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MINISTRY OF HEALTH MALAYSIA
PHARMACEUTICAL SERVICES PROGRAMME

RETROSPECTIVE ANALYSIS OF MALAYSIA MEDICINES PRICE GUIDE

DATA REVIEW FROM 2012 TO 2022

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Retrospective Analysis of Malaysia Medicines Price Guide: Data Review from 2012 to 2022

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LIST OF ABBREVIATIONS

%	*Percentage*
APIs	*Active Pharmaceutical Ingredients*
MyPriMe	*Malaysia Medicines Price Guide / Panduan Harga Ubat Malaysia*
CPI	*Consumer Price Index*
IQVIA	*IQVIA Solutions Malaysia Sdn. Bhd.*
MNMP	*Malaysia National Medicine Policy*
MOH	*Ministry of Health*
NCE	*New Chemical Entity*
NPRA	*National Pharmaceutical Regulatory Agency*
OTC	*Over-the-counter*
PRH	*Product Registration Holders*
PSP	*Pharmaceutical Services Programme*
R&D	*Research and Development*
RP	*Retail Price*
SPSS	*Statistical package for the social sciences*
Q25	*25th Percentile*
Q75	*75th Percentile*
WP	*Wholesale Price*

1.0 INTRODUCTION

1.1 Background

The Malaysian healthcare system is a dual-sector framework comprising public and private healthcare providers, each catering to the nation's diverse healthcare needs. The public sector, overseen by the Ministry of Health (MOH), provides heavily subsidised medical services and medications, funded primarily through the consolidated revenue fund managed by the Ministry of Finance (Thomas, Beh, & Nordin, 2011). This system ensures access to affordable healthcare for a majority of the population. In contrast, the private healthcare sector operates on a market-driven model, where services are financed through employer benefits, private insurance, and direct out-of-pocket payments by consumers. This duality creates distinct challenges, particularly regarding pharmaceutical pricing and accessibility. The pharmaceutical prices in private sectors are not regulated, leading to significant price variability and elevated consumer costs (Babar et al., 2007). The lack of transparency in retail pricing information has created barriers to accessing essential medications, influencing patients' purchasing decisions and resulting in either under-treatment or unnecessary overuse of drugs.

Within this context, the Malaysian National Medicines Policy (MNMP), endorsed by the Cabinet in 2006, plays a pivotal role in bridging the priorities of these sectors. It is a strategic document outlining the Government of Malaysia's medium- and long-term goals for the pharmaceutical sector. The primary objectives of the MNMP are to ensure equitable access to medicines and promote their rational use, focusing on safety, efficacy, and affordability to enhance the nation’s health outcomes. It establishes key priorities and strategies to guide the implementation of pharmaceutical activities, ensuring alignment with defined targets. One of the strategies is to encourage initiatives to raise transparency in medicine pricing in Malaysia and give consumers access to pertinent and easily accessible information.

In 2011, the Ministry of Health (MOH) introduced a voluntary price declaration by product registration holders (PRHs) to promote price transparency and empower consumers on the right to access medicines at affordable prices (Pharmaceutical Services Division, 2012). The policy encourages PRHs to declare their suggested wholesale prices (WPs) and retail prices (RPs) for medicines. These prices are then compiled into a centralised database maintained by the Pharmaceutical Service Programme (PSP). While the WPs remain confidential and utilised for internal reference with PSP, the RPs are made available to the public. The shared RPs are known widely as *Harga Panduan Pengguna / Consumer Price Guide*) is accessible in the National Pharmacy Portal (https://pharmacy.moh.gov.my). Early in 2025, the term was rebranded to *Panduan Harga Ubat Malaysia* / Malaysia Medicines Price Guide (MyPriMe). MyPriMe is a valuable resource that provides information for consumers to

compare market prices for medicines, ultimately empowering them to make more informed and cost-effective purchasing decisions.

The availability of this RPs database aims to promote greater price transparency in the private healthcare sector. The policy intends to foster competition among pharmaceutical providers through transparency, which could drive down prices and improve patient accessibility.

However, the voluntary nature of the reporting process poses challenges. Unlike mandatory reporting systems implemented in countries such as Australia and parts of Europe, where pharmaceutical companies are required to disclose ex-factory prices, Malaysia's system relies on the goodwill of industry stakeholders (Commonwealth of Australia, 2023; Morgan, Thomson, Daw, & Friesen, 2013; Leopold et al., 2012). This approach may limit the comprehensiveness of the database and its effectiveness in achieving the MNMP's objectives. Therefore, strengthening the system through policy adjustments, such as making reporting mandatory or expanding the scope of disclosed data, may enhance its role in regulating medicine prices and ensuring equitable access.

Despite the voluntary medicines price declaration by PRHs being in place for over a decade, its effectiveness remains to be determined. This uncertainty stems from the lack of comprehensive reviews or analyses of the declared price data. Questions remain about the level of compliance by PRHs', the accuracy and representativeness of the declared prices, and how closely the RPs align with actual market prices. Without systematic evaluations and transparency in the data's application, it is difficult to assess the system's impact on reducing medicine prices or improving patient accessibility.

Thus, this report focuses on the response rate of PRHs to voluntary medicines price declarations, price trends, retail markups, and the correlation between declared and market prices. Additionally, it examines how these prices compare with forecasted trends based on the national consumer price index, offering insights into the system's efficiency and potential areas for improvement.

2.0 OBJECTIVES

2.1 General Objectives

- To evaluate prices of medicines reported by Product Registration Holders (PRHs) voluntarily

2.2 Specific Objectives

1. To assess company response rates.
    a. To determine the number of PRHs actively participating in the voluntary medicines price declaration initiative since 2012.
    b. To evaluate the response rate of PRHs in Malaysia to the voluntary medicines price declaration initiative.
    c. To measure the number of medicines published in the MyPriMe from 2012 to 2022.

2. To observe the trend of prices from 2012 to 2022.
    a. To measure the rate of price changes over the years.
    b. To identify the number of medicines with increased, decreased, and stable prices.

3. To measure median retail markup.

4. To determine the association between WPs and RPs.

5. To determine the association between WPs declared voluntarily by PRHs and WPs in IQVIA Database.

6. To compare medicines prices declared for MyPriMe and forecast prices based on the yearly inflation rate.

3.0 METHODOLOGY

3.1 Sampling

The study was conducted using the PSP medicine price database from 2012 to 2022, which consisted of the WPs and RPs of controlled and over-the-counter medicines, as declared voluntarily by PRHs. All those medicines are identified by registration number known as MAL number issued by the National Pharmaceutical Regulatory Agency (NPRA) and ends with Suffix A and X. The suffix A indicates Controlled Medicines are listed under Scheduled poison and require prescription, while Suffix X indicates the medicines are Non-Scheduled Poison and available as over the counter medicines and also known as Non-Prescription Drugs. (National Pharmaceutical Regulatory Agency, 2018). Controlled medicines can be further classified into following categories:

- New Chemical Entity (NCE): A newly discovered active ingredient not previously registered, including new chemical forms, strengths, or indications of existing drugs.
- Prescription Drugs: Medicines requiring a healthcare professional's authorisation often referred to as *scheduled poisons*.
- Biologics: Products derived from living organisms, including vaccines, blood products, monoclonal antibodies, and recombinant proteins like insulin.

Due to the retrospective nature of the data, the study employed a convenience sampling approach. The list of medicines and price details were extracted from the MyPharma-C system. 6825 medicines with available WPs and 6225 with RPs were extracted from the database. Those medicines were conveniently sampled based on the availability of a complete set of price data for both WPs and RPs, adhering to the following criteria:

- Complete price data from the year 2012 to 2022
- Complete price data from the year 2017 to 2022
- Minimum of continuous of 4 years data

Table 3.1 Sample selection of medicines

	Criteria	Number of medicines with Wholesale Price	Number of medicines with Retail Price
Population	Total medicines with price data from 2012-2022 (N)	6,825	6,225
Sample analysed	Number of medicines with minimum continuous 4 years price data (n)	274	218
	Number of medicines with complete 10 years data for both WPs and RPs (2012-2022)	46	46
	Number of medicines with complete 5 years data for both WPs and RPs (2017-2022)	188	188

The number of medicines is counted based on the brand name and packaging size. It is to be noted that there is no data for 2019 as the data collection in 2019 was withheld due to other priorities of the organisation during that year.

