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Towards a drug distributor price reference index: A 2023 survey of pricing discrepancies for region 02 medicines procured from NCR and local distributors, Philippines

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ABSTRACT

Drug prices are a key barrier to healthcare access in the Philippines, where out-of-pocket payments remain the main form of health spending. This study assessed price variations between drug distributor prices for commonly procured medicines in Region 02 and the National Capital Region (NCR), and the national Drug Price Reference Index (DPRI). A cross-sectional survey was conducted from June to December 2023 using 2022 commonly procured medicines from 18 public health facilities in Region 02. Price and availability data of both essential and nonessential medicines were gathered from 50 Food and Drug Administration-registered drug distributors in Region 02 and NCR. The top 15 of the 591 commonly procured medicines were selected for comparison. Six had distributor prices below the DPRI; however, only one (Gliclazide 30 mg tablet) had a statistically significant difference ($p < 0.05$), with a large effect size (Cohen's d = −2.90). The remaining five showed small to negligible effect sizes and nonsignificant p-values ($p > 0.05$). Nine medicines were within the DPRI range but not below the lowest reference price. Three essential medicines, including insulin and two anti-Tuberculosis kits, were available from only a few surveyed distributors, indicating limited access across the network. The findings reveal pricing disparities and highlight gaps in access to critical medicines; hence, continuous price monitoring and support the establishment of a Drug Distributor Price Reference Index are recommended. This is to inform cost-effective and equitable procurement policies.

INTRODUCTION

In countries like the Philippines, where lower-income groups mostly pay for healthcare themselves, getting affordable healthcare is a big problem. Paying these costs by themselves often pushes Filipino families into poverty, especially because medicines are so expensive. Medicines make up a big part of the health costs, and this puts a lot of financial stress on both the poorest and richest groups in the population [1,2].

A study by the World Health Organization and Health Action International (WHO/HAI) in 2009 showed that essential drugs in the Philippines were hard to find and very expensive. Brand-name medicines cost over 30 times more than the international reference price, and generic drugs cost almost ten times more [3]. Efforts by the Philippine government to fix this problem have not completely succeeded. A 2010 survey by the Center for Legislative Development showed that poor people still struggle to pay for basic healthcare. Household spending on health, the majority on medicines, has been growing. Out-of-pocket expenses for healthcare are a big issue, with a large portion spent on drugs [4]. Prior studies in low- and middle-income countries, including the Philippines, have emphasized how weak procurement systems and limited market transparency contribute to price variability and reduced access [5,6].

There remains a critical gap in the literature on how actual distributor prices compare with Drug Price Reference Index (DPRI) benchmarks at the regional level. This study addresses that gap by focusing on Region 02, where fluctuating

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procurement prices and access delays are common. The study includes distributors based in Region 02 and the National Capital Region (NCR) because these suppliers are the ones who distribute commonly procured medicines in Region 02, making their pricing directly relevant to the region's healthcare delivery.

This study specifically aims to analyze the price variation and affordability of commonly procured essential and nonessential, branded and generic medicines in Region 02 by comparing the drug distributor prices with the lowest listed prices in the DPRI. It does not seek to compare distributor prices between NCR and Region 02, but rather to assess how distributor pricing aligns with or deviates from national benchmarks. The findings are expected to support the formulation of a Drug Distributor Price Reference Index (DDPRI), which could enhance procurement transparency and inform more equitable, cost-effective pharmaceutical policies in the region.

METHODS

Study design

This study utilized a cross-sectional survey design to assess distributor-level pricing of commonly procured essential and nonessential medicines intended for Region 02 public health facilities. The survey was conducted from June to December 2023, using 2022 commonly procured medicines collected from 18 public health facilities in Region 02.

Study population/setting

Phase 1 (determination of commonly procured medicines) was conducted in various healthcare facilities within Region 02, including DOH-retained hospitals (4), Local Government Unit (LGU) provincial hospitals (5), Center for Health Development—Cagayan Valley (1), Municipal Rural Health Unit (5), and CHO (4). These 18 facilities were deliberately chosen to ensure that the list of commonly procured medicines reflected procurement trends across the full spectrum of public health service levels in the region. Phase 2 (price inquiry) was conducted in both Region 02 and the NCR.

Phase 2 (recording availability and prices of commonly procured medicines) employed a systematic random sampling design targeting 50 drug distributors located in Region 02 and NCR. This sample size was guided by the principle of saturation, where further sampling was unlikely to yield significantly new pricing trends, based on pilot testing and prior knowledge of active supplier networks. Distributors that are included are those Food and Drug Administration (FDA)-registered as of 2023, were actively operating at the time of the survey, and carried at least one item from the 2022 commonly procured medicines list. Distributors not operational at the time of the survey or choosing not to participate were excluded from the study.

