ≤1 (n)	3	4	0	4	23	20	8	11
Ratio >1 (n)	3	3	1	1	7	20	4	10

AGB: All generic brands available in the reference countries; SGB: Same generic brand available in the reference countries; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries

Figure 4.12
Selling Price Ratio for generic products compared to SGB and AGB in the private sector



AGB: All generic brands available in the reference countries; SGB: Same generic brand available in the reference countries; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International
 Ratio ≤1 = Medicine prices in Malaysia is lower than prices in reference countries; Ratio >1 = Medicine prices in Malaysia is higher than prices in reference countries

4.4 PROCUREMENT TO SELLING PRICES MARK-UP IN THE PRIVATE SECTOR

The result of the mark-up analysis for the three different baskets of medicines was presented in Table 4.14. For this analysis, the OPD setting in private hospitals was comparable to other facilities that offer out-patient services, such as private clinics and community pharmacies. Overall, for all baskets of medicines, the mark-ups in the IPD setting were higher than in the OPD setting. For the WHO/HAI Basket, the median mark-up of originator products in the IPD setting of private hospitals (117.1%, IQR: 78.6 – 146.6%) was higher than in the OPD setting of private hospitals (46.2%, IQR: 40.0 – 61.7%). Similarly, mark-ups of generic products in the IPD setting (233.5%, IQR: 157.0 - 330.6%) were higher than in the OPD setting (132.1%, IQR: 82.4 – 209.2%).

Among the private facilities, it was interesting to note that the OPD setting of private hospitals (46.2%, IQR: 40.0 – 61.7%) had the highest median mark-ups than private clinics (45.8%, IQR: 31.5 – 62.2%) and community pharmacies (15.6%, IQR: 11.1 – 22.3%) for originator products. Conversely, private clinics (142.3%, IQR: 100 – 258.6%) showed the highest median mark-ups, followed by the OPD setting of private hospitals (132.1%, IQR: 82.4 – 209.2%) and community pharmacies (83.0%, IQR: 46.7 – 178.1%) for generic products. Further analysis showed a significant difference in median mark-ups among facilities for the originator and generic products ($p < 0.05$). Overall, median mark-ups for all private facilities in the OPD and IPD settings were 30.1% (IQR: 22.5 – 40.9%) and 117.1% (IQR: 78.6 – 146.6%) for originator products, and 89.6% (IQR: 57.7 – 179.3%) and 233.5% (IQR: 157.0 – 330.6%) for generic products, respectively.

Similarly, for the SDG Basket, it was found that the overall median mark-up in the IPD setting was higher than the OPD setting for both originator (IPD: 121.2%, IQR: 104.5 – 152.6%; OPD: 37.6%, IQR: 27.7 - 48.0%) and generic products (IPD: 217.7%, IQR: 129.0 – 400.0%; OPD: 85.2%, IQR: 48.1 - 149.0%). Specifically, in private hospitals, median mark-ups of originator and generic products in the IPD setting (Originator: 121.2%, IQR: 104.5 – 152.6%; Generic: 217.7%, IQR: 129.0 – 400.0%) were higher than in the OPD setting (Originator: 53.8%, IQR: 42.0 – 63.6%; Generic: 85.2%, IQR: 58.2 – 165.0%). Among private facilities, the median mark-ups of originator products were the highest in private clinics (69.3%, IQR: 60.4 – 111.1%), followed by private hospitals (53.8%, IQR: 42.0 – 63.6%) and community pharmacies (16.8%, IQR: 15.3 - 18.9%). Similarly, private clinics (144.0%, IQR: 89.2 – 271.9%) had the highest median mark-ups on generic products, followed by private hospitals (85.2%, IQR: 58.2 – 165.0%) and community pharmacies (62.3%, IQR: 23.6 – 80.7%). There was a significant difference in median mark-ups between the facilities ($p < 0.05$) for the originator and generic products.

Besides that, for the Single PRH Basket, median mark-ups of originator and generic products for all private in the IPD setting (Originator: 77.0%, IQR: 59.3 – 106.2%; Generic: 208.3%, IQR: 208.3 – 208.3%) were higher than the OPD setting (Originator: 34.7%, IQR: 30.7 – 47.8%; Generic: 92.0%, IQR: 92.0 – 92.0%). The median mark-up of originator products in the IPD setting of private hospitals (77.0%, IQR: 59.3 – 106.2%) was almost double that of the OPD setting (44.0%, IQR: 35.2 – 50.0%). However, for generic products in private hospitals, the OPD setting (216.4%, IQR: 216.4 – 216.4%) was slightly higher than the IPD setting (208.3%, IQR: 208.3 – 208.3%). Among private facilities, private hospitals (Originator: 44.0%, IQR: 35.2

– 50.0%; Generic: 216.4%, IQR: 216.4 – 216.4%) had the highest median mark-ups for the originator and generic products, followed by private clinics (Originator: 42.9%, IQR: 28.9 – 50.1%; Generic: 166.5%, IQR: 166.5 - 166.5%) and community pharmacies (Originator: 11.8%, IQR: 8.8 – 19.2%; Generic: 87.4%, IQR: 87.4 - 87.4%). Further analysis showed that the OPD facilities differed significantly in median mark-ups for the originator and generic products ($p < 0.05$).

Table 4.14
Procurement to selling prices median mark-ups in the private sector by product type and basket of medicines

Product type	Originator						Generic					
	Facility type	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)	Mark-up difference between facilities, p-value*	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)
WHO/HAI Basket												
Private hospital												
IPD Setting ^a	33	118.0%	117.1%	78.6%	146.6%		43	285.3%	233.5%	157.0%	330.6%	
OPD Setting	37	49.7%	46.2%	40.0%	61.7%		45	160.3%	132.1%	82.4%	209.2%	
Private Clinic	26	51.8%	45.8%	31.5%	62.2%	<0.05	41	201.1%	142.3%	100.0%	258.6%	<0.05
Community pharmacy	32	20.1%	15.6%	11.1%	22.3%		40	120.2%	83.0%	46.7%	178.1%	
All private												
OPD Setting	39	33.3%	30.1%	22.5%	40.9%		46	123.4%	89.6%	57.7%	179.3%	
IPD Setting ^a	33	118.0%	117.1%	78.6%	146.6%		43	285.3%	233.5%	157.0%	330.6%	
SDG Basket												
Private hospital												
IPD Setting ^a	17	128.6%	121.2%	104.5%	152.6%		25	277.5%	217.7%	129.0%	400.0%	
OPD Setting	19	55.8%	53.8%	42.0%	63.6%		27	130.6%	85.2%	58.2%	165.0%	
Private Clinic	9	113.1%	69.3%	60.4%	111.1%	<0.05	21	240.0%	144.0%	89.2%	271.9%	<0.05
Community pharmacy	13	17.3%	16.8%	15.3%	18.9%		23	81.9%	62.3%	23.6%	80.7%	
All private												
OPD Setting	19	41.0%	37.6%	27.7%	48.0%		29	98.9%	85.2%	48.1%	149.0%	
IPD Setting ^a	17	128.6%	121.2%	104.5%	152.6%		25	277.5%	217.7%	129.0%	400.0%	

Product type	Originator						Generic					
	Facility type	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)	Mark-up difference between facilities, p-value*	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)
Single PRH Basket												
Private hospital												
IPD Setting ^a	34	89.1%	77.0%	59.3%	106.2%		1	208.3%	208.3%	208.3%	208.3%	
OPD Setting	36	43.2%	44.0%	35.2%	50.0%		1	216.4%	216.4%	216.4%	216.4%	
Private Clinic	21	52.3%	42.9%	28.9%	50.1%	<0.05	1	166.5%	166.5%	166.5%	166.5%	<0.05
Community pharmacy	22	16.8%	11.8%	8.8%	19.2%		1	87.4%	87.4%	87.4%	87.4%	
All private												
OPD Setting	36	37.1%	34.7%	30.7%	47.8%		1	92.0%	92.0%	92.0%	92.0%	
IPD Setting ^a	34	89.1%	77.0%	59.3%	106.2%		1	208.3%	208.3%	208.3%	208.3%	

IPD = Inpatient; OPD = Outpatient; PRH = Product Registration Holder; Q25 = 25th Percentile; Q75 = 75th Percentile; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

^aIPD setting apply for private hospital only

*Kruskal Wallis

Table 4.15 illustrates the distribution of the procurement to selling price median mark-up structure in the private sector by the procurement unit range. The procurement unit range in this study was determined using the percentile of the procurement price in the private sector. The median mark-up for originator products in the WHO/HAI Basket was 37.2% for items that cost less than RM1 and 26.5% for items between RM2 and RM10. However, the median mark-up increased to 37.7% for medicines that cost between RM10 – RM80 and decreased to 13.9% for medicines that cost more than RM80. A similar finding was seen for generic products, whereby median mark-ups decreased from 100.0% for medicines that cost less than RM1 to 40.5% for medicines that cost between RM2 – RM10 but increased to 75.6% for medicines that cost more than RM80.

In the SDG Basket, median mark-ups for originator products slightly reduced from 34.1% for medicines that cost less than RM1 to 25.1% for medicines that cost between RM1 and RM2. Nonetheless, the median mark-up increased from 25.1% to 53.8% as the procurement price increased. Inversely, generic products showed that the median mark-ups slightly increased from 90.1% for medicines that cost less than RM1 to 107.9% for medicines that cost between RM1 and RM2, and declined from 107.9% to 47.2% as the procurement price increased.

A similar trend was observed in the Single PRH Basket, whereby a fluctuation of median mark-ups was found in this basket when the procurement price increased. Initially, the median mark-up of originator products was 50.5% for medicines that cost less than RM1, then reduced to 31.7% for medicines that cost between RM2 and RM10 and had a slight increase for medicines that cost RM10 to RM80 (49.5%) before continuing to reduce to 32.5% for medicines that cost more than RM80.

Table 4.15
Procurement to selling prices median mark-ups structure in the private sector, by procurement unit price range

Product type	Originator					Generic					
	Procurement unit price range	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)	No. of medicines, n	Average (%)	Median (%)	Q25 (%)	Q75 (%)
WHO/HAI Basket											
≤ RM1	12	52.6%	37.2%	29.1%	60.0%	39	139.0%	100.0%	76.7%	201.7%	
RM1 - RM2	15	49.5%	30.0%	24.0%	49.7%	14	55.3%	64.4%	34.1%	74.1%	
RM2 - RM10	18	31.3%	26.5%	22.1%	41.6%	8	65.3%	40.5%	24.7%	74.4%	
RM10 - RM80	6	44.5%	37.7%	31.4%	45.6%	3	50.9%	49.8%	46.8%	54.5%	
> RM80	2	13.9%	13.9%	13.2%	14.6%	2	75.6%	75.6%	53.4%	97.8%	
SDG Basket											
≤ RM1	9	43.1%	34.1%	24.7%	42.6%	20	138.8%	90.1%	53.8%	165.7%	
RM1 - RM2	5	26.4%	25.1%	24.8%	30.7%	7	137.3%	107.9%	68.0%	183.9%	
RM2 - RM10	4	52.0%	48.0%	38.0%	62.0%	9	98.4%	83.7%	48.1%	161.2%	
RM10 - RM80	5	55.7%	53.8%	41.4%	59.2%	4	46.1%	47.2%	43.2%	50.1%	
> RM80	0					0					
Single PRH Basket											
≤ RM1	5	85.4%	50.5%	28.2%	51.9%	1	92.0%	92.0%	92.0%	92.0%	
RM1 - RM2	2	46.0%	46.0%	34.2%	57.7%	0					
RM2 - RM10	14	34.2%	31.7%	30.0%	34.8%	0					
RM10 - RM80	11	47.5%	49.5%	36.9%	57.1%	0					
> RM80	9	29.8%	32.5%	30.0%	35.0%	0					

PRH = Product Registration Holder; Q25 = 25th Percentile; Q75 = 75th Percentile; SDG = Sustainable Development Goal; WHO/HAI = World Health Organization/Health Action International

4.5 AFFORDABILITY

The affordability of medicines was analysed for medicines supplied in the private sector since medicines are supplied for free in the public sector. Fifteen medicines were selected for each of the nine treatment conditions (according to WHO standard treatment) to represent the affordability of medicines in Malaysia. As shown in Table 4.16, Appendices XXXVIII, XXXIX, and XL, most of the originator products for all baskets of medicines generally require patients to pay more than one days' wage. For example, medicines such as Gefitinib 250mg Tablet required more than two months' wage of the LPGW and lowest minimum wage worker. Despite generic availability in the market, originator products of Omeprazole 20mg Tablet, Captopril 20mg Tablet, Atenolol 100mg Tablet, Simvastatin 20mg Tablet, Ceftriaxone 1g Injection, and Diclofenac 50mg Tablet still cost more than one days' wage. On the other hand, generic products for all baskets were more affordable for chronic and acute conditions since they cost less than one days' wage of the LPGW and the lowest minimum wage worker.

Specifically, WHO/HAI Basket (refer to Appendix XXXVIII) showed that cancer treatment medicines such as Trastuzumab 440mg Injection, Imatinib Mesylate 100mg Tablet, Gefitinib 250mg Tablet, Fluorouracil 50mg/ml Injection and Docetaxel 40mg/ml Injection were unaffordable and required 9.1 to 402.1 days' wage of the LPGW and lowest minimum wage worker for the originator and generic products.

Concerning non-communicable diseases (NCDs), most of the originator products to treat NCDs cost more than one day's wage. It could be seen that Captopril 25mg Tablet was the highest number of days' wage needed (5.2 to 6.5 days' wage), followed by Clopidogrel 75mg Tablet (3.9 to 4.9 days' wage), Sitagliptin 50mg & Metformin 500mg Tablet (3.0 to 3.8 days' wage) and Atorvastatin 20mg Tablet (2.2 to 2.8 days' wage). Additionally, originator products for gastrointestinal diseases such as Omeprazole 20mg Tablet and Esomeprazole 20mg Tablet were also considered unaffordable. They required 6.4 to 8.1 days' wage and 2.6 to 3.2 days' wage of the LPGW and lowest minimum wage worker, respectively. However, generic products for Omeprazole 20mg Tablet and Esomeprazole 20mg Tablet were affordable and required less than a days' wage.

Commonly used oral antibiotics for acute treatment, such as generic products of Amoxicillin 500mg Capsule, Amoxicillin 250mg Capsule, Amoxicillin 500mg & Clavulanic Acid 125mg Tablet, Cefuroxime 250mg Tablet, Ciprofloxacin 500mg Tablet, Ciprofloxacin 250mg Tablet, Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet, and Doxycycline 100mg Tablet were more affordable compared to their originator brand products. Originator brand oral antibiotic products such as Cefuroxime 250mg Tablet, Ciprofloxacin 500mg Tablet, and Ciprofloxacin 250mg Tablet required more than one days' wage of both the LPGW and lowest minimum wage worker.

The SDG Basket (refer to Appendix XXXIX) containing essential medicines also presented the same finding where originator products were deemed unaffordable than generic equivalent products. The highest number of days' wages was for the originator product of Morphine 10mg Tablet, which required up to 25.4 days' wage. In contrast, the other medicines for pain/inflammation that are available in generic products such as Dexamethasone Sodium 4mg/ml Injection, Ibuprofen 200mg Tablet and Paracetamol

24mg/ml Suspension (available in the originator and generic brands) were affordable in the private sector.

Besides that, both the originator and generic products for Fluconazole 50mg Tablet were unaffordable and required 5.7 to 7.2 days' wage and 1.2 to 1.5 days' wage, respectively. Fluoxetine 20mg Tablet also required 2.8 to 3.6 days' wage for the originator products and 1.3 to 1.7 days' wage for generic products. Originator products for malaria treatment, such as Artemether 20mg & Lumefantrine 120mg Tablet, cost 2.8 to 3.5 days' wages, and Artesunate 60mg Injection costs 1.4 to 1.8 days' wages and is considered unaffordable in the private sector. Medicines used in maternal and child health, such as Magnesium Sulphate 50% Injection, Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet, Oxytocin 10iu/ml Injection and Folic Acid 5mg Tablet which are mostly available as generic products, were affordable as they required less than a days' wage to purchase a treatment course.

Likewise, most of the originator products in the Single PRH Basket (refer Appendix XL) were not affordable. They required more than one days' wages, except for Digoxin 0.25mg Tablet, Quetiapine Fumarate 50mg Tablet and Measles and Mumps Vaccine (MMR II). Reminiscent of the WHO/HAI Basket, medicines to treat cancer required the highest number of days' wage. This can be exemplified by items such as Rituximab 1400mg Injection (1.2 to 1.5 years' wage), Afatinib Dimaleate 30mg Tablet (3.6 to 4.5 months' wage), Cyclophosphamide 1g Injection (3.0 to 3.8 days' wage) and Capecitabine 150mg Tablet (2.4 to 3.0 days' wage).

Moreover, medicines for cardiovascular diseases are also needed up to 5.4 months' wage, such as Tenecteplase 10,000 unit Injection (4.3 to 5.4 months' wage), Apixaban 2.5mg Tablet, Dabigatran 110mg Tablet, Enoxaparin Sodium 4000iu/0.4ml, Fenofibrate 145mg Tablet and Telmisartan 80mg & Amlodipine 5mg Tablet. Insulin Aspart 30% & Aspart Protamine 70% 100iu/ml and Insulin Detemir 100iu/ml, which are used as diabetes treatments, also required more than one days' wage. Moreover, medicines for vaccination in the private sector also required patients to spend up to 11 days' wages on such as Human Papillomavirus Vaccine (HPV) (9 valent, 2 valent and 4 valent) and Pneumococcal Vaccine (23 valent, 13 valent and 10 valent).

Further analysis according to disease category and by baskets of medicines was presented in Tables 4.17, 4.18 and 4.19. Originator products in the WHO/HAI Basket, particularly for treating of respiratory diseases, central nervous system, cardiovascular disease, depression, diabetes, infectious diseases and gastrointestinal disorders, cost 1.2 to 5.6 days' wage (Table 4.17). Additionally, treatment for cancer in the WHO/HAI Basket needs more than two months' wage of the LPGW and the lowest minimum wage worker. However, if generic products were used, the treatment cost would be more affordable (less than one days' wage), especially for the treatment of most of the disease categories except for medicines for cancer and depression.

Similar findings were noted for the SDG Basket and Single PRH Basket. For the SDG Basket (Table 4.18), treatment using originator products for the central nervous system, depression, diabetes, infectious disease, fungal infection, kidney disease, malaria and pain/inflammation cost 1.3 to 12.7 days' wage. In comparison, generic products were more affordable (less than 1 day's wage) except for treating depression and retroviral disease.

The Single PRH Basket (Table 4.19) mainly consists of originator products that might require patients to spend 1.1 to 70 days' wage on most of the treatment disease categories such as cancer, cardiovascular disease, kidney disease, malaria, diabetes, mental disorders, musculoskeletal disorders, pain/inflammation, respiratory disease, retroviral disease, urinary bladder disease and vaccination. Of note, cancer treatment in this basket also needs more than two months' wage of the LPGW and lowest minimum wage worker.

Table 4.16
Affordability of standard treatment as measured by number of days' wages in the private sector
by medicine and product type of selected medicines

Medicines	Treatment	Total units per treatment ^e	Unit	Originator Products		Generic Products	
				Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Salbutamol 100mcg/dose Inhalation	Asthma	200	doses	0.4	0.5	0.2	0.3
Gefitinib 250mg Tablet ^{a,b,c}	Cancer	30	cap/tab	67.0	84.5		
Diazepam 5mg Tablet ^d	CNS	7	cap/tab			0.2	0.2
Amlodipine 5mg Tablet	CVD	30	cap/tab	1.0	1.3	0.3	0.4
Simvastatin 20mg Tablet	CVD	30	cap/tab	1.3	1.7	0.3	0.4
Amitriptyline HCl 25mg Tablet ^d	Depression	90	cap/tab			0.9	1.1
Metformin HCl 500mg Tablet	Diabetes	60	cap/tab	0.6	0.8	0.2	0.2
Amoxicillin 500mg Capsule ^d	Infectious Disease	42	cap/tab			0.3	0.4
Paracetamol 120mg/5 ml Syrup	Pain/Inflammation	45	ml	0.1	0.1	0.1	0.1
Omeprazole 20mg Tablet	Peptic Ulcer	30	cap/tab	6.4	8.1	0.7	0.8
Atenolol 100mg Tablet	CVD	30	cap/tab	1.3	1.6	0.3	0.4
Captopril 25mg Tablet	CVD	60	cap/tab	5.2	6.5	1.1	1.4
Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension ^d	Infectious Disease	70	ml			0.2	0.2
Ceftriaxone 1g Injection ^a	Infectious Disease	1	injection	1.5	1.9	0.5	0.6
Diclofenac 50mg Tablet	Pain/Inflammation	60	cap/tab	1.4	1.7	0.4	0.5

Cap/tab = capsule/tablet; CVD = Cardiovascular disease, CNS = Central nervous system

^aHospital-only medicines: Data excluded for health clinic & community pharmacy

^bCancer hospital-only medicines: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

^cInnovator/On-patent medicines: Generic brand omitted

^dOriginal brand not available: Original brand data omitted

^eStandard treatments were entered as follows: Acute conditions = full courses of therapy; Chronic conditions, where therapy continues indefinitely = one-month course of therapy.

Number of days' wages = Median Treatment Cost (RM)/Lowest daily wage where, Lowest daily wage (2016): Lowest-paid government worker = RM58.17; Lowest minimum wage as determined by Federal Government of Malaysia = RM46.15

Chemotherapy regimen reference: Systemic Therapy of Cancer 2nd Ed. Ministry of Health and Ministry of Higher Education, Malaysia

Table 4.17
Affordability of standard treatment as measured by number of days' wages in the private sector
by disease and product type for WHO/HAI Basket

Medicines category	Originator Products			Generic Products		
	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Cancer	3	67.0	84.5	3	49.9	62.9
CNS	1	1.4	1.8	1	0.2	0.2
CVD	14	1.2	1.6	14	0.4	0.5
Depression	1	2.8	3.6	1	1.3	1.7
Diabetes	6	1.6	2.0	3	0.5	0.6
Gastrointestinal Disorders	2	4.5	5.6	3	0.8	1.0
Infectious Disease	6	1.4	1.7	10	0.3	0.4
Mental Disorders				1	0.9	1.1
Pain/Inflammation	4	0.7	0.9	7	0.1	0.1
Respiratory Diseases	2	1.5	1.8	2	0.9	1.2
Retroviral Disease				1	3.1	3.9
All	39	1.5	1.8	46	0.4	0.5

CNS = Central nervous system; CVD = Cardiovascular disease

Table 4.18
Affordability of standard treatment as measured by number of days' wages in the private sector by disease and product type for SDG Basket

Medicines category	Originator Products			Generic Products		
	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
CNS	1	1.9	2.3			
CVD	5	0.7	0.9	5	0.3	0.4
Depression	1	2.8	3.6	1	1.3	1.7
Diabetes	3	1.5	1.8	3	0.5	0.6
Fluid & Electrolyte Replenishment				1	0.0	0.0
Fungal Infection	1	5.7	7.2	2	0.8	1.0
Infectious Disease	1	1.5	1.9	4	0.2	0.3
Kidney Diseases	1	1.3	1.7	1	0.5	0.6
Malaria	2	2.1	2.7			
Maternal Child Health				4	0.2	0.3
Pain/Inflammation	2	10.1	12.7	3	0.1	0.1
Respiratory Diseases	1	0.4	0.5	2	0.4	0.5
Retroviral Disease				2	3.2	4.0
Thyroid Disease	1	0.5	0.7	1	0.3	0.4
Umbilical Cord Care				1	0.1	0.1
All	19	1.3	1.7	30	0.3	0.4

CNS = Central nervous system; CVD = Cardiovascular disease

Table 4.19
Affordability of standard treatment as measured by number of days' wages in the private sector by disease and product type for Single PRH Basket

Medicines category	Originator Products			Generic Products		
	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	No. of medicines, n	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Cancer	4	55.8	70.3			
CVD	7	1.6	2.1			
Diabetes	3	1.7	2.1			
Kidney Diseases	1	0.9	1.1			
Malaria	2	2.1	2.7			
Maternal Child Health	1	0.9	1.1			
Mental Disorders	3	1.8	2.3			
Musculoskeletal Disorders	1	7.8	9.9			
Pain/Inflammation	2	2.0	2.6			
Respiratory Diseases	2	3.1	4.0	1	0.2	0.2
Retroviral Disease	1	8.1	10.2			
Urinary Bladder Diseases	1	4.2	5.3			
Vaccination	8	3.7	4.6			
All	36	2.7	3.3	1	0.2	0.2

CVD = Cardiovascular disease

5.0 DISCUSSION

5.1 MEDICINES AVAILABILITY

Medicines availability is one of the essential elements in providing access to medicines. Based on this study, the overall finding in the WHO/HAI Basket showed that medicines were at fair availability in most of the public (79.1%) and private (53.1%) sectors. Specifically, public facilities such as MOH hospitals (80.8%), MOH health clinics (83.3%), university hospitals (82.1%) and the military hospital (75.0%) showed fairly high availability. Fairly high availability was found in private hospitals (61.1%) and community pharmacies (55.5%) but low availability in private clinics (37.8%). These availability findings were consistent with the previous Medicine Prices Monitoring Survey despite the fact that the military hospital and private clinics were not sampled (Pharmaceutical Services Programme, 2018). On the other hand, the availability in the public sector was higher than the study involving 15 medicines in the Western Pacific Region (43.0%, range: 22.2% in the Philippines to 79.2% in Mongolia) and South-East Asia Region (38.3%, range: 16.3% - 57.9%) (Cameron et al., 2009a).

One of the additional facilities included in this current survey is the military hospital. The military hospital, one of the public sector facilities, provides healthcare services for military personnel, dependents and civilian patients (Malaysian Armed Forces Health Services, 2020). The availability of medicines in the military hospital showed fairly high availability, comparable with MOH hospitals and university hospitals. However, unlike MOH hospitals and clinics, some of the common medicines in the WHO/HAI Basket such as Atenolol 100mg Tablet, Diazepam 5mg Tablet, Amoxicillin 500mg Capsule and Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet were not listed in the military hospital's formulary. The military hospital keeps other alternative medicines for hypertension and anti-infectives in this basket, such as Metoprolol 100mg Tablet, Captopril 25mg Tablet, Bisoprolol 5mg Tablet, Frusemide 40mg Tablet, Telmisartan 80mg Tablet and Amoxicillin 250mg Capsule. Differences observed in medicines formulary listing across public facilities are due to their stakeholders' perspectives and decisions made by their Drug Therapeutic Committee. The results for these additional facilities in the current study was beneficial in understanding the overall picture of availability and medicine prices in Malaysia's public and private sectors.

As mentioned in the methodology, the WHO/HAI Basket consists of a Global Core List according to WHO recommendation and a supplementary list based on commonly used medicines in the country and national disease burden. In the private sector, private hospitals (68.0%) and community pharmacies (52.0%) showed fairly high availability, while private clinics showed low availability (42.6%). Despite multidiscipline services offered by private clinics, most private clinics are not providing treatment for communicable diseases such as retroviral diseases, which require training in HIV management, adequate laboratory support, especially for viral load and CD4 count measurements, as well as long-term disease monitoring (Medical Development Division, 2011). This complex care and treatment is the reason that contributes to the unavailability of antiretroviral treatments such as Tenofovir Disoproxil Fumarate 300mg and Emtricitabine 200mg Tablet in the private clinic. As we know, HIV management typically requires patient assessment, strict medicine adherence and regular medical follow-up. Hence, the treatment is usually provided by tertiary centres such as private hospitals instead of private clinics.

Overall, the SDG Basket had fairly high availability in the public sector (72.4%) but low availability in the private sector (38.6%). The SDG Basket consists of essential medicines based on the WHO Model List of Essential Medicines (EML) for acute and chronic, communicable and non-communicable diseases used in primary healthcare. It comprises medicines for various treatments such as diabetes, respiratory, CVD, CNS, anti-infective, pain, malaria, maternal and child health and antiretroviral (World Health Organization, 2019a). Malaysia's National Essential Medicines List (NEML) has been developed to guide public and private facilities in creating their essential lists according to their requirements (Pharmaceutical Services Programme, 2019a). However, it is not mandatory for private facilities to make the list essential medicines available in their facilities.

Medicines for the treatment of maternal health, such as Oxytocin 10iu/ml Injection and Magnesium Sulphate 50% Injection, had very low availability, particularly in community pharmacies and private clinics. Similar to medicines for malaria treatment and retroviral treatment such as Artesunate 60mg Injection, Artemether 20mg & Lumefantrine 120mg Tablet and Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet, had very low availability in those private facilities. As the private sector complements the public sector in healthcare delivery and accommodates overcrowding in public outpatient clinics, facilities such as private clinics provide diagnosis, curative care, preventive, promotive and rehabilitative services to patients (Kenny et al., 2017). Private clinics mostly offered medical check-ups (98.3%) and minor surgeries (91.7%) services, as well as other services for obstetrics and gynaecological services such as antenatal and postnatal care (Hwong et al., 2012). However, maternity and delivery services are usually provided by selected maternity clinics (*klinik bersalin*) or private hospitals. On the other hand, community pharmacies involve treating minor ailments and reducing the need for treatment at primary health clinics or hospitals (Shafie et al., 2012). Therefore, the very low availability of Oxytocin 10iu/ml Injection and Magnesium Sulphate 50% in most private clinics and community pharmacies in this study was justified since these medicines are usually used for life-saving and emergencies during labour.

