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Drug Pricing Policies and National Procurement Under Universal Health Coverage: A Comparative Policy Review

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Abstract
Background: Access to affordable essential medicines is a fundamental prerequisite for achieving Universal Health Coverage (UHC), particularly in developing countries facing fiscal constraints and inefficiencies in pharmaceutical markets. However, the effectiveness of medicine pricing policies varies considerably across countries, depending on regulatory design, procurement capacity, and the strength of institutional governance.
Objectives: This study aims to analyse and compare medicine pricing policies and national procurement systems in Indonesia, the Philippines, and Thailand within the UHC framework.
MethodsThis study employs a comparative policy analysis approach based on three main analytical dimensions adapted from the WHO, utilising secondary data from national regulations, official government reports, and academic literature.
Results: Thailand has demonstrated the most effective model, combining HTA, compulsory licensing, and a centralized GPO system, which reduces drug prices by up to 90%. India optimises generic procurement through the Jan Aushadhi programme, while Malaysia combines external price references with tiered enforcement policies. In contrast, Indonesia and the Philippines still face challenges in price compliance and distribution efficiency, due to institutional fragmentation and weak oversight.
Conclusion: This study underscores the importance of integrating robust regulatory strategies, effective procurement mechanisms, and rigorous monitoring systems to ensure affordability and equitable access to medicines. Cross-country learning can strengthen national pharmaceutical reforms and support policy integration in the ASEAN region.

Keywords: *Asian Pharmaceutical Policy, Drug Prices, UHC, Pharmaceutical Procurement.*

Introduction

Access to safe, effective, and affordable medicines is a fundamental element in achieving Universal Health Coverage (UHC). In many low-to middle-income countries, the price of drugs remains a significant barrier to achieving a fair and inclusive health system, especially when public financing structures are unable to counterbalance the power of the pharmaceutical market. The World Health Organisation (WHO) emphasises that strengthening medicine procurement and pricing systems are two key components of the national health system reform agenda, as they have a direct impact on accessibility, cost efficiency, and patient financial protection[1].

To assess the effectiveness of pharmaceutical policies in the context of UHC, WHO has developed two crucial frameworks: first, the Health System Building Blocks framework, which places governance, financing, and availability of essential medicines as the main pillars of a resilient health system[2]. Secondly, the WHO/HAI Medicine Pricing Policy framework classifies pricing strategies into various approaches, such as external reference pricing (ERP), cost-plus pricing, value-based pricing, and maximum retail price (MRP)[3]. However, in practice, the effectiveness of pricing policies depends heavily on a combination of regulatory design, national procurement capacity, enforcement mechanisms, and political commitment to universal access[4].

Several Asian countries, such as Thailand and India, have demonstrated significant success in controlling drug prices through strategic interventions, including national monopsonies, compulsory licensing (CL), and subsidised generic distribution networks[5]. Meanwhile, Indonesia and the Philippines face challenges in implementing HET and MDRP policies due to fragmented oversight and low private sector compliance with price caps. In Indonesia, the Highest Retail Price (Harga Eceran Tertinggi, HET) policy sets maximum retail prices for selected essential medicines, primarily enforced through public procurement and pharmacies contracted under the National Health Insurance (JKN); however, weak monitoring capacity and limited enforcement in the private market have resulted in substantial price deviations from regulated levels[6]. In the Philippines, the Maximum Drug Retail Price (MDRP) policy establishes statutory

price ceilings for selected essential medicines, but compliance remains low among private pharmacies due to limited enforcement authority, monitoring constraints, and industry resistance, undermining its intended impact on affordability[7].