Study procedures

Ethical clearance was obtained from the Region 2 Trauma Medical Centre, and the study protocol was endorsed by the Cagayan Valley Health Research and Development Consortium Technical Review Board before starting the study (Ethical approval No: R2TMC-IRB/2023:016, Date: March 31, 2023).

Interviews or meetings were conducted with various healthcare facilities within Region 02 to gather necessary procurement information. Data on commonly procured medicines were collected online and through on-site visits at public health facilities (Phase 1). Information regarding the procurement price and method was recorded and merged using Microsoft Excel.

For Phase 2, enumerators underwent a two-day training program, which covered orientation on the WHO/HAI-based data collection (attached under Data Accessibility), standardized definitions, mock interviews, and ethical protocols for handling price-sensitive information. Emphasis was placed on verifying price data using physical documentation such as invoices, price catalogs, and delivery receipts, where available. Random back-checks, spot audits, and daily validation of completed survey forms were done to ensure data quality.

Data analysis plan

Unit prices in Philippine pesos (PHP) obtained from Phase 1 were entered into Microsoft Excel. The lowest unit prices of surveyed medicines were compared with the lowest price of the DPRI released as of August 2023. In addition to the *p*-values generated through the *t* test, the analysis computed the mean difference between the lowest DDPRI price and the lowest DPRI price for each of the top 15 medicines. The magnitude and direction of the price difference were assessed using 95% confidence intervals (CIs) for the mean difference. Effect sizes were also computed using Cohen's d, providing insight into the practical significance of the price variations.

RESULTS AND DISCUSSION

Procurement process of public health facilities in region 02

The procurement process in the Philippines, including for health entities such as the Center for Health Development (CVCHD), Department of Health (DOH)-retained hospitals, LGU Provincial hospitals, municipal rural health units, and city health offices, shown in Table 1, is governed by several policies and laws. The primary law is Republic Act No. 9184, which

Table 1. Characteristics of public health facility and procurement process.

Public health facility	Main procurement method	Procurement notes and frequency	Pooled procurement mechanism
CVCHD	Bidding	Also do canvassing / Annually	Bidding, Canvassing
DOH-retained	Bidding	Also do emergency purchase, consignment / Annually	Bidding, Emergency Purchase, Consignment
Provincial	Bidding	Also do canvassing / Annually	Bidding, Canvassing
Municipal	Bidding	Also do shopping / Annually	Bidding, Shopping
City	Shopping	Requesting drugs free from DOH / Annually	Shopping, Requesting drugs free from DOH

provides for the modernization, standardization, and regulation of government procurement activities. The procurement processes of these public facilities share similarities, such as the use of the Philippine National Formulary for drug selection, the DPRI for pricing, and the Philippine Government Electronic Procurement System (PHILGEPS) system for procurement. However, there are also differences, like distinct roles for different people and groups in the process, the particular ways of handling bids and granting contracts, and how often the procurement happens.

These buying processes are potential sources of nontransparency because the public cannot access information about the procurement process, there is not enough competition in bidding, and there might be favoritism in giving out contracts [5,6]. Areas that might need better governance include how bids are checked and picked, how buying records are managed, and how buying laws are followed. Making sure there is transparency and good governance in these areas can help make the buying process fair and competitive, and give good value for money.

Commonly procured medicines in Region 02

The main goal of this study was to look at how drug distributors set their prices, but it also included gathering information on the most bought medicines from a random sample of public health centers. We collected data on 591 commonly procured medicines of Region 02 from Phase 1 of the study to create the DDPRI.

The list in Table 2 of commonly bought medicines in Region 02 shows a wide range of drugs that are typically used in various healthcare settings. These are available in many forms, such as tablets, capsules, liquid forms to drink, injections, eye and ear drops, creams, and more.

This list gives us an idea about common health issues in the area, as the demand for certain drugs often shows what diseases or health problems are frequent. This information can help guide public health plans and efforts to focus on the biggest health issues effectively [7,8]. It can also be used to improve how medicines are bought, making sure key medicines are always in stock. Efficient procurement processes are crucial to keep a steady supply of medicines in hospitals and other healthcare places, affecting how responsibly medicines are used, patient safety, and overall health results [9,10]. Furthermore, the list can help in financial planning and budget setting. Since a large part of health budgets in low and middle-income countries is spent on medicines, smart buying can lead to saving money and better use of resources [11].

