

# Evaluation of the drug management system at the pharmaceutical supplies installation of the Tegal City Health service in 2019

Anggun Setya Wibawa<sup>1\*</sup>, Gunawan Pamudji Widodo<sup>2</sup>, Iswandi<sup>3</sup>

<sup>1,2,3</sup>Faculty of Pharmacy, Universitas Setia Budi, Surakarta, Indonesia

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## ABSTRACT

Drug management involves a series of interconnected activities, including planning, procurement, receipt, storage, distribution, control, recording, reporting, disposal, monitoring, and evaluation. This study aimed to evaluate the drug management system, identify challenges and solutions, and assess its compliance with the 2010 Ministry of Health standards at the Pharmaceutical Supply Installation of the Tegal City Health Office. A descriptive design was used, with retrospective data collected from 2019 documents. Primary data were obtained through direct observation and in-depth interviews to identify obstacles, while secondary data were sourced from drug management records based on ten indicators and compared with the 2010 standards. The results revealed several discrepancies: in the planning stage, drug conformity with the Fornas Level I reached 92.54% and planning accuracy was 184.22%; in procurement, drug availability was 92.04%, generic drugs 88.97%, and budget allocation 98.14%. Storage met standards, with 0% expired or damaged drugs. In distribution, the proportion of drugs in the safe category was 46.27% and average stock-out duration was 27.40%, while distribution accuracy reached 100%. Key challenges include the presence of non-Fornas drugs, disruptions in the e-logistics reporting system, and procurement delays due to an underdeveloped e-catalogue system. Recommended solutions include regular training for drug management staff, improved coordination with the TPOT team based on clinical and pharmaco-economic considerations, and the addition of pharmacist personnel.

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### Corresponding Author:

Anggun Setya Wibawa,

Pharmacy,

Universitas Setia Budi,

Jl. Letjen Sutoyo, Mojosongo, Kec. Jebres, Kota Surakarta, Jawa Tengah, 57127, Indonesia

Email: [elegansetyawibawa@gmail.com](mailto:elegansetyawibawa@gmail.com)

## INTRODUCTION

Pharmaceutical services are a crucial pillar of the healthcare system, particularly regarding the availability, quality, safety, and effectiveness of medications in healthcare facilities. Medications serve not only as a means of healing but also as an instrument for prevention, recovery, and

improving public health. Adequate medication availability, both in terms of quantity and type, is an indicator of the quality of healthcare services in a region. Appropriate medication management, from planning, procurement, distribution, and evaluation, is crucial for the sustainability of healthcare services (Wirtz et al., 2017).

The urgency of research into medication management is growing as findings persist that inefficiencies persist in the management cycle, such as inaccurate demand planning, drug shortages, and high stocks of expired drugs in some regions. This not only impacts the quality of healthcare services but also wastes public funds. The WHO even emphasizes that poor medication management contributes to the loss of access to essential medicines for vulnerable populations (Organization, 2019), making evaluation of medication management systems crucial to ensuring the achievement of national health development targets. National policies such as the e-Catalogue and Fornas play an important role in drug management, but they also contribute to mismatches between drug needs and availability. In Tegal, delays in the e-Catalogue and the limited drug list in Fornas led to unavailability of certain essential medicines, making planning and service delivery less effective. The research location of the Pharmaceutical Supplies Installation (IPF) of the Tegal City Health Office was selected based on its role as a drug distribution center for all community health centers (Puskesmas) in the region. Preliminary data indicates that there is still a mismatch between drug needs and availability, both in terms of type and quantity. Furthermore, the ever-changing dynamics of disease epidemiology in Tegal City require an adaptive and measurable drug management system. Research at this location is expected to provide a comprehensive overview of the effectiveness of drug management and potential improvements (Anglia, 2019).

The emerging gap is a mismatch between the Ministry of Health's drug management standards and actual practice. For example, generic drug procurement often falls short of the 90% target, and drug distribution sometimes doesn't match actual needs at community health centers. This situation creates problems such as delayed service delivery, drug shortages, and excess stock, ultimately leading to waste (Yuliana, 2018).

Previous research has highlighted similar issues in various regions, but the results have been mixed. Some studies have found low levels of drug planning accuracy due to weak coordination between community health centers and pharmacy installations (Pramukantoro, 2015). On the other hand, others have shown significant improvements through the implementation of electronic-based pharmaceutical management information systems (Nguyen & Knight, 2015). However, there are few studies that specifically examine the integration of drug planning, distribution, and availability holistically at the district/city level, including Tegal City.