3.2 Data analysis

All data were analysed using Microsoft Excel and a statistical package for the social sciences (SPSS) software (version 22.0; SPSS Inc., Chicago, IL, USA). The analysis was presented as the median, average, 25th percentile (Q25), 75th percentile (Q75), ratio, and percentage (%) of price changes. An inferential statistic was also performed in this study. Regression was employed to measure the relationship between variables. It is a statistical method to determine the strength and direction of the association between an independent and dependent variable. As for the comparison between two independent groups, a paired t-test was used, and ANOVA was used for variables with three or more independent groups. Wilcoxon matched-pairs signed-ranks test, is a non-parametric statistical test used to compare prices declared by PRHs and forecasted prices using national inflation. A p-value of less than 0.05 was considered to be statistically significant.

Spearman's rank correlation coefficient was employed to analyse the relationship between the WPs declared by PRHs and prices from the IQVIA Malaysia. IQVIA Malaysia conducts pharmaceutical audits to track and report on medicines distributed in the private sector,

gathering data from pharmaceutical distributors to provide valuable insights into sales, quantities, and product details such as active ingredients, strengths, dosage forms, and pack sizes. This data delivers a comprehensive view of medicine distribution and pricing in the private healthcare market, enabling stakeholders to analyze trends, monitor market dynamics, and evaluate the availability of medicines in Malaysia's private sector supply chain. To promote transparency and support evidence-based pricing evaluations for improved procurement negotiations, the Ministry of Health Malaysia (MOH) has signed a Memorandum of Understanding (MOU) with IQVIA to facilitate the sharing of wholesale medicine price data from both the public and private sectors. Due to the limited availability of historical IQVIA data from 2012 to 2020 at the time of analysis, the correlation test was performed by comparing MyPriMe data from the same period with IQVIA price data.

3.2.1 Price Trend Analysis

Panel data was employed to capture the trending of prices over the period 2012-2022, with price as the dependent variable (y) and year as an independent variable (x). Each product's panel data regression was conducted to identify the co-efficient value and p-value, which were used to categorise the trend. The coefficient obtained for the year variable represents the average change in price per year.

- **Positive Coefficient:** A positive coefficient indicates an upward trend in price over time; for every unit increase in a year, the price is expected to increase by the value of the coefficient (on average).

- **Negative Coefficient:** A negative coefficient suggests a downward trend in price. On average, the price decreases with each year

- **Coefficient Close to Zero:** A coefficient very close to zero (and statistically insignificant) might indicate no statistically significant linear trend in price over the observed years.

Using P-value for Significance:

- **Low p-value (typically < 0.05):** If the p-value is low, the null hypothesis of no relationship between year and price will be rejected. This strengthens the evidence for the trend identified by the coefficient (positive or negative).

- **High p-value (typically > 0.05):** A high p-value suggests that there might not be a statistically significant linear trend in price.

The trend is categorised by integrating the coefficient and p-value: the p-value serves as an indicator of statistical significance, typically with values below 0.05 suggesting significance. The direction of the trend is determined by the sign of the coefficient: positive values indicate an upward trend, while negative values suggest a downward trend. This method provides a structured approach to classifying trends based on their statistical relevance and directionality.

Table 3.2 Classification of Price Trends Using Statistical Significance

Trend	Definition
Increasing Price Trend (Increase)	Positive coefficient with a statistically significant p-value (<0.05).
Decreasing Price Trend (Decrease)	Negative coefficient with a statistically significant p-value (<0.05)
No Statistically Significant Trend/ Stable	Coefficient close to zero and a high p-value (>=0.05)

3.2.2 Analysis in Mark-up

Mark-up price, or "gross profit," represents the additional charges applied to account for overhead costs, distribution expenses, and profit margins (Daniel & Eric, 2018). The percentage mark-up is calculated by subtracting the WPs of the medicines from the RPs.

3.2.3 Analysis on Price Forecast

Forecasting medicine prices using the Consumer Price Index (CPI) involves analysing historical price data for pharmaceuticals alongside changes in the CPI, which tracks the average change over time in prices paid by consumers for goods and services.

The formula for forecasting the price for each product for each year is as follows:

Forecast Price for Each = Price the year before (x) × National Inflation rate for the specified year

The description of each component as follows:

- **Price the year before (x):** This refers to the price of the product in the previous year, which serves as the starting point for the forecast. It represents the known price from the prior year.

- **Inflation rate for the specified year:** This is the inflation rate calculated for the specified year using the baseline CPI of the base year (2012). The inflation rate indicates the percentage price change from the base year to the specified year.

This formula calculates the forecasted price for each product for a particular year by multiplying the product's price in the previous year by the specified year's inflation rate. The resulting value represents the estimated price for the product in the specified year, adjusted for inflation based on the previous year's price.

For example, the price of a product in 2023 (the year before) is Malaysian Ringgit (MYR) 100.00, and the inflation rate for 2024 (using 2012 as the base year) is 5%.

Using the formula, the forecasted price for the product in 2024 would be:

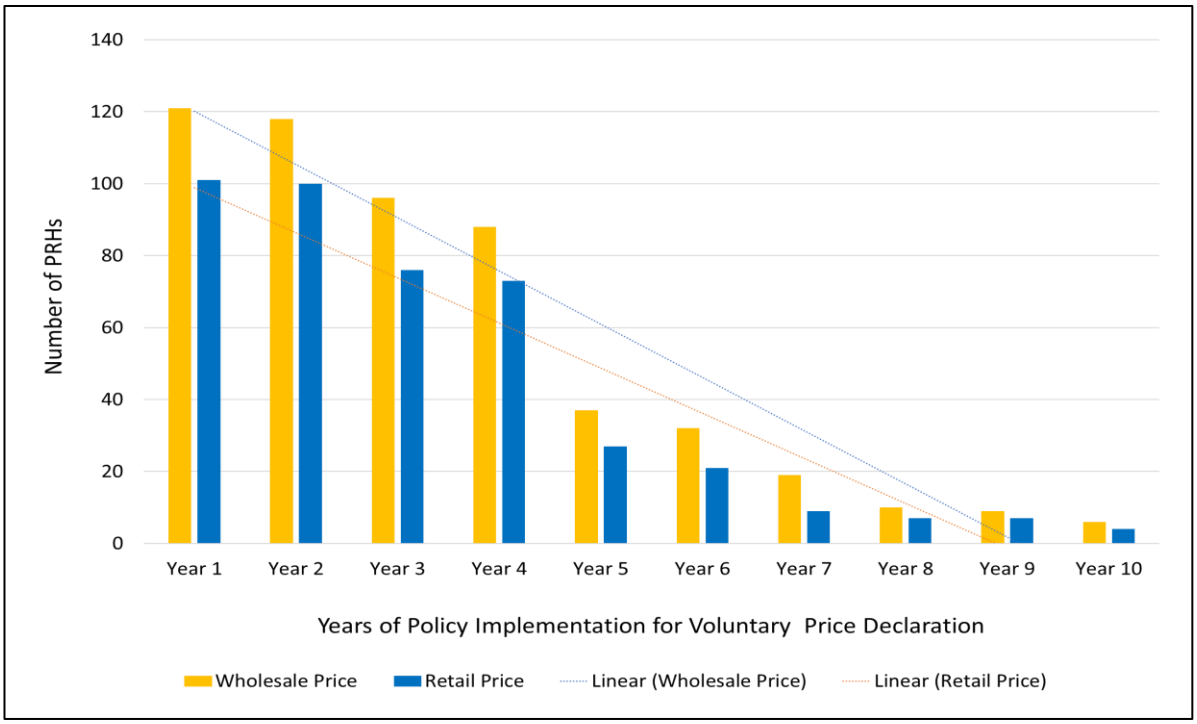
Forecast Price for 2024 = MYR 100.00 ×5% = MYR 10.00 ×1.05 = MYR105.00

So, the forecasted price for the product in 2024 would be MYR 105.00.

4.0 RESULTS

4.1 Response Rate of Product Registration Holders to Voluntary Medicines Price Declaration

4.1.1 Number of Product Registration Holders (PRHs) Consistently Participating in the Voluntary Medicines Price Declaration



Year of policy implementation	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
Number of PRHs provided WP	121	118	96	88	37	32	19	10	9	6
Number of PRHs provided RP	101	100	76	73	27	21	9	7	7	4

Figure 4.1 Number of Product Registration Holders consistently participating in the voluntary medicines price declaration

The number of PRHs consistently participating in the medicines price declaration has reduced from 2012 to 2022, as per Figure 4.1. In the first year of implementation, 2012, 121 PRHs reported WPs, and 101 reported RPs. This number gradually declined, and only 6 PRHs were consistently committed to reporting WPs and 4 PRHs for RPs for a decade since the inception.

These trends suggest a decline in long-term consistency in price reporting for WPs and RPs among PRHs, which may indicate challenges in sustaining reporting mechanisms over extended periods. Over the past 10 years, 6 PRHs, predominantly local pharmaceutical companies, have consistently participated in the voluntary medicines price declaration practice (see Table 4.1).