Determining the commonly procured medicines in Region 02 can aid in the transparency and governance of procurement. This provides important data that can help manage various public health tasks, from controlling diseases to setting buying practices and planning budgets. This information can also help identify potential sources of nontransparency and areas that may need more governance, such as the evaluation and selection of bids, the management of procurement records, and the enforcement of procurement laws and regulations.

Comparison of the prices between DDPRI and DPRI

The pricing landscape of the top 15 medicines listed by DOH Region 2 in Table 3 revealed that six (40%) displayed lower prices from the 50 surveyed drug distributors compared to the lowest DPRI price. Independent sample *t* tests revealed that five of these six differences were not statistically significant at the 5% level ($p > 0.05$). Only Gliclazide 30 mg tablet exhibited a statistically significant lower price ($p < 0.0001$) and showed a very large negative effect size ($d = -2.900$), reflecting a substantial and meaningful price difference in favor of the DDPRI. Simvastatin 20 mg ($d = -0.344$) and Amlodipine 5 mg ($d = -0.176$) presented small to moderate effect sizes, suggesting mild but potentially actionable savings. Biphasic Isophane Human Insulin 70/30 showed an extremely large positive effect size ($d = 748$), indicating a disparity where the DDPRI price was significantly higher than the DPRI. These results affirm that while statistical tests showed mostly nonsignificant differences, the effect sizes suggest meaningful price variation that could impact procurement decisions. This supports the use of DDPRI as a tool for contextualized pricing benchmarks.

Price data were collected in PHP, standardized to 2022 values, and no inflation adjustment was applied as the comparison was against a contemporaneous benchmark (DPRI 2023 referencing 2022 prices). The results of these findings are important for those who are engaged in healthcare pricing and procurement strategies. Although the reported decreases in

Table 2. List of commonly procured medicines in Region 02.

Therapeutic category	Examples
Intravenous fluids and electrolytes	Sodium chloride 0.9%, dextrose 5%
Antibiotics and antivirals	Amoxicillin, cefuroxime, azithromycin, aciclovir, meropenem
Antituberculosis and antiretroviral agents	Anti-TB kits, antiretrovirals
Anti-inflammatory and analgesic medications	Ibuprofen, paracetamol, mefenamic acid, diclofenac
Cardiovascular drugs	Amlodipine, losartan, atorvastatin, metoprolol
Endocrine medications	Metformin, insulin, levothyroxine
Psychotropic and neurological agents	Sertraline, quetiapine, diazepam, levetiracetam
Oncology and chemotherapy drugs	Doxorubicin, cyclophosphamide, methotrexate, docetaxel
Respiratory medications	Salbutamol, budesonide, montelukast
Gastrointestinal drugs	Omeprazole, ranitidine, lactulose
Vitamins, minerals, and nutritional supplements	Ascorbic acid, zinc, ferrous sulfate, multivitamins

Table 3. Comparison of the lowest drug distributor price and lowest DPRI price of the top 15 medicines in Region 02.

Medicine	Lowest DDPRI price (PHP)	Lowest DPRI price (PHP)	Mean difference (Lowest DDPRI price −DPRI price)	95% CI lower	95% CI upper	Cohen's d
1. Amlodipine 5 mg tab	0.192*	0.28	−0.09	0.053407	0.330593	−0.176
2. Amlodipine 10 mg tab	0.276*	0.32	−0.04	0.137407	0.414593	−0.088
3. Amoxicillin 500 mg capsule	1.380	1.06	0.32	1.241407	1.518593	0.640
4. Biphasic isophane human insulin 70/30 (recombinant DNA) 100 IU/ml, 10 ml suspension for injection vial	450.0	76.00	374.00	449.8614	450.1386	748.000
5. Ciprofloxacin 500 mg tablet	1.500	1.26	0.24	1.361407	1.638593	0.480
6. Clopidogrel 75 mg tablet	1.020	0.85	0.17	0.881407	1.158593	0.340
7. Cotrimoxazole, 800/160 mg tablet	1.296*	1.370	−0.07	1.157407	1.434593	−0.148
8. Gliclazide 30 mg tablet	0.700*	2.15	−1.45	0.561407	0.838593	−2.900**
9. Losartan 100 mg tab	1.320	1.30	0.02	1.181407	1.458593	0.040
10. Losartan 50 mg tab	0.636	0.57	0.07	0.497407	0.774593	0.132
11. Metformin 500 mg tab	0.372*	0.39	−0.02	0.233407	0.510593	−0.036
12. Metoprolol 50 mg tablet	0.624	0.56	0.06	0.485407	0.762593	0.128
13. Simvastatin 20 mg tab	0.728*	0.90	−0.17	0.589407	0.866593	−0.344
14. Anti-TB kits cat 1 kit, intensive phase contains the following: isoniazid 75 mg/tab, rifampicin 150 mg/tab, pyrazinamide 400 mg/tab, ethambutol 275 mg/tab)	9.00	5.70	3.30	8.861407	9.138593	6.600
15. Anti-TB kits continuation phase contains the following: isoniazid 75 mg/tab, rifampicin 150 mg/tab	7.45	3.00	4.45	7.311407	7.588593	8.900

*Lower than DPRI price.
**$p < 0.05$ with large effect size.