These differences underscore the importance of a comparative cross-country approach in identifying best practices that can be replicated or adapted to local contexts. Recent evidence synthesised in the WHO Guideline on Country Pharmaceutical Pricing Policies demonstrates that no single pricing instrument is sufficient to improve medicine affordability and access; instead, countries that combine multiple regulatory tools such as price regulation, pooled procurement, generic promotion, and strategic purchasing tend to achieve more sustainable outcomes[8]. The accompanying evidence-to-decision analyses further highlight that the effectiveness of these policies is highly context-dependent and influenced by health system capacity, governance arrangements, and implementation mechanisms[9]. Against this backdrop, this study aims to analyse and compare pricing policies and national drug procurement systems in Indonesia, the Philippines, and Thailand within the framework of Universal Health Coverage (UHC). Using a WHO theory-based policy analysis approach, the study evaluates regulatory instruments, procurement mechanisms, and policy effectiveness in improving access to and affordability of medicines, to contribute to evidence-based pharmaceutical policy formulation and cross-country learning.

Methods

Study Design

This study employed a comparative policy analysis design to examine the structure, mechanisms, and outcomes of drug pricing and procurement systems under the Universal Health Coverage (UHC) framework in five Asian countries: Indonesia, Thailand, the Philippines, Malaysia, and India. This design was chosen to identify similarities, differences, and policy lessons that may be applicable to national pharmaceutical reforms.

Data Sources

The study utilized secondary data obtained from multiple reputable sources, including:

1. Official government regulations and policy documents, such as national drug pricing decrees, procurement guidelines, and ministerial regulations (e.g., Indonesia's Perpres No. 59/2024, Thailand's Drug Act B.E. 2510, and India's Drug Price Control Order 2013).
2. Reports from international organizations, such as the World Health Organization (WHO), World Bank, and national health ministries.
3. Peer-reviewed journal articles indexed in PubMed, Scopus, Web of Science, Science Direct, and Semantic Scholar, focusing on pharmaceutical pricing, procurement, and access policies within the UHC framework (published between 2010 and 2025).
4. Institutional and statistical reports from agencies such as LKPP (Indonesia), NPPA (India), NPRA (Malaysia), NHSO (Thailand), and DOH (Philippines).

Data Collection and Analysis

Data were collected systematically using a documentary review technique. Key policy documents and reports were coded according to three main analytical dimensions adapted from the WHO/HAI Medicine Pricing and Policy Framework (2012) and the Health System Building Blocks (WHO, 2017):

1. Regulatory Framework and Pricing Strategy – including type of pricing approach (e.g., ERP, cost-plus, HTA-based, value-based, MRP).
2. Procurement Mechanism – describing the structure (centralized vs. decentralized), tendering model, and supply chain integration.
3. Implementation Outcomes – assessing price reduction achievements, generic utilization rates, and equity in medicine access.

A comparative matrix was then developed to evaluate policy coherence and performance across the five countries. Thematic synthesis was performed to identify cross-cutting patterns and contextual determinants influencing policy effectiveness.

Result

Indonesia

National Policy Framework and Drug Pricing Mechanism

The development of Indonesia's health system towards universal health coverage (UHC) has been marked by political dynamics and institutional reforms since the early 2000s, culminating in the integration of various financing schemes into Jaminan Kesehatan Nasional (JKN) through the establishment of Badan Penyelenggara Jaminan Sosial (BPJS) in 2014[10]. The context of post-reform decentralisation and fiscal pressures has made drug price control an essential instrument in ensuring system efficiency

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and service affordability, especially for poor and vulnerable segments of society[11].

The reform era brought innovation through the 2005 LKPP e-catalogue system to tackle corruption in manual procurement, which successfully reduced drug prices by 15-20% for the initial 200 items[12]. A significant development occurred with the launch of JKN in 2014, which expanded the HET's coverage to 100 essential medicine[13], and culminated in Presidential Regulation No. 59 of 2024, which serves as the current comprehensive legal framework.

These latest regulations reinforce three main pillars:

1. External Reference Pricing (ERP) by comparing prices in five ASEAN countries (Malaysia, Thailand, the Philippines, Vietnam, Singapore),
2. Cost-based Pricing for 523 JKN generic drugs, and,
3. HET for 142 essential drugs[14].

However, their implementation continues to face significant challenges related to medicine price disparities, as evidence from supply chain and price studies in Indonesia indicates that the prices of essential medicines such as captopril 25 mg in private pharmacies are more than three times higher than corresponding government procurement prices listed in the e-catalogue[15].