Similar to the SDG Basket, the overall average medicines availability of the Single PRH Basket was fairly high in the public sector (56.3%) and very low in the private sector (26.3%). The Single PRH Basket consists of medicines with the particular active ingredients at the specific strength, dosage form, formulation and combination registered in Malaysia by only one PRH. Medicines in this basket are usually new and patented medicines, some of them being imported or locally produced generic products. Therefore, the availability of medicines in public and private facilities was expected to be lower than in other baskets. Medicines for diabetes, including Insulin Detemir 100iu/ml, Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml, Sitagliptin 50mg & Metformin 500mg Tablet, were found to be fairly available in MOH hospitals, a military hospital and university hospitals. However, they were low in availability in private facilities, particularly in private clinics and community pharmacies. On the other hand, Dextromethorphan, Phenylephrine & Triprolidine Syrup is the only generic product in this basket, and it is not available in the MOHMF. Thus, these medicines are found only in the private sector and have low availability.

Besides that, the availability of vaccines in the Single PRH Basket such as Human Papilloma Virus 2-valent Vaccine, Pneumococcal 13-valent Vaccine and Measles, Mumps & Rubella Vaccine was higher in MOH facilities than in private facilities as they are listed under

the National Immunization Programme (NIP) and provided for free in government health facilities for Malaysians (Coe et al., 2017; Ministry of Health Malaysia, 2015). However, these vaccines are also available in the private sector, typically to provide vaccination for private school children (Buang et al., 2018). They offer more variety in terms of brands of PCV, MMR and HPV vaccines, and parents have the option to choose according to their needs and coverage of serotype protection. For example, the selection of PCV 13 compared to PCV 10.

Of note, comparing originator and generic products, this study found that the availability of generic products was higher than originator products in both public and private sectors for the WHO/HAI Basket and SDG Basket. The finding was in line with the Generic Medicines Policy as tabulated in our MNMP (Ministry of Health Malaysia, 2012). More specifically, originator products have higher availability than generic products in private hospitals for the WHO/HAI Basket and Single PRH Basket. Private hospitals typically prefer originator products over generic products. Medical consultants perceive that patients seeking treatment in private hospitals would expect to be prescribed the “best medicine” (Malaysia Competition Commission, 2017). This was also attributed to the finding that most physicians in private hospitals had negative perceptions about the safety, quality and efficacy of generic products and could limit the use of generic products in their prescribing (Rohit Kumar et al., 2015). Conversely, the findings showed generic products had higher availability in private clinics and community pharmacies than in private hospitals for the WHO/HAI Basket and SDG Basket. A study that supported these findings found that general practitioner clinics preferred to use generic products due to the limited charges for medicines, consultation fees, and cost-control measures undertaken by Third Party Administrators and Managed Care Organisations (TPA/MCO) (Kenny et al., 2017).

Generally, the high prices of cancer medicines and expensive cancer treatments have a huge impact on access in most countries. Cancer medicines are only available in the WHO/HAI Basket and Single PRH Basket. There were Docetaxel 40mg/ml Injection, Fluorouracil 50mg/ml Injection, Gefitinib 250mg Tablet, Imatinib Mesylate 100mg Tablet, and Trastuzumab 440mg Injection as anticancer medicines in the WHO/HAI Basket. Afatinib 30mg Tablet, Capecitabine 150mg Tablet, Cyclophosphamide 1g Injection, Nilotinib 150mg Tablet and Rituximab 1400mg Injection were listed in the Single PRH Basket. According to the Malaysian Statistic of Medicines (MSOM) 2015-2016, common anticancer medicines used in Malaysia were Capecitabine, 5-Fluorouracil and Cyclophosphamide. Meanwhile, the five most commonly used targeted therapies in oncology are Imatinib, Pazopanib, Gefitinib, Lapatinib and Sorafenib. Imatinib is the most commonly used targeted therapy to treat gastrointestinal stromal tumours and chronic myeloid leukaemia (Pharmaceutical Services Programme, 2020b). All anticancer medicines in the WHO/HAI Basket and Single PRH Basket were listed in the MOHMF. Therefore, anticancer medicines availability in both baskets of medicines generally was higher in the public sector than in the private sector (Refer Appendix V-XVI). Low availability in the private sector could be explained by the fact that these specialised medicines are typically marketed in selected hospitals with cancer centres of specialisation. Thus, cancer patients have a limited choice of private hospitals, located in urban areas. The findings in this study were contrary to those of other middle-income countries, such as Mexico, which reported that their mean availability in both public and private sector premises was fairly high, with mean availability of 61.2% and 67.5%, respectively (Moye-Holz et al., 2020).

5.2 PRICE VARIATION

Generally, MOH procured most of the public sector medicines listed in the APPL and contract list at a centrally fixed price (Hassali et al., 2015). The findings of this study showed that there was a very small variation in procurement prices in the public sector across all baskets of medicines. A very small variation might be contributed by LP medicines procured by individual MOH hospitals/institutions/health clinics (Pharmaceutical Services Programme, 2018). Besides that, despite the procurement process in other public-sector facilities such as military and university hospitals having to adhere to guidelines under the MOF (Ministry of Health Malaysia, 2020e), they have their list of medicines and procurement contracts.

Therefore, medicine procurement in the military hospital and university hospitals was slightly different from that in MOH hospitals and health clinics, thus leading to price variation. Specifically, among public sector facilities, university hospitals had the biggest variation in procurement prices due to the individual procurement conducted by each university hospital. This individual procurement practice had led to different brands for generic products procured for the same medicines among university hospitals. However, no variation was observed for the military hospital in this study. This is due to the centralised procurement policy of the Malaysian Armed Forces, Health Service Division, whereby the Malaysian Armed Forces Medical & Dental Depot runs the pharmaceutical procurement for all military facilities centrally.

In reality, individual or decentralised procurement can result in a loss of medicine quality supervision and regulation in procurement; and across the pharmaceutical supply chain (Millington & Bhardwaj, 2017). Hence, centralised procurement or tendering across premises enables the public sector to procure medicines at standard and lower prices with large quantities. A systematic review also reported that most countries with centralised procurement and tendering processes demonstrated cost savings in healthcare at national and sub-national levels. Although centralised procurement is not a quick fix for improving the healthcare system, by creating economies of scale (bundling quantities, minimising duplications, reducing the number of transactions) and purchasing power, centralised procurement and tendering can reduce costs in many contexts (Baldi & Vannoni, 2017; Millington & Bhardwaj, 2017; Seidman & Atun, 2017).

MOH, MOHE and MOD had a consensus for pooled procurement involving 85 items on the contract list to optimise government spending through bulk procurement, negotiation and obtaining the fair price for medicines (Ministry of Health Malaysia, 2020e). As a way forward, the pooled procurement among public-sector facilities can be extended to all medicines for greater savings for the government. Besides that, it is recommended that the centralised pooled procurement be implemented among private sector facilities, and to establish collaboration between the public and private sectors to increase procurement volume and maximise negotiation power.

Unlike the public sector, there was a wide variation in procurement prices for the private sector, with private clinics having a wide variation across all baskets and product types. The variation in the private sector is mainly contributed by confidential bonuses, discounts or rebates, and tier-pricing (Hassali et al., 2015). Pharmaceutical companies usually offer

bonuses, discounts or rebates based on purchase quantity (Hassali et al., 2010; Siang, Hassali, Alrasheedy, et al., 2014). Chains or large alliance facilities that purchase in bulk usually receive lower prices or extra quantities of medicine from pharmaceutical companies (Hassali et al., 2015). Other than that, pharmaceutical companies also offer different prices to different groups of people, which causes price differentiation (also known as tier-pricing) (Hassali et al., 2010). Therefore, private clinics usually get bonuses, discounts or rebates as in Malaysia, and they are the leading decision-makers in prescribing and are allowed to dispense their prescriptions (Hassali et al., 2010; Siang, Hassali, Alrasheedy, et al., 2014). However, some private clinics prefer to purchase a small number of medicines or urgently needed medicines from regular retail pharmacies, which will provide them with a different discount (Malaysia Competition Commission, 2017), thus explaining the variation in procurement prices in private clinics.

In short, variation in private sector procurement prices is to be expected because different facilities may have different procurement deals. Moreover, in Malaysia, the government currently regulates only doctor's consultation fees, not medicine prices (Ahmad et al., 2019). Thus, manufacturers, distributors, and retailers are free to set medicine prices based on market forces, resulting in price variation and price wars in the private sector (Hassali et al., 2012; Siang, Hassali, Alrasheedy, et al., 2014).

Generic products had a larger variation in procurement and selling prices than originator products in this study. This finding was consistent with the previous Medicine Prices Monitoring Survey (Pharmaceutical Services Programme, 2018). Other studies also indicated that originator products had more stable prices than generic products (Nguyen et al., 2009). There is only one brand name available in the marketplace for each medicine for originator products; thus, the variation is small even though price competition exists (Pharmaceutical Services Programme, 2018). This can be noted in the Single PRH Basket, which had the smallest variation and most stable prices than the WHO/HAI Basket and SDG Basket, consisting mainly of originator products.

Meanwhile, the WHO/HAI Basket and SDG Basket usually include generic products, explaining the price variation in these baskets. As for generic products, more than one company produces a particular medicine under different brands (H. Kumar et al., 2021). Thus, the price competition is intense as different brands have different costs for the ingredients, methods used to prepare the company's medicine, transportation, marketing and promotion strategies (Karki et al., 2020; Sai & H., 2017). Besides that, a previous study has mentioned that as the number of drug manufacturing companies grows, the price variation among generic products also increases simultaneously (Rahul Kumar et al., 2015).

In summary, variations in procurement and selling prices in the private sector exist and are unavoidable, mainly contributed by trading practises in the pharmaceutical industry such as confidential bonuses, discounts or rebates, and tier-pricing. Therefore, the Pharmaceutical Services Programme took the initiative by developing the Good Pharmaceutical Trade Practice (GPTP) guidelines in 2015, endorsed by the Malaysia Competition Commission (MyCC). This guideline was developed to harmonise trade practice by promoting standard prices and bonus schemes to all distribution channels and healthcare providers (Pharmaceutical Services Division, 2015). However, it is an administrative order that is not legally binding. Hence, adherence is poor as the implementation by pharmaceutical companies is voluntary.

Moreover, to minimise the price variation and develop fair pricing among facilities, price transparency or the sharing of prices by pharmaceutical companies and wholesalers/distributors is encouraged. Patients can make a more informed choice before purchasing by comparing prices and selecting the medicine that offers the desired level of value (Ahmad et al., 2019). Due to price transparency, medicine prices will be standardised, thus reducing price wars and preventing monopolies. This allows private healthcare facilities to focus on providing patient-care services. The competition will be concentrated on patient-oriented care, which will benefit patients by improving their treatment outcomes (Hassali et al., 2010). As a result, the Pharmaceutical Services Programme developed Consumer Price Guides (CPG) in 2015, accessible at <https://www.pharmacy.gov.my>. The CPG serves as a public reference for purchasing medicines in the private sector, which consisting of controlled medicines and over-the-counter (OTC) products registered with NPRA. Consumers can make use of information on medicines availability and market prices.

5.3 PRICE COMPARISON

5.3.1 Median procurement price comparison

In this study, originator products were procured at a five time higher than generic products for the WHO/HAI Basket and SDG Basket. A similar pattern, with a considerable price difference between originator and generic products in lower-middle and low-income countries (>300.0%), with a 152.0% difference in upper-middle-income countries, was also seen in a previous study finding (Cameron et al., 2009b). Drug discovery is a time-consuming, complicated, expensive and high-risk process; thus, pharmaceutical companies tend to maximise profits in order to recover the cost of research and development (R & D) (El-Dahiyat et al., 2011). Apart from the expenses spent on R & D, the combination of inelastic demand for single-source medicines and patent protection keeps the companies in a strong market position, giving them chances to manipulate prices (Henry & Searles, 2012). High medicine prices also occur in off-patent products, and this situation will continue to increase until a competitor enters the market (Morgan et al., 2020). Therefore, to optimise pharmaceutical expenditure, the greater use of generic medicines is suggested and has become a medicine policy option in major countries, including Malaysia (Hassali et al., 2015; Malaysia Competition Commission, 2017). Generics are alternative medicines for originator products produced in the absence of patent protection, so they do not bear the high cost of research and development of medicines and thus have a lower price than originator products (Hassali et al., 2010; Henry & Searles, 2012). This statement is consistent with local studies, which revealed that generic products were much cheaper than originator products (Babar et al., 2007; Shafie & Hassali, 2008).

Of special note, regardless of product types, the private sector had higher procurement prices than the public sector across all baskets, parallel with a finding from the previous Medicine Price Monitoring Survey (Pharmaceutical Services Programme, 2018). Another study in India also revealed that the cost of antihypertensive drugs was higher in the private sector than in the public sector (Rahul Kumar et al., 2015). In the public sector, medicines are usually procured in bulk through concession supply and national tenders, whereas in the private sector, the procurement is done separately across facilities (Hassali et al., 2015; Malaysia Competition Commission, 2017). This difference explains the reason for

lower procurement prices in the public sector as compared to the private sector. Private hospitals typically obtain their medicines directly from pharmaceutical companies, whereas private clinics and community pharmacies can get their medicine supplies from one of two sources: manufacturers/importers or wholesalers/distributors (Malaysia Competition Commission, 2017).

Among public sector facilities across all baskets of medicines, it is interesting to note that the military hospital had slightly higher procurement prices than MOH facilities. It is known that the procurement method for all public sector facilities follows the MOF procurement guidelines. However, military hospitals are prone to procure originator and halal products as their medicine selection. Besides that, military hospitals procure at a lower volume than MOH facilities and university hospitals, which could be the reason for the difference from those of other public-sector facilities.

5.3.2 Median selling price comparison

Free-market forces and the lack of medicine pricing regulation enable private pharmaceutical providers to determine their selling prices (Babar et al., 2007; Hassali et al., 2012). As reported in previous studies, generic products are generally cheaper than originator products (Dunne et al., 2013; Dylst & Simoens, 2010; Shafie & Hassali, 2008; Zeng, 2013). Similarly, the current study showed that originator products for both WHO/HAI Basket and SDG Basket had twice their generic equivalent selling prices. The addition of generic products to the market provides competition to original brands that are often sold at far higher prices. As the originator products may continue to be marketed at a high price, most patients will purchase their generic equivalent, which provides cheaper alternatives (National Academies of Sciences Engineering and Medicine, 2018).

It was shown that the median selling price of private hospitals and private clinics was higher than community pharmacies for all baskets among private facilities. Several studies have found that medicine prices in private clinics and hospitals are costlier than in community pharmacies (Babar et al., 2005; Siang, Hassali, Saleem, et al., 2014). Both private hospitals and private clinics tend to mark up their medicine prices, much higher than community pharmacies, resulting in higher selling prices for the originator and generic products (Ahmad & Islahudin, 2018; Babar et al., 2007). Meanwhile, community pharmacies sell them at lower prices to attract customers and remain competitive (Xi et al., 2015). Different bonus schemes have resulted in price disparities within the pharmaceutical market where small independent pharmacies are forced to sell at lower prices to compete with the big players, although their procurement prices are higher (Siang, Hassali, Alrasheedy, et al., 2014).

Regarding the location and geographical area of the facilities, there was no difference in selling price between Peninsular and East Malaysia. Patients in East Malaysia paid almost similar prices for all baskets of medicine compared to Peninsular Malaysia. Although East Malaysia may face issues and challenges such as high handling charges, inefficient land transport and poor distribution channels that prompt high prices of goods (Mhd. Ruslan et al., 2019), the lower cost of transportation in Peninsular Malaysia may be outweighed by the greater cost of conducting business such as higher operational and rental costs in the central region of Peninsular Malaysia (Chin, 2016) compared to East Malaysia. Moreover, medicines are not like other commodities and are one of the major components in healthcare; thus,

putting a fair price on medicines is necessary to make them affordable while covering the seller's cost and at a reasonable profit margin, regardless of the location of the premises.

5.3.3 International price comparison

This study attempted to compare Malaysia's median procurement price and median selling price with reference countries such as Australia, Taiwan, South Korea, Thailand and South Africa. Studies comparing international medicine prices prove that similar countries pay different prices for the same medicine. The evidence serves as a barometer of the outcome of pricing policies established in countries with higher prices. It allows policymakers to debate existing policies and identify ways to obtain fair prices (Bipartisan Policy Center, 2019; Ollendorf et al., 2021). Additionally, the international price comparison also adopted as a method known as External Reference Pricing (ERP) to set the price of medicines in the domestic market. ERP has been advocated as one of the reliable policies regulating medicine prices used in conjunction with other pricing policies (World Health Organization, 2020b).

There are a few methodologies for international medicine price comparison by considering medicine selection, unit of measurement for price and volume, consumption weightage, and purchasing power parities (PPPs). Nevertheless, there is no single, right measure of international price differences for medicines. The current study adopted the simplest measurement form by directly comparing prices at equivalent supply chains between Malaysia and reference countries. The objective is to measure the average price difference, not to identify the cause of price differences. However, the price difference partially reflects the effects of pricing policies established in those countries. Customarily, Management Sciences for Health's (MSH) International Medical Products Price Guide is utilised as the international reference prices (IRP) for international price comparison. IRPs are recommended as the standard to compare prices between countries (World Health Organization & Health Action International, 2008). However, this method was not adopted in the current study as the available IRP had not been updated since 2015.

Generally, the public procurement price of originator products across all baskets in Malaysia was lower than wholesale prices in reference countries. The findings affirm that public procurement in Malaysia is efficient in obtaining fair prices for medicines. Public sector procurement policies are primarily facilitated by technical specifications required by the MOF (Government Procurement Division, 2020). Public sector procurement encompasses multiple policies, including external reference pricing, internal reference pricing, tendering and negotiation, and the use of generic medicines (Lee et al., 2021; Md Hamzah et al., 2020; World Health Organization, 2015) to improve procurement efficiency. On the contrary, the wholesale price of originator products in Malaysia's private sector was higher than in reference countries. Similar findings were noted in a study by Ahmad & Islahudin (2018) and Wong et al. (2019) that the price of originators in Malaysia's private sector is higher than the international price reference. Similar scenarios were observed in other developing countries, especially in countries lacking pricing policies in the private sector (Cameron et al., 2009b; Sooksriwong et al., 2009). Market forces drive medicine sales in Malaysia's private sector; thus, originator products monopolise the market. A monopoly like this, combined with a lack of price regulation, could lead to soaring medicine prices in Malaysia's private sector.

In comparisons with AGB, it was noted that more than half of the generic products were procured at higher prices than reference countries in the private sector compared to the public sector. The generic products compared with reference countries were from the WHO/HAI Basket and SDG Basket, which reflect commonly used medicines in most countries. Although the availability of generic products reflects a competitive market force driving down the price, it alone does not improve procurement efficiency in the private sector. The reference countries in the present study, such as Australia and South Africa, regulate the wholesale prices in the private sector across both originator and generic products. The regulation prevents manufacturers, wholesalers, and distributors from inflating medicine prices for retailers, consequently increasing the selling price to patients.

The present study also compared the selling prices of medicines in Malaysia's private sector with those in Australia and South Africa. Overall, Malaysia's private sector sold more than half of the originator products at a higher price than Australia and South Africa across all baskets. This result is consistent with the finding of a previous study in which the mean retail medicine prices in Penang were 30.3 – 148.3% higher than in Australia (Hassali et al., 2012). On the other hand, the selling price of generic products in Malaysia's private sector was lower than in reference countries. While originator products often monopolise the market, generic products allow competition through market forces and are readily available across the entire dispensing channel.

More in-depth analysis considering the size of the markets, the national pharmaceutical manufacturing sector's capacity and capabilities, the impact of taxes, duties and mark-ups, and other economic indicators are required to discern the reason for variation between different countries. The information will be helpful for policymakers and governments to decide the optimal intervention on pricing policies to make medicines more affordable and accessible.

5.4 PRICE MARK-UPS

Initially, the establishment of free pricing practice encouraged healthy competition between manufacturers of both original and generic products (Ahmad et al., 2019). However, because no specific regulation has been adopted, there is no fixed maximum or ceiling price for medicines, with each manufacturer and retailer setting their mark-up percentage. Hence, wide price variations and uncontrolled price mark-ups in the pharmaceutical industry, particularly -the private sector, are inevitable (Ahmad & Islahudin, 2018). On that account, there is currently no mark-up regulation in the private healthcare system in Malaysia, as reflected by the various mark-ups in the current findings. Our recent findings showed that originator products (30.1 – 121.2%) had lower mark-ups than the generic equivalent (85.2 – 233.5%) for all baskets at each facility, which was consistent with previous research findings (Ahmad et al., 2019; Ahmad & Islahudin, 2018; Babar et al., 2007). These different mark-ups are apparent because generic products typically have low baseline costs, allowing the private sector to boost pricing such that they are still profitable while keeping them affordable (Alpern et al., 2014). Current studies show that originator products are typically much costlier to procure than generic products, similar to previous studies (Dunne et al., 2013; Shafie & Hassali, 2008). In some ways, this makes generic products appear to be a somewhat cheaper option

when compared to originator products, even though the price has been marked up (Ahmad & Islahudin, 2018).

Fundamentally, while private facilities provide healthcare services, their main goal is to generate revenue as a means to stay afloat and remain competitive (Malaysia Competition Commission, 2017). Retail mark-ups are usually added to cover overhead costs such as staff salaries, rent, repackaging and loss, and profit (World Health Organization & Health Action International, 2008). In the current study, the IPD setting of private hospitals had the highest mark-up for the originator and generic products in all baskets compared to the OPD facilities. The primary distinction between inpatient and outpatient care is that an inpatient needs an overnight stay or ward admission depending on the severity of their illness, which is not the case for outpatient care (Quek, 2009). Moreover, private hospitals had the highest mark-up for originator products among OPD setting facilities. Although there is widespread generic substitution in government hospitals, private hospitals are known as prominent buyers of originator medicines, up to 40.0% together with private clinics (Malaysia Competition Commission, 2017). Most private hospitals are equipped with brand-new and advanced technology in more comfortable and luxurious settings at higher prices. It is plausible that private hospitals tend to have higher pharmaceutical mark-ups due to more personalised and attentive specialised services. High operating and capital expenditure expenses make it difficult for them to cut the cost of medicines as the charges are cross-subsidised with their operating costs and contribute to their income (Chua, 2019).

In contrast, for generic products, the prices were marked-up higher in private clinics (WHO/HAI: 142.3%; SDG: 144.0%) than in other OPD setting facilities. Similarly, a previous study found that those dispensing doctor clinics had a 50.0 – 70.0% mark-up on generic products compared to retail pharmacies with a range of 25.0 – 38.0% (Babar et al., 2007). This study found that the mark-up for generic products in private clinics can range up to 258.6% for the WHO/HAI Basket, 271.9% for the SDG Basket and 166.5% for the Single PRH Basket. A local study finding could support this result as it revealed that the price of Paracetamol 500mg (blister pack of 10 tablets) was charged differently (ranging from RM2 to RM20) by private clinics and resulted in a high-profit margin of more than 4900.0% (Zin et al., 2020). Unlike private hospitals, private clinics have more restrictions on the consultation fees, with a range of RM10 to RM35 per visit, which is much lower than fees between RM30 and RM125 for private hospitals (Ministry of Health Malaysia, 2006). Moreover, patients in Malaysia's healthcare system rely significantly upon and seek advice from physicians on their conditions. Due to these factors, private clinics tend to prescribe generic products rather than brand-name medications as they can set higher mark-ups and gain more profit (Babar et al., 2007).

It is worth noting that the mark-up for the originator and generic products was lower in community pharmacies than in private hospitals and private clinics, as reflected by the lowest selling prices among those three facilities. Previous research has shown that medicine mark-ups are often larger in private hospitals and clinics than in community pharmacies (Ahmad & Islahudin, 2018; Babar et al., 2007). Over the years, in the context of the pharmaceutical free market, community pharmacies would engage in a price war with one another by reducing prices, resulting in reduced profit margins (Siang, Hassali, Saleem, et al., 2014). In order to accommodate consumers' demands, every community pharmacy would negotiate the selling price with a smaller profit margin to ensure sales (N.S Murugiah, 2009). Therefore, instead of depending on medicine sales, community pharmacies also rely on selling

OTC medications, dietary supplements, and personal care products to make profits and remain sustainable (Gregório et al., 2015).

According to this study finding, it was clear that no regressive mark-up was seen in each facility for both originator and generic products across all baskets. Medicines with the highest procurement costs did not always have the lowest mark-up margins. This contrasts with previous studies in which a lower percentage mark-up is applied regressively to higher-priced products (Aitken, 2016; World Health Organization, 2015). Furthermore, in contrast with the previous study done in 2017, in which regressive mark-up was observed, the current study involves three baskets of medicines and includes all types of medicine formulations in the mark-up analysis (Pharmaceutical Services Programme, 2018). Moreover, with an unregulated system in the private pharmaceutical sector, mark-up can be set free at any margin (Babar et al., 2007).

Overall, Malaysia had higher private retailer mark-ups in comparison with other countries. For example, Nepalese private retailers reported a 16.0% mark-up, while a maximum of 10.0 – 15.0% of retailer mark-up was found in Pakistan. Meanwhile, in Malawi, the retailer's mark-up in the private retail sector is about 35.0 – 65.0% (Mendis et al., 2007). Higher mark-ups could become a hindrance to regular access to medicines as they are thought to be determinants of pharmaceutical prices in developing countries other than tariff and non-tariff barriers, sales tax, procurement and distribution costs (Bate et al., 2006). However, reducing the base price without regulating mark-ups may increase profits for retailers without lowering the price paid by patients (Babar et al., 2007). High mark-ups along the distribution chain inflate prices will make medicines less accessible. The strategy to be highlighted is to control mark-ups along the pharmaceutical distribution chain, which might include regulation of wholesale and retail mark-ups. It is assumed that regulating mark-ups will decrease or control pharmaceutical prices (World Health Organization, 2015).

Moreover, depending on the product kind and price, mark-up regulation can be more flexible. It is possible to develop different strategies for the originator and generic products for essential or non-essential medicines. It is well known that original brands and generics are offered at different costs, so regressive mark-ups can have a distinct impact (Gray & Matsebula, 2000; World Health Organization, 2015). Generics are typically cheaper than originator products, and they can be significantly cheaper if mark-ups are kept low and incentives are provided to encourage the usage of generics (Babar et al., 2007). The higher mark-up on generic products may suggest that the pricing of the originator products is used as a price limit for generics (Babar et al., 2005). According to the WHO/HAI policy review, it is suggested to adopt regressive mark-ups rather than fixed percentage mark-ups as they are likely to produce better results, as being practised in China, South Africa, Lithuania, Denmark, Tunisia, Syria and Lebanon (World Health Organization, 2015; Yang et al., 2010). While regressive mark-up policies could prevent excessive costs added to medicines as they pass through the supply chain, the fixed fee mark-up can significantly raise the price of otherwise low-cost medicines (Singal et al., 2011; Suh, 2011; World Health Organization, 2015).

5.5 AFFORDABILITY

According to WHO/HAI, medicines are considered affordable when the course of treatment is less than one days' wage of the LPGW or minimum wage worker (World Health Organization & Health Action International, 2008). The WHO/HAI standard treatment using originator products such as Captopril 25mg Tablet, Omeprazole 20mg Tablet, Atenolol 100mg Tablet, Simvastatin 20mg Tablet, Ceftriaxone 1g Injection and Diclofenac 50mg Tablet cost more than one days' wage, even though there was a generic equivalent available on the market. Specifically, Omeprazole 20mg Tablet cost about a week of wage of LPGW and minimum wage for one course of treatment, which is commensurate with the findings of previous studies in Malaysia and Jordan (Ahmad & Islahudin, 2018; Alefan et al., 2018; Pharmaceutical Services Programme, 2018; Yang et al., 2010).

Besides that, this study found that one-month hypertension treatments such as Captopril 25mg Tablet also cost 5.2 – 6.5 days' wages for originator products and 1.1 – 1.4 days' wages of the LPGW and minimum wage worker for generic products, similar to a previous study (Ahmad & Islahudin, 2018). This study also supported that generic products were fairly affordable compared to originator products, especially for the low-income population, consistent with other studies (Cameron et al., 2009b; Yang et al., 2010). Vice versa, originator products, especially for non-communicable diseases such as diabetes, cardiovascular disease, mental illness and cancer, were unaffordable for this population. It is known that low-income populations may seek treatment in public healthcare facilities, but some of them may seek treatment in the private sector; thus, unaffordable medicine may affect the continuity of treatment in private facilities.

Succinctly, treatment for diabetes in all baskets of medicines was less affordable for originator products than generics or biosimilars. Originator products in the WHO/HAI Basket such as Gliclazide 80mg Tablet, Insulin Glargine 300iu/3ml, Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit, Saxagliptin 5mg Tablet, and Sitagliptin 50mg and Metformin 500mg Tablet cost more than one days' wage of the LPGW and minimum worker wage. Similar findings were found for originator products for diabetes treatment in the SDG Basket such as Recombinant Synthetic Human Insulin Short Acting 100iu/ml and in the Single PRH Basket such as Insulin Aspart 30% and Insulin Aspart Protamine 70% 100iu/ml and Insulin Detemir 100iu/ml. This finding is consistent with previous studies in the Asia-Pacific region (Kaplan, 2016; Li et al., 2019; Wang et al., 2017), which found that medicines for treating chronic conditions such as diabetes were less affordable, especially for originator products, specifically for insulin products that cost 3.5 to 17.1 days' wage of China's lowest-paid government workers.

Many medicines for diabetes treatment are available as generic products, which are more affordable for the individual and the health system (Beran et al., 2018). On the other hand, new insulin products such as analogue insulin in the Single PRH Basket are usually associated with higher prices than human insulin in the SDG Basket and WHO/HAI Basket. Data from other countries showed that analogue insulin's median price was 2-fold higher than human insulin in the private sector. Across the countries, analogue insulin needs the LPGW to work for 7 days, compared to an average of 2.5-3.5 days for human insulin (Kaplan, 2016). The

affordability of the treatment becomes a challenge with the higher cost of new agents and originator products.