Empirical evidence shows that medication management evaluations can identify critical areas with potential for inefficiency. For example, research in Semarang reported an average annual drug shortage of 25% due to weak consumption-based planning (Djarmiko, 2009). Similar findings in Surakarta indicated that up to 30% of drug stocks were unused, causing significant losses for the local government (Silvania et al., 2012). This study seeks to address this gap by examining the medication management system in Tegal City in more detail as a way to optimize healthcare services.

The novelty of this article lies in the integration of drug management evaluation based on ten Ministry of Health indicators with an analysis of field phenomena involving policy aspects, coordination between community health centers, and the limitations of the *e-catalog system* in drug procurement. This approach not only assesses the achievement of technical indicators but also uncovers the root causes of weaknesses in the drug supply chain at the regional level. The research results are expected to provide evidence-based recommendations for strengthening drug management and serve as an evaluation model that can be adapted by other regions in Indonesia (Rumbay et al., 2015).

Drug management in health systems involves selection, planning and quantification, procurement, storage, distribution, rational use, as well as monitoring and evaluation, aiming to ensure the availability of essential medicines that are safe, effective, high-quality, and affordable. Good drug governance is a prerequisite for universal health coverage (UHC) because it affects patient access, continuity of therapy, and cost efficiency. Essential drug policies, the National

Formulary (DOEN/Fornas), and generic drug policies guide planning, procurement, and cost control, while preventing unnecessary variations in government health facilities.

Drug needs are planned using two main approaches: the consumption method, based on historical use and trends, and the morbidity method, based on disease incidence or prevalence and treatment regimens. Combining both approaches is recommended when usage data is unstable or program changes occur. The ABC-VEN technique prioritizes clinically essential and high-cost items for more efficient allocation. Procurement, including through Indonesia's e-Catalogue, ensures the right product, quantity, quality, price, and timing according to regulations. Challenges such as supplier limitations or quota restrictions can affect supply, making synchronization between planning, procurement, and supplier contract management critical.

Proper drug storage includes temperature and humidity control, security, physical organization, and FEFO (first-expiry-first-out) to minimize expiration. Key performance indicators include the percentage of expired or damaged items and stock record accuracy. Distribution can use push (central allocation) or pull (facility-driven demand) models, with evidence showing pull models supported by strong logistics management information systems (LMIS) are more effective in reducing stockouts and expirations. Timely distribution and flexibility in redistributing stock among facilities help maintain availability and prevent stagnation.

Reliable data from LPLPO/LMIS forms the foundation for decision-making, influenced by staff competence, workload, and system integration. Pharmacy and Therapeutics Committees (TPOT) strengthen selection, formulary, and usage policies, while regular training and supervision support compliance with standards. Evaluation of drug management uses operational indicators such as compliance with formularies, planning accuracy, proportion of generic medicines, availability and months of sufficient stock, expiration and damage rates, stock accuracy, distribution timeliness, and stockout rates/days out of stock.

The evaluation of medication management in Tegal City reveals challenges that are comparable to, and in some aspects more complex than, those observed in other regions facing similar problems. Preliminary data indicate a mismatch between drug needs and availability at community health centers, reflecting weaknesses in planning, procurement, and distribution. Similar issues have been reported in Semarang, where an average annual drug shortage of 25% was observed due to weak consumption-based planning, and in Surakarta, where up to 30% of drug stocks went unused, causing significant financial losses for the local government. In Tegal, gaps include falling short of the Ministry of Health's 90% generic drug procurement target and distribution that does not always align with actual needs, compounded by rapidly changing disease epidemiology and limited integration of electronic management systems. This situation underscores the urgency of intervention, as it directly affects access to essential medicines, delays service delivery, and leads to public fund wastage. A comprehensive evaluation using the Ministry of Health's ten operational indicators, combined with analysis of inter-center coordination and e-catalog limitations, not only provides an overview of current performance but also offers an evaluative model that other regions can adapt to strengthen drug management, improve healthcare quality, and optimize resource efficiency.

## RESEARCH METHOD

This study used a descriptive evaluative design with a retrospective approach, reviewing LPLPO (Drug Use Report and Request Sheet) documents from 2019-2022 at the Tegal City Health Office's IPF. The descriptive method was chosen to provide a systematic overview of medication management implementation at the IPF, while the retrospective approach allowed for analysis based on available historical data, particularly the previous year's LPLPO documents. This approach is commonly used in pharmaceutical management studies as it enables the assessment of compliance with national and international standards (Embrey, 2012; WHO, 2019). The research location was the IPF of the Tegal City Health Office, which functions as the central unit for planning, procurement, storage, and distribution of drugs for all community health centers

(Puskesmas) in the city. The location was purposively selected because the IPF is a strategic unit representing real-world drug management at the district/city level. The study was conducted in 2023, reviewing data from 2019–2022 to capture trends in medication management implementation over several years.