Table 4.1 List of Product Registration Holders consistently participated from 2012-2022

No.	List of PRHs consistently participated from 2012-2022	Average number of medicines prices declared every year	
		Wholesale Prices	Retail Prices
1	PRH A	87	100
2	PRH B	47	47
3	PRH C	10	10
4	PRH D	78	78
5	PRH E	69	*NA
6	PRH F	18	*NA

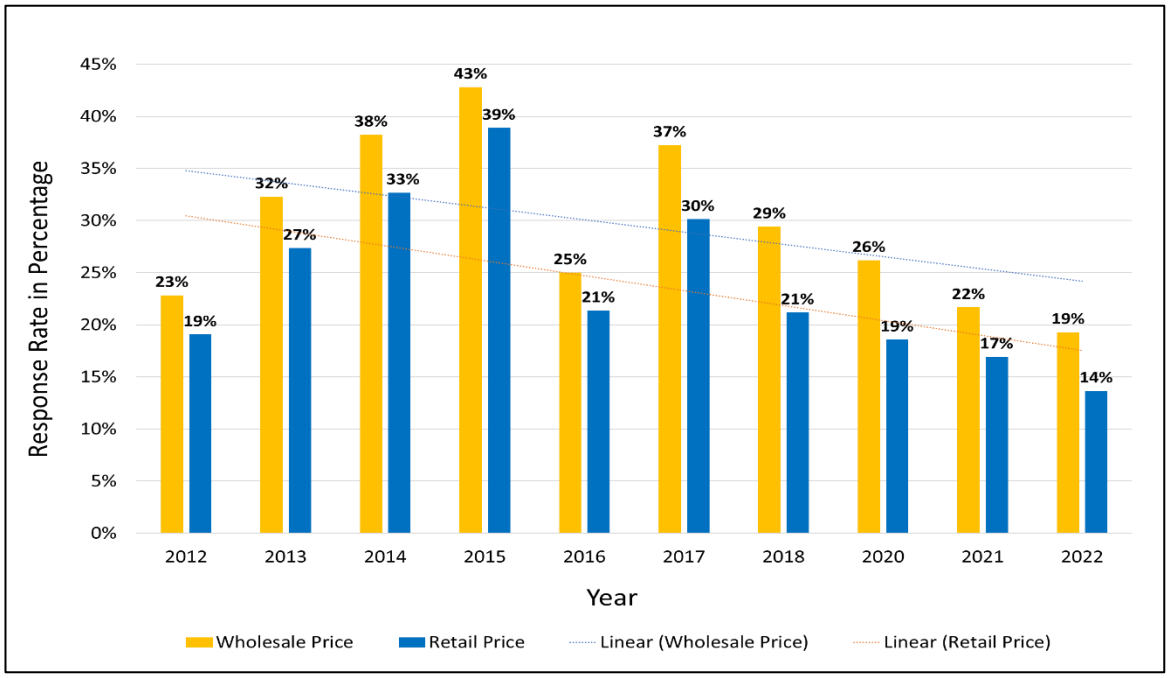
*NA: not available; no RPs shared by respective PRHs
Names of PRHs are kept confidential

4.1.2 The Response Rate of Product Registration Holders (PRHs) Registered in Malaysia to Voluntary Medicines Price Declaration

Referring to Figure 4.2, the number of PRHs participating in the voluntary declaration of WPs and RPs for medicines has fluctuated over the years, showing an overall declining trend. Approximately 350 PRHs have registered their medicines in Malaysia, particularly for those categorised under registration numbers with Suffix A and Suffix X. The response rate for voluntary medicines price declarations was calculated based on the proportion of PRHs participating in the initiative relative to the total number of registered PRHs.

- **WPs:** The highest participation was recorded in 2013, with 144 PRHs providing data. Participation then declined, hitting a low of 50 PRHs in 2018 before slightly recovering in subsequent years, with 65 PRHs reporting in 2022.

- **RPs:** Similarly, the highest engagement occurred in 2013, with 122 PRHs submitting RPs data. Participation steadily decreased, reaching the lowest point in 2018 with only 36 PRHs, and concluding in 2022 with 46 participants.



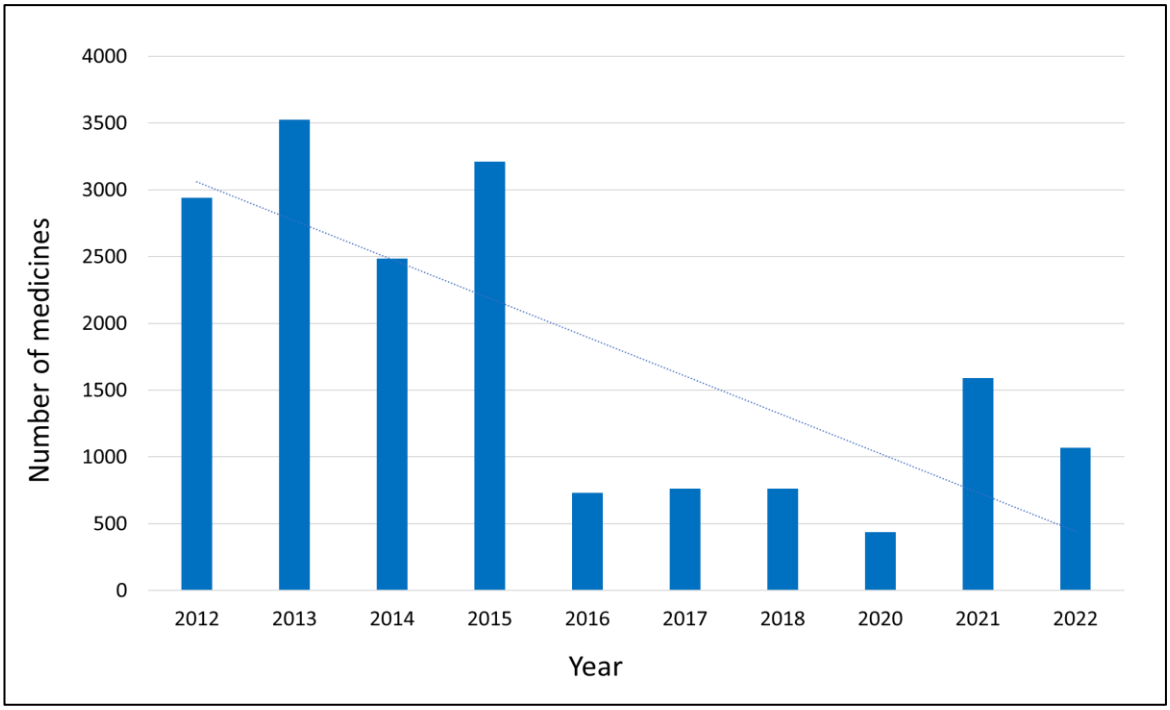
Year	2012	2013	2014	2015	2016	2017	2018	2020	2021	2022
Number of PRHs provided WPs	121	144	117	131	55	89	50	55	73	65
Number of PRHs provided RPs	101	122	100	119	47	72	36	39	57	46

* Total Number of PRHs with medicines Suffix A & X for the respective year may vary (~ 337-350)

Figure 4.2 The Response Rate of PRHs Registered in Malaysia to Voluntary Medicines Price Declaration

This trend indicates a gradual decline in PRHs involvement in the voluntary medicines price declaration initiative, suggesting challenges in sustaining long-term participation. This could stem from insufficient motivators, such as prospects for business expansion or market advantages. Moreover, the lack of regulatory consequences for opting out may diminish the perceived value or priority of participation, resulting in declining interest in the initiative.