National Procurement System and Policy Implementation

Indonesia's national drug procurement system, implemented through the LKPP e-catalogue under the National Health Insurance (JKN) scheme, has contributed to substantial reductions in public medicine procurement prices. Empirical evidence indicates that the introduction of the e-catalogue mechanism led to price decreases for a large proportion of listed medicines, with hundreds of products experiencing lower procurement prices than in the pre-e-catalogue period. This demonstrates the effectiveness of centralized tendering and price competition as cost-containment instruments within the public pharmaceutical supply system[16].

Nevertheless, the implementation of the e-catalogue system continues to face structural challenges. These include market concentration, in which a limited number of suppliers dominate the supply of generic medicines, as well as logistical and distribution constraints that lead to delays in the availability of medicines, particularly in disadvantaged, frontier, and outermost regions. Such challenges highlight the need for complementary supply-side and distribution policies to ensure equitable access across regions[17].

Impact and Challenges of Policy Implementation

The implementation of this policy has resulted in a 40% increase in the availability of essential medicines in community health centres between 2019 and 2023. However, it has been confronted with the issue of price inequality, with market prices remaining 20-40% higher than government procurement prices[18]. The main challenges include:

1. Resistance from the pharmaceutical industry through patent evergreening strategies and price appeals,
2. LKPP's monitoring capacity, which only covers 30% of the national supply chain, and
3. policy fragmentation between the central and regional governments, with 12 provinces having different drug pricing regulations[19].

This situation requires a comprehensive overhaul of the monitoring and incentive systems to achieve equitable and affordable access to medicines. Politically, the process of formulating and implementing drug pricing policies in Indonesia is heavily influenced by pressure from various actors, including the pharmaceutical industry and local governments. The path to UHC in Indonesia is not only technocratic but also fraught with political negotiations involving cross-sectoral actors, making drug pricing policy an arena of tension between fiscal efficiency and industry interests[10],[20]. In addition, the WHO study emphasises that although Indonesia has covered 92% of its population under the JKN, access to medicines still faces challenges in terms of fiscal sustainability, geographical distribution, and service quality control[21].

Thailand

National Policy Framework and Drug Pricing Mechanism

Thailand has a well-established drug policy framework supported by longstanding national drug policies. Within this framework, the Government Pharmaceutical Organization (GPO) plays a key role in public pharmaceutical production and supply. At the same time, the National Health Security Office (NHSO) administers the Universal Coverage Scheme (UCS), which provides health coverage to nearly the entire population[22].

Thailand applies a combination of drug pricing mechanism, including the use of international price

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comparisons as a reference in price negotiations, the application of maximum allowable purchasing prices for medicines procured through the public system, and value-based price negotiation informed by health technology assessment (HTA), particularly for high-cost medicines such as for cancer and rare diseases[22]. This system is supported by the National List of Essential Medicines, which includes 851 medicines with controlled prices. Thailand's success in price control is reflected in the price disparity of only 10-15% between government and private facilities for generic medicines[23].

National Procurement System and Policy Implementation

Thailand has implemented a centralized procurement system under the Universal Coverage Scheme, coordinated by the National Health Security Office (NHSO), to improve efficiency, affordability, and equitable access to essential and high-cost medicines. According to the NHSO, the central procurement mechanism comprises three core functions: the selection of medicines based on clinical priority and national essential medicines criteria; centralized procurement and price negotiation through pooled purchasing and national bargaining; and logistics and supply management to ensure continuous availability at health facilities. Health technology assessment (HTA) is used to inform both the selection of medicines and price negotiations within this centralized procurement framework (NHSO, Central Procurement Management Mechanism)[24].