The study population consisted of all drug management data at the Tegal City IPF, with total sampling applied to include all documents in the drug management cycle, such as LPLPO forms from Puskesmas, drug requirement recapitulation reports, procurement reports, warehouse stock records, and distribution documents. Total sampling ensured a comprehensive evaluation so that each stage of the management cycle could be analyzed without sampling bias (Creswell & Clark, 2011). Data included primary sources, obtained through in-depth interviews with drug management officers at the IPF and Puskesmas, and direct observation of storage and distribution systems, as well as secondary sources, including LPLPO documents, procurement reports, inventory records, and distribution reports. The combination of primary and secondary data allowed for triangulation and a more objective assessment (Yin, 2014). Data were analyzed using percentages, averages, and gap analysis to compare actual practices with Ministry of Health standards, while qualitative findings from interviews helped interpret the results. This approach provided a comprehensive overview of the implementation and effectiveness of medication management.

Research instruments included observation sheets and evaluation checklists based on ten drug management indicators established by the Indonesian Ministry of Health (2014), covering conformity of drugs with the DOEN/Fornas, accuracy of drug planning, availability of drugs according to needs, proportion of generic drug value, allocation of procurement funds, percentage of expired drugs, percentage of damaged drugs, distribution accuracy, level of drug availability (months sufficient), and average drug shortage time. Quantitative results were compared against Ministry of Health standards using percentages, averages, and gap analysis to identify deviations, and were supported by qualitative analysis from in-depth interviews, providing a comprehensive mixed-method assessment in line with health policy evaluation principles (Creswell & Clark, 2011).

## RESULTS AND DISCUSSIONS

Based on the LPLPO recapitulation report and proposed drug needs from eight community health centers (Puskesmas) in Tegal City, a study of the drug management system at the Tegal City Health Office's Pharmaceutical Supplies Installation in 2019 revealed several important findings. The drug management process analyzed included planning, procurement, storage, and distribution. The results of the drug management system analysis were obtained based on the following indicators.

### Planning Stage Compliance of Available Drug Items

**Table 1.** Number of drug systems available at the Tegal City Health office IPF included in fornas I

Number of drug items available	The number of available drug items entered Fornas Level I	% Compliance of available drug items according to Fornas level I	Standard Ministry of Health, 2010 (%)
201	186	92.54	100

### Accuracy of Drug Planning

**Table 2.** Number of planned drugs with number of drugs used at the 2019 Tegal City Health office IPF

Planned stock quantity of bat	Amount of medication used 2019	% Accuracy of Drug Planning in 2019	Standard Ministry of Health, 2010 (%)
1,281,507	696,000	18.4	100 -362.50

Table 1 shows that the conformity of medicines at the Tegal City Pharmacy Installation with the Fornas standard in 2019 was 92.54%, still below the target. Medicine selection is done by the Head of the Pharmacy Installation based on proposals from Puskesmas and the previous year's needs. However, some medicines needed by the community or proposed by doctors, such as Respiredon and Trihexyphenidyl, are not listed in Fornas, so the implementation of the Fornas standard is not yet optimal.

Previous research showed that the drug compliance indicator with the National Guidelines for National Medicines Level I only reached 60.77% (Pramukantoro, 2015). As an improvement effort, a re-evaluation of drug needs planning should be conducted by the Drug Management and Health Workforce Team (TPOT) in conjunction with other health workers to ensure drug use aligns with the National Guidelines for National Medicines and National Essential Medicines (DOEN).

Table 2 shows medicine planning accuracy by comparing 2018 plans and needs with 2019 usage. Accuracy ranged from 100% to 362.5%, averaging 184%, meaning most Puskesmas had more medicine than needed. Evaluation is needed because overplanning wastes funds, while underplanning can cause shortages. The ideal accuracy range is 100%-110%.

The 2019 year-end report showed that the accuracy of drug planning at the Tegal City Pharmacy Installation was inefficient. The percentage of drug planning exceeded 100% and the number of excess stocks was higher than that of appropriately planned drugs. This condition was influenced by several factors, including an increase in the number of patient visits with a wide variety of diseases, which increased drug use and affected availability at the Community Health Center. Furthermore, interviews with Pharmaceutical Section staff revealed that some drugs planned for specific programs were not used because the program proponent forgot to carry out the activity.