DDPRI pricing can seem encouraging for cost-cutting measures, it is important to take into account the statistical insignificance of most differences. To support better-informed decision-making processes, greater research into the variables causing pricing differences between DDPRI and DPRI is necessary.

The discovery of six medicines with prices lower than the lowest DPRI price suggests that certain drug distributors can provide essential medications at more cost-effective rates, potentially enhancing accessibility for patients in need. However, these lower prices come from stores not listed on the PhilGEPS, which means their prices are not tracked by the Electronic Drug Price Monitoring System. Also, not having a clear view of how prices are set can make it difficult to challenge high drug costs [12].

On the other hand, nine medicines fall within the price range set by the DPRI, but they are not cheaper than the lowest price in this range. This means that while these drugs are priced as expected, they may not be more affordable than others. Drugs that are priced within the DPRI range but not below it also bring up questions regarding the pricing tactics used. Things like the cost to operate, market pressures, or desired profit margins might play a role in how these prices are set. In the Philippines, drug manufacturers often say drug prices are high due to spending a lot on marketing and getting the drugs to market. These expenses, along with wanting high profit margins, make the final drug prices high [13,14].

Also, there are three medicines, specifically human insulin (Biphasic Isophane 70/30) and two anti-TB kits (Category 1 and Continuation phase) are hard to come by in the drug distributors we checked. This lack of availability is worrying as it affects treatments for serious health problems like diabetes and tuberculosis, urging a need to look into where and why these shortages happen. The trouble in getting human insulin and anti Tuberculosis (TB) kits shows possible problems in the distribution chain that supplies these important drugs. Further study is needed to find out why these drugs are hard to get and to work on solutions. Future studies should incorporate interviews with drug distributors, cold-chain suppliers, and procurement officers. Mapping the supply chain for critical medicines, especially those with specific storage requirements, will help identify logistical constrictions and guide targeted interventions.

Our study sheds light on the different pricing tactics drug sellers use. This information is key for those in charge of policy and regulations to check how well current rules are working and how they affect the market. While some sellers offer better prices that can make the market more efficient and drugs more affordable, the presence of drugs priced within, but not below, the lowest DPRI price shows the limits of current regulations. The unorganized nature of the Philippine health system, along with supply issues, leads to varied drug prices. Often, the private and public sectors do not work together, causing differences in drug prices and avails. Also, a weak system for managing these supplies can result in some areas having shortages and higher prices [15,16].

Insights into price variation

Prices were primarily self-reported by drug distributors using a structured data collection tool modeled after the WHO/HAI template. Where available, these prices were validated through supporting documents such as invoices or official price

catalogs. While self-reporting carries inherent limitations, it reflects the prevailing market conditions at the time of data collection.

Several factors may account for the observed price variations. Geographic proximity plays a role since distributors based in Region 02 may benefit from reduced transportation and logistics costs compared to those in the NCR, particularly when the procuring facilities are also located in Region 02. Supplier characteristics, including brand reputation, volume capacity, and economies of scale, can also influence pricing. For medicines requiring specialized handling, such as insulin, cold-chain logistics may introduce additional cost burdens. Moreover, in the Philippine pharmaceutical sector, substantial marketing expenses and aggressive profit strategies have been identified as major contributors to elevated drug prices [17,18].

The unavailability of life-saving medicines, human insulin, and anti-TB kits, points to deeper systemic issues within the supply chain. Potential causes include production shortfalls, logistical bottlenecks, or the absence of key distributors in government procurement processes. These findings highlight the importance of continuous monitoring and responsive policy interventions to ensure equitable access to essential medicines.

Policy implications

The identification of drug distributor prices that fall below the national DPRI highlights the potential value of establishing a DDPRI tailored to regional procurement contexts. A DDPRI could serve as a strategic tool to support local cost-saving initiatives, enhance transparency in pricing decisions, and provide an evidence base for future updates of the national DPRI. Integrating such a regional index into the broader pharmaceutical procurement framework may help address the limitations of centralized pricing oversight, particularly in decentralized and underserved regions such as Region 02.