The GPO also succeeded in reducing the price of Imatinib (a leukaemia drug) by 75% from the initial price after direct negotiations with the manufacturer[25]. Thailand pioneered Strategic Purchasing through the NHSO with innovative mechanisms such as Price-volume Agreements (progressive discounts based on purchase volume) and Risk-sharing Schemes (payments based on treatment outcomes). For cancer drugs, Thailand has developed the ASEAN Patent Pooling, which enables the joint purchase of five major cancer drugs at lower prices[23,26].

Impact and Challenges of Policy Implementation

The implementation of Thailand's policy has increased the coverage of essential medicines in primary health facilities from 78% (2015) to 95% (2023), with price disparities between regions of only 8%27. However, this system faces complex challenges:

1. Diplomatic pressure from the United States and the European Union on CL's policies, including the threat of trade sanctions[28],
2. A 45% dependence on imported pharmaceutical raw materials, which makes the system vulnerable to global supply fluctuations, and
3. Limited local production capacity for advanced biological medicines, resulting in continued dependence on imports[29].

Filipina

National Policy Framework and Drug Pricing Mechanism

The Philippines established a regulatory framework for drug pricing through the Universally Accessible Cheaper and Quality Medicines Act of 2008 (Republic Act No. 9502), amended in 2019, and reinforced by the Philippine National Drug Policy 2021-2030. This system places the Department of Health (DOH) as the primary regulator, with the support of the Philippine Food and Drug Administration (PFDA), for oversight of implementation[30]. The Philippines applies three pricing approaches:

1. International Reference Pricing by comparing prices in six countries (Thailand as the primary reference, followed by Malaysia, India, Indonesia, Pakistan, and Vietnam),
2. Cost-plus Pricing with a margin of 25-30% for 350 locally produced generic drugs, and
3. Negotiated Pricing for 50 cancer and rare disease drugs[31].

The implementation of the Maximum Drug Retail Price (MDRP) has shown mixed results – it has succeeded in reducing the prices of 21 essential medicines by an average of 50%, but there is still a 200% price disparity for cardiovascular drugs, such as atorvastatin 20mg (private pharmacy price: 25 pesos vs government price: 8 pesos), due to weak enforcement[32].

National Procurement System and Policy Implementation

The Philippines is developing a complex national drug procurement system through the Philippine Government Electronic Procurement System (PhilGEPS) with a hybrid approach that combines centralised tendering by the DOH for essential drugs[32], decentralised procurement by provincial hospitals, and the Botika ng Bayan

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programme, a community pharmacy[33]. The system has achieved several important milestones, including improved price efficiency and affordability of essential medicines through pooled procurement and negotiated purchasing mechanisms[28], and a 65% reduction in the price of combination Tuberculosis drugs through a five-year volume guarantee scheme[31].

The Botika ng Bayan programme, which has reached 1,200 units, has succeeded in providing generic medicines at prices 50% cheaper than the market[26]. However, this system faces fundamental challenges in the supply chain, including an overly dependent relationship with four major distributors (controlling 70% of the market), limited electronic infrastructure (only 60% of health facilities are fully connected), and inefficient distribution to island regions, which can take 3-6 weeks[31,37]. The most crucial regulatory challenge is the absence of a compulsory licensing mechanism due to international political pressure[31].

Impact and Challenges of Policy Implementation

The implementation of drug price control policies in the Philippines during the period 2015-2023 has had a positive impact, increasing the availability of essential drugs in community health centres from 45% to 75%[37], expansion of Botika ng Bayan coverage to 40% of disadvantaged areas[33], as well as an increase in the use of generic drugs from 30% to 55%[36]. However, this system still poses profound systemic challenges, particularly regarding price compliance. Only 45% of private pharmacies comply with the Maximum Drug Retail Price (MDRP), with the lowest compliance rate in the Mindanao region (30%)[36,38,39].

The issue of drug supply has become increasingly complex with the withdrawal of 15 essential drugs from the market by manufacturers in response to the MDRP policy. Limited monitoring capacity only allows the PFDA to monitor 35% of the national supply chain. In contrast, dependence on imports of raw materials for drugs, which reaches 80% (mainly from India and China), creates systemic vulnerability[31,40].