4.1.3 The Number of Medicines with Retail Prices (RPs) Published as MyPriMe 2012-2022



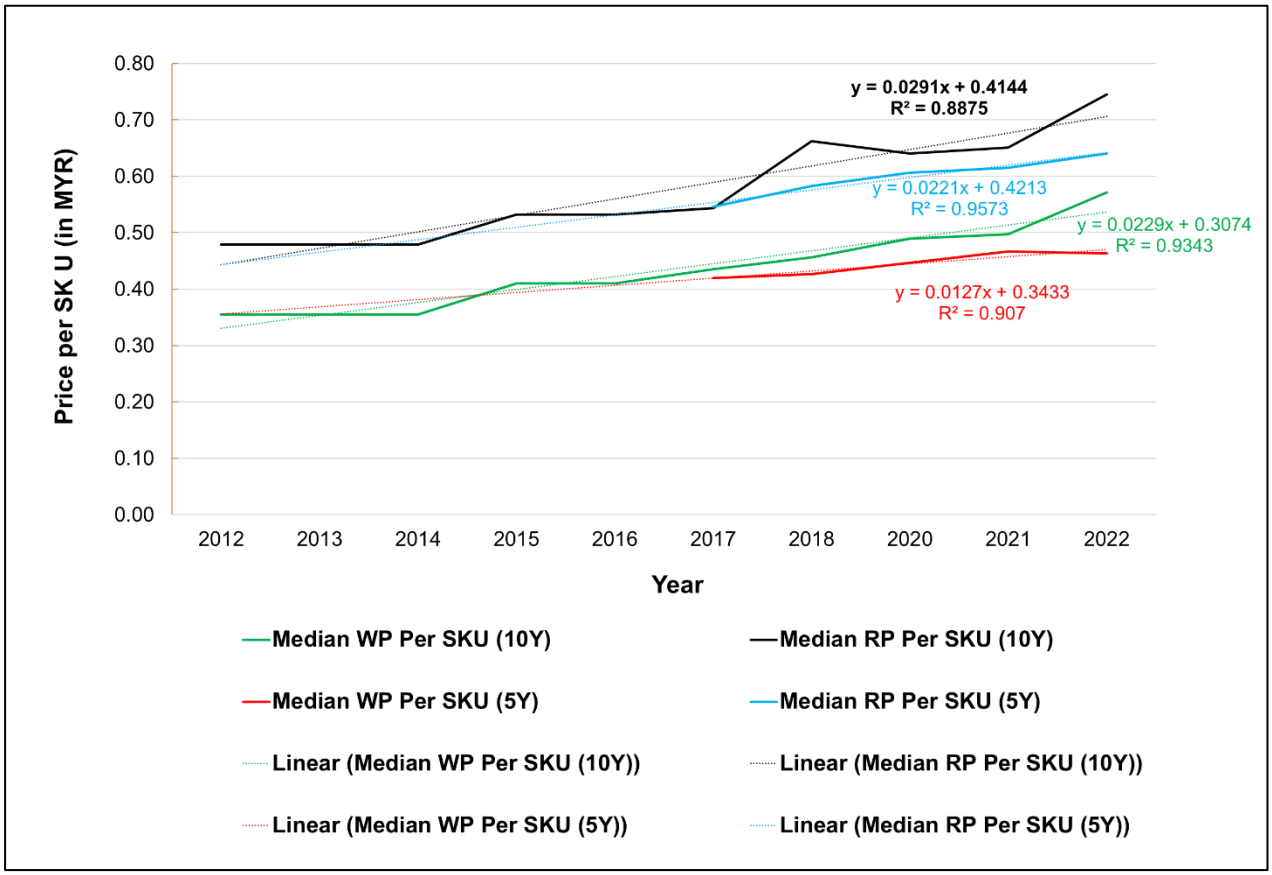
Year	2012	2013	2014	2015	2016	2017	2018	2020	2021	2022
Number of Medicines (n)	2940	3526	2485	3209	730	761	761	436	1590	1068

Figure 4.3 Number of medicines with retail prices published as MyPriMe (2012-2022)

Referring to Figure 4.3, the number of medicines for which price data was declared between 2012 and 2022, showing a general decline over the years. Between 2012 to 2015 there was an initial increase, with the number of medicines peaking in 2013 at 3,526, followed by slight fluctuations, reaching 3,209 in 2015. However, a sharp drop is observed after 2015, with the number of medicines decreasing to just 730 in 2016. Although there were slight recoveries in 2017 (761) and 2021 (1,590), the overall trend remains downward, ending with 1,068 medicines in 2022. The trendline emphasises the consistent overall decline in the number of medicines with price declarations over the years. This decline affirms the reduced participation in sustaining the price declaration process.

4.2 Price Trend & Percentage Price Changes

4.2.1 Median Wholesale Prices (WPs) and Retail Prices (RPs) Trend For 10-year and 5-year period



Year	2012	2013	2014	2015	2016	2017	2018	2020	2022
Median WP Per SKU (10Y)	0.36	0.36	0.36	0.41	0.41	0.44	0.46	0.49	0.57
Median RP Per SKU (10Y)	0.48	0.48	0.48	0.53	0.53	0.54	0.66	0.65	0.75
Median WP Per SKU (5Y)					0.42	0.43	0.45	0.47	0.46
Median RP Per SKU (5Y)					0.55	0.58	0.61	0.62	0.64

WP: Wholesale Price; RP: Retail Price; SKU: Stock keeping Unit (i.e per tablet, per ml); n 2012-2022 (10Y) =46; n 2017-2022 (5Y) = 188

Figure 4.4 Median wholesale price and retail price trend for 10-year and 5-year period

Referring to Figure 4.4, the trend was analysed based on median WPs and RPs per SKU (stock-keeping unit) in Malaysian Ringgit (MYR) over a 10-year period (2012–2022) and a 5-year period (2018–2022). It includes both observed data and linear regression trends, with key findings as follows:

a) Wholesale Prices (WPs):

- **10-Year Trend:** The median WPs per SKU (green line) increased gradually from MYR 0.36 in 2012 to MYR 0.57 in 2022.

- **5-Year Trend:** A slightly less steep increase is evident in the 5-year median WPs trend (red line), indicating slower price growth in the latter half of the period.

b) Retail Prices (RPs):

- **10-Year Trend:** The median RPs per SKU (black line) rose consistently from MYR 0.48 in 2012 to MYR 0.75 in 2022, showing a sharper upward trajectory compared to WPs.

- **5-Year Trend:** The 5-year median RPs trend (blue line) also shows a steady rise, from MYR 0.55 in 2018 to MYR 0.64 in 2022, reflecting continued growth in retail pricing.

c) Linear Trends and R^2 Values:

- Both WPs and RPs demonstrate positive linear trends, with R^2 values close to 1, indicating strong correlation and predictive reliability in the price increase over time.

- The 10-year RPs trend shows the steepest slope (0.0291x), highlighting a faster growth rate compared to other categories.

Retail prices (RPs) exhibit consistently higher growth than WPs, suggesting increasing retail markups or differences in pricing strategies over the years. The more gradual growth in WPs compared to RPs indicates that while wholesale costs have risen, additional factors like market demand, distribution, or retailer margins contribute to the steeper rise in RPs.

4.2. Percentage of Wholesale Prices (WPs) changes for 10-year and 5-year period

Table 4.2 provides insights into the rate of change in medicine WPs over 10 years (2012–2022) and 5 years (2017–2022), categorised into three groups: Increase, Stable, and Sum of All, with further breakdowns for medicines classified under Suffix A and Suffix X. For the 10-year period, medicines in the increase category saw a median rate of price change of 40.0%, with Suffix A medicines experiencing a slightly higher median (42.2%) compared to Suffix X at 25.0%. The Stable category showed a much lower median of 15.0%, with no medicines under Suffix X in this group. The sum of all group, which includes both increase and stable categories, had a median change of 25.7%.

For the 5-year period, the price changes were generally lower, with total medicines in the increase category having a median rate of 21.1%. Suffix A had a median change of 21.3%, and Suffix X exhibited a slightly lower median at 20.9%. In contrast, medicines in the stable category showed minimal change, with a median rate of 5.9%. When combining all groups, the sum of all median for the 5-year period was 18.2%, indicating a deceleration in price increases compared to the 10-year period. This suggests that while some medicines, especially those in the Increment category, experienced notable price hikes, others showed stability. Suffix A typically exhibited more significant price changes than Suffix X over both timeframes. It is to be noted none of the medicines sampled for the respective time frame has any decrease of WPs.

Table 4.2 Percentage of wholesale price changes for 10-year and 5-year period

Category based on Regression Analysis	Medicines classification	No of medicines (n)	Rate of change (%) in 10 Years (2012-2022) (n=46)						No of medicines (n)	Rate of change (%) in 5 years (2017-2022) (n=188)					
			Min (%)	Average (%)	Median (%)	Max (%)	Q25 (%)	Q75 (%)		Min (%)	Average (%)	Median (%)	Max (%)	Q25 (%)	Q75 (%)
Increment	**Total**	28	4.0	63.9	**40.0**	240.0	26.5	81.3	127	-18.6	23.1	**21.1**	134.4	14.9	25.2
	Suffix A	24	4.0	65.8	42.2	240.0	27.2	81.3	90	-18.6	22.9	21.3	83.5	15.1	26.7
	Suffix X	4	10.3	52.6	25.0	150.0	15.1	62.5	37	7.0	23.4	20.9	134.4	14.1	22.1
Stable	**Total**	18	0.0	13.5	**15.0**	25.8	14.2	15.8	61	-30.3	8.6	**5.9**	39.2	0.0	16.3
	Suffix A	18	0.0	13.5	15.0	25.8	14.2	15.8	59	-30.3	8.7	5.9	39.2	0.0	16.5
	Suffix X	0	0	0	0	0	0	0	2	0.0	6.6	6.6	13.3	3.3	10.0
Sum of All	**Total**	46	0.0	44.2	**25.7**	240.0	25.7	47.9	188	-30.3	18.4	**18.2**	134.4	7.7	23.3
	Suffix A	42	0	43.4	**25.7**	240.0	14.9	47.9	149	-30.3	17.3	16.9	83.5	5.9	23.4
	Suffix X	4	10.3	52.6	**25.0**	150.0	15.1	62.5	39	0.0	22.6	20.5	134.4	14.0	22.1

Suffix A: Controlled medicines; Suffix X: Over-the-counter medicines

Percentage price changes were calculated by subtracting the earliest price from the later price, dividing that difference by the earlier price and multiplying by 100%.