It is interesting to note that in the WHO/HAI Basket, NCD medicines, especially for cancer treatment, required 10 months to more than one-year' wage of the LPGW and minimum wage worker for the originator product of Trastuzumab 440mg Injection, compared to 5 – 6 months' wages for its generic equivalent. Other anticancer medicines such as Imatinib Mesylate 100mg Tablet, Gefitinib 250mg Tablet, Fluorouracil 50mg/ml and Docetaxel 40mg/ml Injection are also required up to 2 months' wage of the LPGW and minimum wage worker. Besides that, anticancer medicines in the Single PRH Basket, mostly originator products such as Rituximab 1400mg Injection, cost up to 1.5 years' wage of the LPGW and minimum wage worker. Afatinib dimaleate 30mg Tablet, Cyclophosphamide 1g Injection and Capecitabine 150mg Tablet were also shown to be less affordable when they required more than one days' and up to more than two months' wage of the LPGW and minimum wage worker. The high price of cancer medicines and associated costs may not be affordable for the lower-income population in the long term. As reported in the ACTION study, cancer disease in Southeast Asia results in more than 75.0% of patients suffering death or financial catastrophe within one year of disease (Kimman et al., 2015). This large expenditure on cancer treatments, including non-medical costs, may burden OOP payment, thus leading to catastrophic toxicity (Bhoo-Pathy et al., 2019). Globally, 150 million people suffer from financial catastrophe and become impoverished because they pay for health services (Xu et al., 2007). Despite the support from insurance coverage, patients usually experience financial hardship directly associated with the high cost of cancer treatment, particularly for new targeted cancer medicines (Kimman et al., 2015; World Health Organization, 2018).

Besides that, despite highly subsidised cancer treatment in Malaysia's public hospitals, there was still an OOP paid by patients higher than their ability to pay, which led to financial hardship for patients and their families. Thus, this cost could result in poverty, particularly for low-income patients already nearing the poverty line (Azzani et al., 2017). The unaffordable and unsustainable cost of anticancer medicines may also affect global health expenditure by restricting demand and containing spending, limiting cancer medicines' availability in many countries (World Health Organization, 2018). Therefore, a multifaceted policy approach by various stakeholders (government and pharmaceutical industries) such as efficient resource allocation, patient assisted programmes, pooled procurement, improved transparency of pricing, value-based pricing mechanism and compulsory licence issuance (Sirohi & Mathew, 2021; World Health Organization, 2018) will improve access and reduce OOP to cancer treatment.

Vaccines in the Single PRH Basket cost between 3.7 to 4.6 days' wage of the LPGW and minimum wage worker. Despite the selling price of the vaccines being relatively high and less affordable to the low-income population, these vaccines, such as HPV, PCV and MMR, were available at public health facilities and were listed in the NIP in the public sector. It is provided for free to ensure universal coverage for the population. However, to accommodate certain populations and advocate vaccine implementation, the vaccines are also available in private facilities such as private clinics. In other words, vaccines affordability is not an issue and enrolling in the NIP may have benefitted the low-income population. Vaccination in the private sector was provided for children in private schools and non-Malaysian citizens.

In a nutshell, pharmaceutical prices are dynamic and shaped by multiple stakeholders. The current free-market economy in the pharmaceutical industry does not efficiently limit medicine's cost, especially originator products protected by patents (Suh, 2011). The issue of high medicine prices with a variation among healthcare providers may become unsustainable for our healthcare system in the long term. Additionally, unregulated mark-ups may allow healthcare providers to set the medicine at any competitive price, but competition in the market fails to reduce the price. In the long run, it may affect the patients' affordability, especially the lower-income population. If medicine prices are too high or become unaffordable, patients, particularly those without insurance coverage, may be unable to obtain them, forcing them to skip treatment or incur debt (Suh, 2011). Therefore, to address the issue of medicine prices, other countries have implemented pricing strategies such as health technology assessment, generic substitution, medicine price setting, therapeutic referencing, international reference price, removing taxes and tariffs, and fixed margin (Henry & Searles, 2012). In Malaysia, since medicine prices are not regulated, introducing a national medicines policy to regulate medicine prices may stabilise unreasonable prices in the market. Consumer empowerment through various media on the effectiveness of generic medicines and making an informed choice in selecting the medicines can also be done as part of the medicine prices intervention.

5.6 STUDY LIMITATIONS

There were a few limitations in this study. Firstly, this study was voluntary and based on the consent of the private facilities. There were poor responses from private clinics in certain areas, which reduced the comprehensiveness of data collected. Besides that, most private clinics and community pharmacies were independent facilities; hence the result may not be generalisable to chain facilities. Secondly, the availability of the predetermined list of medicines was measured on the day of data collection. Therefore, medicines that were not available during data collection but may have been available on other days were not recorded. The predetermined list of medicines was dosage and strength specific; hence the alternative strength and dosage form may be available during data collection and not recorded to substitute for the unavailability of medicines. However, the result of availability indicates the real-life situation of patients when they seek treatment at healthcare facilities. Thirdly, in the current study, price comparisons with other reference countries were assessed by comparing the same products, strength and nearest pack size with products available in our country and only reference countries comparable to Malaysia were selected. Comparing medicine prices with other international reference countries is complex and needs to be cautiously interpreted. Other factors, such as medicine being sold at different strengths, pack sizes, and various modes of administration, as well as having different patent status, launch date, price category, price level, and reimbursement status with or without restrictions in different indications, sales volume, or confidential discounts, all have a significant influence on the pricing of medicines in respective countries. Future studies should consider these factors to allow fair price comparisons between countries. Lastly, affordability was calculated based on the price of medicines and may underestimate the total cost of treatment, including indirect costs such as travel, food, accommodation, loss of productivity and affected income. Furthermore, the cost of treatment also depends on the severity of the disease, whereby some patients may require multiple therapies and need more than one type of medication.

6.0 CONCLUSIONS

This study provided imperative data to comprehend the nature of the pharmaceutical chain and distribution in Malaysia as well as to serve as a baseline to guide the implementation of future pharmaceutical pricing policies. The finding of this study showed the overall average medicines availability of the WHO/HAI Basket, SDG Basket and Single PRH Basket in Malaysia was fairly high, particularly in the public sector, but low to very low in the private sector for SDG Basket and Single PRH Basket. Among three baskets of medicines, the Single PRH Basket had the lowest average medicine availability for originator products in the public and private sectors. Generally, the availability of generic products was higher in the public sector, in line with the generic dispensing and substitution promoted by the MNMP. Findings from the study also highlighted large price variations and high mark-ups for both originators and generics in the private sector for all baskets of medicines, which were contributed to by the free market business activities in Malaysia. Of note, procurement prices and selling prices for all the baskets in the private sector, were relatively higher than in reference countries. Besides that, most of the originator products for the WHO/HAI Basket, SDG Basket and Single PRH Basket, especially the oncology, antiviral and on-patent medicines, were less affordable compared to the generic products. Therefore, comprehensive policies and regulations are needed to address all these highlighted pharmaceutical price findings as observed in this study. Future studies and ongoing work can be conducted to explore other pharmaceutical price components and factors affecting pharmaceutical pricing to provide more up-to-date information and strengthen national pharmaceutical pricing strategies.

7.0 RECOMMENDATIONS

Medicines are not like other normal commodities where their supply and demand are usually determined by the healthcare practitioner rather than the consumer itself, resulting in market failure. In other words, market failure occurs when there is an information asymmetry between doctors and patients, in which patients do not have the same level of knowledge as the prescriber (Henry & Searles, 2012). Therefore, based on the study's findings and the current scenario in Malaysia, there is a need for strong regulation, strategies and comprehensive policies to address pharmaceutical matters, which correspond to the aims of the MNMP to ensure access, availability and affordability of medicines. Below are the suggestions for pharmaceutical pricing:

1. Improve medicines price transparency to promote fair pricing
 - Strengthen collaboration for price sharing with procurement centres from other agencies, such as universities and military hospitals
 - Improve collaboration with other countries to establish a price sharing platform and exchange procurement price information (e.g. Price Information Exchange for Essential Medicines (PIEmeds) initiative of WHO for WPRO region)
 - Encourage price transparency from pharmaceutical industries and providers by sharing prices from the initial level of the supply chain (Stage 1: MSP/CIF and Stage 2: Landed price), procurement and recommended selling price with the government
 - Selling prices from various healthcare providers also should be made transparent to consumers
 - Improve and update Consumer Price Guide information regularly (currently available at <https://www.pharmacy.gov.my/v2/en/apps/drug-price>) to provide more comprehensive price data for consumers and insurance providers
 - Monitor the impact of price transparency on affordability and availability of medicines, including its possible effect on differential pricing and price disparities
 - Continue to support the WHO price transparency resolution on “Improving the transparency of markets for medicines, vaccines, and other health products”
2. Improve access to medicines in public and private sectors
 - Increase the budget allocation for public procurement of high-priced but cost-effective medicines such as on-patent originators and oncology products
 - Develop innovative financing mechanisms to finance public and private sector in-patent innovator medicines
 - Strengthen the capacity to support value-based medicines and health technology assessment (HTA)
 - Revise the policies to address pharmaceutical patents' evergreening and to facilitate registration and market entry of generic products
3. Provide fair pricing by reducing price variation among supply channels
 - Reinforce Good Pharmaceutical Trade Practice (GPTP) guidelines to practice standard price and bonus schemes for all channels and healthcare providers
 - Enable GPTP to be legally binding by developing regulations and possibly enforcing non-discriminatory trade practices to harmonise the trade-in healthcare sector

4. Improve procurement efficiency to obtain fairer prices
 - Encourage private sector facilities to benchmark their price with IRP and External Reference Price (ERP)
 - Promote the use of pooled procurement, including among private-sector facilities
 - Establish a nationwide collaboration, especially in the medicine procurement system (public and private), to pool purchasing volume and maximise negotiation power
5. Mark-ups and price regulation
 - Conduct future research on price components, especially at the initial level of the supply chain (ex-manufacturer price/CIF), to understand the range of mark-up from market entry to supply chain end
 - Develop pricing strategies at appropriate levels of the supply chain and provide legal enforcement through regulations
 - Consider strategies such as using regressive mark-ups to address the excessive mark-up for the originator and generic products
 - Strengthen collaboration and involvement of stakeholders in the development of pricing mechanisms and regulations
 - Establish a Medicine Pricing Authority to advise the government on pharmaceutical pricing matters
 - Coordinate and monitor price regulation policies with other healthcare policies (e.g. health insurance, consultation fees, hospital charges) to be in line with the country's objectives
 - Develop pricing strategies to reduce the price gap between off-patent originators and generics, such as regulating brand premiums by legislation
 - Consider other mechanisms to standardise generic's price, such as price benchmarking using internal reference pricing
6. Improve the affordability of medicines in the private sector
 - Encourage health professionals to provide generic options and promote the use of generic for their patient
 - Educate the public on the availability of affordable generic medicines
 - Enhance awareness of pricing and the safety, efficacy and quality of generic products
 - Empower consumers on purchasing medicines at fair prices by educating them on medicine prices through various media

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APPENDICES

Appendix I. Appointment Letter for Data Collectors

Page 1



PEJABAT PENGARAH KANAN PERKHIDMATAN FARMASI
OFFICE OF THE SENIOR DIRECTOR OF PHARMACEUTICAL SERVICES
Kementerian Kesihatan Malaysia
Ministry of Health Malaysia
Lot 36, Jalan Universiti, Petaling Jaya
46200 SELANGOR
MALAYSIA

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Faks : 03-7968 2248
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E-mel : pejabatpkp1@moh.gov.my

Ruj. kami: KKM.600-34/5/9 (33)
Tarikh : 21 Ogos 2020

SENARAI EDARAN SEPERTI DI LAMPIRAN A

Tuan/Puan,

PELANTIKAN KETUA PEMUNGUT DATA DAN PEGAWAI PEMUNGUT DATA UNTUK KAJIAN PEMANTAUAN HARGA UBAT (KPHU) 2020-2021

Saya dengan hormatnya merujuk perkara di atas.

2. Sukacita dimaklumkan bahawa tuan/puan telah dilantik sebagai Ketua Pemungut Data dan Pegawai Pemungut Data bagi KPHU tahun 2020-2021.
3. Tahniat diucapkan di atas pelantikan tuan/puan dan diharap tuan/puan dapat memberikan kerjasama sepenuhnya dalam menjayakan KPHU ini.
4. Bersama ini disertakan terma rujukan bagi Ketua Pemungut Data dan Pegawai Pemungut Data dalam melaksanakan kajian ini seperti di **Lampiran B**. Dengan pelantikan ini, tuan/puan adalah layak mendapat 5 mata CPD dibawah kategori A11.

Sekian, terima kasih.

"BERKHIDMAT UNTUK NEGARA"

Saya yang menjalankan amanah,

(**A**)TIA BINTI (HASHIM) RPh. 1274

Pengarah
Bahagian Amalan & Perkembangan Farmasi
b/p Pengarah Kanan Perkhidmatan Farmasi
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Appendix II. Data Collection Form

Manual data collection form
(Excel format)

No.	Nama Generik	Kekuatan	Bentuk dosej	Originality	Nama Produk	No MAL	Nama Pemegang Pendaftaran Produk	Pack Size Recommended	Availability (Yes/ No)	Jumlah pek jualan	Pek	Kuantiti per pek available [OPD]	Harga Jualan [OPD] (RM)	Harga Jualan per unit [OPD] (RM)
1	Acetylsalicylic acid, glycine	100 + 45mg	Tab/cap	Original brand	Cardiprin	MAL19973065XZ	Reckitt Benckiser	30						#DIV/0!
1	Acetylsalicylic acid, glycine	100 + 45mg	Tab/cap	Generic	Glyprin	MAL20001570XZ	Duopharma Marketing	30						#DIV/0!
1	Acetylsalicylic acid, glycine	100 + 45mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
1	Acetylsalicylic acid, glycine	100 + 45mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
2	Afatinib dimaleate ^c	30 mg	Tab/cap	Original brand	Giotrif	MAL14075070AZ	Boehringer Ingelheim	28						#DIV/0!
2	Afatinib dimaleate ^c	30 mg	Tab/cap	Generic		#N/A	#N/A	28						#DIV/0!
3	Agomelatine ^c	25 mg	Tab/cap	Original brand	Valdoxan	MAL20091965AZ	Servier Malaysia	28						#DIV/0!
3	Agomelatine ^c	25 mg	Tab/cap	Generic		#N/A	#N/A	28						#DIV/0!
4	Amitriptyline ^d	25 mg	Tab/cap	Original brand	Tryptanol/ Tryptozol	#N/A	#N/A	100						#DIV/0!
4	Amitriptyline ^d	25 mg	Tab/cap	Generic		#N/A	#N/A	100						#DIV/0!
5	Amlodipine	5mg	Tab/cap	Original brand	Norvasc	MAL19970269ARZ	Pfizer	30						#DIV/0!
5	Amlodipine	5mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
5	Amlodipine	5mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
5	Amlodipine	5mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
5	Amlodipine	5mg	Tab/cap	Generic		#N/A	#N/A	30						#DIV/0!
6	Amoxicillin ^d	500 mg	Tab/cap	Original brand	Amoxil	#N/A	#N/A	100						#DIV/0!
6	Amoxicillin ^d	500 mg	Tab/cap	Generic		#N/A	#N/A	100						#DIV/0!
6	Amoxicillin ^d	500 mg	Tab/cap	Generic		#N/A	#N/A	100						#DIV/0!
6	Amoxicillin ^d	500 mg	Tab/cap	Generic		#N/A	#N/A	100						#DIV/0!
6	Amoxicillin ^d	500 mg	Tab/cap	Generic		#N/A	#N/A	100						#DIV/0!

Appendix III. Offer Letter to Facilities

Page 1



**KETUA PENGARAH KESIHATAN MALAYSIA
DIRECTOR GENERAL OF HEALTH MALAYSIA**

Kementerian Kesihatan Malaysia
Aras 12, Blok E7, Kompleks E,
Pusat Pentadbiran Kerajaan Persekutuan,
62500 PUTRAJAYA.

Tel: 03-8330 8000
Faks: 03-8899 5542
Email: arah@kkm.gov.my

Ruj Kami : (25)KKM.600-34/5/8
Tarikh : 15 Mei 2020

Ketua Pegawai Eksekutif/Pengamal Perubatan/Ahli Farmasi

YBhg. Datuk/ Dato'/ Tuan/ Puan,

**PELAWAAN MENGAMBIL BAHAGIAN DALAM KAJIAN PEMANTAUAN HARGA
UBAT (KPHU) 2020 ANJURAN KEMENTERIAN KESIHATAN MALAYSIA**

Dengan segala hormatnya saya merujuk kepada perkara di atas.

2. Untuk makluman YBhg. Datuk/ Dato'/ Tuan/ Puan, **Kajian Pemantauan Harga Ubat (KPHU)** adalah satu komitmen kerajaan yang memerlukan koordinasi dan jaringan kerjasama antara sektor awam dan swasta dengan objektif untuk pemantauan ketersediaan (*availability*), harga dan kemampuan milik (*affordability*) ubat di Malaysia. Kajian berdasarkan metodologi World Health Organization (WHO) ini telah dijalankan sejak tahun 2008 untuk memantau kemampuan mendapatkan ubat-ubatan di kalangan pengguna Malaysia.

3. Bagi pelaksanaan kajian, maklumat dari **premis kesihatan swasta** diperlukan untuk mendapatkan data harga ubat yang menyeluruh di Malaysia. Oleh yang demikian, perkongsian maklumat harga ubat borong (*wholesale*) dan runcit (*retail*)/pesakit seperti di **Lampiran A** untuk anggaran 100 jenis ubat-ubatan adalah amat diperlukan bagi menjayakan objektif KPHU. Aktiviti pungutan data tidak akan mengambil masa yang lama atau mengganggu aktiviti harian di premis kajian.

4. Sehubungan itu, Kementerian Kesihatan Malaysia (KKM) ingin menjemput YBhg. Datuk/ Dato'/ Tuan/ Puan untuk menyertai kajian ini. Penyertaan kajian adalah **SULIT** dan perkongsian data yang dikumpul adalah dalam bentuk **aggregate** sahaja tanpa menunjukkan nama premis. Dalam usaha ini, KKM berharap dapat membina satu pangkalan data harga ubat-ubatan dan menjana trend harga ubat-ubatan di Malaysia. Hasil kajian ini akan dimuat naik dalam laman web farmasi di <https://www.pharmacy.gov.my>.

5. Pegawai pemungut data akan mengaturkan tarikh dan masa yang sesuai untuk pengumpulan data dengan pihak fasiliti yang dipilih dan yang bersetuju untuk menyertai kajian ini. Ahli farmasi di premis yang terlibat adalah layak untuk mendapat 5 mata CPD dibawah kategori A11.

6. Pihak kami berharap agar pihak YBhg. Datuk/ Dato/ Tuan/ Puan dapat melengkapkan borang persetujuan penyertaan di Lampiran B. Segala maklumat yang dikumpul adalah untuk tujuan kajian sahaja.


7. Sebarang pertanyaan boleh ditujukan kepada urusetia Pn. Saliza Ibrahim di talian 03-78413245 atau e-mel saliza.ibn@moh.gov.my/ Pn. Norazfin binti A. Kadir di talian 03-78413396 atau e-mel j_norazlin@moh.gov.my untuk maklumat lanjut.

Perhatian dan kerjasama YBhg. Datuk/ Dato/ Tuan/ Puan dalam menjayakan kajian ini amatlah dihargai dan kami dahului dengan ribuan terima kasih.

Sekian, terima kasih.

" BERKHIDMAT UNTUK NEGARA "

Saya yang menjalankan amanah,


(DATUK DR. NOOR HISHAM BIN ABDULLAH)

Appendix IV. Participation Consent Form

LAMPIRAN B

Pengarah
 Bahagian Amalan dan Perkembangan Farmasi
 Kementerian Kesihatan Malaysia
 Lot 36, Jalan Universiti
 46350 Petaling Jaya, Selangor
 (U/P: Puan Saliza binti Ibrahim / Puan Norazlin binti A.Kadir)

Saya.....bersetuju mengambil bahagian dalam Kajian Pemantauan Harga Ubat 2020 dan akan memberikan kerjasama semasa proses pemungutan maklumat harga ubat-ubatan sekurang-kurangnya untuk tempoh dua tahun dari tarikh permulaan pemungutan data.

BORANG PENYERTAAN KAJIAN PEMANTAUAN HARGA UBAT	
Nama Premis dan Alamat	
Nama Pengamal Perubatan/Ahli Farmasi	
No. Telefon	
No. Faks	
E-mel	

.....
 Tandatangan

.....
 Tarikh

Sila kembalikan borang Lampiran B melalui faks kepada Cawangan Pengurusan Harga Ubat di talian fax 03-79682222 atau e-mel ke saliza.ibr@moh.gov.my dan j_norazlin@moh.gov.my sebelum 27 Ogos 2020

Appendix V. Number of facilities with the medicine (No.) and availability (%), by facility type and sector for individual medicine for WHO/HAI Basket

Sector	Public										Private								Overall	
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	28	97.0	18	56.0	43	86.0	89	80.0	124	85.0
Amitriptyline 25mg Tablet	16	89.0	11	92.0	1	100.0	4	100.0	32	91.0	18	62.0	8	25.0	14	28.0	40	36.0	72	49.0
Amlodipine 5mg Tablet	15	83.0	12	100.0	1	100.0	4	100.0	32	91.0	27	93.0	25	78.0	46	92.0	98	88.0	130	89.0
Amoxicillin 500mg Capsule	10	56.0	8	67.0			0	0.0	18	53.0	17	59.0	24	75.0	12	24.0	53	48.0	71	49.0
Amoxicillin 250mg Capsule	13	72.0	10	83.0	1	100.0	4	100.0	28	80.0	12	41.0	13	41.0	5	10.0	30	27.0	58	40.0
Amoxicillin 500mg & Clavulanic acid 125mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	27	93.0	25	78.0	20	40.0	72	65.0	107	73.0
Atenolol 100mg Tablet	18	100.0	12	100.0			3	75.0	33	97.0	7	24.0	17	53.0	46	92.0	70	63.0	103	71.0
Atorvastatin 20mg Tablet	16	89.0	12	100.0	0	0.0	4	100.0	32	91.0	27	93.0	23	72.0	46	92.0	96	86.0	128	88.0
Bisoprolol 5mg Tablet	17	94.0	11	92.0	1	100.0	4	100.0	33	94.0	25	86.0	16	50.0	43	86.0	84	76.0	117	80.0
Captopril 25mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	14	48.0	3	9.0	6	12.0	23	21.0	58	40.0
Ceftriaxone 1g Injection	18	100.0	4	33.0	1	100.0	4	100.0	27	77.0	27	93.0	10	31.0	1	2.0	38	34.0	65	45.0
Cefuroxime 250mg Tablet	11	61.0	6	50.0	1	100.0	4	100.0	22	63.0	28	97.0	15	47.0	17	34.0	60	54.0	82	56.0

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name																				
Celecoxib 200mg Capsule	18	100.0			1	100.0	4	100.0	23	100.0	28	97.0	23	72.0	47	94.0	98	88.0	121	90.0
Chlorpheniramine 4mg Tablet	18	100.0	11	92.0	1	100.0	4	100.0	34	97.0	27	93.0	21	66.0	49	98.0	97	87.0	131	90.0
Ciprofloxacin 500mg Tablet	5	28.0			1	100.0	4	100.0	10	43.0	28	97.0	15	47.0	8	16.0	51	46.0	61	46.0
Ciprofloxacin 250mg Tablet	15	83.0			1	100.0	2	50.0	18	78.0	4	14.0	1	3.0	1	2.0	6	5.0	24	18.0
Clopidogrel 75mg Tablet	18	100.0	5	42.0	1	100.0	3	75.0	27	77.0	28	97.0	11	34.0	40	80.0	79	71.0	106	73.0
Diazepam 5mg Tablet	16	89.0	9	75.0			3	75.0	28	82.0	16	55.0	9	28.0	1	2.0	26	23.0	54	37.0
Diclofenac 50mg Tablet	15	83.0	12	100.0	0	0.0	3	75.0	30	86.0	22	76.0	22	69.0	49	98.0	93	84.0	123	84.0
Docetaxel 40mg/ml Injection	6	67.0					1	25.0	7	54.0	1	3.0					1	13.0	8	38.0
Doxycycline 100mg Capsule	17	94.0	12	100.0	1	100.0	4	100.0	34	97.0	27	93.0	23	72.0	11	22.0	61	55.0	95	65.0
Enalapril 10mg Tablet	11	61.0	9	75.0	0	0.0	1	25.0	21	60.0	5	17.0	3	9.0	24	48.0	32	29.0	53	36.0
Esomeprazole 20mg Tablet	4	22.0			0	0.0	1	25.0	5	22.0	17	59.0	5	16.0	28	56.0	50	45.0	55	41.0
Fluorouracil 50mg/ml Injection	5	56.0					4	100.0	9	69.0	5	17.0					5	63.0	14	67.0
Fluoxetine 20mg Capsule	15	83.0	2	17.0	0	0.0	3	75.0	20	57.0	15	52.0	0	0.0	6	12.0	21	19.0	41	28.0
Frusamide 40mg Tablet	18	100.0	11	92.0	1	100.0	4	100.0	34	97.0	27	93.0	19	59.0	42	84.0	88	79.0	122	84.0

Sector	Public										Private						Overall			
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Gefitinib 250mg Tablet	6	67.0					2	50.0	8	62.0	7	24.0			7	88.0	15	71.0		
Gliclazide 80mg Tablet	18	100.0	12	100.0	1	100.0	3	75.0	34	97.0	17	59.0	12	38.0	50	100.0	79	71.0	113	77.0
Hydrochlorothiazide 25mg Tablet	16	89.0	12	100.0	1	100.0	4	100.0	33	94.0	15	52.0	4	13.0	31	62.0	50	45.0	83	57.0
Imatinib Mesylate 100mg Tablet	6	67.0					2	50.0	8	62.0	1	3.0					1	13.0	9	43.0
Insulin Glargine 300iu/3ml	12	67.0	11	92.0	1	100.0	3	75.0	27	77.0	19	66.0	3	9.0	13	26.0	35	32.0	62	42.0
Loratadine 10mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	23	79.0	22	69.0	49	98.0	94	85.0	129	88.0
Mefenamic acid 250mg Capsule	18	100.0	11	92.0	1	100.0	4	100.0	34	97.0	13	45.0	14	44.0	40	80.0	67	60.0	101	69.0
Metformin 500mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	24	83.0	24	75.0	49	98.0	97	87.0	132	90.0
Metoprolol 100mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	19	66.0	5	16.0	38	76.0	62	56.0	97	66.0
Omeprazole 20mg Tablet	18	100.0	10	83.0	1	100.0	4	100.0	33	94.0	20	69.0	15	47.0	46	92.0	81	73.0	114	78.0
Pantoprazole 40mg Tablet	17	94.0	10	83.0	1	100.0	4	100.0	32	91.0	27	93.0	23	72.0	48	96.0	98	88.0	130	89.0
Paracetamol 24mg/ml Suspension	11	61.0	11	92.0	1	100.0	3	75.0	26	74.0	7	24.0	5	16.0	38	76.0	50	45.0	76	52.0
Perindopril 4mg Tablet	18	100.0	12	100.0	0	0.0	4	100.0	34	97.0	12	41.0	15	47.0	47	94.0	74	67.0	108	74.0
Prednisolone 5mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	27	93.0	28	88.0	41	82.0	96	86.0	131	90.0

Sector	Public										Private						Overall			
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	17	94.0	11	92.0	0	0.0	3	75.0	31	89.0	1	3.0	0	0.0	0	0.0	1	1.0	32	22.0
Salbutamol 100mcg/dose Inhaler	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	28	97.0	19	59.0	48	96.0	95	86.0	130	89.0
Salmeterol 50mcg & Fluticasone 250mcg Inhalation	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	21	72.0	2	6.0	29	58.0	52	47.0	87	60.0
Saxagliptin 5mg Tablet	6	33.0	6	50.0	0	0.0	2	50.0	14	40.0	9	31.0	0	0.0	7	14.0	16	14.0	30	21.0
Simvastatin 20mg Tablet	6	33.0	3	25.0	1	100.0	4	100.0	14	40.0	23	79.0	18	56.0	46	92.0	87	78.0	101	69.0
Sitagliptin 50mg & Metformin 500mg Tablet	1	6.0			1	100.0	2	50.0	4	17.0	14	48.0	2	6.0	21	42.0	37	33.0	41	31.0
Sodium Valproate 200mg Enteric Coated Tablet	18	100.0	11	92.0	1	100.0	4	100.0	34	97.0	17	59.0	0	0.0	22	44.0	39	35.0	73	50.0
Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension	13	72.0	3	25.0	0	0.0	4	100.0	20	57.0	9	31.0	3	9.0	3	6.0	15	14.0	35	24.0
Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet	17	94.0	11	92.0	0	0.0	4	100.0	32	91.0	21	72.0	5	16.0	3	6.0	29	26.0	61	42.0