Malaysia

National Policy Framework and Drug Pricing Mechanism

Malaysia has established a comprehensive drug pricing regulatory system through the Control of Drugs and Cosmetics Regulations 1984, last amended in 2019, and reinforced by the National Medicines Policy 2021-2025. This legal framework places the Ministry of Health (MOH) as the primary regulator through the Pharmaceutical Services Programme, with the National Pharmaceutical Regulatory Agency (NPRA) responsible for overseeing implementation[34,35]. Malaysia applies three pricing approaches:

1. External Reference Pricing (ERP) by comparing prices in seven countries (Australia, New Zealand, the United Kingdom, South Korea, Thailand, Singapore, and India),
2. Cost-plus Pricing with a margin of 15-25% for locally produced generic drugs, and
3. Health Technology Assessment (HTA)-based Pricing for innovative drugs[42].

The implementation of Maximum Medicine Price (MMP) since 2019 has succeeded in reducing the prices of 5,734 medicine items by an average of 28%, but there are still price disparities of up to 150% for medicines such as rosuvastatin 20mg (private price: RM35 ($8.56) vs government price: RM14 ($3.42)) due to variations in distribution margins[43].

National Procurement System and Policy Implementation

Malaysia operates a centralised drug procurement system through the Pharmaceutical Services Programme under the Ministry of Health, with the Central Contract System mechanism serving as the backbone of national procurement44. This system has demonstrated significant success in reducing drug prices through several key strategies: annual competitive tenders have successfully reduced the cost of insulin glargine by 45% (from RM120 ($29.34) to RM66 ($16.14) per vial).

In contrast, a Health Technology Assessment (HTA)-based approach has reduced the price of cancer drugs such as trastuzumab by up to 60%[42]. The strict implementation of the Generics First Policy has encouraged the use of generic drugs, reaching 80% in public health facilities[45]. However, the system faces complex structural challenges, particularly its dependence on imports for 65% of pharmaceutical raw materials, which creates supply vulnerability[41].

The issue of uneven distribution is evident in the 2-3 week delay in delivery to Sabah and Sarawak, as well as the fragmentation of the system between the federal government and the 13 states, which have different authorities in health management[46]. This challenge is exacerbated by the lack of an optimal

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integrated monitoring system to ensure compliance among all stakeholders.

Impact and Challenges of Policy Implementation

The implementation of drug price control policies in Malaysia during the 2019-2023 period has had a positive impact on the national health system, as reflected in the increase in the availability of essential drugs in health clinics from 70% to 90% and the high adoption of generic medicines in public facilities, which has reached 80%[45]. However, a comprehensive evaluation shows that this achievement has not been evenly distributed across all sectors, with compliance with the Maximum Medicine Price (MMP) in private pharmacies only reaching 60% nationally, and even lower in Sabah (45%)[46].

The pharmaceutical industry responded to this policy by substituting 12 medicines from the MMP list, while the NPRA's limited monitoring capacity was only able to monitor 50% of the national supply chain[41]. Other fundamental challenges include policy fragmentation between the federal and State governments, as well as high dependence on imports, which account for 65% of raw materials and 40% of finished products[47]. A study identified an urgent need to strengthen the integrated surveillance system and increase local production capacity through the full implementation of the National Pharma Plan 2021-2025, while highlighting the importance of policy harmonisation between levels of government to address disparities in access to medicines across Malaysia[42].

India

National Policy Framework and Drug Pricing Mechanism

India has established a comprehensive drug price regulation system through the Drug Price Control Order (DPCO) 2013, which was last amended in 2019, and reinforced by the National Pharmaceutical Pricing Policy 2012. This legal framework places the National Pharmaceutical Pricing Authority (NPPA) as the primary regulator with authority to set maximum prices for 870 essential medicines on the National List of Essential Medicines (NLEM)[48,49]. India implements a unique pricing approach:

1. Cost-based Pricing for medicines in the National List of Essential Medicines (NLEM) with a 100% margin on production costs,
2. Market-based Pricing for non-essential medicines with a maximum annual increase of 10%, and
3. Special Price Negotiation for cancer and rare disease medicines through Patient Access Schemes[50,51].