4.2.3 Percentage of Retail Prices (RPs) changes for 10-year and 5-year period

Data on the rate of change in RPs of medicines over two periods: 10 years (2012–2022) and 5 years (2017–2022), categorised based on regression analysis into Increment (price increase) and Stable (price remained unchanged) was presented in Table 4.3. The data is further classified into two product groups, Suffix A and Suffix X, with key statistical metrics like minimum, average, median, maximum, Q25 (25th percentile), and Q75 (75th percentile) shown.

Over the 10-year period, the overall median price change is 26.7%, with minimum and maximum changes of -3.7% and 214.8%, respectively. Medicines in the Increment category display a higher median increase (33.6%) compared to Stable medicines (16.0%). Within the product classifications, Suffix A shows a stronger upward trend with a median increase of 28.0%, while Suffix X exhibits a lower median of 25.0% but a higher average change of 51.6%, reflecting greater variability.

For the 5-year period, the overall median price change is 15.0%, indicating slower growth compared to the 10-year trend. In this period, medicines in the Increment category have a median increase of 19.7%, while Stable medicines experience minimal changes, with a median of only 5.4%. Comparing product classifications, Suffix A maintains a higher median change of 16.2% (ALL) versus Suffix X, which has a lower median of 10.3%. However, Suffix X continues to show significant variability with a maximum increase of 134.4%.

In summary, medicines in the Increment category consistently show greater price increases compared to Stable medicines, particularly for Suffix A products. While price changes over the 10-year period reflect stronger upward trends (26.7% median), the 5-year period shows a slowdown in RPs growth (15.0% median), suggesting price stabilisation in the short term. Additionally, significant variability, especially in Suffix X products, highlights differing trends within product groups.

Table 4.3 Percentage of retail price changes for 10-year and 5-year period

Category based on Regression Analysis	Medicines classification	No of medicines (n)	Rate of change (%) in 10 Years (2012-2022) (n=46)						No of medicines (n)	Rate of change (%) in 5 years (2017-2022) (n=188)					
			Min (%)	Average (%)	Median (%)	Max (%)	Q25 (%)	Q75 (%)		Min (%)	Average (%)	Median (%)	Max (%)	Q25 (%)	Q75 (%)
Increment	**Total**	29	-3.7	54.4	**33.6**	214.8	20.4	62.0	124	-18.8	21.7	**19.7**	134.4	10.3	26.1
	Suffix A	25	-3.7	54.9	38.3	214.8	18.3	62.0	88	-18.8	22.8	21.9	84.6	14.8	26.7
	Suffix X	4	22.1	51.6	25.0	134.4	24.3	52.3	36	5.8	19.1	10.3	134.4	8.8	18.0
Stable	**Total**	17	0.0	18.1	**16.0**	39.2	14.5	28.0	64	-30.6	6.9	**5.4**	25.8	0.0	15.1
	Suffix A	17	0.0	18.1	16.0	39.2	14.5	28.0	61	-30.6	7.1	5.8	25.8	0.0	15.2
	Suffix X	0	0	0	0	0	0	0	3	0.0	2.5	0.0	7.6	0.0	3.8
Sum of All	**Total**	46	-3.7	41.0	**26.7**	214.8	15.8	39.1	188	-30.6	16.7	**15.0**	134.4	7.0	22.8
	Suffix A	42	-3.7	40.0	28.0	214.8	15.1	39.1	149	-30.6	16.4	16.2	84.6	5.9	23.4
	Suffix X	4	22.1	51.6	25.0	134.4	24.3	52.3	39	0.0	17.8	10.3	134.4	7.9	17.0

Suffix A: Controlled medicines; Suffix X: Over-the-counter medicines

Percentage price changes were calculated by subtracting the earliest price from the later price, dividing that difference by the earlier price and multiplying by 100%.

Figure 4.5 illustrates the percentage increase in the WPs of various medicines between 2012 and 2022, with the data sorted in descending order. Each bar represents the degree of price change for a specific medication over the decade. The x-axis displays the percentage change, while the y-axis lists the names of the drugs and formulations.

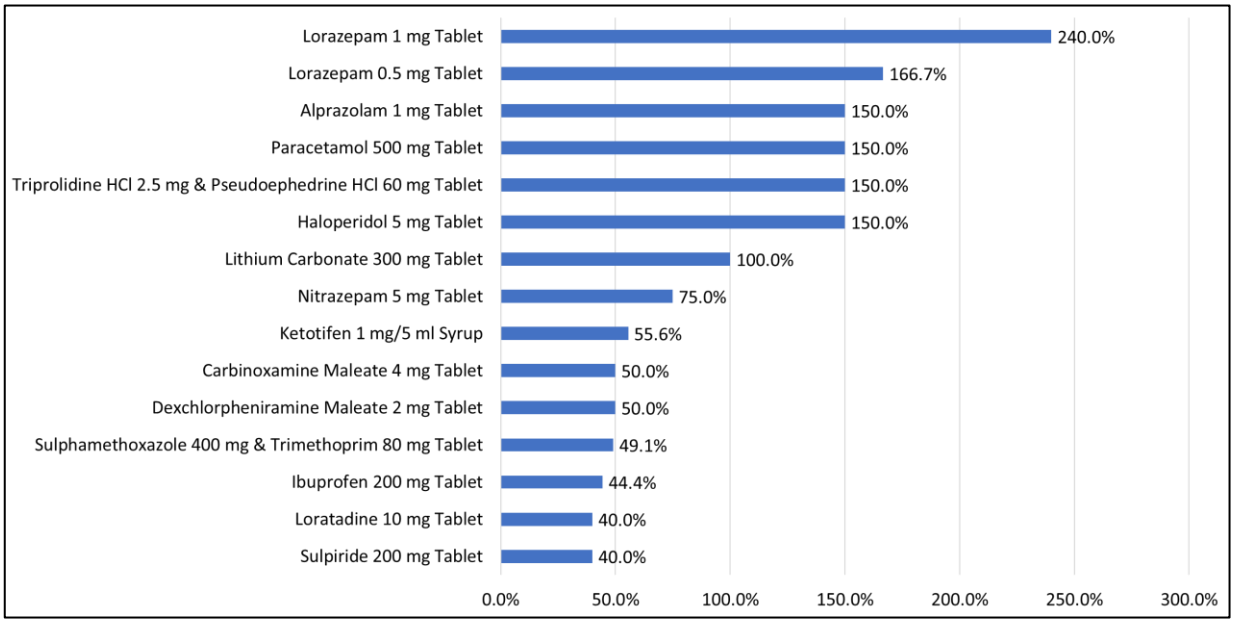


Figure 4.5 Top 15 medicines with the highest rate of wholesale price changes from 2012-2022

Lorazepam formulations show the most significant price hikes, where Lorazepam 1 mg Tablet increased by 240.0%, followed by Lorazepam 0.5 mg Tablet at 166.7%. Several other medicines, including Alprazolam 1 mg Tablet, Paracetamol 500 mg Tablet, Triprolidine HCl 2.5 mg & Pseudoephedrine HCl 60 mg Tablet, and Haloperidol 5 mg Tablet, all experienced a 150.0% price increase.

Lithium Carbonate 300 mg Tablet also shows a substantial rise, doubling its price to 100%. Lower down the list, Nitrazepam 5 mg Tablet recorded a 75.0% increase, and Ketotifen 1 mg/ 5 ml Syrup saw a 55.6% hike. Medications such as Carbinoxamine Maleate 4 mg Tablet and Dexchlorpheniramine Maleate 2 mg Tablet experienced more modest increases of 50.0%, while Sulphamethoxazole 400 mg & Trimethoprim 80 mg Tablet showed a 49.1% rise. At the lower end, Ibuprofen 200 mg Tablet, Loratadine 10 mg Tablet, and Sulpiride 200 mg Tablet registered increases of 44.4% and 40.0%, respectively.