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Telmisartan 80mg Tablet	17	94.0	12	100.0	1	100.0	4	100.0	34	97.0	23	79.0	5	16.0	32	64.0	60	54.0	94	64.0
Telmisartan 80mg & Amlodipine 5mg Tablet					0	0.0	2	50.0	2	50.0	21	72.0	7	22.0	27	54.0	55	50.0	57	50.0
Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet	11	61.0	9	75.0			4	100.0	24	71.0	7	24.0	0	0.0	0	0.0	7	6.0	31	21.0
Trastuzumab 440mg Injection	5	56.0					0	0	5	38.0	7	24.0					7	88.0	12	57.0
Average	14	80.8	10	83.3	1	75.0	3	82.1	26	79.1	18	61.1	12	37.8	28	55.5	54	53.1	79	59.4

Av. = Availability; MOH = Ministry of Health

Appendix VI. Number of facilities with the medicine (No.) and availability (%), by facility type and sector for individual medicine for SDG Basket

Sector	Public										Private								Overall	
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	28	97.0	18	56.0	43	86.0	89	80.0	124	85.0
Amlodipine 5mg Tablet	15	83.0	12	100.0	1	100.0	4	100.0	32	91.0	27	93.0	25	78.0	46	92.0	98	88.0	130	89.0
Amoxicillin 500mg Capsule	10	56.0	8	67.0			0	0.0	18	51.0	17	59.0	24	75.0	12	24.0	53	48.0	71	49.0
Artemether 20mg & Lumefantrine 120mg Tablet	16	89.0	5	42.0	1	100.0	3	75.0	25	71.0	5	17.0	0	0.0	0	0.0	5	5.0	30	21.0
Artesunate 60mg Injection	13	72.0	4	33.0	0	0.0	4	100.0	21	60.0	2	7.0	0	0.0	0	0.0	2	2.0	23	16.0
Beclomethasone 100mcg Inhaler	11	61.0	8	67.0	0	0.0	1	25.0	20	57.0	0	0.0	2	6.0	1	2.0	3	3.0	23	16.0
Benzylpenicillin 1 mega unit (600mg) Injection	12	67.0	4	33.0	1	100.0	4	100.0	21	60.0	22	76.0	0	0.0	0	0.0	22	20.0	43	29.0
Ceftriaxone 1g Injection	18	100.0	4	33.0	1	100.0	4	100.0	27	77.0	27	93.0	10	31.0	1	2.0	38	34.0	65	45.0
Chlorhexidine Solution 5% Solution	15	83.0	9	75.0	1	100.0	3	75.0	28	80.0	8	28.0	1	3.0	4	8.0	13	12.0	41	28.0
Dexamethasone Sodium Phosphate 4mg/ml Injection	17	94.0	8	67.0	1	100.0	3	75.0	29	83.0	21	72.0	3	9.0	0	0.0	24	22.0	53	36.0

Sector	Public										Private								Overall	
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet							1	25.0	1	25.0	5	17.0	0	0.0	0	0.0	5	5.0	6	5.0
Enalapril 10mg Tablet	11	61.0	9	75.0	0	0.0	1	25.0	21	60.0	5	17.0	3	9.0	24	48.0	32	29.0	53	36.0
Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	4	22.0	7	58.0	0	0.0	1	25.0	12	34.0	1	3.0	7	22.0	46	92.0	54	49.0	66	45.0
Fluconazole 50mg Tablet	3	17.0			0	0.0	2	50.0	5	22.0	12	41.0	3	9.0	7	14.0	22	20.0	27	20.0
Fluoxetine 20mg Capsule	15	83.0	2	17.0	0	0.0	3	75.0	20	57.0	15	52.0	0	0.0	6	12.0	21	19.0	41	28.0
Folic Acid 5mg Tablet	18	100.0	12	100.0	1	100.0	3	75.0	34	97.0	25	86.0	15	47.0	43	86.0	83	75.0	117	80.0
Furosemide 40mg Tablet	18	100.0	11	92.0	1	100.0	4	100.0	34	97.0	27	93.0	19	59.0	42	84.0	88	79.0	122	84.0
Gentamicin 40mg/ml Injection	17	94.0	0	0.0	1	100.0	4	100.0	22	63.0	24	83.0	1	3.0	1	2.0	26	23.0	48	33.0
Gliclazide 80mg Tablet	18	100.0	12	100.0	1	100.0	3	75.0	34	97.0	17	59.0	12	38.0	50	100.0	79	71.0	113	77.0
Ibuprofen 200mg Tablet	18	100.0	11	92.0	1	100.0	3	75.0	33	94.0	9	31.0	7	22.0	17	34.0	33	30.0	66	45.0
Levothyroxine 50mcg Tablet	11	61.0	3	25.0	0	0.0	4	100.0	18	51.0	22	76.0	3	9.0	29	58.0	54	49.0	72	49.0

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Magnesium sulphate 50% in 10ml Injection	17	94.0	10	83.0	1	100.0	4	100.0	32	91.0	24	83.0	0	0.0	0	0.0	24	22.0	56	38.0
Metformin 500mg Tablet	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	24	83.0	24	75.0	49	98.0	97	87.0	132	90.0
Morphine 10mg Tablet	7	39.0			0	0.0	4	100.0	11	48.0	9	31.0	0	0.0	0	0.0	9	8.0	20	15.0
Nystatin 100,000iu/ml Suspension	17	94.0	10	83.0	0	0.0	4	100.0	31	89.0	25	86.0	8	25.0	18	36.0	51	46.0	82	56.0
Oral Rehydration Salt	16	89.0	11	92.0	1	100.0	4	100.0	32	91.0	25	86.0	22	69.0	45	90.0	92	83.0	124	85.0
Oxytocin 10iu/ml Injection	17	94.0	7	58.0	1	100.0	4	100.0	29	83.0	21	72.0	0	0.0	0	0.0	21	19.0	50	34.0
Paracetamol 24mg/ml Suspension	11	61.0	11	92.0	1	100.0	3	75.0	26	74.0	7	24.0	5	16.0	38	76.0	50	45.0	76	52.0
Phenytoin 100mg Capsule	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	18	62.0	0	0.0	8	16.0	26	23.0	61	42.0
Recombinant Human Erythropoietin Alpha 2000iu Injection	9	50.0			1	100.0	1	25.0	11	48.0	11	38.0	0	0.0	0	0.0	11	10.0	22	16.0

Sector	Public										Private								Overall	
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Recombinant Synthetic Human Insulin Short Acting 100iu/ml	17	94.0	12	100.0	1	100.0	3	75.0	33	94.0	5	17.0	0	0.0	1	2.0	6	5.0	39	27.0
Salbutamol 100mcg/ dose Inhaler	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	28	97.0	19	59.0	48	96.0	95	86.0	130	89.0
Simvastatin 20mg Tablet	6	33.0	3	25.0	1	100.0	4	100.0	14	40.0	23	79.0	18	56.0	46	92.0	87	78.0	101	69.0
Average	14	78.0	8	69.3	1	71.0	3	77.3	25	72.4	16	56.3	8	23.6	19	37.9	43	38.6	67	46.4

Av. = Availability; MOH = Ministry of Health

Appendix VII. Number of facilities with the medicine (No.) and availability (%), by facility type and sector for individual medicine for Single PRH Basket

Sector	Public										Private						Overall			
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Afatinib dimaleate 30mg Tablet	2	22.2			1	25.0	3	23.1	4	13.8			4	50.0	7	33.3				
Agomelatine 25mg Tablet	13	72.2			0	0.0	2	50.0	15	65.2	13	44.8	0	0.0	4	8.0	17	15.3	32	23.9
Apixaban 2.5mg Tablet	7	38.9			1	100.0	2	50.0	10	43.5	8	27.6	2	6.3	11	22.0	21	18.9	31	23.1
Artemether 20mg & Lumefantrine 120mg Tablet	16	88.9	5	41.7	1	100.0	3	75.0	25	71.4	5	17.2	0	0.0	0	0.0	5	4.5	30	20.5
Artesunate 60mg Injection	13	72.2	4	33.3	0	0.0	4	100.0	21	60.0	2	6.9	0	0.0	0	0.0	2	1.8	23	15.8
Bilastine 20mg Tablet											20	69.0	4	12.5	29	58.0	53	47.7	53	47.7
Budesonide 160 mcg & Formoterol 4.5mcg Inhalation	18	100.0	12	100.0	1	100.0	4	100.0	35	100.0	24	82.8	6	18.8	35	70.0	65	58.6	100	68.5
Capecitabine 150mg Tablet	4	44.4			0	0.0	4	30.8	4	30.8	3	10.3			3	37.5	3	37.5	7	33.3
Cyclophosphamide 1g Injection	8	88.9			4	100.0	12	92.3	12	92.3	8	27.6			8	100.0	8	100.0	20	95.2

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Dabigatran 110mg Tablet	10	55.6			0	0.0	3	75.0	13	56.5	20	69.0	4	12.5	22	44.0	46	41.4	59	44.0
Dextromethorphan 15mg/5ml, Phenylephrine 5mg/5ml & Triprolidine 1.25mg/5ml											3	10.3	2	6.3	22	44.0	27	24.3	27	24.3
Digoxin 0.25mg Tablet	16	88.9	10	83.3	1	100.0	3	75.0	30	85.7	25	86.2	1	3.1	17	34.0	43	38.7	73	50.0
Dydrogesterone 10mg Tablet	15	83.3	6	50.0	1	100.0	4	100.0	26	74.3	25	86.2	11	34.4	25	50.0	61	55.0	87	59.6
Enoxaparin Sodium 4000iu/0.4ml	13	72.2	2	16.7	1	100.0	3	75.0	19	54.3	22	75.9	0	0.0	0	0.0	22	19.8	41	28.1
Fenofibrate 145mg Tablet	16	88.9	10	83.3	1	100.0	0	0.0	27	77.1	26	89.7	5	15.6	25	50.0	56	50.5	83	56.8
Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml	10	55.6	11	91.7	1	100.0	3	75.0	25	71.4	22	75.9	5	15.6	17	34.0	44	39.6	69	47.3
Insulin Detemir 100iu/ml	8	44.4	5	41.7	1	100.0	3	75.0	17	48.6	19	65.5	1	3.1	11	22.0	31	27.9	48	32.9
Lamivudine 300mg & Abacavir Sulphate 600mg Tablet	8	44.4					1	25.0	9	41.0	1	3.4	0	0.0	0	0.0	1	0.9	10	7.5

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Leflunomide 10mg Capsule	6	33.3			0	0.0	1	25.0	7	30.4	3	10.3	0	0.0	0	0.0	3	2.7	10	7.5
Mirtazapine 15mg Tablet	17	94.4			0	0.0	4	100.0	21	91.3	14	48.3	3	9.4	12	24.0	29	26.1	50	37.3
Nilotinib 150mg Tablet	5	55.6					2	50.0	7	53.8	0	0.0					0	0.0	7	33.3
Oxycodone HCl 10mg Tablet	8	44.4			1	100.0	3	75.0	12	52.2	7	24.1	0	0.0	0	0.0	7	6.3	19	14.2
Quetiapine Fumarate 50mg Tablet	14	77.8	2	16.7	1	100.0	2	50.0	19	54.3	3	10.3	0	0.0	3	6.0	6	5.4	25	17.1
Raltegravir 400mg Tablet	9	50.0					2	50.0	11	47.8	0	0.0	0	0.0	0	0.0	0	0.0	11	8.2
Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection	13	72.2			1	100.0	4	100.0	18	78.3	17	58.6	0	0.0	4	8.0	21	18.9	39	29.1
Rituximab 1400mg Injection	4	44.4					1	25.0	5	38.5	6	20.7					6	75.0	11	52.4
Sitagliptin 50mg & Metformin 500mg Tablet	1	5.6			1	100.0	2	50.0	4	17.4	14	48.3	2	6.3	21	42.0	37	33.3	41	30.6
Telmisartan 80mg & Amlodipine 5mg Tablet					0	0.0	2	50.0	2	50.0	21	72.4	7	21.9	27	54.0	55	49.5	57	49.6

Sector	Public										Private								Overall	
	MOH Hospital		MOH Health Clinic		Military Hospital		University Hospital		All		Private Hospital		Private Clinic		Community Pharmacy		All		All	
	n = 18		n = 12		n = 1		n = 4		n = 35		n = 29		n = 32		n = 50		n = 111		n = 146	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Tenecteplase 10,000 units Injection	11	61.1			1	100.0	2	50.0	14	60.9	10	34.5	0	0.0	0	0.0	10	9.0	24	17.9
Tiotropium Bromide 2.5mg Inhalation	16	88.9	10	83.3	1	100.0	4	100.0	31	88.6	21	72.4	0	0.0	9	18.0	30	27.0	61	41.8
Tolterodine 4mg Tablet	10	55.6			1	100.0	3	75.0	14	60.9	4	13.8	1	3.1	4	8.0	9	8.1	23	17.2
Human Papillomavirus Vaccine (HPV) 9 valent											20	69.0	3	9.4	1	2.0	24	21.6	24	21.6
Human Papillomavirus Vaccine (HPV) 2 valent			4	33.3					4	33.3	3	10.3	4	12.5	0	0.0	7	6.3	11	8.9
Human Papillomavirus Vaccine (HPV) 4 valent											5	17.2	1	3.1	0	0.0	6	5.4	6	5.4
Pneumococcal Vaccine 23 valent	14	77.8			1	100.0	2	50.0	17	73.9	19	65.5	15	46.9	1	2.0	35	31.5	52	38.8
Pneumococcal Vaccine 13 valent	6	33.3					1	25.0	7	31.8	26	89.7	11	34.4	1	2.0	38	34.2	45	33.8
Pneumococcal Vaccine 10 valent							1	25.0	1	25.0	18	62.1	5	15.6	1	2.0	24	21.6	25	21.7

Sector	Public										Private								Overall	
	MOH Hospital n = 18		MOH Health Clinic n = 12		Military Hospital n = 1		University Hospital n = 4		All n = 35		Private Hospital n = 29		Private Clinic n = 32		Community Pharmacy n = 50		All n = 111		All n = 146	
Facility Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11)					1	100.0			1	100.0	24	82.8	7	21.9	1	2.0	32	28.8	33	29.5
Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix)	1	5.6	4	33.3			1	25.0	6	17.6	6	20.7	3	9.4	0	0.0	9	8.1	15	10.3
Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR)							1	25.0	1	25.0	0	0.0	0	0.0	0	0.0	0	0.0	1	0.9
Average	10	60.0	7	54.5	1	75.0	2	57.4	14	56.3	12	42.3	3	9.2	9	17.3	22	26.3	35	31.0

Av. = Availability; MOH = Ministry of Health

Appendix VIII. Medicine availability according to range, by product type and sector for WHO/HAI Basket

Availability	Range	Public		Private					
		No. Originator Product	No. Generic Product	No. Originator Product	No. Generic Product				
Absent	0.0%	1	Amoxi cillin 500mg Capsule	1	Imati nib Mesylate 100mg Tablet	1	Amoxi cillin 500mg Capsule	1	Imati nib Mesylate 100mg Tablet
		2	Amoxi cillin 250mg Capsule	2	Sal meterol 50mcg & Fluti casone 250mcg Inhalation	2	Amoxi cillin 250mg Capsule	2	Recombi nant Synthetic Human Bi phasic Iso phane Insulin 100iu/unit
		3	Atenol ol 100mg Tablet	3	Sodi um Valproate 200mg Enteric Coated Tablet	3	Docetaxel 40mg/ml Injection	3	Sodi um Valproate 200mg Enteric Coated Tablet
		4	Captopril 25mg Tablet	4	Tras ruzumab 440mg Injection	4	Pantoprazole 40mg Tablet		
		5	Diclofenac 50mg Tablet						
		6	Docetaxel 40mg/ml Injection						
		7	Doxycycline 100mg Capsule						
		8	Enal april 10mg Tablet						
		9	Esomeprazole 20mg Tablet						
		10	Fluoxetine 20mg Capsule						
		11	Frusemi de 40mg Tablet						
		12	Gli clazide 80mg Tablet						
		13	Lorata dine 10mg Tablet						
		14	Metformin 500mg Tablet						
		15	Metoprol ol 100mg Tablet						
		16	Omeprazole 20mg Tablet						
		17	Pantoprazole 40mg Tablet						
		18	Paracetamol 24mg/ml Suspension						
		19	Peri ndopril 4mg Tablet						
		20	Sal butamol 100mcg/ dose Inhaler						
		21	Simvastatin 20mg Tablet						

Availability	Range	Public		Private	
		No. Originator Product	No. Generic Product	No. Originator Product	No. Generic Product
Very low	<30.0%	1 Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	1 Esomeprazole 20mg Tablet	1 Atenolol 100mg Tablet	1 Amoxicillin 250mg Capsule
		2 Amlodipine 5mg Tablet		2 Captopril 25mg Tablet	2 Captopril 25mg Tablet
		3 Amoxicillin 500mg & Clavulanic acid 125mg Tablet		3 Ceftriaxone 1g Injection	3 Ceftriaxone 1g Injection
		4 Atorvastatin 20mg Tablet		4 Ciprofloxacin 500mg Tablet	4 Cefuroxime 250mg Tablet
		5 Bisoprolol 5mg Tablet		5 Ciprofloxacin 250mg Tablet	5 Ciprofloxacin 250mg Tablet
		6 Ceftriaxone 1g Injection		6 Diclofenac 50mg Tablet	6 Diazepam 5mg Tablet
		7 Cefuroxime 250mg Tablet		7 Doxycycline 100mg Capsule	7 Docetaxel 40mg/ml Injection
		8 Ciprofloxacin 500mg Tablet		8 Enalapril 10mg Tablet	8 Enalapril 10mg Tablet
		9 Ciprofloxacin 250mg Tablet		9 Fluoxetine 20mg Capsule	9 Esomeprazole 20mg Tablet
		10 Clopidogrel 75mg Tablet		10 Frusemide 40mg Tablet	10 Fluoxetine 20mg Capsule
		11 Insulin Glargine 300iu/3ml		11 Imatinib Mesylate 100mg Tablet	11 Insulin Glargine 300iu/3ml
		12 Sitagliptin 50mg & Metformin 500mg Tablet		12 Metoprolol 100mg Tablet	12 Salmeterol 50mcg & Fluticasone 250mcg Inhalation
		13 Telmisartan 80mg Tablet		13 Omeprazole 20mg Tablet	13 Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension
		14 Paracetamol 24 mg/ml Suspension	14 Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet		
		15 Perindopril 4mg Tablet	15 Telmisartan 80mg Tablet		
		16 Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	16 Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet		
		17 Saxagliptin 5mg Tablet			
		18 Simvastatin 20mg Tablet			

Availability	Range	Public		Private	
		No. Originator Product	No. Generic Product	No. Originator Product	No. Generic Product
Low	30.0 – 49.0%	1 Saxagliptin 5mg Tablet	1 Celecoxib 200mg Capsule	1 Amoxicillin 500mg & Clavulanic acid 125mg Tablet	1 Acetylsalicylic Acid 100mg & Glycine 45mg Tablet
		2 Trastuzumab 440mg Injection	2 Ciprofloxacin 500mg Tablet	2 Cefuroxime 250mg Tablet	2 Amitriptyline 25mg Tablet
			3 Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit Simvastatin 20mg Tablet	3 Esomeprazole 20mg Tablet	3 Amoxicillin 500mg Capsule
				4 Gliclazide 80mg Tablet	4 Bisoprolol 5mg Tablet
				5 Insulin Glargine 300iu/3ml	5 Celecoxib 200mg Capsule
				6 Loratadine 10mg Tablet	6 Ciprofloxacin 500mg Tablet
				7 Salmeterol 50mcg & Fluticasone 250mcg Inhalation	7 Doxycycline 100mg Capsule
				8 Sitagliptin 50mg & Metformin 500mg Tablet	8 Hydrochlorothiazide 25mg Tablet
				9 Sodium Valproate 200mg Enteric Coated Tablet	9 Metoprolol 100mg Tablet
				10 Telmisartan 80mg & Amlodipine 5mg Tablet	10 Paracetamol 24mg/ml Suspension
Fairly high	50.0 – 80.0%	1 Celecoxib 200mg Capsule	1 Amoxicillin 500mg Capsule	1 Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	1 Amlodipine 5mg Tablet
		2 Gefitinib 250mg Tablet	2 Amoxicillin 250mg Capsule	2 Amlodipine 5mg Tablet	2 Amoxicillin 500mg & Clavulanic acid 125mg Tablet
		3 Imatinib Mesylate 100mg Tablet	3 Ceftriaxone 1g Injection	3 Atorvastatin 20mg Tablet	3 Atenolol 100mg Tablet
		4 Telmisartan 80mg & Amlodipine 5mg Tablet	4 Cefuroxime 250mg Tablet	4 Bisoprolol 5mg Tablet	4 Atorvastatin 20mg Tablet
			5 Ciprofloxacin 250mg Tablet	5 Celecoxib 200mg Capsule	5 Clopidogrel 75mg Tablet
		6 Clopidogrel 75mg Tablet	6 Clopidogrel 75mg Tablet	6 Diclofenac 50mg Tablet	

Availability	Range	Public		Private	
		No. Originator Product	No. Generic Product	No. Originator Product	No. Generic Product
			7 Docetaxel 40mg/ml Injection	7 Metformin 500mg Tablet	7 Fluorouracil 50mg/ml Injection
			8 Enalapril 10mg Tablet	8 Salbutamol 100mcg/dose Inhaler	8 Frusemide 40mg Tablet
			9 Fluorouracil 50mg/ml Injection	9 Telmisartan 80mg Tablet	9 Gliclazide 80mg Tablet
			10 Fluoxetine 20mg Capsule		10 Lorazepam 10mg Tablet
			11 Insulin Glargine 300iu/3ml		11 Mefenamic acid 250mg Capsule
			12 Paracetamol 24mg/ml Suspension		12 Metformin 500mg Tablet
			13 Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension		13 Omeprazole 20mg Tablet
			14 Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet		14 Perindopril 4mg Tablet
					15 Salbutamol 100mcg/dose Inhaler
					16 Simvastatin 20mg Tablet
					17 Trastuzumab 440mg Injection
High	>80.0%	1 Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	1 Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	1 Gefitinib 250mg Tablet	1 Chlorpheniramine 4mg Tablet
		2 Salmeterol 50mcg & Fluticasone 250mcg Inhalation	2 Amitriptyline 25mg Tablet	2 Trastuzumab 440mg Injection	2 Pantoprazole 40mg Tablet
		3 Sodium Valproate 200mg Enteric Coated Tablet	3 Amlodipine 5mg Tablet		3 Prednisolone 5mg Tablet
			4 Amoxicillin 500mg & Clavulanic acid 125mg Tablet		

Availability	Range	Public		Private	
		No. Originator Product	No. Generic Product	No. Originator Product	No. Generic Product
			5	Atenolol 100mg Tablet	
			6	Atorvastatin 20mg Tablet	
			7	Bisoprolol 5mg Tablet	
			8	Captopril 25mg Tablet	
			9	Chlorpheniramine 4mg Tablet	
			10	Diazepam 5mg Tablet	
			11	Diclofenac 50mg Tablet	
			12	Doxycycline 100mg Capsule	
			13	Frusemide 40mg Tablet	
			14	Gliclazide 80mg Tablet	
			15	Hydrochlorothiazide 25mg Tablet	
			16	Loratadine 10mg Tablet	
			17	Mefenamic acid 250mg Capsule	
			18	Metformin 500mg Tablet	
			19	Metoprolol 100mg Tablet	
			20	Omeprazole 20mg Tablet	
			21	Pantoprazole 40mg Tablet	
			22	Perindopril 4mg Tablet	
			23	Prednisolone 5mg Tablet	
			24	Salbutamol 100mcg/ dose Inhaler	
			25	Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet	
			26	Telmisartan 80mg Tablet	

Appendix IX. Medicine availability according to range, by product type and sector for SDG Basket

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
Absent	0.0%	1	Amoxicillin 500mg Capsule	1	Phenytoin 100mg Capsule	1	Amoxicillin 500mg Capsule	1	Phenytoin 100mg Capsule
		2	Enalapril 10mg Tablet			2	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet		
		3	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet			3	Gentamicin 40mg/ml Injection		
		4	Fluconazole 50mg Tablet			4	Ibuprofen 200mg Tablet		
		5	Fluoxetine 20mg Capsule						
		6	Furosemide 40mg Tablet						
		7	Gentamicin 40mg/ml Injection						
		8	Gliclazide 80mg Tablet						
		9	Ibuprofen 200mg Tablet						
		10	Metformin 500mg Tablet						
		11	Paracetamol 24mg/ml Suspension						
		12	Salbutamol 100mcg/dose Inhaler						
		13	Simvastatin 20mg Tablet						
Very low	<30.0%	1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	1	Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet	1	Artemether 20mg & Lumefantrine 120mg Tablet	1	Beclomethasone 100mcg Inhaler
		2	Amlodipine 5mg Tablet	2	Fluconazole 50mg Tablet	2	Artesunate 60mg Injection	2	Benzylpenicillin 1 mega unit (600mg) Injection

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
		3	Ceftriaxone 1g Injection	3	Levothyroxine 50mcg Tablet	3	Ceftriaxone 1g Injection	3	Ceftriaxone 1g Injection
		4	Recombinant Human Erythropoietin Alpha 2000iu Injection			4	Enalapril 10mg Tablet	4	Chlorhexidine Solution 5% Solution
						5	Fluconazole 50mg Tablet	5	Dexamethasone Sodium Phosphate 4mg/ml Injection
						6	Fluoxetine 20mg Capsule	6	Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet
						7	Furosemide 40mg Tablet	7	Enalapril 10mg Tablet
						8	Morphine 10mg Tablet	8	Fluconazole 50mg Tablet
						9	Paracetamol 24mg/ml Suspension	9	Fluoxetine 20mg Capsule
						10	Phenytoin 100mg Capsule	10	Gentamicin 40mg/ml Injection
						11	Recombinant Human Erythropoietin Alpha 2000IU Injection	11	Levothyroxine 50mcg Tablet
						12	Recombinant Synthetic Human Insulin Short Acting 100IU/ml	12	Magnesium sulphate 50% in 10 ml Injection
						13	Simvastatin 20mg Tablet	13	Oxytocin 10iu/ml Injection
								14	Recombinant Human Erythropoietin Alpha 2000iu Injection
								15	Recombinant Synthetic Human Insulin Short Acting 100iu/ml

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
Low	30.0 - 49.0%	1	Levothyroxine 50mcg Tablet	1	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	1	Gliclazide 80mg Tablet	1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet
		2	Morphine 10mg Tablet	2	Recombinant Human Erythropoietin Alpha 2000iu Injection	2	Levothyroxine 50mcg Tablet	2	Amoxicillin 500mg Capsule
				3	Recombinant Synthetic Human Insulin Short Acting 100iu/ml			3	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet
				4	Simvastatin 20mg Tablet			4	Ibuprofen 200mg Tablet
							5	Nystatin 100,000iu/ml Suspension	
							6	Paracetamol 24mg/ml Suspension	
Fairly high	50.0 - 80.0%	1	Artemether 20mg & Lumefantrine 120mg Tablet	1	Amoxicillin 500mg Capsule	1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	1	Amlodipine 5mg Tablet
		2	Artesunate 60mg Injection	2	Beclomethasone 100mcg Inhaler	2	Amlodipine 5mg Tablet	2	Folic Acid 5mg Tablet
				3	Benzylpenicillin 1 mega unit (600mg) Injection	3	Metformin 500mg Tablet	3	Frusemide 40mg Tablet
				4	Ceftriaxone 1g Injection	4	Salbutamol 100mcg/dose Inhaler	4	Gliclazide 80mg Tablet
				5	Chlorhexidine Solution 5% Solution			5	Metformin 500mg Tablet
				6	Enalapril 10mg Tablet			6	Salbutamol 100mcg/dose Inhaler
				7	Fluoxetine 20mg Capsule			7	Simvastatin 20mg Tablet
				8	Gentamicin 40mg/ml Injection				
				9	Paracetamol 24mg/ml Suspension				

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
High	>80.0%	1	Phenytoin 100mg Capsule	1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet			1	Oral Rehydration Salt
		2	Recombinant Synthetic Human Insulin Short Acting 100iu/ml	2	Amlodipine 5mg Tablet				
				3	Dexamethasone Sodium Phosphate 4mg/ml Injection				
				4	Folic Acid 5mg Tablet				
				5	Furosemide 40mg Tablet				
				6	Gliclazide 80mg Tablet				
				7	Ibuprofen 200mg Tablet				
				8	Magnesium sulphate 50% in 10 ml Injection				
				9	Metformin 500mg Tablet				
				10	Nystatin 100,000iu/ml Suspension				
				11	Oral Rehydration Salt				
				12	Oxytocin 10iu/ml Injection				
				13	Salbutamol 100mcg/dose Inhaler				

Appendix X. Medicine availability according to range, by product type and sector for Single PRH Basket

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
Absent	0.0%					1	Nilotinib 150mg Tablet		
						2	Raltegravir 400mg Tablet		
						3	Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR)		
Very low	<30.0%	1	Afatinib dimaleate 30mg Tablet			1	Agomelatine 25mg Tablet	1	Dextromethorphan 15mg/5ml, Phenylephrine 5mg/5ml & Triprolidine 1.25mg/5ml
		2	Sitagliptin 50mg & Metformin 500mg Tablet			2	Apixaban 2.5mg Tablet		
		3	Pneumococcal Vaccine 10 valent			3	Artemether 20mg & Lumefantrine 120mg Tablet		
		4	Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix)			4	Artesunate 60mg Injection		
		5	Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR)			5	Enoxaparin Sodium 4000iu/0.4ml		
						6	Insulin Detemir 100iu/ml		
						7	Lamivudine 300mg & Abacavir Sulphate 600mg Tablet		