The implementation of the DPCO has successfully reduced the average price of cardiovascular drugs by 35%, but there are still price disparities of up to 400% for some antibiotics, such as azithromycin 500mg (private price: ₹120 ($1.32) vs government price: ₹25 ($0.28)), due to variations in the distribution chain[48,52].

National Procurement System and Policy Implementation

India has developed a decentralised drug procurement system through the Central Medical Services Society (CMSS) for the central government and State Medical Services Corporations for State governments[53]. This system has achieved significant success in reducing prices through bulk procurement mechanisms, such as a 50% reduction in the cost of regular insulin (from ₹300 ($3.30) to ₹150 ($1.65) per vial) and a 70% reduction in the price of combination Tuberculosis drugs following the implementation of volume-based tendering[49,53].

The Jan Aushadhi programme, which provides high-quality generic medicines at 50-90% lower prices through 8,000 Pradhan Mantri Bhartiya Janaushadhi Kendras, distributed medicines worth ₹1,200 ($13.20) crore in 2022-2023[54]. However, the system faces complex challenges, including price variations between states that can reach 300% for the same medicine, dependence on five major distributors controlling 65% of the market, and distribution delays of four to eight weeks to rural areas[55]. India also actively uses compulsory licensing for HIV and cancer drugs, with a notable case involving sorafenib tosylate (a liver cancer drug), which successfully reduced the price by 97% from ₹280,000 ($3079.86) to ₹8,800 ($96.79) per month[48].

Impact and Challenges of Policy Implementation

The implementation of India's policy has had a positive impact, with an increase in the availability of essential medicines in primary health facilities from 35% (2012) to 75% (2023) and growth in the share of generic drugs to 80% in the public sector. However, an evaluation by Reddy et al. (2011) revealed

systemic challenges: only 45% of private pharmacies comply with DPCO prices, with the lowest compliance rates in Bihar (28%) and Uttar Pradesh (32%)[56]. The pharmaceutical industry responded by discontinuing 12% of medicines from the NLEM and litigating against 35 NPPA decisions[57].

Limited monitoring capacity only allows the NPPA to monitor 40% of the supply chain, while dependence on China for 70% of active ingredients makes the system vulnerable to supply disruptions58, Case study by50,59,60. This indicates that the Jan Aushadhi programme's success has not been accompanied by equitable access, with 65% of vehicles concentrated in urban areas and only 12% in tribal districts. This situation requires comprehensive reform of the supervision and incentive systems to achieve Universal Access to Medicines as mandated by the 2017 National Health Policy.

Table 1. Policy Comparison

Country	Primary Regulation	Pricing Method	Procurement System	Strength	Weakness
Indonesia	Perpres 59/2024	ERP, HET, cost-based	E-katalog LKPP	● Availability of essential medicines in community health centres increased by 40% (2019–2023) ● Extensive JKN coverage	● Price disparity between the market and government procurement (20–40%) ● Industry resistance (evergreening, price comparisons) ● Limited LKPP monitoring capacity (±30%)
Thailand	Drug Act B.E. 2510	HTA, CL, reference pricing	GPO bulk purchasing	● Coverage of essential medicines in primary care increased to 95% ● Low price disparities between regions (±8%) ● Effective use of CL and HTA	● International diplomatic pressure on CL policy ● Dependence on raw material imports (45%) ● Limited local biological production capacity
Filipina	Cheaper Medicines Act (2008)	MDRP, international reference	PhilGEPS + Botika ng Bayan	● Availability of essential medicines increased (45% → 75%) ● Expansion of Botika ng Bayan to 40% of disadvantaged areas ● Increased use of generic medicines	● Low MDRP compliance (±45%) ● Withdrawal of medicines by industry (15 essential medicines) ● Limited PFDA monitoring capacity (±35%) ● High dependence on imported raw materials (80%)
Malaysia	Control of Drugs Reg. (1984)	MMP, ERP	Central contract system	● Availability of essential medicines increased (70% → 90%) ● High adoption rate of generics in the public sector (80%) ● Low private sector compliance with MMP (±60%; Sabah 45%)	● Product substitution by industry ● Limited NPRA monitoring (±50%) ● Federal–state policy fragmentation ● High import dependency
India	DPCO 2013 + NPPP 2012	Cost-based, market-based	CMSS + Jan Aushadhi	● CMSS + Jan Aushadhi ● High share of generic medicines in the public sector (80%)	● Low DPCO price compliance in the private sector (±45%) ● Litigation and product recalls by industry ● Inequality in access to Jan Aushadhi (urban–tribal) ● Dependence on raw materials from China (70%)