Drug needs planning at the Pharmacy Installation, which is based on LPLPO reports from Community Health Centers, is still suboptimal, resulting in frequent shortages and excess stock. The calculation method used still refers to previous consumption, namely based on usage in the previous period. Interviews with Tegal City Pharmacy Installation officers revealed that some Community Health Center officers do not fully understand the drug planning process, from drug selection to evaluation. Furthermore, the Community Health Center Information System (Simpus) within the Tegal City Health Office's work area is not yet functioning optimally and is not coordinated with the Pharmacy Installation.

Inappropriate planning is caused by a lack of attention to drug stock and disease patterns (Pramukantoro, 2015). This condition results in excess stock in the Pharmaceutical Warehouse or Pharmaceutical Installation. Research (Sulistiyowati, 2020) shows that the increase in excess stock is influenced by a suboptimal drug management system. Excess stock can occur because the lead time at the Pharmaceutical Installation is too long, around six months, resulting in drug inventory exceeding 100% (Wibowo et al., 2021). When determining the lead time, it is important to consider the expiration date of each drug, as excessive stock can shorten the shelf life of drugs and often trigger drug destruction.

According to (Yuliana, 2018), inappropriate drug planning is also caused by several factors, including drugs received not according to plan, drop delivery of drugs, receipt of drugs towards the end of the year, inaccurate drug data, changes in disease patterns, and lack of attention to stock and predictions of disease development. According to Rumbay et al. (2015), proper and accurate drug needs planning can be achieved through effective coordination and monitoring. Furthermore, determining drug needs accurately and predicting future needs requires considering several factors, including drug usage, disease patterns, lead times, buffer stock, and remaining stock (Sartika & Riani, 2021).

The solution to drug needs planning should begin with strengthening coordination to ensure that drug needs, budgets, and stocks do not overlap, thus avoiding overstocking. Overstocking often occurs because some planned drugs are not used optimally. The role of the

TPOT team needs to be strengthened, particularly in direct discussions with drug users and program stakeholders at community health centers. The drug planning team must also conduct a selection process that takes into account clinical and pharmaco-economic aspects, so that the plans submitted by the Puskesmas can be adjusted based on the selection results.

Coordination with healthcare workers needs to be based on data on disease patterns from the past three years to prioritize drug needs more accurately, while also adapting to conditions and drug use patterns in each region. Furthermore, regular training for drug management staff at Pharmacies and Community Health Centers is crucial. Utilization of the Community Health Center Information System (SIMPUS) must be optimized to ensure all reports on drug needs and use are well-integrated, especially between Community Health Centers and Pharmacies. Competency evaluation of human resource managers for drug management is also necessary, as some staff are not yet fully qualified.

### Procurement Stage

#### Availability of drugs according to needs

**Table 3.** Availability of drugs according to needs

Number of drug items available	Number of drug items needed by the community	Percentage (%)	Standard Ministry of Health, 2010 (%)
201	185	92.04	90

Table 3 shows that the drug availability rate reached 92.04%. This result indicates that drug availability has met the minimum health service standard of 90%, making it an important indicator in maintaining the continuity of pharmaceutical services in Tegal City. Good drug availability is reflected in the stock condition, which does not experience significant shortages or excesses. However, there are several obstacles related to drug availability at the Pharmaceutical Supplies Installation of the Tegal City Health Office. One of these is the continued availability of several drugs that are not always needed, such as BIOSAT 1.5 (ATS/antitetanus serum) injection 1500 IU/ml (IM), which is only used in certain cases.

In addition, Haloperidol drops 2 mg/ml (LODOMER), previously only available in tablet form, are now available in drop form for patients who cannot swallow medication. This drug is an antipsychotic used to treat mental disorders, such as schizophrenia, so it must remain available for psychiatric cases that require it. According to (Pramukantoro, 2015), the availability of drugs according to need reached 102.84%. Some drugs that are not always needed but are still available include artesunate injection, quinine injection, and primaquine tablets, which are used for certain diseases such as malaria, which are rare but must still be readily available if needed.

Solutions to increase drug availability include planning drug needs with a method that is better than the consumption method, regular training for drug management officers at Community Health Centers and Pharmacy Installations, and improving evaluation by the Tegal City Health Office Pharmacy Installation of health service facilities, especially Community Health Centers, in the drug planning process.