Overall, the data reveals significant price increases across several medicines, with Lorazepam experiencing the steepest hikes.

Meanwhile, Figure 4.6 illustrates the percentage changes in RPs for various pharmaceutical products between 2012 and 2022. Each bar represents the degree of price change for a specific medication over the decade. The x-axis displays the percentage change, while the y-axis lists the names of the drugs and formulations.

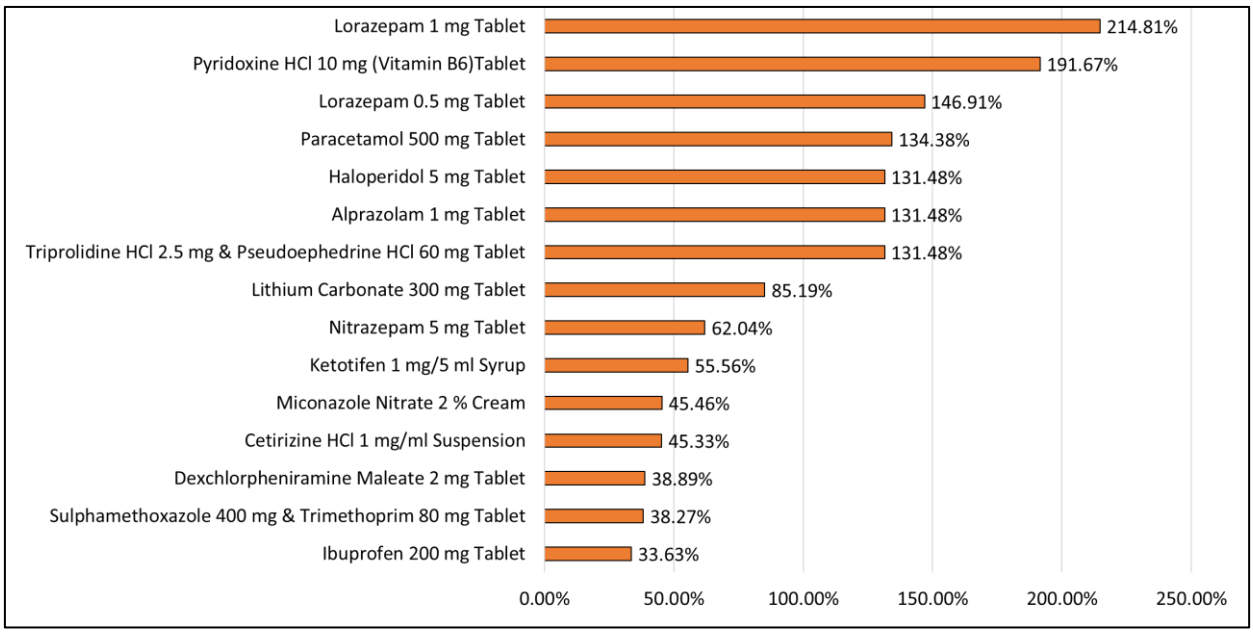


Figure 4.6 Top 15 medicines with the highest rate of retail price changes from 2012-2022

The most substantial price hikes were observed for Lorazepam 1 mg Tablet, which surged by 214.81%, followed closely by Pyridoxine HCl 10 mg (Vitamin B6) Tablet with a rise of 191.67% and Lorazepam 0.5 mg Tablet at 146.91%. Other medications, such as Paracetamol 500 mg Tablet, Haloperidol 5 mg Tablet, Alprazolam 1 mg Tablet, and Triprolidine HCl 2.5 mg & Pseudoephedrine HCl 60 mg Tablet, saw notable price increases ranging between 131.48% and 134.38%, reflecting substantial cost escalations.

Moderate price changes were observed for Lithium Carbonate 300 mg Tablet (85.19%) and Nitrazepam 5 mg Tablet (62.04%), while Ketotifen 1 mg/5 ml Syrup rose by 55.56%. In contrast, smaller price increases were recorded for products such as Miconazole Nitrate 2% Cream (45.46%), Cetirizine HCl 1 mg/ml Suspension (45.33%), and Dexchlorpheniramine Maleate 2 mg Tablet (38.89%). The lowest percentage changes were seen for Sulphamethoxazole 400 mg & Trimethoprim 80 mg Tablet (38.27%) and Ibuprofen 200 mg Tablet, which increased by 33.63%. The chart highlights a widespread upward trend in RPs over the decade, with sedatives, psychotropic drugs, and essential medicines experiencing the steepest hikes.

4.2.4 Price Trend Categories of Medicines (Increase, Stable, and Decrease) Across Different Product Types

Table 4.4 analyses the number of medicines with increased, stable, or decreased WPs and RPs over a 10-year period from 2012 to 2022 (n=46). Among the analysed medicines, 66.67% (n=29) experienced a price increase, including 3 non-prescription and 26 prescription drugs. In contrast, 33.33% (n=17) showed stable prices, all of which were prescription drugs.

Table 4.4 Number of medicines with wholesale and retail price trends (increase, stable, decrease) from 2012-2022 (n=46)

Price Trend Category (WP & RP)	Biologics	New Chemical Entity	Non - Prescription	Prescription	Total (n)	Percentage (%)	P-value
Increase	0	0	3	26	29	66.67	**0.001**
Stable	0	0	0	17	17	33.33	
Decrease	0	0	0	0	0	0	
Total (n)	**0**	**0**	**3**	**43**	**46**	**100**	

*Trend was deduced based on panel data regression analysis
#Anova

Notably, no medicines demonstrated a decrease in prices during the review period, with WPs and RPs either increasing or remain stable. The p-value of 0.001 in the table indicates a statistically significant difference between the price trend categories (increased, stable, and decreased) for WPs and RPs from 2012 to 2022. The significant p-value highlights a clear pattern of price behaviour over the decade, particularly with the majority of medicines experiencing price increases, predominantly among prescription drugs.

Referring to Table 4.5, between 2017 and 2022, the WPs of 188 medicines were analysed, revealing significant differences in price trends. The majority of products (65.96%, n=124) experienced an increase in prices, comprising 25 non-prescription drugs and 99 prescription drugs. Meanwhile, 34.04% (n=64) of the products had stable prices, including three new chemical entities, two non-prescription drugs, and 59 prescription drugs.

Table 4.5 Number of medicines with wholesale price trends (increase, stable, decrease) from 2017–2022 (n=188)

Price Trend Category	Biologics	New Chemical Entity	Non - Prescription	Prescription	Total (n)	Percentage (%)	P-value
Increase	0	0	25	99	124	65.96	**0.001**
Stable	0	3	2	59	64	34.04	
Decrease	0	0	0	0	0	0.0	
Total (n)	**0**	**3**	**27**	**158**	**188**	**100**	

*Trend was deduced based on panel data regression analysis
#Anova

Notably, no products (0%) showed a decrease in WPs during this period. Prescription drugs dominated the dataset, accounting for 158 out of 188 products, with non-prescription drugs making up only 27 products, and no biologics were represented. The p-value of 0.001 indicates a statistically significant difference between the price trend categories (increased, stable, and decreased). This analysis highlights a clear trend of rising WPs for most products during the 5-year period, with a smaller proportion maintaining stable prices**.**

Meanwhile, referring to Table 4.6, between 2017 and 2022, the RPs of 188 medicines were analysed, showing a significant difference in price trends as indicated by the p-value of 0.001. The majority of medicines (67.55%, n=127) experienced an increase in RPs, comprising 25 non-prescription and 102 prescription drugs. Meanwhile, 32.45% (n=61) of the medicines had stable prices, which included 3 new chemical entities, 2 non-prescription drugs, and 56 prescription drugs.

Notably, no medicines (0%) showed a decrease in RPs during this period. Prescription drugs dominated the dataset, accounting for 158 out of 188 products, while non-prescription drugs and new chemical entities represented smaller portions. The significant p-value highlights a clear trend of increasing RPs, particularly among prescription medicines, with fewer products maintaining stable prices and none experiencing price reductions.