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Discussion

A comparative analysis of national drug pricing systems in Indonesia, Thailand, the Philippines, Malaysia, and India provides critical insights into the design of effective pharmaceutical policies. Our findings indicate that Thailand's integrated approach, which combines compulsory licensing for essential medicines (particularly antiretrovirals and cancer drugs) with robust government production through the Government Pharmaceutical Organisation (GPO), has achieved the most significant price reductions (45-90%) while maintaining quality standards[29]. This success contrasts with the challenges faced by Indonesia and the Philippines, where private sector compliance with price caps remains an issue (38-45% compliance) due to fragmented enforcement systems[18,36]. India's Jan Aushadhi scheme emerges as another exemplary model, demonstrating how strategic generic substitution can dramatically improve affordability (50-90% price reduction compared to branded drugs) while expanding access through its network of 8,000 pharmacies[60,61].

Based on a comparative analysis of five countries, three main models of best practice have been identified that can serve as a reference for strengthening national and regional pharmaceutical systems. First, in terms of a comprehensive pricing framework, Thailand exemplifies excellence through the application of Health Technology Assessment (HTA)-based pricing for innovative medicines, which rigorously evaluates 12 clinical and economic parameters[62]. India contributed a transparent cost-plus pricing model for generic drugs, with a fixed margin of 16% for manufacturers, striking a balance between industry profitability and affordability[49]. Meanwhile, Malaysia has developed a dynamic price reference system that adjusts prices quarterly based on the average of seven reference countries, ensuring that prices remain competitive[43].

In terms of efficient procurement mechanisms, Thailand once again excels with its centralised purchasing system through the GPO, which has successfully consolidated demand across all public health facilities and achieved savings of 35-60%[26]. India complements this model with a volume-based centralised tendering system that can reduce the price of essential medicines by 40-70%[60]. In the Indonesian context, the e-catalogue system can be strengthened by adopting Thailand's supplier diversification strategy, thereby reducing dependence on the three leading generic suppliers, which currently control 60% of the market.

The third crucial aspect is the enforcement and monitoring system. Malaysia implements an effective tiered enforcement mechanism, ranging from warnings, heavy fines of up to RM500,000, to revocation of distribution licences for repeat offenders[43]. India complements this with a national monitoring network involving 1,200 field officers conducting monthly audits[49,58], Meanwhile, Thailand leads in transparency through a real-time price database covering all healthcare facilities. These three models offer valuable lessons for strengthening oversight systems in developing countries that still face challenges in enforcing drug price regulations. It is important to note that geographic characteristics influence the applicability of these best-practice models. Countries with contiguous land masses, such as India and Thailand, benefit from lower logistics complexity and more integrated distribution networks, facilitating centralised procurement and monitoring. In contrast, geographically fragmented archipelagic countries like Indonesia and the Philippines face higher transportation costs, longer lead times, and greater coordination challenges across islands, which can constrain distribution efficiency and enforcement of pricing policies. Consequently, the adaptation of these models in archipelagic settings requires complementary investments in logistics infrastructure, regional warehousing, and digital supply-chain integration to ensure equitable access.