Availability	Range	Public		Private	
		No.	Originator Product	No.	Generic Product
				8	Leflunomide 10mg Capsule
				9	Mirtazapine 15mg Tablet
				10	Oxycodone HCl 10mg Tablet
				11	Quetiapine Fumarate 50mg Tablet
				12	Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection
				13	Tenecteplase 10,000 units Injection
				14	Tiotropium Bromide 2.5mg Inhalation
				15	Tolterodine 4mg Tablet
				16	Human Papillomavirus Vaccine (HPV) 9 valent
				17	Human Papillomavirus Vaccine (HPV) 2 valent
				18	Human Papillomavirus Vaccine (HPV) 4 valent
				19	Pneumococcal Vaccine 10 valent
				20	Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11)
				21	Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix)

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
Low	30.0 - 49.0%	1	Apixaban 2.5mg Tablet			1	Bilastine 20mg Tablet		
		2	Capecitabine 150mg Tablet			2	Capecitabine 150mg Tablet		
		3	Insulin Detemir 100iu/ml			3	Dabigatran 110mg Tablet		
		4	Lamivudine 300mg & Abacavir Sulphate 600mg Tablet			4	Digoxin 0.25mg Tablet		
		5	Leflunomide 10mg Capsule			5	Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml		
		6	Rituximab 1400mg Injection			6	Sitagliptin 50mg & Metformin 500mg Tablet		
		7	Human Papillomavirus Vaccine (HPV) 2 valent			7	Pneumococcal Vaccine 23 valent		
		8	Pneumococcal Vaccine 13 valent			8	Pneumococcal Vaccine 13 valent		
Fairly high	50.0 - 80.0%	1	Agomelatine 25mg Tablet			1	Afatinib dimaleate 30mg Tablet		
		2	Artemether 20mg & Lumefantrine 120mg Tablet			2	Budesonide 160mcg & Formoterol 4.5mcg Inhalation		
		3	Artesunate 60mg Injection			3	Dydrogesterone 10mg Tablet		
		4	Dabigatran 110mg Tablet			4	Fenofibrate 145mg Tablet		
		5	Dydrogesterone 10mg Tablet			5	Rituximab 1400mg Injection		
		6	Enoxaparin Sodium 4000iu/0.4ml			6	Telmisartan 80mg & Amlodipine 5mg Tablet		

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
		7	Fenofibrate 145mg Tablet						
		8	Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml						
		9	Nilotinib 150mg Tablet						
		10	Oxycodone HCl 10mg Tablet						
		11	Quetiapine Fumarate 50mg Tablet						
		12	Raltegravir 400mg Tablet						
		13	Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection						
		14	Telmisartan 80mg & Amlodipine 5mg Tablet						
		15	Tenecteplase 10,000 units Injection						
		16	Tolterodine 4mg Tablet						
		17	Pneumococcal Vaccine 23 valent						
High	>80.0%	1	Budesonide 160 mcg & Formoterol 4.5mcg Inhalation			1	Cyclophosphamide 1g Injection		
		2	Cyclophosphamide 1g Injection						
		3	Digoxin 0.25mg Tablet						

Availability	Range	Public				Private			
		No.	Originator Product	No.	Generic Product	No.	Originator Product	No.	Generic Product
		4	Mirtazapine 15mg Tablet						
		5	Tiotropium Bromide 2.5mg Inhalation						
		6	Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11)						

Appendix XI. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the public sector for WHO/HAI Basket

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	1	25.0	3	75.0	1	3.0	34	97.0
Amitriptyline 25mg Tablet			16	89.0			11	92.0			1	100.0			4	100.0			32	91.0
Amlodipine 5mg Tablet	0	0.0	15	83.0	0	0.0	12	100.0	1	100	0	0.0	0	0.0	4	100.0	1	3.0	31	89.0
Amoxicillin 500mg Capsule	0	0.0	10	56.0	0	0.0	8	67.0					0	0.0	0	0.0	0	0.0	18	53.0
Amoxicillin 250mg Capsule	0	0.0	13	72.0	0	0.0	10	83.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	28	80.0
Amoxicillin 500mg & Clavulanic acid 125mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	1	25.0	3	75.0	1	3.0	34	97.0
Atenolol 100mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0					0	0.0	3	75.0	0	0.0	33	97.0
Atorvastatin 20mg Tablet	0	0.0	16	89.0	0	0.0	12	100.0	0	0.0	0	0.0	1	25.0	4	100.0	1	3.0	32	91.0
Bisoprolol 5mg Tablet	0	0.0	17	94.0	0	0.0	11	92.0	1	100	0	0.0	2	50.0	2	50.0	3	9.0	30	86.0
Captopril 25mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0
Ceftriaxone 1g Injection	0	0.0	18	100.0	0	0.0	4	33.0	1	100	1	100.0	0	0.0	4	100.0	1	3.0	27	77.0
Cefuroxime 250mg Tablet	0	0.0	11	61.0			6	50.0	1	100	0	0.0	0	0.0	4	100.0	1	3.0	21	60.0
Celecoxib 200mg Capsule	13	72.0	5	28.0					1	100	0	0.0	2	50.0	2	50.0	16	70.0	7	30.0
Chlorpheniramine 4mg Tablet			18	100.0			11	92.0			1	100.0			4	100.0			34	97.0
Ciprofloxacin 500mg Tablet	2	11.0	3	17.0					1	100	0	0.0	0	0.0	4	100.0	3	13.0	7	30.0
Ciprofloxacin 250mg Tablet	0	0.0	15	83.0					1	100	0	0.0	1	25.0	1	25.0	2	9.0	16	70.0

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Clopidogrel 75mg Tablet	0	0.0	18	100.0	0	0.0	5	42.0	1	100	0	0.0	2	50.0	3	75.0	3	9.0	26	74.0
ODiazepam 5mg Tablet	0	0.0	16	89.0	0	0.0	9	75.0					0	0.0	3	75.0			28	82.0
Diclofenac 50mg Tablet	0	0.0	15	83.0	0	0.0	12	100.0	0	0.0	0	0.0	0	0.0	3	75.0	0	0.0	30	86.0
Docetaxel 40mg/ml Injection	0	0.0	6	67.0									0	0.0	1	25.0	0	0.0	7	54.0
Doxycycline 100mg Capsule	0	0.0	17	94.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	34	97.0
Enalapril 10mg Tablet	0	0.0	11	61.0	0	0.0	9	75.0	0	0.0	0	0.0	0	0.0	1	25.0	0	0.0	21	60.0
Esomeprazole 20mg Tablet	0	0.0	4	22.0					0	0.0	0	0.0	0	0.0	1	25.0	0	0.0	5	22.0
Fluorouracil 50mg/ml Injection			5	56.0										4	100.0				9	69.0
Fluoxetine 20mg Capsule	0	0.0	15	83.0	0	0.0	2	17.0	0	0.0	0	0.0	0	0.0	3	75.0	0	0.0	20	57.0
Frusamide 40mg Tablet	0	0.0	18	100.0	0	0.0	11	92.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	34	97.0
Gefitinib 250mg Tablet	6	67.0											2	50.0			8	62.0		
Gliclazide 80mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	3	75.0	0	0.0	34	97.0
Hydrochlorothiazide 25mg Tablet			16	89.0			12	100.0			1	100.0			4	100.0			33	94.0
Imatinib Mesylate 100mg Tablet	6	67.0	0	0.0									2	50.0	0	0.0	8	62.0	0	0.0
Insulin Glargine 300iu/3ml	0	0.0	12	67.0	0	0.0	11	92.0	1	100.0	0	0.0	2	50.0	1	25.0	3	9.0	24	69.0
Loratadine 10mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0
Mefenamic acid 250mg Capsule			18	100.0			11	92.0			1	100.0			4	100.0			34	97.0
Metformin 500mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	0.0	0	0.0	4	100.0	0	0.0	35	100.0
Metoprolol 100mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	0.0	0	0.0	4	100.0	0	0.0	35	100.0

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Omeprazole 20mg Tablet	0	0.0	18	100.0	0	0.0	10	83.0	0	0.0	1	0.0	0	0.0	4	100.0	0	0.0	33	94.0
Pantoprazole 40mg Tablet	0	0.0	17	94.0	0	0.0	10	83.0	0	0.0	1	0.0	0	0.0	4	100.0	0	0.0	32	91.0
Paracetamol 24 mg/ml Suspension	0	0.0	11	61.0	0	0.0	11	92.0	0	0.0	1	0.0	0	0.0	3	75.0	0	0.0	26	74.0
Perindopril 4mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	0	0.0	0	0.0	4	100.0	0	0.0	34	97.0
Prednisolone 5mg Tablet			18	100.0			12	100.0			1	100.0			4	100.0			35	100.0
Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	17	94.0	5	28.0	10	83.0	7	58.0	0	0.0	0	0.0	3	75.0	0	0.0	30	86.0	12	34.0
Salbutamol 100mcg/dose Inhaler	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0
Salmeterol 50mcg & Fluticasone 250mcg Inhalation	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0	0	0.0
Saxagliptin 5mg Tablet	6	33.0			6	50.0			0	0.0			2	50.0			14	40.0		
Simvastatin 20mg Tablet	0	0.0	6	33.0	0	0.0	3	25.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	14	40.0
Sitagliptin 50mg & Metformin 500mg Tablet	1	6.0							1	100.0			2	50.0			4	17.0		
Sodium Valproate 200mg Enteric Coated Tablet	18	100.0	0	0.0	11	92.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	34	97.0	0	0.0
Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension			13	72.0			3	91.0			0	0.0			4	100.0			20	57.0
Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet			17	94.0			11	92.0			0	0.0			4	100.0			32	91.0

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Telmisartan 80mg Tablet	0	0.0	17	94.0	0	0.0	12	100.0	0	0.0	1	100.0	1	25.0	3	75.0	1	3	33	94.0
Telmisartan 80mg & Amlodipine 5mg Tablet													2	50.0			2	50		
Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet			11	61.0			9	75.0							4	100.0			24	71.0
Trastuzumab 440mg Injection	5	56.0	0	0.0									0	0	0	0	5	38	0	0.0
Average	2	14.1	13	73.9	1	9.8	9	80.3	0	33.3	1	53.7	1	19.3	3	73.0	4	16.0	24	72.4

Av. = Availability; MOH = Ministry of Health

Appendix XII. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the public sector for SDG Basket

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	1	25.0	3	75.0	1	3.0	34	97.0
Amlodipine 5mg Tablet	0	0.0	15	83.0	0	0.0	12	100.0	1	100.0	0	0.0	0	0.0	4	100.0	1	3.0	31	89.0
Amoxicillin 500mg Capsule	0	0.0	10	56.0	0	0.0	8	67.0					0	0.0	0	0.0	0	0.0	18	53.0
Artemether 20mg & Lumefantrine 120mg Tablet	16	89.0			5	42.0			1	100.0			3	75.0			25	71.0		
Artesunate 60mg Injection	13	72.0			4	33.0			0	0.0			4	100.0			21	60.0		
Beclomethasone 100mcg Inhaler			11	61.0			8	67.0			0	0.0			1	25.0			20	57.0
Benzylpenicillin 1 mega unit (600mg) Injection			12	67.0			4	33.0			1	100.0			4	100.0			21	60.0
Ceftriaxone 1g Injection	0	0.0	18	100.0	0	0.0	4	33.0	1	100.0	1	100.0	0	0.0	4	100.0	1	3.0	27	77.0
Chlorhexidine Solution 5% Solution			15	83.0			9	75.0			1	100.0			3	75.0			28	80.0
Dexamethasone Sodium Phosphate 4mg/ml Injection			17	94.0			8	67.0			1	100.0			3	75.0			29	83.0
Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet															1	25.0			1	25.0
Enalapril 10mg Tablet	0	0.0	11	61.0	0	0.0	9	75.0	0	0.0	0	0.0	0	0.0	1	25.0	0	0.0	21	60.0

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet		0.0	4	22.0		0.0	7	58.0		0.0	0	0.0			1	25.0	0	0.0	12	34.0
Fluconazole 50mg Tablet	0	0.0	3	17.0		0.0			0	0.0	0	0.0	0	0.0	2	50.0	0	0.0	5	22.0
Fluoxetine 20mg Capsule	0	0.0	15	83.0	0	0.0	2	17.0	0	0.0	0	0.0	0	0.0	3	75.0	0	0.0	20	57.0
Folic Acid 5mg Tablet			18	100.0			12	100.0			1	100.0			3	75.0			34	97.0
Frusemide 40mg Tablet	0	0.0	18	100.0	0	0.0	11	0.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	34	97.0
Gentamicin 40mg/ml Injection	0	0.0	17	94.0	0	0.0	0	0.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	22	63.0
Gliclazide 80mg Tablet	0	0.0	18	100.0	0	0.0	12	0.0	0	0.0	1	100.0	0	0.0	3	75.0	0	0.0	34	97.0
Ibuprofen 200mg Tablet	0	0.0	18	100.0	0	0.0	11	0.0	0	0.0	1	100.0	0	0.0	3	75.0	0	0.0	33	94.0
Levothyroxine 50mcg Tablet	11	61.0	0	0.0	3	25.0	0	0.0	0	0.0	0	0.0	3	75.0	1	25.0	17	49.0	1	3.0
Magnesium sulphate 50% in 10ml Injection			17	94.0			10	83.0			1	100.0			4	100.0			32	91.0
Metformin 500mg Tablet	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0
Morphine 10mg Tablet	7	39.0							0	0.0			4	100.0			11	48.0		
Nystatin 100,000iu/ml Suspension			17	94.0			10	83.0	0	0.0	0	0.0	0	0.0	4	100.0			31	89.0
Oral Rehydration Salt			16	89.0			11	92.0			1	100.0			4	100.0			32	91.0
Oxytocin 10iu/ml Injection			17	94.0			7	58.0			1	100.0			4	100.0			29	83.0
Paracetamol 24mg/ml Suspension	0	0.0	11	61.0	0	0.0	11	92.0	0	0.0	1	100.0	0	0.0	3	75.0	0	0.0	26	74.0
Phenytoin 100mg Capsule	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0	0	0.0

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Product Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Recombinant Human Erythropoietin Alpha 2000iu Injection	0	0.0	9	50.0					1	100.0	0	0.0	0	0.0	1	25.0	1	4.0	10	43.0
Recombinant Synthetic Human Insulin Short Acting 100iu/ml	15	83.0	10	56.0	10	83.0	7	58.0	1	100.0	0	0.0	3	75.0	0	0.0	29	83.0	17	49.0
Salbutamol 100mcg/dose Inhaler	0	0.0	18	100.0	0	0.0	12	100.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	35	100.0
Simvastatin 20mg Tablet	0	0.0	6	33.0	0	0.0	3	25.0	0	0.0	1	100.0	0	0.0	4	100.0	0	0.0	14	40.0
Average	4	20.2	13	72.2	2	14.9	8	65.4	0	27.3	1	60.7	1	23.9	3	66.7	6	18.4	23	66.9

Av. = Availability; MOH = Ministry of Health

Appendix XIII. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the public sector for Single PRH Basket

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Product Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Afatinib dimaleate 30mg Tablet	2	22.0											1	25.0			3	23.0		
Agomelatine 25mg Tablet	13	72.0							0	0.0			2	50.0			15	65.0		
Apixaban 2.5mg Tablet	7	39.0							1	100.0			2	50.0			10	43.0		
Artemether 20mg & Lumefantrine 120mg Tablet	16	89.0			5	42.0			1	100.0			3	75.0			25	71.0		
Artesunate 60mg Injection	13	72.0			4	33.0			0	0.0			4	100.0			21	60.0		
Bilastine 20mg Tablet																				
Budesonide 160mcg & Formoterol 4.5mcg Inhalation	18	100.0			12	100.0			1	100.0			4	100.0			35	100.0		
Capecitabine 150mg Tablet	4	44.0											0	0.0			4	31.0		
Cyclophosphamide 1g Injection	8	89.0											4	100.0			12	92.0		
Dabigatran 110mg Tablet	10	56.0							0	0.0			3	75.0			13	57.0		
Dextromethorphan 15mg/5ml, Phenylephrine 5mg/5ml & Triprolidine 1.25mg/5ml																				
Digoxin 0.25mg Tablet	16	89.0			10	83.0			1	100.0			3	75.0			30	86.0		
Dydrogesterone 10mg Tablet	15	83.0			6	50.0			1	100.0			4	100.0			26	74.0		
Enoxaparin Sodium 4000iu/0.4ml	13	72.0			2	17.0			1	100.0			3	75.0			19	54.0		
Fenofibrate 145mg Tablet	16	89.0			10	83.0			1	100.0			0	0.0			27	77.0		
Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml	10	56.0			11	92.0			1	100.0			3	75.0			25	71.0		

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Product Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Insulin Detemir 100iu/ml	8	44.0			5	42.0			1	100.0			3	75.0			17	49.0		
Lamivudine 300mg & Abacavir Sulphate 600mg Tablet	8	44.0											1	25.0			9	41.0		
Leflunomide 10mg Capsule	6	33.0							0	0.0			1	25.0			7	30.0		
Mirtazapine 15mg Tablet	17	94.0							0	0.0			4	100.0			21	91.0		
Nilotinib 150mg Tablet	5	56.0											2	50.0			7	54.0		
Oxycodone HCl 10mg Tablet	8	44.0							1	100.0			3	75.0			12	52.0		
Quetiapine Fumarate 50mg Tablet	14	78.0			2	17.0			1	100.0			2	50.0			19	54.0		
Raltegravir 400mg Tablet	9	50.0											2	50.0			11	50.0		
Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection	13	72.0							1	100.0			4	100.0			18	78.0		
Rituximab 1400mg mg Injection	4	44.0											1	25.0			5	38.0		
Sitagliptin 50mg & Metformin 500mg Tablet	1	6.0							1	100.0			2	50.0			4	17.0		
Telmisartan 80mg & Amlodipine 5mg Tablet									0	0.0			2	50.0			2	50.0		
Tenecteplase 10,000 units Injection	11	61.0							1	100.0			2	50.0			14	61.0		
Tiotropium Bromide 2.5mg Inhalation	16	89.0			10	83.0			1	100.0			4	100.0			31	89.0		
Tolterodine 4mg Tablet	10	56.0							1	100.0			3	75.0			14	61.0		
Human Papillomavirus Vaccine (HPV) 9 valent																				
Human Papillomavirus Vaccine (HPV) 2 valent					4	33.0											4	33.0		

Facility Type	MOH Hospital n = 18				MOH Health Clinic n = 12				Military Hospital n = 1				University Hospital n = 4				All n = 35			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Human Papillomavirus Vaccine (HPV) 4 valent																				
Pneumococcal Vaccine 23 valent	14	78.0							1	100.0			2	50.0			17	74.0		
Pneumococcal Vaccine 13 valent	6	33.0											1	25.0			7	32.0		
Pneumococcal Vaccine 10 valent													1	25.0			1	25.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11)									1	100.0							1	100.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix)	1	6.0			4	33.0							1	25.0			6	18.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR)													1	25.0			1	25.0		
Average	10	60.0			7	54.5			1	75.0			2	57.4			14	56.3		

Av. = Availability; MOH = Ministry of Health

Appendix XIV. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the private sector for WHO/HAI Basket

Facility Type	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	27	93.0	1	3.0	12	38.0	6	19.0	39	78.0	30	60.0	78	70.0	37	33.0
Amitriptyline 25mg Tablet	0	0.0	18	62.0	0	0.0	8	25.0	0	0.0	14	28.0			40	36.0
Amlodipine 5mg Tablet	26	90.0	13	45.0	9	28.0	21	66.0	33	66.0	46	92.0	68	61.0	80	72.0
Amoxicillin 500mg Capsule	0	0.0	17	59.0	0	0.0	24	75.0	0	0.0	12	24.0	0	0.0	53	48.0
Amoxicillin 250mg Capsule	0	0.0	12	41.0	0	0.0	13	41.0	0	0.0	5	10.0	0	0.0	30	27.0
Amoxicillin 500mg & Clavulanic acid 125mg Tablet	26	90.0	19	66.0	4	13.0	25	78.0	15	30.0	9	18.0	45	41.0	62	56.0
Atenolol 100mg Tablet	1	3.0	6	21.0	0	0.0	17	53.0	2	4.0	46	92.0	3	3.0	69	62.0
Atorvastatin 20mg Tablet	23	79.0	19	66.0	4	13.0	21	66.0	31	62.0	45	90.0	58	52.0	85	77.0
Bisoprolol 5mg Tablet	22	76.0	6	21.0	6	19.0	11	34.0	43	86.0	21	42.0	71	64.0	38	34.0
Captopril 25mg Tablet	0	0.0	14	48.0	1	3.0	2	6.0	1	2.0	5	10.0	2	2.0	21	19.0
Ceftriaxone 1g Injection	25	86.0	17	59.0	1	3.0	9	28.0	0	0.0	1	2.0	26	23.0	27	24.0
Cefuroxime 250mg Tablet	28	97.0	14	48.0	5	16.0	12	38.0	15	30.0	6	12.0	48	43.0	32	29.0
Celecoxib 200mg Capsule	27	93.0	6	21.0	11	34.0	15	47.0	44	88.0	28	56.0	82	74.0	49	44.0
Chlorpheniramine 4mg Tablet			27	93.0			21	66.0			49	98.0			97	87.0
Ciprofloxacin 500mg Tablet	21	72.0	22	76.0	1	3.0	15	47.0	4	8.0	6	12.0	26	23.0	43	39.0
Ciprofloxacin 250mg Tablet	3	10.0	1	3.0	0	0.0	1	3.0	0	0.0	1	2.0	3	3.0	3	3.0
Clopidogrel 75mg Tablet	25	86.0	20	69.0	4	13.0	8	25.0	32	64.0	36	72.0	61	55.0	64	58.0
Diazepam 5mg Tablet	0	0.0	16	55.0	0	0.0	9	28.0	0	0.0	1	2.0			26	23.0
Diclofenac 50mg Tablet	6	21.0	16	55.0	1	3.0	21	66.0	9	18.0	48	96.0	16	14.0	85	77.0
Docetaxel 40mg/ml Injection	0	0.0	1	3.0									0	0.0	1	13.0

Facility Type	Private Hospital				Private Clinic				Community Pharmacy				All			
	n = 29				n = 32				n = 50				n = 111			
Product Type	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Doxycycline 100mg Capsule	10	34.0	17	59.0	0	0.0	23	72.0	0	0.0	11	22.0	10	9.0	51	46.0
Enalapril 10mg Tablet	4	14.0	1	3.0	2	6.0	1	3.0	12	24.0	17	34.0	18	16.0	19	17.0
Esomeprazole 20mg Tablet	17	59.0	0	0.0	3	9.0	3	9.0	28	56.0	1	2.0	48	43.0	4	4.0
Fluorouracil 50mg/ml Injection			5	17.0									5			63.0
Fluoxetine 20mg Capsule	13	45.0	3	10.0	0	0.0	0	0.0	4	8.0	4	8.0	17	15.0	7	6.0
Frusemide 40mg Tablet	7	24.0	22	76.0	2	6.0	18	56.0	23	46.0	34	68.0	32	29.0	74	67.0
Gefitinib 250mg Tablet	7	24.0											7	88.0		
Gliclazide 80mg Tablet	12	41.0	8	28.0	4	13.0	8	25.0	23	46.0	48	96.0	39	35.0	64	58.0
Hydrochlorothiazide 25mg Tablet			15	52.0			4	13.0			31	62.0			50	45.0
Imatinib Mesylate 100mg Tablet	1	3.0	0	0.0									1	13.0	0	0.0
Insulin Glargine 300iu/3ml	18	62.0	4	14.0	2	6.0	1	3.0	13	26.0	0	0.0	33	30.0	5	5.0
Loratadine 10mg Tablet	15	52.0	10	34.0	2	6.0	21	66.0	31	62.0	48	96.0	48	43.0	79	71.0
Mefenamic acid 250mg Capsule			13	45.0			14	44.0			40	80.0			67	60.0
Metformin 500mg Tablet	16	55.0	13	45.0	5	16.0	21	66.0	35	70.0	47	94.0	56	50.0	81	73.0
Metoprolol 100mg Tablet	12	41.0	7	24.0	1	3.0	4	13.0	8	16.0	36	72.0	21	19.0	47	42.0
Omeprazole 20mg Tablet	5	17.0	19	66.0	0	0.0	15	47.0	4	8.0	46	92.0	9	8.0	80	72.0
Pantoprazole 40mg Tablet	0	0.0	27	93.0	0	0.0	23	72.0	0	0.0	48	96.0	0	0.0	98	88.0
Paracetamol 24mg/ml Suspension	1	3.0	6	21.0	0	0.0	5	16.0	22	44.0	26	52.0	23	21.0	37	33.0
Perindopril 4mg Tablet	3	10.0	10	34.0	1	3.0	14	44.0	5	10.0	47	94.0	9	8.0	71	64.0
Prednisolone 5mg Tablet			27	93.0			28	88.0			41	82.0			96	86.0
Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	1	3.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	1	1.0	0	0.0
Salbutamol 100mcg/ dose Inhaler	26	90.0	3	10.0	14	44.0	9	28.0	48	96.0	46	92.0	88	79.0	58	52.0

Facility Type	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Salmeterol 50mcg & Fluticasone 250mcg Inhalation	21	72.0	1	3.0	1	3.0	1	3.0	29	58.0	0	0.0	51	46.0	2	2.0
Saxagliptin 5mg Tablet	9	31.0			0	0.0			7	14.0			16	14.0		
Simvastatin 20mg Tablet	9	31.0	17	59.0	3	9.0	17	53.0	15	30.0	46	92.0	27	24.0	80	72.0
Sitagliptin 50mg & Metformin 500mg Tablet	14	48.0			2	6.0			21	42.0			37	33.0		
Sodium Valproate 200mg Enteric Coated Tablet	17	59.0	0	0.0	0	0.0	0	0.0	22	44.0	0	0.0	39	35.0	0	0.0
Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension			9	31.0			3	15.0			3	5.0			15	14.0
Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet			21	72.0			5	16.0			3	6.0			29	26.0
Telmisartan 80mg Tablet	23	79.0	2	7.0	3	9.0	3	9.0	32	64.0	7	14.0	58	52.0	12	11.0
Telmisartan 80mg & Amlodipine 5mg Tablet	21	72.0			7	22.0			27	54.0			55	50.0		
Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet			7	24.0			0	0.0			0	0.0			7	6.0
Trastuzumab 440mg Injection	7	24.0	4	14.0									7	88.0	4	50.0
Average	12	42.1	11	37.7	3	8.5	11	34.8	17	33.0	23	46.2	31	32.1	43	40.7

Av. = Availability

Appendix XV. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the private sector for SDG Basket

Facility Type Product Type Generic Name	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	27	93.0	1	3.0	12	38.0	6	19.0	39	78.0	30	60.0	78	70.0	37	33.0
Amlodipine 5mg Tablet	26	90.0	13	45.0	9	28.0	21	66.0	33	66.0	46	92.0	68	61.0	80	72.0
Amoxicillin 500mg Capsule	0	0.0	17	59.0	0	0.0	24	75.0	0	0.0	12	24.0	0	0.0	53	48.0
Artemether 20mg & Lumefantrine 120mg Tablet	5	17.0			0	0.0			0	0.0			5	5.0		
Artesunate 60mg Injection	2	7.0			0	0.0			0	0.0			2	2.0		
Beclomethasone 100mcg Inhaler			0	0.0			2	6.0			1	2.0			3	3.0
Benzylpenicillin 1 mega unit (600mg) Injection			22	76.0			0	0.0			0	0.0			22	20.0
Ceftriaxone 1g Injection	25	86.0	17	59.0	1	3.0	9	28.0	0	0.0	1	2.0	26	23.0	27	24.0
Chlorhexidine Solution 5% Solution			8	28.0			1	3.0			4	8.0			13	12.0
Dexamethasone Sodium Phosphate 4mg/ml Injection			21	72.0			3	9.0			0	0.0			24	22.0
Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet			5	17.0			0	0.0			0	0.0			5	5.0
Enalapril 10mg Tablet	4	14.0	1	3.0	2	6.0	1	3.0	12	24.0	17	34.0	18	16.0	19	17.0
Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	0	0.0	1	3.0	0	0.0	7	22.0	0	0.0	46	92.0	0	0.0	54	49.0
Fluconazole 50mg Tablet	9	31.0	3	10.0	0	0.0	3	9.0	4	8.0	4	8.0	13	12.0	10	9.0
Fluoxetine 20mg Capsule	13	45.0	3	10.0	0	0.0	0	0.0	4	8.0	4	8.0	17	15.0	7	6.0
Folic Acid 5mg Tablet			25	86.0			15	47.0			43	86.0			83	75.0
Frusemide 40mg Tablet	7	24.0	22	76.0	2	6.0	18	56.0	23	46.0	34	68.0	32	29.0	74	67.0
Gentamicin 40mg/ml Injection	0	0.0	24	83.0	0	0.0	1	3.0	0	0.0	1	2.0	0	0.0	26	23.0
Gliclazide 80mg Tablet	12	41.0	8	28.0	4	13.0	8	25.0	23	46.0	48	96.0	39	35.0	64	58.0
Ibuprofen 200mg Tablet	0	0.0	9	31.0	0	0.0	7	22.0	0	0.0	17	34.0	0	0.0	33	30.0