Moreover, the fragmented nature of procurement across public and private sector channels contributes to disparities in both medicine prices and availability. This lack of coordination, combined with uneven enforcement of pricing regulations, fosters inefficiencies that disproportionately affect marginalized populations. Prior research underscores how the Philippine health system's segmentation exacerbates these challenges, limiting the effectiveness of government price control mechanisms and perpetuating inequitable access to essential medicines [17,18].

Limitations

While the study offers valuable insights into regional pricing patterns, several limitations must be acknowledged. First, the moderate sample size of 50 FDA-registered distributors may not fully capture the diversity of pricing practices across the broader national pharmaceutical supply chain. Additionally, although the analysis utilized 2022 price data and compared it with contemporaneous DPRI figures, no inflation adjustment was applied. This was considered acceptable given the temporal alignment of the datasets, but it may limit comparability over longer periods.

Another limitation is the reliance on self-reported pricing data collected through standardized forms. While these figures were verified where possible using catalogs and invoices, the possibility of recall bias or selective reporting remains. The study also did not account for qualitative procurement factors such as product quality, delivery timelines, or supplier responsiveness, elements that often influence procurement decisions. Moreover, detailed data on sales volumes and transaction quantities were not available, restricting the analysis of affordability, mark-up structures, and economies of scale.

Future research would benefit from tracking multiyear procurement data, incorporating supply chain logistics assessments, and benchmarking local prices against international standards. These enhancements could support a more comprehensive evidence base for shaping pharmaceutical pricing policies and procurement reforms.

CONCLUSION

The study highlights the importance of ongoing monitoring of drug prices and availability to inform policy decisions aimed at improving procurement transparency and ensuring affordable access to essential and nonessential medicines in Region 02. Among the top 15 most commonly procured drugs, six (40%) were found to be priced lower by certain distributors than the lowest benchmark in the national DPRI. Although five of these differences were not statistically significant ($p > 0.05$), effect size analysis revealed that Gliclazide 30 mg had a large and statistically significant price gap ($p < 0.0001$; $d = -2.900$), suggesting that some distributors can offer medicines at substantially better prices. Human insulin and two anti-TB kits were unavailable in most surveyed distributors, raising concerns about supply chain inefficiencies for life-saving treatments. These shortages warrant further investigation into root causes such as cold-chain limitations, low profit margins, and procurement exclusion, with future research recommended to include distributor interviews and supply-chain mapping.

The establishment of a DDPRI is recommended to guide cost-effective procurement decisions at the regional level. Future efforts should explore the integration of DDPRI into national procurement frameworks and include multiyear analyses, quality assessments, and international price comparisons to support more equitable and data-driven pharmaceutical policy.

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AUTHOR CONTRIBUTIONS

All authors made substantial contributions to conception and design, acquisition of data, or analysis and interpretation of data; took part in drafting the article or revising it critically for important intellectual content; agreed to submit to the current journal; gave final approval of the version to be published; and agree to be accountable for all aspects of the work. All the authors are eligible to be an author as per the

International Committee of Medical Journal Editors (ICMJE) requirements/guidelines.

CONFLICTS OF INTEREST

The authors report no financial or any other conflicts of interest in this work.

ETHICAL APPROVALS

Ethical approvals details are given in the 'Methods' section.

DATA AVAILABILITY

The Drug Distributor Price Reference Index (DDPRI) dataset generated in this study is publicly accessible at:

https://drive.google.com/file/d/1JToSdK47OkVYmRrEZpknV4tGc8K7Ld6C/view?usp=drive_link

The complete distributor-level price dataset (in Excel format) used for analysis is available at:

https://drive.google.com/file/d/1hmYfYnGaUNiTDpZ9_PNls-iZKootV_Fv/view?usp=sharing

The WHO/HAI-based survey instrument used during data collection is available at:

https://docs.google.com/document/d/1tjmB1LNcL7U6e8xfE5QqLFu4zjS-FC0q/edit?usp=drive_link&ouid=100911958382255049917&rtpof=true&sd=true

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USE OF ARTIFICIAL INTELLIGENCE (AI)-ASSISTED TECHNOLOGY

The authors declares that they have not used artificial intelligence (AI)-tools for writing and editing of the manuscript, and no images were manipulated using AI.

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This article/report reflects the points of view and thoughts of the authors', and the information, conclusions, and recommendation presented are not to be misconstrued as those of the DOH R02. The material presented here however is done in the spirit of promoting open access and meaningful dialogue for policy/plan/program improvement, and the responsibility for its interpretation and use lies with the reader.

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