Implementation challenges remain significant, particularly regarding political obstacles to mandatory licensing in the Philippines and data transparency gaps in Indonesia's price database. The study also identified persistent disparities in access to medicines between rural and urban areas, with tribal districts in India having only 12% coverage of Jan Aushadhi outlets compared to 65% in urban areas[60,63], and similar disparities exist in the Botika ng Bayan programme in the Philippines[33]. This challenge is exacerbated by economic and market dynamics, in which low purchasing power and regional income gaps make medicines less affordable, especially in low-per capita GDP areas and rural regions. Cross-country evidence shows that low purchasing power and per capita GDP are closely linked to reduced access to essential medicines, even when price control measures or public procurement systems are in place[64].

ASEAN countries can establish a regional reference price database inspired by the European Union's Euripid system, combined with technology transfer initiatives between developing countries, such as the India-Thailand collaboration in the

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production of active pharmaceutical ingredients. These measures have the potential to reduce dependence on imported raw materials by an estimated 65–90%, subject to successful implementation and supporting industrial policies[65]. Several limitations of this study should be acknowledged. The estimated reduction in dependence on imported raw materials (65–90%) is derived from policy projections and secondary sources, and its realization depends on multiple enabling factors, including domestic manufacturing capacity, regulatory readiness, and sustained government incentives. Additionally, this study does not empirically assess implementation outcomes, which may differ across therapeutic classes and regions. Future research using primary data and longitudinal designs is needed to validate these projections.

Conclusions

This study concludes that the effectiveness of drug pricing policies is primarily determined by the extent to which countries can design integrated regulatory systems, strengthen national procurement mechanisms, and implement robust price monitoring systems. Thailand and India are models of success, combining strategic interventions such as HTA, compulsory licensing, and subsidised generic pharmacy networks. Malaysia has strengthened the effectiveness of its policies through a dynamic ERP system and strict law enforcement. In contrast, Indonesia and the Philippines show that the main obstacles lie in fragmented oversight, resistance from the pharmaceutical industry, and weak policy enforcement at the sub-national level. To achieve inclusive and sustainable UHC, structural reforms are needed, including increased institutional procurement capacity, incentives for local production, and the adoption of a transparent price-monitoring system.

Lessons from these five countries demonstrate that there is no one-size-fits-all policy model; instead, a combination of context-sensitive and evidence-based strategies is essential to achieving a fair, efficient, and resilient pharmaceutical system. Future research should further examine subnational implementation dynamics, the effects of pricing policies on health outcomes, and the role of domestic pharmaceutical industries in sustaining affordable and equitable access to medicines across diverse health system settings.

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Author Contribution

Study design	:	EI, RAD,CW
Data acquisition	:	EI, RAD
Data analysis	:	EI, RAD
Manuscript writing	:	EI

Ethical Consideration

This study did not involve human subjects or primary data collection; thus, ethical approval was not required. However, all data were used in compliance with open-access and fair citation principles, ensuring academic integrity.

Abbreviation

BPJS	:	Badan Penyelenggara Jaminan Nasional
CL	:	Compulsory Licensing
CMSS	:	Central Medical Services Society
DOH	:	Department of Health
DPCO	:	Drug Price Control Order
ERP	:	External Reference Pricing
GPO	:	Government Pharmaceutical Organisation
HAI	:	Health-Associated Infectons
HET	:	Harga Eceran Tertinggi
HTA	:	Health Technology Assessment
JKN	:	Jaminan Kesehatan Nasional
LKPP	:	Lembaga Kebijakan Pengadaan Barang/Jasa Pemerintah
MDRP	:	Maximum Drug Retail Price
MMP	:	Maximum Medicine Price
MRP	:	Maximum Retail Price
NHSO	:	National Health Security Office
NLEM	:	National List of Essential Medicines
NPPA	:	National Pharmaceutical Pricing Authority
NPRA	:	National Pharmaceutical Regulatory Agency
Perpres	:	Peraturan Presiden
PFDA	:	Philippine Food and Drug Administration

PhilGEPS	:	Philippine Government Electronic Procurement System
UCS	:	Universal Coverage Scheme
UHC	:	Universal Health Coverage
WHO	:	World Health Organisation

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