Facility Type	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
Product Type	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Generic Name	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Levothyroxine 50mcg Tablet	22	76.0	0	0.0	3	9.0	0	0.0	28	56.0	10	20.0	53	48.0	10	9.0
Magnesium sulphate 50% in 10ml Injection			24	83.0			0	0.0			0	0.0			24	22.0
Metformin 500mg Tablet	16	55.0	13	45.0	5	16.0	21	66.0	35	70.0	47	94.0	56	50.0	81	73.0
Morphine 10mg Tablet	9	31.0			0	0.0			0	0.0			9	8.0		
Nystatin 100,000iu/ml Suspension	0	0.0	25	86.0			8	25.0			18	36.0			51	46.0
Oral Rehydration Salt			25	86.0			22	69.0			45	90.0			92	83.0
Oxytocin 10iu/ml Injection			21	72.0			0	0.0			0	0.0			21	19.0
Paracetamol 24mg/ml Suspension	1	3.0	6	21.0	0	0.0	5	16.0	22	44.0	26	52.0	23	21.0	37	33.0
Phenytoin 100mg Capsule	18	62.0	0	0.0	0	0.0	0	0.0	8	16.0	0	0.0	26	23.0	0	0.0
Recombinant Human Erythropoietin Alpha 2000iu Injection	8	28.0	6	21.0	0	0.0	0	0.0	0	0.0	0	0.0	8	7.0	6	5.0
Recombinant Synthetic Human Insulin Short Acting 100iu/ml	1	3.0	4	14.0	0	0.0	0	0.0	0	0.0	1	2.0	1	1.0	5	5.0
Salbutamol 100mcg/ dose Inhaler	26	90.0	3	10.0	14	44.0	9	28.0	48	96.0	46	92.0	88	79.0	58	52.0
Simvastatin 20mg Tablet	9	31.0	17	59.0	3	9.0	17	53.0	15	30.0	46	92.0	27	24.0	80	72.0
Average	10	34.5	11	39.5	2	7.5	7	21.7	13	25.6	18	36.5	26	23.1	37	33.0

Av. = Availability

Appendix XVI. Number of facilities with the medicine (No.) and availability (%), by product and facility type for individual medicine in the private sector for Single PRH Basket

Facility Type Product Type Generic Name	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Afatinib dimaleate 30mg Tablet	4	14.0											4	50.0		
Agomelatine 25mg Tablet	13	45.0			0	0.0			4	8.0			17	15.0		
Apixaban 2.5mg Tablet	8	28.0			2	6.0			11	22.0			21	19.0		
Artemether 20mg & Lumefantrine 120mg Tablet	5	17.0			0	0.0			0	0.0			5	5.0		
Artesunate 60mg Injection	2	7.0			0	0.0			0	0.0			2	2.0		
Bilastine 20mg Tablet	20	69.0			4	13.0			29	58.0			53	48.0		
Budesonide 160mcg & Formoterol 4.5mcg Inhalation	24	83.0			6	19.0			35	70.0			65	59.0		
Capecitabine 150mg Tablet	3	10.0											3	38.0		
Cyclophosphamide 1g Injection	8	28.0											8	100.0		
Dabigatran 110mg Tablet	20	69.0			4	13.0			22	44.0			46	41.0		
Dextromethorphan 15mg/5ml, Phenylephrine 5mg/5ml & Triprolidine 1.25mg/5ml			3	10.0			2	6			22	44.0			27	24.0
Digoxin 0.25mg Tablet	25	86.0			1	3.0			17	34.0			43	39.0		
Dydrogesterone 10mg Tablet	25	86.0			11	34.0			25	50.0			61	55.0		
Enoxaparin Sodium 4000iu/0.4ml	22	76.0			0	0.0			0	0.0			22	20.0		
Fenofibrate 145mg Tablet	26	90.0			5	16.0			25	50.0			56	50.0		
Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml	22	76.0			5	16.0			17	34.0			44	40.0		
Insulin Detemir 100IU/ml	19	66.0			1	3.0			11	22.0			31	28.0		
Lamivudine 300mg & Abacavir Sulphate 600mg Tablet	1	3.0			0	0.0			0	0.0			1	1.0		
Leflunomide 10mg Capsule	3	10.0			0	0.0			0	0.0			3	3.0		
Mirtazapine 15mg Tablet	14	48.0			3	9.0			12	24.0			29	26.0		
Nilotinib 150mg Tablet	0	0.0											0	0.0		
Oxycodone HCl 10mg Tablet	7	24.0			0	0.0			0	0.0			7	6.0		
Quetiapine Fumarate 50mg Tablet	3	10.0			0	0.0			3	6.0			6	5.0		

Facility Type	Private Hospital n = 29				Private Clinic n = 32				Community Pharmacy n = 50				All n = 111			
	Originator		Generic		Originator		Generic		Originator		Generic		Originator		Generic	
	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.	No.	Av.
Raltegravir 400mg Tablet	0	0.0			0	0.0			0	0.0			0	0.0		
Recombinant Human ErythropoietinBeta 2000iu/0.3ml Injection	17	59.0			0	0.0			4	8.0			21	19.0		
Rituximab 1400mg mg Injection	6	21.0											6	75.0		
Sitagliptin 50mg & Metformin 500mg Tablet	14	48.0			2	6.0			21	42.0			37	33.0		
Telmisartan 80mg & Amlodipine 5mg Tablet	21	72.0			7	22.0			27	54.0			55	50.0		
Tenecteplase 10,000units Injection	10	34.0			0	0.0			0	0.0			10	9.0		
Tiotropium Bromide 2.5mg Inhalation	21	72.0			0	0.0			9	18.0			30	27.0		
Tolterodine 4mg Tablet	4	14.0			1	3.0			4	8.0			9	8.0		
Human Papillomavirus Vaccine (HPV) 9 valent	20	69.0			3	9.0			1	2.0			24	22.0		
Human Papillomavirus Vaccine (HPV) 2 valent	3	10.0			4	13.0			0	0.0			7	6.0		
Human Papillomavirus Vaccine (HPV) 4 valent	5	17.0			1	3.0			0	0.0			6	5.0		
Pneumococcal Vaccine 23 valent	19	66.0			15	47.0			1	2.0			35	32.0		
Pneumococcal Vaccine 13 valent	26	90.0			11	34.0			1	2.0			38	34.0		
Pneumococcal Vaccine 10 valent	18	62.0			5	16.0			1	2.0			24	22.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11)	24	83.0			7	22.0			1	2.0			32	29.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix)	6	21.0			3	9.0			0	0.0			9	8.0		
Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR)	0	0.0			0	0.0			0	0.0			0	0.0		
Average	13	43.1	3	10.3	3	9.3	2	6.3	8	16.5	22	44.0	22	26.3	27	24.3

Av. = Availability

Appendix XVII. Medicine with procurement unit price variation ≥ 2 in the public sector, by basket and product type

No.	Generic name	No. of facilities, n	Variation (Q75/Q25)
WHO/HAI Basket			
Originator			
1	Bisoprolol 5mg Tablet	3	5.0
Single PRH Basket			
Originator			
1	Afatinib dimaleate 30mg Tablet	3	3.7

Q25 = 25th percentile; Q75 = 75th percentile

All procurement price variation for originator medicines in SDG Basket and generic medicines in the public sector were below two.

Appendix XVIII. Medicine with procurement unit price variation ≥ 2 in the private sector, by basket and product type

No.	Generic name	No. of facilities, n	Variation (Q75/Q25)
WHO/HAI Basket			
Generic			
1	Captopril 25mg Tablet	20	2.7
2	Ciprofloxacin 500mg Tablet	40	2.0
3	Clopidogrel 75mg Tablet	60	2.5
4	Pantoprazole 40mg Tablet	94	6.5
5	Paracetamol 24mg/ml Suspension	35	2.2
6	Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet	26	2.1
SDG Basket			
Originator			
1	Fluconazole 50mg Tablet	13	2.1
Generic			
1	Beclomethasone 100mcg Inhaler	3	2.6
2	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	54	2.1
3	Ibuprofen 200mg Tablet	33	8.9
4	Oxytocin 10iu/ml Injection	19	2.2
5	Paracetamol 24mg/ml Suspension	35	2.2
Single PRH Basket			
Originator			
1	Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection	21	2.1

Q25 = 25th percentile; Q75 = 75th percentile

All procurement price variation for originator medicines in WHO/HAI Basket and generic medicines in Single PRH Basket were below two.

Appendix XIX. Medicine with selling unit price variation ≥ 2 in the private sector, by basket and product type

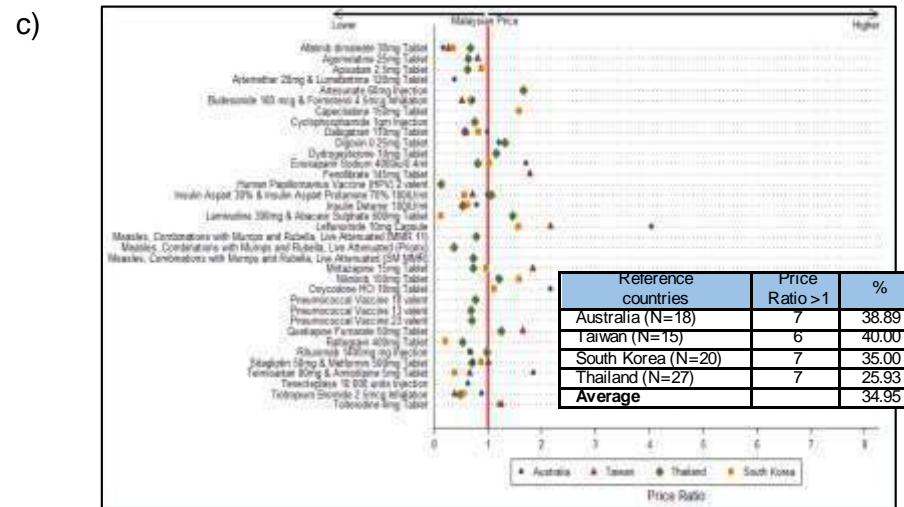
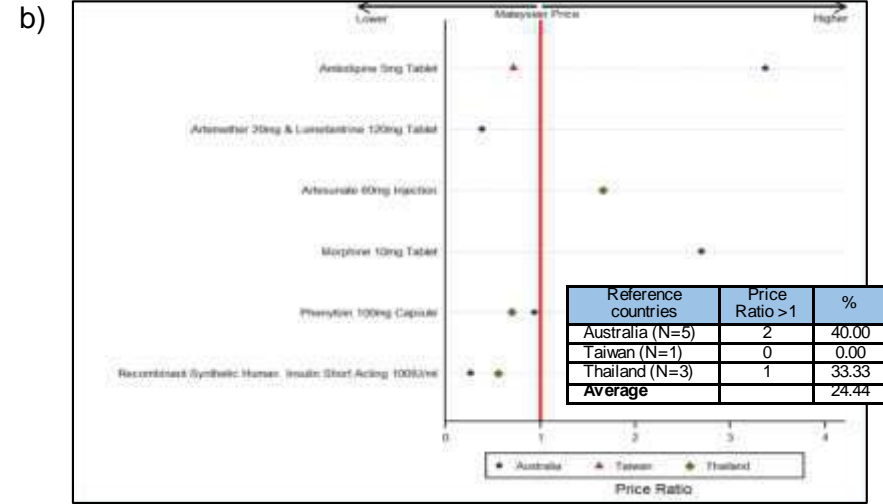
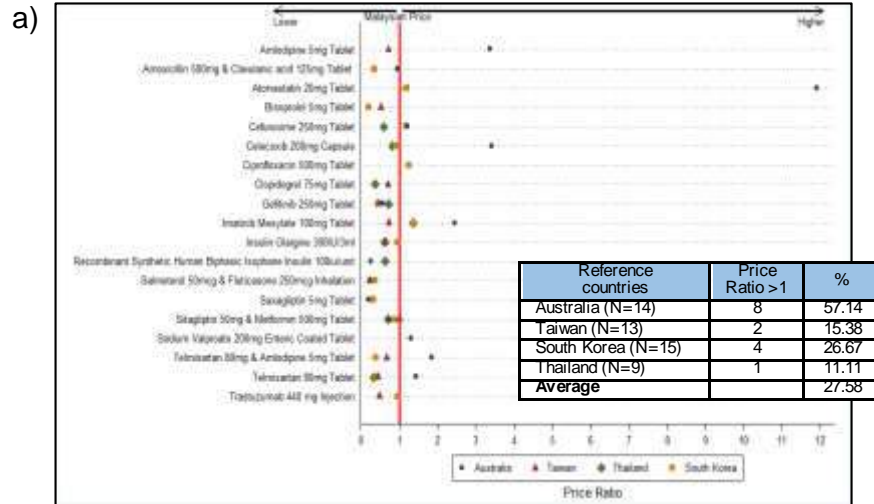
No.	Generic name	No. of facilities, n	Variation (Q75/Q25)
WHO/HAI Basket			
Generic			
1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	37	2.0
2	Amoxicillin 500mg Capsule	52	2.0
3	Captopril 25mg Tablet	21	2.0
4	Ceftriaxone 1g Injection	26	2.9
5	Chlorpheniramine 4mg Tablet	97	3.3
6	Ciprofloxacin 500mg Tablet	43	2.0
7	Diazepam 5mg Tablet	26	2.0
8	Doxycycline 100mg Capsule	51	2.0
9	Esomeprazole 20mg Tablet	4	2.3
10	Frusemide 40mg Tablet	74	2.5
11	Mefenamic acid 250mg Capsule	67	2.0
12	Metformin 500mg Tablet	81	2.4
13	Pantoprazole 40mg Tablet	97	4.4
14	Prednisolone 5mg Tablet	95	2.4
SDG Basket			
Generic			
1	Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	37	2.0
2	Amoxicillin 500mg Capsule	52	2.0
3	Beclomethasone 100mcg Inhaler	3	2.3
4	Benzylpenicillin 1 mega unit (600mg) Injection	19	2.9
5	Ceftriaxone 1g Injection	26	2.9
6	Chlorhexidine Solution 5% Solution	12	3.2
7	Ciprofloxacin 500mg Tablet	43	2.0
8	Dexamethasone Sodium Phosphate 4mg/ml Injection	21	4.1
9	Fluconazole 50mg Tablet	9	3.1
10	Folic Acid 5mg Tablet	83	2.9
11	Frusemide 40mg Tablet	74	2.5
12	Gentamicin 40mg/ml Injection	23	2.7
13	Ibuprofen 200mg Tablet	33	2.8
14	Metformin 500mg Tablet	81	2.4

No.	Generic name	No. of facilities, n	Variation (Q75/Q25)
Single PRH Basket			
Originator			
1	Digoxin 0.25mg Tablet	43	2.4

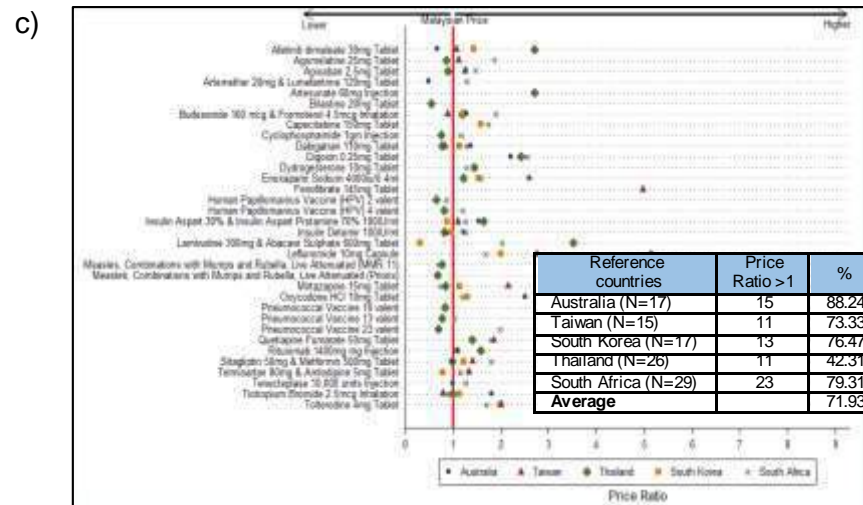
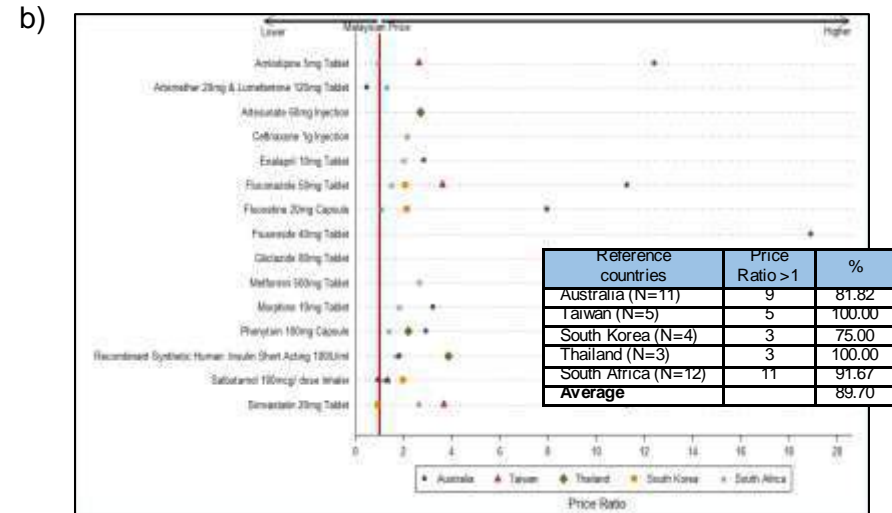
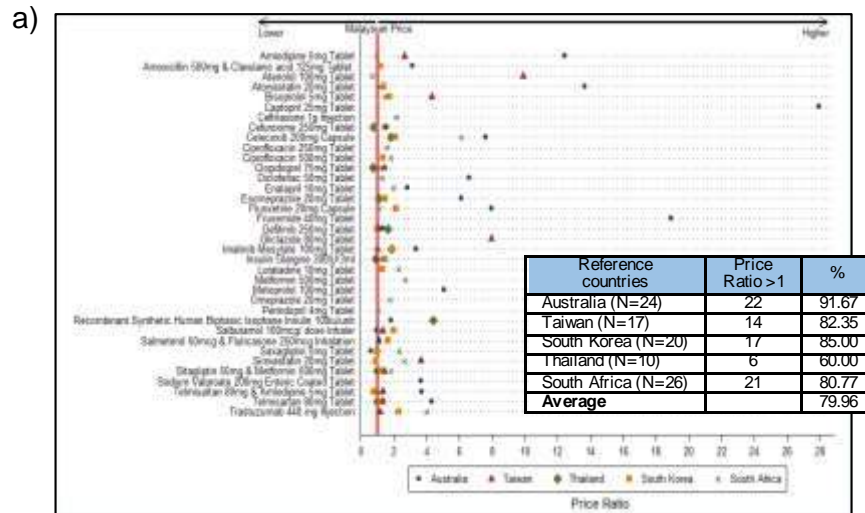
PRH = Product Registration Holder; SDG = Sustainable Development Goal; Q25 = 25th percentile; Q75 = 75th percentile; WHO/HAI = World Health Organization/Health Action International

All selling price variation for originator medicines in WHO/HAI Basket and SDG Basket and generic medicines in Single PRH Basket were below two.

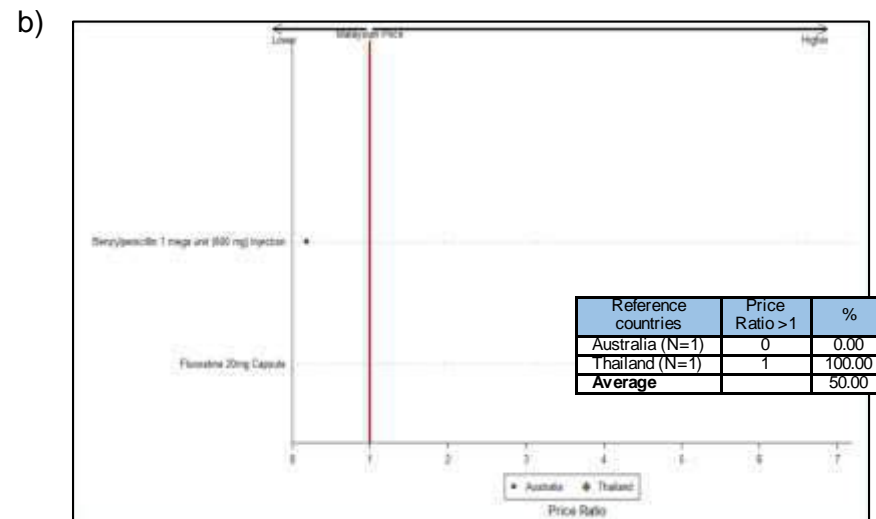
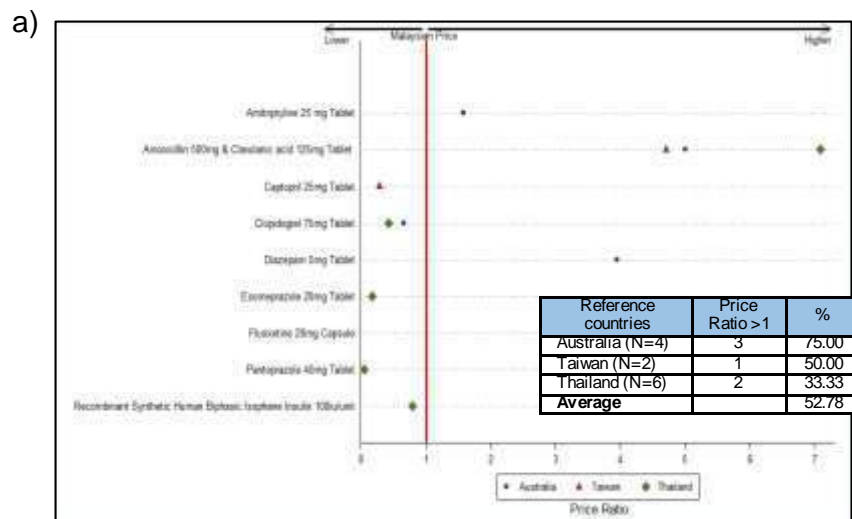
Appendix XX. Procurement Price Ratio for originator products in the public sector by basket: a) WHO/HAI Basket b) SDG Basket c) Single PRH Basket



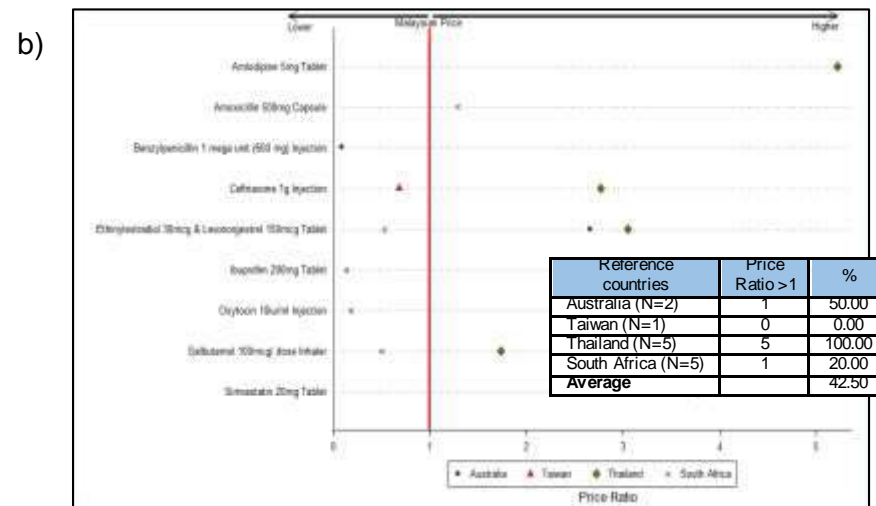
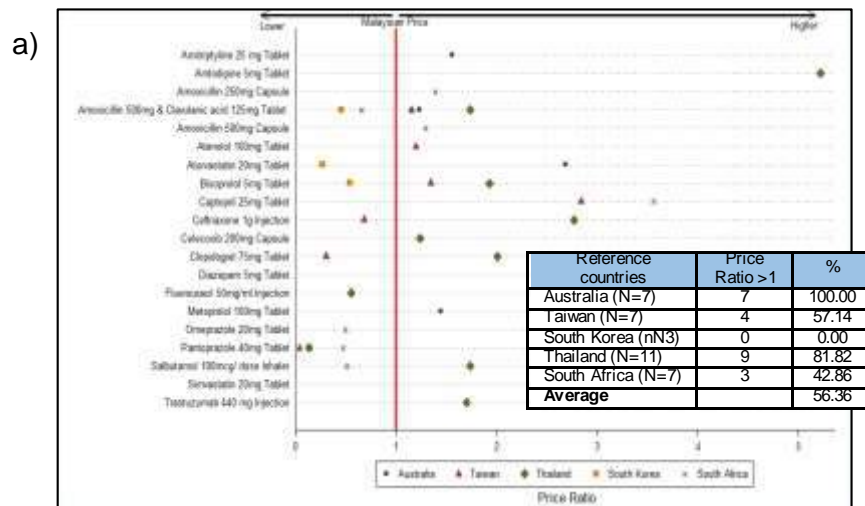
Appendix XXI. Procurement Price Ratio for originator products in the private sector by basket: a) WHO/HAI Basket b) SDG Basket c) Single PRH Basket



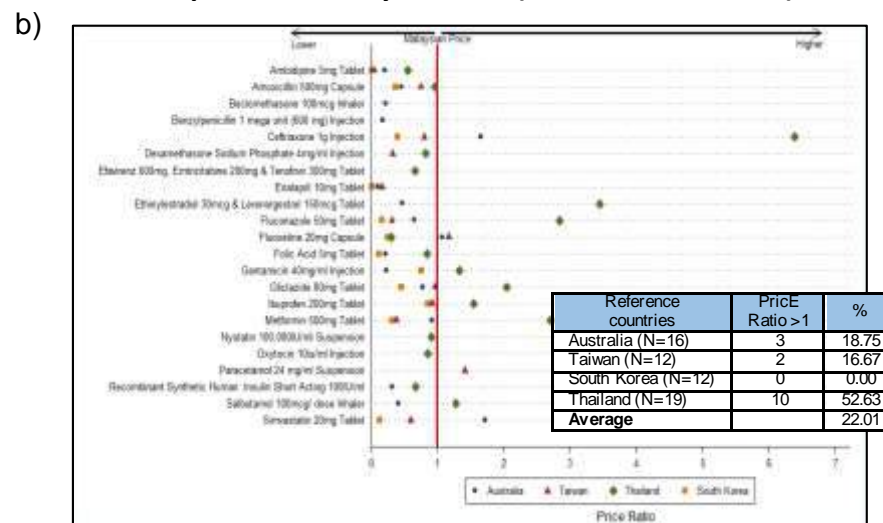
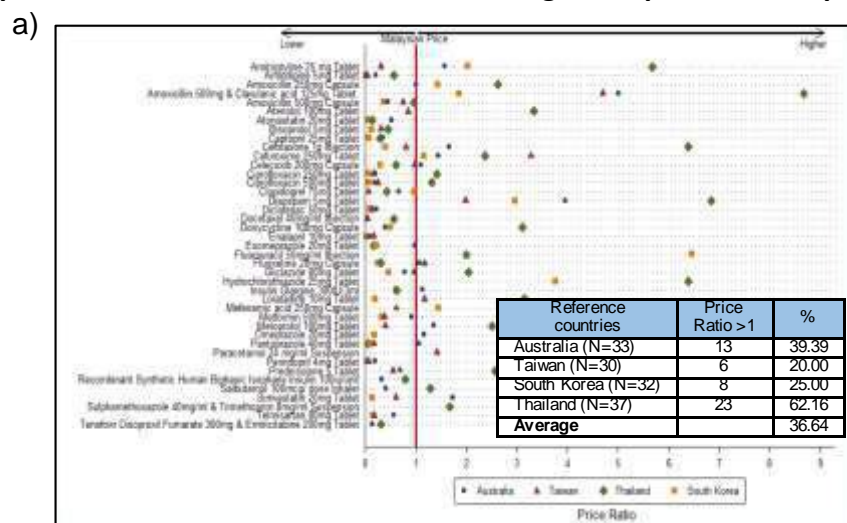
Appendix XXII. Procurement Price Ratio for generic products compared to SGB in the public sector by basket: a) WHO/HAI Basket b) SDG Basket



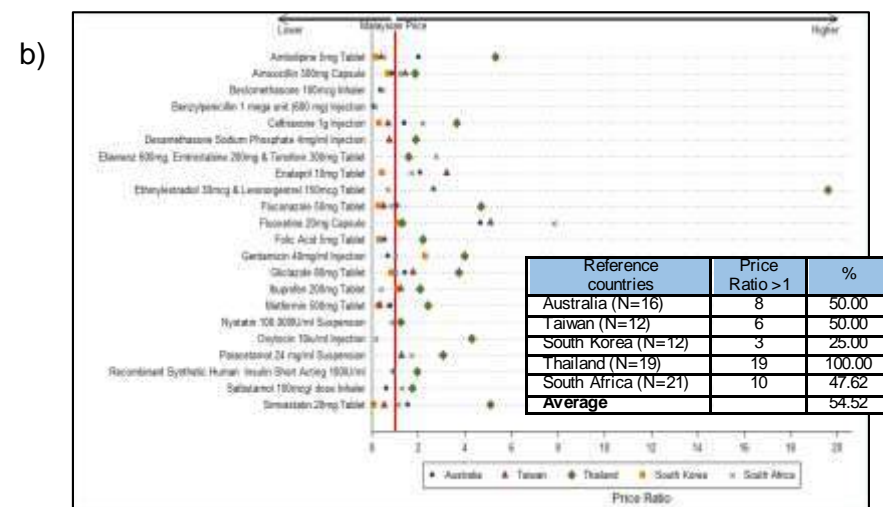
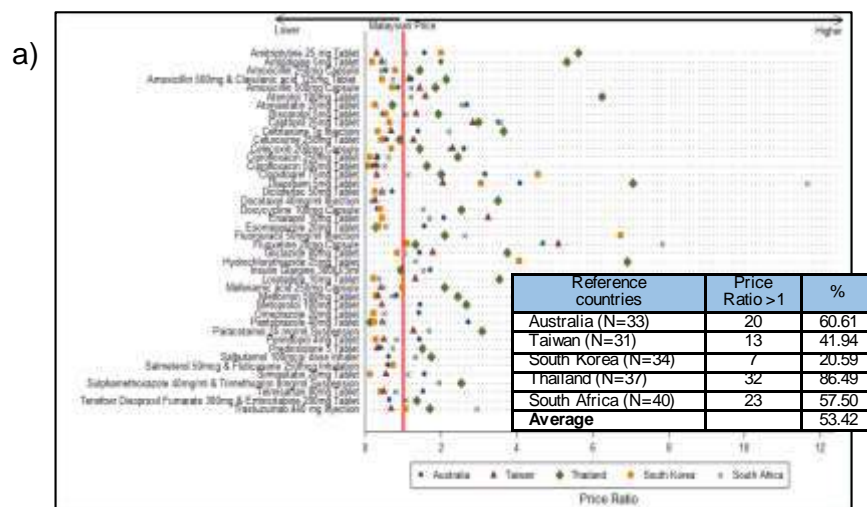
Appendix XXIII. Procurement Price Ratio for generic products compared to SGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket



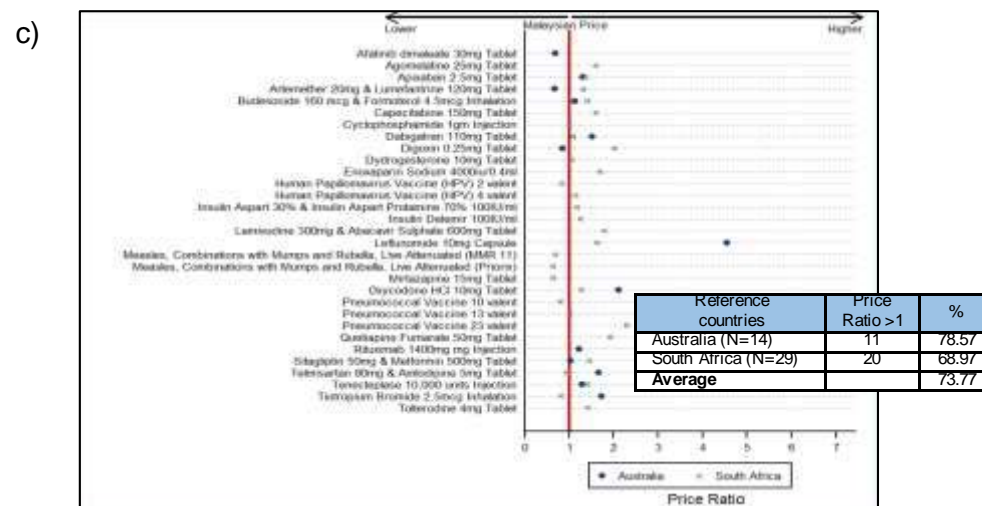
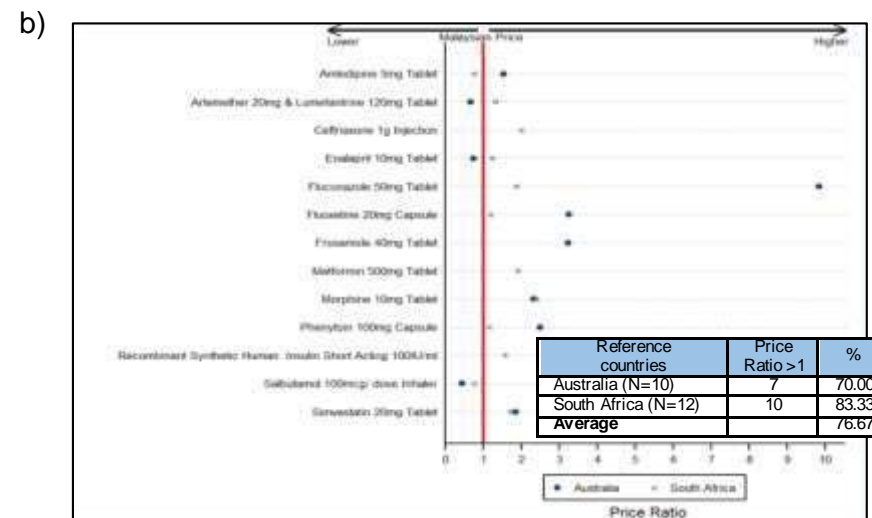
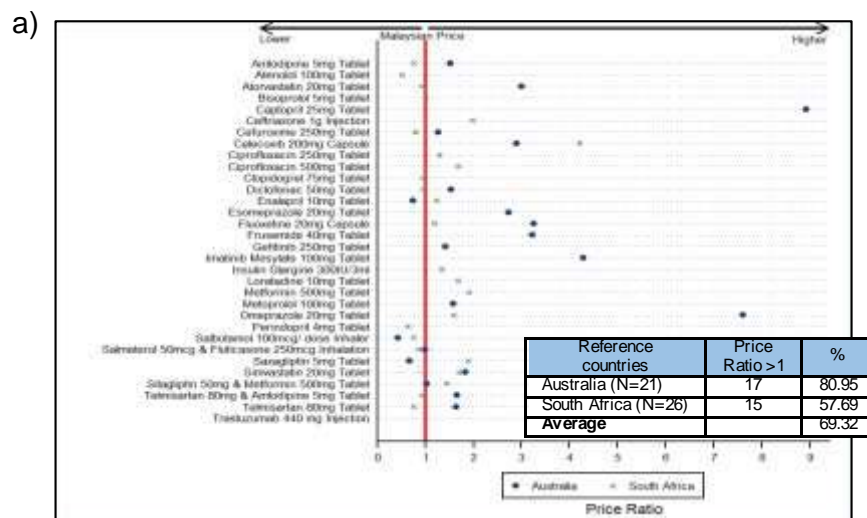
Appendix XXIV. Procurement Price Ratio for generic products compared to AGB in the public sector by basket: a) WHO/HAI Basket b) SDG Basket



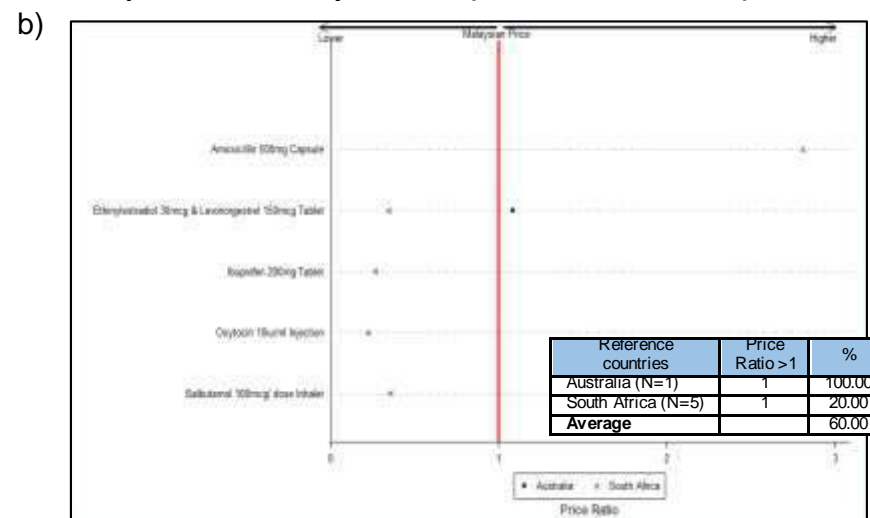
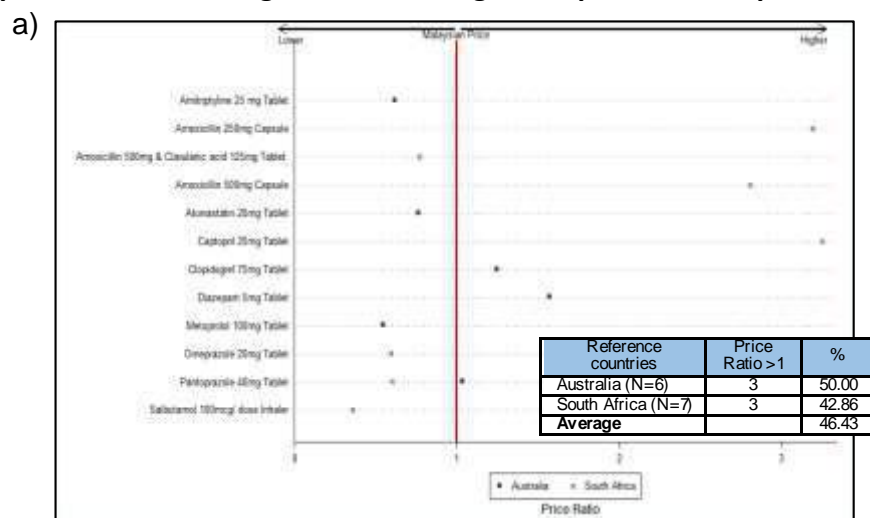
Appendix XXV. Procurement Price Ratio for generic products compared to AGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket



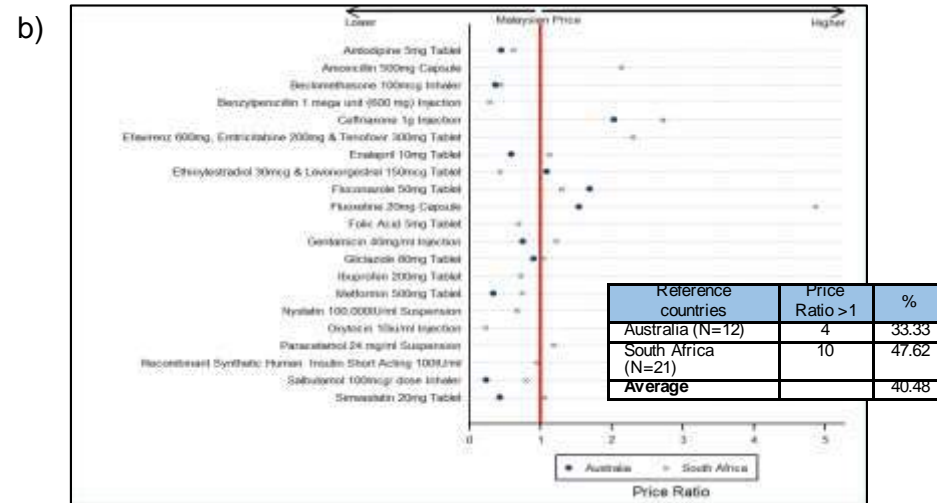
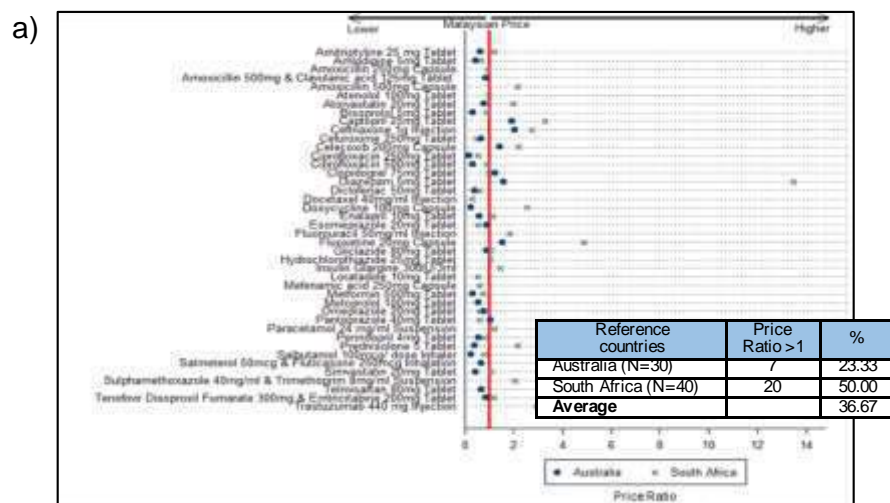
Appendix XXVI. Selling Price Ratio for originator products in the private sector by basket: a) WHO/HAI Basket b) SDG Basket c) Single PRH Basket



Appendix XXVII. Selling Price Ratio for generic products compared to SGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket



Appendix XXVIII. Selling Price Ratio for generic products compared to AGB in the private sector by basket: a) WHO/HAI Basket b) SDG Basket



Appendix XXIX. Procurement Price Ratio >1 for originator products in the public sector

No.	Generic Name	Australia	Taiwan	South Korea	Thailand
WHO/HAI Basket					
1	Amlodipine 5mg Tablet	3.4	0.7		
2	Atorvastatin 20mg Tablet	11.9	1.2	1.2	
3	Cefuroxime 250mg Tablet	1.2		1.2	0.6
4	Celecoxib 200mg Capsule	3.4		0.9	0.8
5	Ciprofloxacin 500mg Tablet			1.2	
6	Imatinib Mesylate 100mg Tablet	2.5	0.7	1.4	1.4
7	Sodium Valproate 200mg Enteric Coated Tablet	1.3			
8	Sitagliptin 50mg & Metformin 500mg Tablet	0.7	1.0	0.9	0.7
9	Telmisartan 80mg & Amlodipine 5mg Tablet	1.8	0.7	0.4	
10	Telmisartan 80mg Tablet	1.4	0.4	0.4	0.3
SDG Basket					
1	Amlodipine 5mg Tablet	3.4	0.7		
2	Artesunate 60mg Injection				1.7
3	Morphine 10mg Tablet	2.7			
Single PRH Basket					
1	Artesunate 60mg Injection				1.7
2	Capecitabine 150mg Tablet			1.6	
3	Digoxin 0.25mg Tablet	1.2			1.3
4	Dydrogesterone 10mg Tablet				1.2
5	Enoxaparin Sodium 4000iu/0.4ml	1.7		1.0	0.8
6	Fenofibrate 145mg Tablet		1.8		
7	Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml	1.0	0.7	0.6	1.1
8	Lamivudine 300mg & Abacavir Sulphate 600mg Tablet			0.1	1.5
9	Leflunomide 10mg Capsule	4.0	2.2	1.6	
10	Mirtazapine 15mg Tablet		1.8	1.0	0.7
11	Nilotinib 150mg Tablet	1.2		1.6	1.2
12	Oxycodone HCl 10mg Tablet	2.2		1.1	
13	Quetiapine Fumarate 50mg Tablet	7.8	1.6	3.6	1.2
14	Sitagliptin 50mg & Metformin 500mg Tablet	0.7	1.0	0.9	0.7
15	Telmisartan 80mg & Amlodipine 5mg Tablet	1.8	0.7	0.4	
16	Tolterodine 4mg Tablet		1.2	1.2	

PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXX. Procurement Price Ratio >1 for originator products in the private sector

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket						
1	Amlodipine 5mg Tablet	12.4	2.6			1.0
2	Amoxicillin 500mg & Clavulanic acid 125mg Tablet	3.2		1.2		
3	Atenolol 100mg Tablet		9.9			0.7
4	Atorvastatin 20mg Tablet	13.7	1.3	1.4		1.1
5	Bisoprolol 5mg Tablet		4.3	1.7		1.5
6	Captopril 25mg Tablet	27.9				
7	Ceftriaxone 1g Injection					2.1
8	Cefuroxime 250mg Tablet	1.5		1.5	0.8	0.9
9	Celecoxib 200mg Capsule	7.6		2.1	1.8	6.1
10	Ciprofloxacin 250mg Tablet					1.6
11	Ciprofloxacin 500mg Tablet			1.4		1.8
12	Clopidogrel 75mg Tablet		1.4		0.7	1.2
13	Diclofenac 50mg Tablet	6.6				1.3
14	Enalapril 10mg Tablet	2.9				2.0
15	Esomeprazole 20mg Tablet	6.1		1.5	1.1	
16	Fluoxetine 20mg Capsule	8.0		2.2		1.1
17	Fruzemide 40mg Tablet	18.9				
18	Gefitinib 250mg Tablet	1.3	1.1	1.0	1.7	
19	Gliclazide 80mg Tablet		7.9			
20	Imatinib Mesylate 100mg Tablet	3.4	1.0	1.9	1.9	
21	Insulin Glargine 300iu/3ml		0.9	1.4	0.9	1.5
22	Loratadine 10mg Tablet			1.3		2.3
23	Metformin 500mg Tablet					2.7
24	Metoprolol 100mg Tablet	5.1				
25	Omeprazole 20mg Tablet	21.5				1.8
26	Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit	1.8			4.4	
27	Salbutamol 100mcg/ dose Inhaler	0.9	1.3	2.0		1.2
28	Salmeterol 50mcg & Fluticasone 250mcg Inhalation	1.1	1.1	1.6		1.1
29	Saxagliptin 5mg Tablet	0.6	1.0	1.0		2.3
30	Simvastatin 20mg Tablet	11.3	3.7	0.9		2.6

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
31	Sitagliptin 50mg & Metformin 500mg Tablet	1.0	1.4	1.2	1.0	1.8
32	Sodium Valproate 200mg Enteric Coated Tablet	3.7				
33	Telmisartan 80mg & Amlodipine 5mg Tablet	3.7	1.3	0.8		1.2
34	Telmisartan 80mg Tablet	4.3	1.3	1.2	1.0	1.0
35	Trastuzumab 440mg Injection		1.1	2.3		4.0
SDG Basket						
1	Amlodipine 5mg Tablet	12.4	2.6			1.0
2	Artemether 20mg & Lumefantrine 120mg Tablet	0.5				1.3
3	Artesunate 60mg Injection				2.7	
4	Ceftriaxone 1g Injection					2.1
5	Enalapril 10mg Tablet	2.9				2.0
6	Fluconazole 50mg Tablet	11.3	3.6	2.1		1.5
7	Fluoxetine 20mg Capsule	8.0		2.2		1.1
8	Fruzemide 40mg Tablet	18.9				
9	Gliclazide 80mg Tablet		7.9			
10	Metformin 500mg Tablet					2.7
11	Morphine 10mg Tablet	3.2				1.8
12	Phenytoin 100mg Capsule	3.0			2.2	1.4
13	Recombinant Synthetic Human Insulin Short Acting 100iu/ml	1.8			3.9	1.7
14	Salbutamol 100mcg/ dose Inhaler	0.9	1.3	2.0		1.2
15	Simvastatin 20mg Tablet	11.3	3.7	0.9		2.6
Single PRH Basket						
1	Afatinib dimaleate 30mg Tablet	0.7	1.1	1.4	2.7	
2	Agomelatine 25mg Tablet		1.1		0.9	1.9
3	Apixaban 2.5mg Tablet	1.3	1.3		0.9	1.5
4	Artemether 20mg & Lumefantrine 120mg Tablet	0.5				1.3
5	Artesunate 60mg Injection				2.7	
6	Budesonide 160mcg & Formoterol 4.5mcg Inhalation	1.3	0.9	1.2	1.2	1.9
7	Capecitabine 150mg Tablet			1.6		1.7
8	Cyclophosphamide 1g Injection				0.8	1.2
9	Dabigatran 110mg Tablet	1.4	0.8	1.1	0.8	1.3

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
10	Digoxin 0.25mg Tablet	2.2			2.4	2.6
11	Dydrogesterone 10mg Tablet				1.5	1.3
12	Enoxaparin Sodium 4000iu/0.4ml	2.6		1.5	1.2	1.6
13	Fenofibrate 145mg Tablet		5.0			
14	Human Papillomavirus Vaccine (HPV) 4 valent				0.8	1.2
15	Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml	1.5	1.1	0.9	1.6	1.3
16	Insulin Detemir 100iu/ml	1.2	0.8	1.0	0.8	1.3
17	Lamivudine 300mg & Abacavir Sulphate 600mg Tablet			0.3	3.5	2.0
18	Leflunomide 10mg Capsule	5.2	2.8	2.0		1.7
19	Mirtazapine 15mg Tablet		2.2	1.1	0.8	0.7
20	Oxycodone HCl 10mg Tablet	2.5		1.3		1.2
21	Pneumococcal Vaccine 13 valent				0.8	1.0
22	Pneumococcal Vaccine 23 valent				0.7	2.0
23	Quetiapine Fumarate 50mg Tablet	8.8	1.9	4.1	1.4	1.8
24	Rituximab 1400mg mg Injection	1.1		1.1	1.6	
25	Sitagliptin 50mg & Metformin 500mg Tablet	1.0	1.4	1.2	1.0	1.8
26	Telmisartan 80mg & Amlodipine 5mg Tablet	3.7	1.3	0.8		1.2
27	Tenecteplase 10,000 units Injection	1.0				1.3
28	Tiotropium Bromide 2.5mcg Inhalation	1.8	0.8	1.1	1.0	0.9
29	Tolterodine 4mg Tablet		2.0	2.0		1.7

PRH = Product Registration Holder; SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXI. Procurement Price Ratio >1 for generic products compared to SGB in the public sector

No.	Generic Name	Australia	Taiwan	Thailand
WHO/HAI Basket				
1	Amitriptyline 25mg Tablet	1.6		
2	Amoxicillin 500mg & Clavulanic acid 125mg Tablet	5.0	4.7	7.1
3	Diazepam 5mg Tablet	4.0		
4	Fluoxetine 20mg Capsule			6.5
SDG Basket				
1	Fluoxetine 20mg Capsule			6.5

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXII. Procurement Price Ratio >1 for generic products compared to SGB in the private sector

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket						
1	Amitriptyline 25mg Tablet	1.6				
2	Amlodipine 5mg Tablet				5.2	
3	Amoxicillin 250mg Capsule					1.4
4	Amoxicillin 500mg & Clavulanic acid 125mg Tablet	1.2	1.2	0.5	1.7	0.7
5	Amoxicillin 500mg Capsule					1.3
6	Atenolol 100mg Tablet		1.2			
7	Atorvastatin 20mg Tablet	2.7		0.3		
8	Bisoprolol 5mg Tablet		1.4	0.5	1.9	
9	Captopril 25mg Tablet		2.8			3.6
10	Ceftriaxone 1g Injection		0.7		2.8	
11	Celecoxib 200mg Capsule				1.2	
12	Clopidogrel 75mg Tablet	3.2	0.3		2.0	
13	Diazepam 5mg Tablet	4.1				
14	Metoprolol 100mg Tablet	1.5				
15	Pantoprazole 40mg Tablet	2.7	0.1		0.1	0.5
16	Salbutamol 100mcg/ dose Inhaler				1.7	0.5
17	Simvastatin 20mg Tablet				3.8	
18	Trastuzumab 440mg Injection				1.7	
SDG Basket						
1	Amlodipine 5mg Tablet				5.2	
2	Amoxicillin 500mg Capsule					1.3
3	Ceftriaxone 1g Injection		0.7		2.8	
4	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	2.7			3.1	0.5
5	Salbutamol 100mcg/ dose Inhaler				1.7	0.5
6	Simvastatin 20mg Tablet				3.8	

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXIII. Procurement Price Ratio >1 for generic products compared to AGB in the public sector

No.	Generic Name	Australia	Taiwan	South Korea	Thailand
WHO/HAI Basket					
1	Amitriptyline 25mg Tablet	1.6	0.3	2.0	5.7
2	Amoxicillin 250mg Capsule	1.0		1.4	2.6
3	Amoxicillin 500mg & Clavulanic acid 125mg Tablet	5.0	4.7	1.9	8.7
4	Atenolol 100mg Tablet		0.8		3.3
5	Ceftriaxone 1g Injection	1.7	0.8	0.4	6.4

No.	Generic Name	Australia	Taiwan	South Korea	Thailand
6	Cefuroxime 250mg Tablet	1.5	3.3	1.2	2.4
7	Celecoxib 200mg Capsule	1.1	1.0	0.3	0.6
8	Ciprofloxacin 250mg Tablet	0.2	0.2	0.1	1.4
9	Ciprofloxacin 500mg Tablet	0.2	0.2	0.1	1.3
10	Diazepam 5mg Tablet	4.0	2.0	3.0	6.8
11	Doxycycline 100mg Capsule	0.4		0.5	3.1
12	Fluorouracil 50mg/ml Injection			6.5	2.0
13	Fluoxetine 20mg Capsule	1.1	1.2	0.3	0.3
14	Gliclazide 80mg Tablet	0.8	1.0	0.5	2.0
15	Hydrochlorothiazide 25mg Tablet			3.8	6.4
16	Insulin Glargine 300iu/3ml	1.1		0.6	0.6
17	Loratadine 10mg Tablet		1.2	0.2	3.2
18	Mefenamic acid 250mg Capsule		0.6	1.5	3.1
19	Metformin 500mg Tablet	0.9	0.4	0.3	2.7
20	Metoprolol 100mg Tablet	1.4	0.4		2.5
21	Omeprazole 20mg Tablet	1.2		0.2	7.9
22	Pantoprazole 40mg Tablet	1.1	0.2	0.1	0.1
23	Paracetamol 24mg/ml Suspension		1.4		3.4
24	Prednisolone 5mg Tablet	0.7	0.5		2.6
25	Salbutamol 100mcg/ dose Inhaler	0.4			1.3
26	Simvastatin 20mg Tablet	1.7	0.6	0.1	5.6
27	Sulphamethoxazole 40mg/ml & Trimethoprim 8mg/ml Suspension				1.7
SDG Basket					
1	Ceftriaxone 1g Injection	1.7	0.8	0.4	6.4
2	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	0.5			3.4
3	Fluconazole 50mg Tablet	0.7	0.3	0.2	2.8
4	Fluoxetine 20mg Capsule	1.1	1.2	0.3	0.3
5	Gentamicin 40mg/ml Injection	0.2		0.8	1.3
6	Gliclazide 80mg Tablet	0.8	1.0	0.5	2.0
7	Ibuprofen 200mg Tablet		0.9	0.9	1.6
8	Metformin 500mg Tablet	0.9	0.4	0.3	2.7
9	Paracetamol 24mg/ml Suspension		1.4		3.4
10	Salbutamol 100mcg/ dose Inhaler	0.4			1.3
11	Simvastatin 20mg Tablet	1.7	0.6	0.1	5.6

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXIV. Procurement Price Ratio >1 for generic products compared to AGB in the private sector

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
WHO/HAI Basket						
1	Amitriptyline 25mg Tablet	1.6	0.3	2.0	5.6	1.1
2	Amlodipine 5mg Tablet	2.0	0.4	0.2	5.3	0.5
3	Amoxicillin 250mg Capsule	0.6		0.8	1.4	0.4
4	Amoxicillin 500mg & Clavulanic acid 125mg Tablet	1.2	1.2	0.5	2.1	0.7
5	Amoxicillin 500mg Capsule	0.9	1.4	0.7	1.9	1.2
6	Atenolol 100mg Tablet		1.6		6.3	1.2
7	Atorvastatin 20mg Tablet	2.7	0.3	0.3	0.7	2.5
8	Bisoprolol 5mg Tablet	0.5	1.3	0.5	1.9	1.1
9	Captopril 25mg Tablet	3.5	2.8	0.7	3.0	3.6
10	Ceftriaxone 1g Injection	1.4	0.7	0.3	3.6	2.2
11	Cefuroxime 250mg Tablet	0.6	1.3	0.4	0.9	0.4
12	Celecoxib 200mg Capsule	2.6	2.3	0.7	1.4	2.2
13	Ciprofloxacin 250mg Tablet	0.3	0.3	0.1	2.4	0.6
14	Ciprofloxacin 500mg Tablet	0.2	0.3	0.1	1.6	0.5
15	Clopidogrel 75mg Tablet	3.2	0.3	4.6	2.0	1.1
16	Diazepam 5mg Tablet	4.1	2.0	3.1	7.1	11.6
17	Docetaxel 40mg/ml Injection		0.3		3.5	0.2
18	Doxycycline 100mg Capsule	0.3		0.4	2.5	1.5
19	Enalapril 10mg Tablet	2.1	3.2	0.5		1.7
20	Esomeprazole 20mg Tablet	1.6		0.4	0.3	0.5
21	Fluorouracil 50mg/ml Injection			6.8	2.1	2.6
22	Fluoxetine 20mg Capsule	4.7	5.1	1.1	1.3	7.8
23	Gliclazide 80mg Tablet	1.4	1.8	0.9	3.8	1.0
24	Hydrochlorothiazide 25mg Tablet			4.1	6.9	1.3
25	Insulin Glargine 300iu/3ml	1.7		0.9	0.9	1.5
26	Loratadine 10mg Tablet		1.3	0.2	3.5	0.4
27	Mefenamic acid 250mg Capsule		0.4	1.0	2.1	0.5
28	Metformin 500mg Tablet	0.8	0.3	0.3	2.4	0.7
29	Metoprolol 100mg Tablet	1.4	0.4		2.7	
30	Omeprazole 20mg Tablet	1.4		0.2	9.6	0.5
31	Pantoprazole 40mg Tablet	2.7	0.4	0.3	0.1	0.5
32	Paracetamol 24mg/ml Suspension		1.3		3.1	1.7