Table 4.6 Number of medicines with retail price trends (increase, stable, decrease) from 2017–2022 (n=188)

Price Trend Category	Biologics	New Chemical Entity	Non - Prescription	Prescription	Total (n)	Percentage (%)	P-value
Increase	0	0	25	102	127	67.55	**0.001**
Stable	0	3	2	56	61	32.45	
Decrease	0	0	0	0	0	0.0	
Total (n)	**0**	**3**	**27**	**158**	**188**	**100**	

*Trend was deduced based on panel data regression analysis
#Anova

4.3 Retail Mark-up

Medicine price mark-ups across different product types and classifications, showing median, average, and percentile values variations was presented in Table 4.9. For total of products of 110, the median mark-up was found to be 30.0% (25th percentile: 25.0%; 75th percentile: 35.0%) and an average of 34.2%. Products classified under Suffix A exhibited similar trends, while those under Suffix X showed slightly lower mark-ups, with a median of 25.1% (25th percentile: 25.0%, 75th percentile: 35.0%) and an average of 29.4%.

Table 4.7 Retail mark-up by product type and classification

Product type	Product classification	No of product (n)	Median (%)	Average (%)	25th (%)	75th (%)
Sum of All	**Total**	110	**30.0**	34.2	25.0	35.0
	Suffix A	96	30.0	34.9	25.0	35.0
	Suffix X	14	25.1	29.4	25.0	35.0
New chemical entity	**Total**	3	**33.3**	19.4	12.5	33.3
	Suffix A	3	33.3	19.4	12.5	33.3
	Suffix X	0				
Biologics	**Total**	2	**0.0**	0.0	0.0	0.0

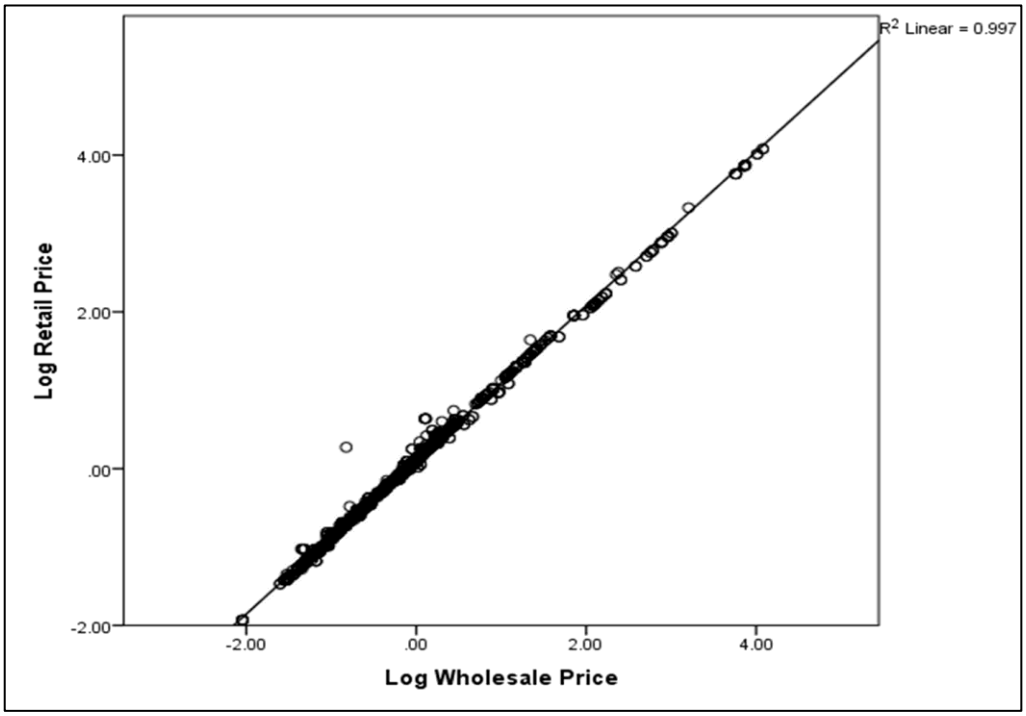
Product type	Product classification	No of product (n)	Median (%)	Average (%)	25th (%)	75th (%)
	Suffix A	2	0.0	0.0	0.0	0.0
	Suffix X	0				
Non prescription	**Total**	13	**25.0**	29.4	25.0	35.0
	Suffix A	0				
	Suffix X	13	25.0	29.4	25.0	35.0
Prescription	**Total**	92	**30.0**	36.1	25.0	35.0
	Suffix A	91	30.0	36.1	25.0	35.0
	Suffix X	1	30.0	30.2	25.0	35.2

Prescription drugs had the highest mark-ups among the categories, with a median of 30.0% (25th percentile: 25.0%, 75th percentile: 35.0%) and an average of 36.1%, indicating a consistent pricing trend. Non-prescription drugs, in comparison, had a median of 25.0% (25th percentile: 25.0%, 75th percentile: 35.0%) and an average of 29.4%, suggesting slightly lower mark-ups. New chemical entities displayed higher variability, with a median mark-up of 33.3% (25th percentile: 12.5%, 75th percentile: 33.33%) but a lower average of 19.4%. In contrast, Biologics exhibited no mark-ups, as indicated by a consistent 0% median and average mark-up values. This reflects that PRH reported identical WPs and RPs for these products. The uniformity in pricing can be attributed to the unique nature of biologics, primarily dispensed in hospital settings rather than being sold as retail products in healthcare facilities. This distribution model minimises opportunities for RPs variations and ensures that biologics are primarily used within clinical environments, reinforcing their standardised pricing structure.

Overall, the data highlights a general trend of moderate markups for most medicines, with prescription drugs carrying higher markups compared to non-prescription drugs. The classification of products into Suffix A and Suffix X further shows that Suffix X products generally have lower price markups, reflecting possible differences in pricing strategies or market positioning.

4.4 Association Between Wholesale Prices (WPs) and Retail Prices (RPs) from MyPriMe

Referring to Figure 4.7, the regression analysis reveals a strong linear relationship between the log WPs and RPs. With a sample size of 166 observations, the model demonstrates an R-squared value of 0.997, indicating that log WPs explain 99.7% of the variance in log RPs.



	Log retail price			
	n	R square	Unstandardized Coefficients (B)	p-value*
Log wholesale price	166	0.997	0.983	<0.001

Figure 4.7 Regression analysis between wholesale prices and retail prices

The unstandardised coefficient (B) is 0.983, suggesting that a 1-unit increase in log WPs results in a proportional 0.983-unit increase in log RPs, reflecting a near one-to-one relationship. The p-value is <0.001, confirming this highly statistically significant relationship. These results highlight a near-perfect alignment between WPs and RPs, demonstrating consistent pricing behaviour.

4.5 Association Between Wholesale Medicines Prices Declared Voluntarily and IQVIA Medicine Prices Database

Table 4.8 demonstrates a strong significant association between wholesale medicine prices voluntarily declared by Price Reporting Holder and the prices recorded in IQVIA across an 8-year period (2012–2020). The Pearson correlation coefficients range from 0.960 to 0.982, indicating a very strong positive correlation each year. The p-value for all years is consistently 0.001, confirming the statistical significance of these associations. The overall correlation coefficient across the entire period is 0.976, reflecting a robust relationship between the voluntarily declared prices and the actual market prices recorded in IQVIA.

Table 4.8 Association between wholesale medicines prices declared voluntarily and IQVIA medicine price database

Year	Correlation coefficient, *p*	*p*-value*
2012	0.978	0.001
2013	0.982	0.001
2014	0.980	0.001
2015	0.961	0.001
2016	0.960	0.001
2017	0.976	0.001
2018	0.977	0.001
2020	0.981	0.001
Overall	**0.976**	**0.001**

These findings suggest that the prices voluntarily reported by pharmaceutical companies accurately represent the market prices. This trend holds consistently over the years, reinforcing the reliability of voluntary medicines price declarations. The results align with the earlier study by Ahmad N. et al., (2019), which similarly demonstrated a strong association between declared and actual medicine prices in Malaysia's private healthcare sector

4.6 Comparison of Medicines Prices Declared by Product Registration Holders (PRHs) and Forecasted Price with Yearly Inflation

Analytical findings comparing medicine prices declared by PRHs with forecasted prices adjusted for yearly inflation for both wholesale and retail levels was presented in Table 4.9. For WPs, the Wilcoxon Signed Ranks Test revealed a significant difference, with a Z-value of -11.577 and a p-value of 0.000, indicating that forecasted prices exceeded declared prices in most cases [436 cases showed positive ranks (forecasted prices > declared prices), while 92 cases showed negative ranks (declared prices > forecasted prices)].

Table 4.9 Comparison between medicines prices declared by PRH and forecasted price (wholesale vs retail) with yearly inflation

	Group	N	Mean Rank	Sum of Ranks	Z	p-value
Wholesale Forecast	**Negative Value**	92	317.63	29222.00	-11.577	0.000
	Positive Value	436	253.29	110434.00		
	Equal	66				
Retail Forecast	**Negative Value**	114	193.88	22102.00	-6.451	0.000
	Positive Value	264	187.61	49529.00		
	Equal	42				

Similarly, for RPs, the Wilcoxon test also showed a significant difference (Z = -6.451, p-value = 0.000), with most forecasted prices exceeding declared prices [264 cases showed positive ranks (forecasted prices > declared prices), while 114 cases showed negative ranks (declared prices > forecasted prices)]. These findings suggest that prices declared by PRHs are consistently lower than forecasted prices based on yearly inflation. This indicates that inflation alone may not fully account for factors like raw material costs, exchange rates, and market dynamics, emphasising the need for a more comprehensive approach to medicine price forecasting.

5.0 DISCUSSION

In 2011, Malaysia's Ministry of Health (MOH) launched a policy to improve pharmaceutical price transparency by encouraging PRHs to declare their WPs and RPs voluntarily through the MyPharma-C System. Managed by the PSP, this initiative saw declining compliance over time due to its voluntary nature and lack of mandatory enforcement. It is suggested that the government consider incorporating mandatory price disclosure into pharmaceutical pricing regulations to enhance price transparency, similar to practices in South Africa, Vietnam, and some European countries (Ahmad et al., 2019).

The cost of medicines in Malaysia has been a growing concern over the past decade. Since 2012, there has been a notable increase in prescription and over-the-counter (OTC) drug prices. According to a report by the Galen Centre for Health and Social Policy, some medicines experienced price increases of up to 30% between 2012 and 2018 (Galen Centre for Health and Social Policy, 2019). Another study published in the Malaysian Journal of Pharmacy pointed out that the price differences between branded and generic medicines could be as high as 60% (Malaysian Journal of Pharmacy, 2020).

A few factors were noted to influence the pricing of medicines in Malaysia. Regulatory frameworks and market dynamics influence the pricing of medicines in Malaysia. According to Motlagh et al. (2012), liberalising the pharmaceutical market and reducing government control over drug prices has led to increased competition among private healthcare providers, driving up prices as they seek to maximise profits.

Additionally, the general economic conditions, including inflation and fluctuations in the Malaysian Ringgit, have played a significant role in the rising cost of medicines. Malaysia imports a large portion of its pharmaceuticals, and a weaker Ringgit has made these imports more expensive. Rahman et al. (2017) highlight that inflationary pressures have led to higher operational costs for pharmaceutical companies, which are then passed on to consumers. Furthermore, the research and development (R&D) cost for new drugs has increased globally. Pharmaceutical companies often cite high R&D expenditures as a justification for higher drug prices. A study by Ching et al. (2018) indicates that multinational pharmaceutical firms operating in Malaysia have raised prices to recoup R&D investments.

The report also highlights that the retail markup varies across different product categories with a median markup ranging between 25-30%, with prescription medicines having a higher average markup than non-prescription medicines and new chemical entities. Notably, new chemical entities exhibit a wider range of retail mark-ups, as indicated by the lower 25th percentile (12.5%) and the same 75th percentile (33.3%) as their median value, suggesting variability in pricing strategies for these medicines. The establishment of markups

in this study is considered moderate, as the data relies on suggested retail prices (RPs) provided by price-regulated holders (PRHs). PRHs often proclaim to apply a simple mark-up to come up with suggested retail prices, typically following a general rule of thumb of 30-35%, common in general retail business. It is often claimed that they are unable to fully consider other factors that influence the final mark-up at retail premises, such as operational costs, market competition, demand fluctuations, and the business strategies employed by provider

As currently there is no specific regulation or policies that have been adopted and no fixed maximum or ceiling price for medicines, private sector having their own mark-up percentage for originator medicines (30.1 – 121.2%) and generic medicines (85.2 – 233.5%) as reported in Medicine Price Monitoring in Malaysia 2022. Therefore, significant price variations and unchecked price mark-ups in the pharmaceutical industry, especially within the private sector, are unavoidable (Ahmad et al., 2019). If mark-ups are regulated in the future, it is highly recommended that countries should implement regressive mark-ups instead of fixed percentage mark-ups (Lee et al., 2020).

In Malaysia, the association between wholesale and RPs of medicine are influenced by several factors such as mark-up and margins, regulatory control, supply chain cost, volume and market competition. The result shows a strong correlation on the importance of WPs in determining RPs. The regulatory bodies can use this information to monitor RPs effectively to ensure that mark-up remains reasonable and fair. While consumers can gain knowledge and awareness regarding price transparency. With this, consumers can make more informed choice decisions before purchasing medicines (Rondan-Cataluña, 2019). The strong association suggests that market dynamics in Malaysia ensure that changes in WPs are quickly reflected in RPs. This responsiveness can be beneficial in maintaining equilibrium in the market avoiding sudden and unexplainable RPs hikes (Nalca A, 2023).

Significant association of declared WPs and recorded price in IQVIA suggest that IQVIA's price can be considered a validated source that reflects the actual market trend (Ahmad et al., 2019). High correlation leads to narrow confidence intervals in predictions, providing a more precise and reliable price. Consequently, having access to comparative pricing information empowers purchasers to refine their negotiation strategies, potentially securing more favourable prices (Kyle & Ridley, 2007). The benefit of having a validated WPs source can uncover potential pricing irregularities, prevent price variations due to inefficiencies, and bridge information of price gaps between suppliers and buyers. Such a platform enables all suppliers to evaluate their procurement procedures against other wholesale suppliers (Hinsch, Kaddar, & Schmitt, 2014). The IQVIA platform comprised prices data from various stakeholders in policy implementation such as government, wholesalers, retailers, private and public health facilities. This comprehensive dataset has the potential to alleviate supply-demand imbalances and may avert resultant challenges to impeding access leading to

improving accessibility to medicine (Koduah et al., 2022). Ultimately, it can contribute to enhancing the overall accessibility of medicine.

Forecasting medicine prices is a complex task that requires consideration of various factors beyond just the inflation rate. While inflation can provide a general indication of the overall increase in prices over time, it may not accurately capture the specific dynamics affecting medicine prices. Several factors significantly influence the trends in medicine prices, including raw material costs, generic market entry, currency exchange rate fluctuations, and global crises affecting distribution logistics. Variations in the prices of active pharmaceutical ingredients (APIs) directly impact production costs and, consequently, medicine prices. The entry of generic medicines introduces competition, particularly for off-patent drugs, often driving prices down as multiple manufacturers compete. Currency exchange rate fluctuations also play a substantial role, especially in countries reliant on imported raw materials or finished medicines, where changes in exchange rates increase costs.

Global crises, such as pandemics or geopolitical conflicts, further complicate the situation by disrupting supply chains, causing shortages, increasing transportation costs, and creating logistical challenges that lead to price hikes. Effective forecasting models for medicine prices must incorporate these factors to enhance predictive accuracy. By doing so, policymakers and healthcare stakeholders can improve pricing strategies, mitigate supply chain disruptions, and ensure consistent access to affordable medicines for all populations.

5.1 Limitation

The RPs reported by PRHs did not account for any discounts or bonus schemes. This implies the reported prices may not reflect the true net costs after such adjustments, leading to potentially inflated price data. The analysis of price trends is based on a limited number of samples. This limitation arises from inconsistent reporting by Pharmaceutical Registration Holders (PRHs), which affects the comprehensiveness of the dataset.

6.0 CONCLUSIONS

Over the years, companies' response rates to voluntary medicines price declarations and the number of medicines with prices published for the consumer price guide have decreased.

In general, the median price declared by PRHs is increasing. There was a strong, significant association between medicine prices declared voluntarily by PRHs and the prices in IQVIA every year of the 8-year period. This implies that the prices voluntarily declared by the company represent actual market prices. There is a significant difference between prices declared to the PSD and the forecasted price, with yearly inflation implying that forecasting medicines prices using the inflation rate alone may not be adequate and that other relevant elements must be factored in. The trending of medicines prices depends on multiple factors, including the price of raw materials, currency exchange, and global crises that may affect product logistics.

To address the rising cost of medicines in Malaysia, it is recommended to enhance price transparency and monitoring. Although Malaysia does not currently enforce formal price regulations, strengthening transparency initiatives through mandatory reporting of WPs and RPs can improve compliance and provide valuable market data for monitoring. Additionally, efforts to promote the use of generic medicines should be intensified. Public awareness campaigns and incentives for healthcare providers to prescribe generics can help reduce costs while ensuring access to quality medications. Expanding pharmaceutical subsidies and insurance schemes is also crucial. Implementing broader subsidies and initiatives like the National Health Insurance Scheme can reduce out-of-pocket expenses and improve affordability for essential medicines. Together, these measures aim to improve the accessibility and affordability of medicines for all Malaysians.

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