No.	Generic Name	Australia	Taiwan	South Korea	Thailand	South Africa
33	Perindopril 4mg Tablet	1.4	0.5	0.3		0.8
34	Prednisolone 5mg Tablet	0.4	0.3		1.5	0.7
35	Salbutamol 100mcg/ dose Inhaler	0.6			1.7	1.3
36	Simvastatin 20mg Tablet	1.6	0.5	0.1	5.1	1.1
37	Sulphamethoxazole 40mg/ml & Trimethoprim 8mg/ml Suspension				2.5	1.9
38	Telmisartan 80mg Tablet	1.5	0.5	0.4		0.8
39	Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet	0.6			1.4	1.1
40	Trastuzumab 440mg Injection		0.7	1.1	1.7	2.9
SDG Basket						
1	Amlodipine 5mg Tablet	2.0	0.4	0.2	5.3	0.5
2	Amoxicillin 500mg Capsule	0.9	1.4	0.7	1.9	1.2
3	Ceftriaxone 1g Injection	1.4	0.7	0.3	3.6	2.2
4	Dexamethasone Sodium Phosphate 4mg/ml Injection		0.8		1.9	
5	Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet				1.6	2.7
6	Enalapril 10mg Tablet	2.1	3.2	0.5		1.7
7	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	2.7			19.6	0.7
8	Fluconazole 50mg Tablet	1.1	0.5	0.3	4.7	0.8
9	Fluoxetine 20mg Capsule	4.7	5.1	1.1	1.3	7.8
10	Folic Acid 5mg Tablet	0.6		0.3	2.2	0.4
11	Gentamicin 40mg/ml Injection	0.7		2.3	4.0	1.0
12	Gliclazide 80mg Tablet	1.4	1.8	0.9	3.8	1.0
13	Ibuprofen 200mg Tablet		1.2	1.1	2.1	0.4
14	Metformin 500mg Tablet	0.8	0.3	0.3	2.4	0.7
15	Nystatin 100,000iu/ml Suspension				1.3	0.9
16	Oxytocin 10iu/ml Injection				4.3	0.2
17	Paracetamol 24 mg/ml Suspension		1.3		3.1	1.7
18	Recombinant Synthetic Human Insulin Short Acting 100iu/ml	0.9			2.0	1.0
19	Salbutamol 100mcg/ dose Inhaler	0.6			1.7	1.3
20	Simvastatin 20mg Tablet	1.6	0.5	0.1	5.1	1.1

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXV. Selling Price Ratio >1 for originator products in the private sector

No.	Generic Name	Australia	South Africa
WHO/HAI Basket			
1	Amlodipine 5mg Tablet	1.5	0.8
2	Atorvastatin 20mg Tablet	3.0	0.9
3	Bisoprolol 5mg Tablet		1.0
4	Captopril 25mg Tablet	8.9	
5	Ceftriaxone 1g Injection		2.0
6	Cefuroxime 250mg Tablet	1.3	0.8
7	Celecoxib 200mg Capsule	2.9	4.2
8	Ciprofloxacin 250mg Tablet		1.3
9	Ciprofloxacin 500mg Tablet		1.7
10	Diclofenac 50mg Tablet	1.5	0.9
11	Enalapril 10mg Tablet	0.7	1.2
12	Esomeprazole 20mg Tablet	2.7	
13	Fluoxetine 20mg Capsule	3.3	1.2
14	Frusemide 40mg Tablet	3.2	
15	Gefitinib 250mg Tablet	1.4	
16	Imatinib Mesylate 100mg Tablet	4.3	
17	Insulin Glargine 300iu/3ml		1.3
18	Loratadine 10mg Tablet		1.7
19	Metformin 500mg Tablet		1.9
20	Metoprolol 100mg Tablet	1.6	
21	Omeprazole 20mg Tablet	7.6	1.6
22	Saxagliptin 5mg Tablet	0.7	1.9
23	Simvastatin 20mg Tablet	1.8	1.7
24	Sitagliptin 50mg & Metformin 500mg Tablet	1.0	1.4
25	Telmisartan 80mg & Amlodipine 5mg Tablet	1.7	0.9
26	Telmisartan 80mg Tablet	1.6	0.7
27	Trastuzumab 440mg Injection		3.7
SDG Basket			
1	Amlodipine 5mg Tablet	1.5	0.8
2	Artemether 20mg & Lumefantrine 120mg Tablet	0.7	1.3
3	Ceftriaxone 1g Injection		2.0
4	Enalapril 10mg Tablet	0.7	1.2
5	Fluconazole 50mg Tablet	9.8	1.9
6	Fluoxetine 20mg Capsule	3.3	1.2
7	Frusemide 40mg Tablet	3.2	
8	Metformin 500mg Tablet		1.9

No.	Generic Name	Australia	South Africa
9	Morphine 10mg Tablet	2.3	2.4
10	Phenytoin 100mg Capsule	2.5	1.1
11	Recombinant Synthetic Human Insulin Short Acting 100iu/ml		1.6
12	Simvastatin 20mg Tablet	1.8	1.7
Single PRH			
1	Agomelatine 25mg Tablet		1.6
2	Apixaban 2.5mg Tablet	1.3	1.4
3	Artemether 20mg & Lumefantrine 120mg Tablet	0.7	1.3
4	Budesonide 160mcg & Formoterol 4.5mcg Inhalation	1.1	1.4
5	Capecitabine 150mg Tablet		1.6
6	Dabigatran 110mg Tablet	1.5	1.1
7	Digoxin 0.25mg Tablet	0.8	2.0
8	Dydrogesterone 10mg Tablet		1.0
9	Enoxaparin Sodium 4000iu/0.4ml		1.7
10	Human Papillomavirus Vaccine (HPV) 4 valent		1.1
11	Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml		1.2
12	Insulin Detemir 100iu/ml		1.3
13	Lamivudine 300mg & Abacavir Sulphate 600mg Tablet		1.8
14	Leflunomide 10mg Capsule	4.5	1.6
15	Oxycodone HCl 10mg Tablet	2.1	1.3
16	Pneumococcal Vaccine 23 valent		2.3
17	Quetiapine Fumarate 50mg Tablet	6.7	1.9
18	Rituximab 1400mg mg Injection	1.2	
19	Sitagliptin 50mg & Metformin 500mg Tablet	1.0	1.4
20	Telmisartan 80mg & Amlodipine 5mg Tablet	1.7	0.9
21	Tenecteplase 10,000 units Injection	1.3	1.4
22	Tiotropium Bromide 2.5mcg Inhalation	1.7	0.8
23	Tolterodine 4mg Tablet		1.4

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXVI. Selling Price Ratio >1 for generic products compared to SGB in the private sector

No.	Generic Name	Australia	South Africa
WHO/HAI Basket			
1	Amoxicillin 250mg Capsule		3.2
2	Amoxicillin 500mg Capsule		2.8
3	Captopril 25mg Tablet		3.3
4	Clopidogrel 75mg Tablet	1.3	
5	Diazepam 5mg Tablet	1.6	
6	Pantoprazole 40mg Tablet	1.0	0.6
SDG Basket			
1	Amoxicillin 500mg Capsule		2.8
2	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	1.1	0.4

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXVII. Selling Price Ratio >1 for generic products compared to AGB in the private sector

No.	Generic Name	Australia	South Africa
WHO/HAI Basket			
1	Amitriptyline 25mg Tablet	0.6	1.2
2	Amoxicillin 500mg Capsule		2.1
3	Atorvastatin 20mg Tablet	0.8	1.9
4	Captopril 25mg Tablet	1.9	3.2
5	Ceftriaxone 1g Injection	2.0	2.7
6	Celecoxib 200mg Capsule	1.4	2.2
7	Clopidogrel 75mg Tablet	1.2	1.0
8	Diazepam 5mg Tablet	1.6	13.5
9	Doxycycline 100mg Capsule	0.3	2.5
10	Enalapril 10mg Tablet	0.6	1.1
11	Fluorouracil 50mg/ml Injection		1.8
12	Fluoxetine 20mg Capsule	1.5	4.9
13	Gliclazide 80mg Tablet	0.9	1.0
14	Hydrochlorothiazide 25mg Tablet		1.0
15	Insulin Glargine 300iu/3ml		1.4
16	Pantoprazole 40mg Tablet	1.0	0.6
17	Paracetamol 24mg/ml Suspension		1.2
18	Prednisolone 5mg Tablet	0.4	2.2
19	Simvastatin 20mg Tablet	0.4	1.1

No.	Generic Name	Australia	South Africa
20	Sulphamethoxazole 40mg/ml & Trimethoprim 8mg/ml Suspension		2.0
21	Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet	0.9	1.2
22	Trastuzumab 440mg Injection		2.9
SDG Basket			
1	Amoxicillin 500mg Capsule		2.1
2	Ceftriaxone 1g Injection	2.0	2.7
3	Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet		2.3
4	Enalapril 10mg Tablet	0.6	1.1
5	Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	1.1	0.4
6	Fluconazole 50mg Tablet	1.7	1.3
7	Fluoxetine 20mg Capsule	1.5	4.9
8	Gentamicin 40mg/ml Injection	0.8	1.2
9	Gliclazide 80mg Tablet	0.9	1.0
10	Paracetamol 24mg/ml Suspension		1.2
11	Simvastatin 20mg Tablet	0.4	1.1

SDG = Sustainable Development Goal; WHO/HAI: World Health Organization/ Health Action International

Appendix XXXVIII. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for WHO/HAI Basket

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Docetaxel 40mg/ml Injection ^{a,b,f}	Cancer	3	ml				2904.00	49.9	62.9
Fluorouracil 50mg/ml Injection ^{a,b,d,f}	Cancer	18	ml				528.00	9.1	11.4
Gefitinib 250mg Tablet ^{a,b,c}	Cancer	30	cap/tab	3900.00	67.0	84.5			
Imatinib Mesylate 100mg Tablet ^{a,b}	Cancer	30	cap/tab	3046.20	52.4	66.0			
Trastuzumab 440mg Injection ^{a,b,f}	Cancer	2	injection	18556.98	319.0	402.1	8697.96	149.5	188.5
Diazepam 5mg Tablet ^d	CNS	7	cap/tab				8.99	0.2	0.2
Sodium Valproate 200mg Enteric Coated Tablet	CNS	90	cap/tab	83.79	1.4	1.8			
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	CVD	30	cap/tab	16.42	0.3	0.4	11.25	0.2	0.2
Amlodipine 5mg Tablet	CVD	30	cap/tab	60.00	1.0	1.3	17.70	0.3	0.4
Atenolol 100mg Tablet	CVD	30	cap/tab	75.00	1.3	1.6	16.50	0.3	0.4
Atorvastatin 20mg Tablet	CVD	30	cap/tab	130.00	2.2	2.8	33.00	0.6	0.7
Bisoprolol 5mg Tablet	CVD	30	cap/tab	51.00	0.9	1.1	21.00	0.4	0.5

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Captopril 25mg Tablet	CVD	60	cap/tab	300.00	5.2	6.5	64.64	1.1	1.4
Clopidogrel 75mg Tablet	CVD	30	cap/tab	225.00	3.9	4.9	64.64	1.1	1.4
Enalapril 10mg Tablet	CVD	30	cap/tab	33.53	0.6	0.7	27.00	0.5	0.6
Frusemide 40mg Tablet	CVD	30	cap/tab	40.35	0.7	0.9	9.00	0.2	0.2
Hydrochlorothiazide 25mg Tablet	CVD	30	cap/tab				7.00	0.1	0.2
Metoprolol 100mg Tablet	CVD	60	cap/tab	69.00	1.2	1.5	24.00	0.4	0.5
Perindopril 4mg Tablet	CVD	30	cap/tab	46.00	0.8	1.0	24.00	0.4	0.5
Simvastatin 20mg Tablet	CVD	30	cap/tab	76.40	1.3	1.7	18.00	0.3	0.4
Telmisartan 80mg Tablet	CVD	30	cap/tab	90.00	1.5	2.0	37.50	0.6	0.8
Telmisartan 80mg & Amlodipine 5mg Tablet ^c	CVD	30	cap/tab	95.00	1.6	2.1			
Fluoxetine 20mg Capsule ^a	Depression	30	cap/tab	165.00	2.8	3.6	78.00	1.3	1.7
Gliclazide 80mg Tablet	Diabetes	60	cap/tab	85.00	1.5	1.8	28.95	0.5	0.6
Insulin Glargine 300iu/3ml	Diabetes	1	penfill	68.75	1.2	1.5	49.00	0.8	1.1

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Metformin 500mg Tablet	Diabetes	60	cap/tab	35.70	0.6	0.8	9.00	0.2	0.2
Recombinant Synthetic Human Biphasic Isophane Insulin 100iu/unit ^f	Diabetes	2	penfill	99.90	1.7	2.2			
Saxagliptin 5mg Tablet ^c	Diabetes	30	cap/tab	122.36	2.1	2.7			
Sitagliptin 50mg & Metformin 500mg Tablet ^{c,d}	Diabetes	60	cap/tab	176.79	3.0	3.8			
Esomeprazole 20mg Tablet	Gastrointestinal Disorders	30	cap/tab	148.82	2.6	3.2	48.11	0.8	1.0
Omeprazole 20mg Tablet	Gastrointestinal Disorders	30	cap/tab	372.30	6.4	8.1	38.14	0.7	0.8
Pantoprazole 40mg Tablet ^d	Gastrointestinal Disorders	30	cap/tab				45.00	0.8	1.0
Amoxicillin 500mg Capsule ^d	Infectious Disease	21	cap/tab				16.80	0.3	0.4
Amoxicillin 250mg Capsule ^d	Infectious Disease	42	cap/tab				21.00	0.4	0.5
Amoxicillin 500mg & Clavulanic acid 125mg Tablet	Infectious Disease	14	cap/tab	55.72	1.0	1.2	28.00	0.5	0.6
Ceftriaxone 1g Injection ^a	Infectious Disease	1	injection	89.00	1.5	1.9	28.00	0.5	0.6
Cefuroxime 250mg Tablet	Infectious Disease	14	cap/tab	70.00	1.2	1.5	33.18	0.6	0.7

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Ciprofloxacin 500mg Tablet	Infectious Disease	14	cap/tab	179.76	3.1	3.9	16.80	0.3	0.4
Ciprofloxacin 250mg Tablet	Infectious Disease	14	cap/tab	105.00	1.8	2.3	7.00	0.1	0.2
Doxycycline 100mg Capsule	Infectious Disease	7	cap/tab	16.80	0.3	0.4	4.20	0.1	0.1
Sulphamethoxazole 8mg/ml & Trimethoprim 40mg/ml Suspension ^a	Infectious Disease	70	ml				10.85	0.2	0.2
Sulphamethoxazole 400mg & Trimethoprim 80mg Tablet	Infectious Disease	28	cap/tab				14.00	0.2	0.3
Amitriptyline 25mg Tablet ^d	Mental Disorders	90	cap/tab				49.50	0.9	1.1
Loratadine 10mg Tablet	Pain/ Inflammation	3	cap/tab	4.26	0.1	0.1	1.50	0.0	0.0
Chlorpheniramine 4mg Tablet	Pain/ Inflammation	9	cap/tab				1.80	0.0	0.0
Celecoxib 200mg Capsule ^a	Pain/ Inflammation	30	cap/tab	146.70	2.5	3.2	72.90	1.3	1.6
Diclofenac 50mg Tablet ^d	Pain/ Inflammation	60	cap/tab	78.78	1.4	1.7	21.00	0.4	0.5
Mefenamic acid 250mg Capsule ^d	Pain/ Inflammation	18	cap/tab				5.40	0.1	0.1
Paracetamol 24mg/ml Suspension	Pain/ Inflammation	45	ml	6.00	0.1	0.1	4.28	0.1	0.1

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Prednisolone 5mg Tablet ^d	Pain/ Inflammation	3	cap/tab				0.90	0.0	0.0
Salbutamol 100mcg/ dose Inhaler	Respiratory Diseases	200	doses	25.10	0.4	0.5	12.00	0.2	0.3
Salmeterol 50mcg & Fluticasone 250mcg Inhalation	Respiratory Diseases	60	doses	145.00	2.5	3.1	97.50	1.7	2.1
Tenofovir Disoproxil Fumarate 300mg & Emtricitabine 200mg Tablet ^d	Retroviral Disease	30	cap/tab				180.00	3.1	3.9

Cap/tab = capsule/tablet, CVD = Cardiovascular disease, CNS = Central nervous system; RM = Malaysian Ringgit

^aHospital-only medicine: Data excluded for health clinic & community pharmacy

^bCancer hospital-only medicine: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

^cInnovator/On-patent medicine: Generic brand omitted

^dOriginal brand not available: Original brand data omitted

^eStandard treatments were entered as follows: Acute conditions = full courses of therapy; Chronic conditions, where therapy continues indefinitely = one-month course of therapy

^fDosage was estimated for patient with weight of 62.65 kg (CI: 62.20, 63.09), Body Mass Index (BMI) 24.37 kg/m² and Body Surface Area (BSA) 1.7 m²

Number of days' wages = Median Treatment Cost (RM)/Lowest daily wage where, Lowest daily wage (2016): Lowest-paid government worker = RM58.17; Lowest minimum wage as determined by Federal Government of Malaysia = RM46.15

Chemotherapy regimen reference: Systemic Therapy of Cancer 2nd Ed. Ministry of Health and Ministry of Higher Education, Malaysia

Weight and BMI reference: Azmi, M. Y., Junidah, R., Mariam, A. S., Safiah, M. Y., Fatimah, S., Norimah, A. K., ... & Tahir, A. (2009). Body Mass Index (BMI) of Adults: Findings of the Malaysian Adult Nutrition Survey (MANS). Malaysian Journal of Nutrition, 15(2).

BSA reference: Mosteller, R.D. (1987). Simplified Calculation of BSA. New England Journal Medicine, 317: 1098

Appendix XXXIX. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for SDG Basket

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Phenytoin 100mg Capsule	CNS	90	cap/tab	108.00	1.9	2.3			
Acetylsalicylic Acid 100mg & Glycine 45mg Tablet	CVD	30	cap/tab	16.42	0.3	0.4	11.25	0.2	0.2
Amlodipine 5mg Tablet	CVD	30	cap/tab	60.00	1.0	1.3	17.70	0.3	0.4
Enalapril 10mg Tablet	CVD	30	cap/tab	33.53	0.6	0.7	27.00	0.5	0.6
Frusemide 40mg Tablet	CVD	30	cap/tab	40.35	0.7	0.9	9.00	0.2	0.2
Simvastatin 20mg Tablet	CVD	30	cap/tab	76.40	1.3	1.7	18.00	0.3	0.4
Fluoxetine 20mg Capsule ^a	Depression	30	cap/tab	165.00	2.8	3.6	78.00	1.3	1.7
Gliclazide 80mg Tablet	Diabetes	60	cap/tab	85.00	1.5	1.8	28.95	0.5	0.6
Metformin 500mg Tablet	Diabetes	60	cap/tab	35.70	0.6	0.8	9.00	0.1	0.2
Recombinant Synthetic Human Insulin Short Acting 100iu/ml ^f	Diabetes	2	penfill	99.90	1.7	2.2	55.00	1.0	1.2

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Oral Rehydration Salt ^d	Fluid & Electrolyte Replenishment	3	sachet				1.8	0.0	0.0
Fluconazole 50mg Tablet ^a	Fungal Infection	14	cap/tab	331.80	5.7	7.2	70.0	1.2	1.5
Nystatin 100,000iu/ml Suspension ^d	Fungal Infection	40	ml				23.9	0.4	0.5
Amoxicillin 500mg Capsule ^d	Infectious Disease	21	cap/tab				16.8	0.3	0.4
Benzylpenicillin 1 mega unit (600mg) Injection ^d	Infectious Disease	1	injection				7.0	0.1	0.2
Ceftriaxone 1g Injection ^a	Infectious disease	1	injection	89.00	1.5	1.9	28.0	0.5	0.6
Gentamicin 40mg/ml Injection ^d	Infectious Disease	1	injection				5.3	0.1	0.1
Recombinant Human Erythropoietin Alpha 2000iu Injection ^{a,f}	Kidney Diseases	1	injection	76.75	1.3	1.7	29.5	0.5	0.6
Artemether 20mg & Lumefantrine 120mg Tablet ^c	Malaria	24	cap/tab	163.20	2.8	3.5			
Artesunate 60mg Injection ^c	Malaria	1	injection	82.10	1.4	1.8			

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Ethinylestradiol 30mcg & Levonorgestrel 150mcg Tablet	Maternal Child Health	28	cap/tab				14.7	0.3	0.3
Folic Acid 5mg Tablet ^d	Maternal Child Health	30	cap/tab				4.5	0.1	0.1
Magnesium sulphate 50% in 10 ml Injection ^d	Maternal Child Health	1	injection				29.6	0.5	0.6
Oxytocin 10iu/ml Injection ^d	Maternal Child Health	1	injection				10.2	0.2	0.2
Dexamethasone Sodium Phosphate 4mg/ml Injection ^d	Pain/ Inflammation	1	injection				5.5	0.1	0.1
Ibuprofen 200mg Tablet ^d	Pain/ Inflammation	60	cap/tab				27.0	0.5	0.6
Morphine 10mg Tablet ^{a,c}	Pain/ Inflammation	180	cap/tab	1170.00	20.1	25.4			
Paracetamol 24mg/ml Suspension	Pain/ Inflammation	45	ml	6.00	0.1	0.1	4.3	0.1	0.1
Beclomethasone 100mcg Inhaler ^d	Respiratory Diseases	200	doses				35.0	0.6	0.8
Salbutamol 100mcg/dose Inhaler	Respiratory Diseases	200	doses	25.10	0.4	0.5	12.0	0.2	0.3

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Efavirenz 600mg, Emtricitabine 200mg & Tenofovir 300mg Tablet ^d	Retroviral Disease	30	cap/tab				190.80	3.3	4.1
Levothyroxine 50mcg Tablet	Thyroid Disease	60	cap/tab	30.00	0.5	0.7	17.70	0.3	0.4
Chlorhexidine Solution 5% Solution ^d	Umbilical Cord Care	70	ml				6.86	0.1	0.2

Cap/tab = capsule/tablet, CVD = Cardiovascular disease, CNS = Central nervous system; RM = Malaysian Ringgit

^aHospital-only medicine: Data excluded for health clinic & community pharmacy

^bCancer hospital-only medicine: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

^cInnovator/On-patent medicine: Generic brand omitted

^dOriginal brand not available: Original brand data omitted

^eStandard treatments were entered as follows: Acute conditions = full courses of therapy; Chronic conditions, where therapy continues indefinitely = one-month course of therapy

^fDosage was estimated for patient with weight of 62.65 kg (CI: 62.20, 63.09), Body Mass Index (BMI) 24.37 kg/m² and Body Surface Area (BSA) 1.7 m²

Number of days' wages = Median Treatment Cost (RM)/Lowest daily wage where, Lowest daily wage (2016): Lowest-paid government worker = RM58.17; Lowest minimum wage as determined by Federal Government of Malaysia = RM46.15

Chemotherapy regimen reference: Systemic Therapy of Cancer 2nd Ed. Ministry of Health and Ministry of Higher Education, Malaysia

Weight and BMI reference: Azmi, M. Y., Junidah, R., Mariam, A. S., Safiah, M. Y., Fatimah, S., Norimah, A. K., ... & Tahir, A. (2009). Body Mass Index (BMI) of Adults: Findings of the Malaysian Adult Nutrition Survey (MANS). Malaysian Journal of Nutrition, 15(2).

BSA reference: Mosteller, R.D. (1987). Simplified Calculation of BSA. New England Journal Medicine, 317: 1098

Appendix XL. Affordability of standard treatment as measured by number of days' wages in the private sector by medicine and product type for Single PRH Basket

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Afatinib dimaleate 30mg Tablet ^{a,b,c}	Cancer	30	cap/tab	6315.00	108.6	136.8			
Capecitabine 150mg Tablet ^{a,b,c,f}	Cancer	28	cap/tab	137.20	2.4	3.0			
Cyclophosphamide 1g Injection ^{a,b,c,f}	Cancer	3	injection	175.05	3.0	3.8			
Nilotinib 150mg Tablet ^{a,b,c}	Cancer	120	cap/tab						
Rituximab 1400mg mg Injection ^{a,b,c}	Cancer	4	injection	26680.00	458.7	578.1			
Apixaban 2.5mg Tablet ^{a,c}	CVD	60	cap/tab	408.00	7.0	8.8			
Dabigatran 110mg Tablet ^{a,c}	CVD	10	cap/tab	60.95	1.0	1.3			
Digoxin 0.25mg Tablet ^c	CVD	30	cap/tab	12.00	0.2	0.3			
Enoxaparin Sodium 4000iu/0.4ml ^c	CVD	2	injection	87.88	1.5	1.9			
Fenofibrate 145mg Tablet ^c	CVD	30	cap/tab	110.85	1.9	2.4			

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Telmisartan 80mg & Amlodipine 5mg Tablet ^c	CVD	30	cap/tab	95.00	1.6	2.1			
Tenecteplase 10,000 units Injection ^{c,f}	CVD	1	injection	7500.00	128.9	162.5			
Insulin Aspart 30% & Insulin Aspart Protamine 70% 100iu/ml ^{c,f}	Diabetes	2	penfill	96.10	1.7	2.1			
Insulin Detemir 100iu/ml ^{c,f}	Diabetes	1	penfill	68.18	1.2	1.5			
Sitagliptin 50mg & Metformin 500mg Tablet ^{a,c}	Diabetes	60	cap/tab	176.79	3.0	3.8			
Recombinant Human Erythropoietin Beta 2000iu/0.3ml Injection ^c	Kidney Diseases	1	injection	49.79	0.9	1.1			
Artemether 20mg & Lumefantrine 120mg Tablet ^c	Malaria	24	cap/tab	163.20	2.8	3.5			
Artesunate 60mg Injection ^c	Malaria	1	injection	82.10	1.4	1.8			
Dydrogesterone 10mg Tablet ^c	Maternal Child Health	14	cap/tab	50.40	0.9	1.1			
Agomelatine 25mg Tablet ^{a,c}	Mental Disorders	30	cap/tab	216.00	3.7	4.7			

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Mirtazapine 15mg Tablet ^{a,c}	Mental Disorders	30	cap/tab	105.00	1.8	2.3			
Quetiapine Fumarate 50mg Tablet ^{a,c}	Mental Disorders	1	cap/tab	7.84	0.1	0.2			
Leflunomide 10mg Capsule ^{a,c}	Musculoskeletal Disorders	30	cap/tab	454.80	7.8	9.9			
Bilastine 20mg Tablet ^c	Pain/ Inflammation	7	cap/tab	9.31	0.2	0.2			
Oxycodone HCl 10mg Tablet ^{a,c}	Pain/ Inflammation	28	cap/tab	228.20	3.9	4.9			
Budesonide 160mcg & Formoterol 4.5mcg Inhalation ^c	Respiratory Diseases	120	doses	145.80	2.5	3.2			
Dextromethorphan 15mg/5ml, Phenylephrine 5mg/5ml & Triprolidine 1.25mg/5ml	Respiratory Diseases	90	ml				9.00	0.2	0.2
Tiotropium Bromide 2.5mg Inhalation ^c	Respiratory Diseases	60	doses	219.68	3.8	4.8			
Lamivudine 300mg & Abacavir Sulphate 600mg Tablet ^{a,c}	Retroviral Disease	30	cap/tab	473.00	8.1	10.2			
Raltegravir 400mg Tablet ^{a,c}	Retroviral Disease	60	cap/tab						

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Tolterodine 4mg Tablet ^c	Urinary Bladder Diseases	30	cap/tab	246.00	4.2	5.3			
Human Papillomavirus Vaccine (HPV) 9 valent ^c	Vaccination	1	injection	506.75	8.7	11.0			
Human Papillomavirus Vaccine (HPV) 2 valent ^c	Vaccination	1	injection	220.00	3.8	4.8			
Human Papillomavirus Vaccine (HPV) 4 valent ^c	Vaccination	1	injection	297.00	5.1	6.4			
Pneumococcal Vaccine 23 valent ^c	Vaccination	1	injection	124.00	2.1	2.7			
Pneumococcal Vaccine 13 valent ^c	Vaccination	1	injection	270.00	4.6	5.9			
Pneumococcal Vaccine 10 valent ^c	Vaccination	1	injection	208.78	3.6	4.5			
Measles, Combinations with Mumps and Rubella, Live Attenuated (MMR 11) ^c	Vaccination	1	injection	47.08	0.8	1.0			

Medicine	Treatment	Total units per treatment	Unit	Originator Product			Generic Product		
				Median Treatment Cost (RM) ^e	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]	Median Treatment Cost (RM)	Number of days' wages [Government worker]	Number of days' wages [Minimum wage]
Measles, Combinations with Mumps and Rubella, Live Attenuated (Priorix) ^c	Vaccination	1	injection	48.82	0.8	1.1			
Measles, Combinations with Mumps and Rubella, Live Attenuated (SM MMR) ^c	Vaccination	1	injection						

Cap/tab = capsule/tablet, CVD = Cardiovascular disease, CNS = Central nervous system; RM = Malaysian Ringgit

^aHospital-only medicine: Data excluded for health clinic & community pharmacy

^bCancer hospital-only medicine: Data may be excluded for Health Clinic, Community Pharmacy, Private Clinic & Hospital without oncology services

^cInnovator/On-patent medicine: Generic brand omitted

^dOriginal brand not available: Original brand data omitted

^eStandard treatments were entered as follows: Acute conditions = full courses of therapy; Chronic conditions, where therapy continues indefinitely = one-month course of therapy

^fDosage was estimated for patient with weight of 62.65 kg (CI: 62.20, 63.09), Body Mass Index (BMI) 24.37 kg/m² and Body Surface Area (BSA) 1.7 m²

Number of days' wages = Median Treatment Cost (RM)/Lowest daily wage where, Lowest daily wage (2016): Lowest-paid government worker = RM58.17; Lowest minimum wage as determined by Federal Government of Malaysia = RM46.15

Chemotherapy regimen reference: Systemic Therapy of Cancer 2nd Ed. Ministry of Health and Ministry of Higher Education, Malaysia

Weight and BMI reference: Azmi, M. Y., Junidah, R., Mariam, A. S., Safiah, M. Y., Fatimah, S., Norimah, A. K., ... & Tahir, A. (2009). Body Mass Index (BMI) of Adults: Findings of the Malaysian Adult Nutrition Survey (MANS). Malaysian Journal of Nutrition, 15(2).

BSA reference: Mosteller, R.D. (1987). Simplified Calculation of BSA. New England Journal Medicine, 317: 1098

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