#### Percentage Generic Drugs

**Table 4.** Percentage of generic drugs

Number of drug items	The total value of generic drugs stored in IFK	Total value of drugs stored in IFK	Percentage value of Generic Drugs (%)	Standard Ministry of Health, 2010 (%)
168	Rp.1,672,378,196	Rp.1,879,751,962	88.97	90

Based on the data in Table 4, the percentage of generic drugs available or procured by the Tegal City Pharmacy Installation reached 88.97% of the total value of drugs or funds provided. Minimum health service standards stipulate that generic drug procurement should reach 90% (RI, 2010), so these results indicate that generic drug procurement almost meets the established standards.

This shortage in generic drug use is likely due to several factors. One is the lack of stock of generic drugs from manufacturers, such as folic acid tablets, tranexamic acid injection 100 mg/ml, atropine injection 0.25 mg/ml, and metronidazole syrup. Furthermore, the practice of doctors and other medical personnel who continue to prescribe non-generic drugs also affects the percentage of generic drug use. Another obstacle is the untimely launch of the e-catalog at the beginning of the year, resulting in late orders for generic drugs, and delays in delivery due to out-of-stock orders at suppliers (Dianingtyas et al., 2022).

### Percentage Allocation of funds for drug procurement

**Table 5.** Percentage of drug procurement fund allocation at the Tegal City IPF

Total fund allocation drug procurement (Realization) (Rp)	Total amount of funds needed for drug procurement (Rp)	Percentage (%)	Standard Ministry of Health 2010 (%)
1,780,785,656	1,814,532,000	98.14	100

Based on Table 5, the percentage of government drug procurement funds allocated to the Tegal City Health Office Pharmacy Unit in 2019 was lower than the total drug management funding requirement, which was 98.14%. This was due to increased funding for free medical treatment programs at several Community Health Centers, the emergence of new disease cases that increased the need for drugs in basic services, and the numerous health programs implemented at the Puskesmas, which increased the allocation of funds for basic health services.

Previous research (Anglia, 2019) noted an increase in the budget for free medical treatment. The drug procurement process at the Tegal City Pharmacy Installation faced a number of obstacles, including the untimely publication of the e-catalog at the beginning of the year resulting in delayed drug orders, drug availability from suppliers that was often out of stock with new deliveries made at the end of the year, ordering limits on the e-catalog, obstacles in the supply system from the pharmaceutical industry providing the e-catalog, the unpreparedness of the auction winner causing delays or non-fulfillment of delivery commitments, and late deliveries even though funds were available.

Several steps can be taken to address drug procurement issues, including: conducting periodic evaluations by all drug officers at Community Health Centers in active coordination with other health workers, increasing government and Health Office support in health policies and programs that adapt to disease patterns and drug needs in Tegal City, reactivating the Health Information System (SIK) so that drug management data is more accurate and up-to-date, and holding regular training for drug management personnel at the Pharmacy Installation and Community Health Centers.

### Stage Drug Storage

#### Percentage of Expired Drugs

**Table 6.** Percentage of expired drugs

Total Types of Medicines Available	Total types of expired drugs	Percentage (%)	Ministry of Health Standard 2010 (%)
201	0	0	0

Based on Table 6, the percentage of expired medicines at the Tegal City Pharmacy Supply Installation was 0% out of 201 items, showing that medicine storage is well managed. Every received medicine has a minimum shelf life of 24 months; if shorter, it is returned or replaced, and

Puskesmas only accept it if it can be used immediately. This shows that the expired medicine management procedure is already optimal.

Research (Anglia, 2019) states that drugs with short expiry dates usually come from the Special Allocation Fund (DAK) program, while drugs with long expiry dates are specifically for drugs sourced from the Regional Budget or General Allocation Fund (DAU). The solution implemented by the Tegal City Pharmacy Installation in handling drugs with short expiry dates includes several steps, including: returning the goods directly to the distributor, replacing them with other drugs accompanied by a return letter guarantee, and offering or informing the Community Health Center whether they are willing to accept short-expiry drugs so they can be used immediately.

### Percentage of Damaged Drugs

**Table 7.** Percentage of damaged drugs

Total Types of Medicines Available	Total types of expired drugs	Percentage (%)	Ministry of Health Standard 2010 (%)
201	0	0	0

Based on Table 7, the percentage of damaged medicines at the Tegal City Pharmacy Supply Installation was 0% out of 201 items, showing that medicine storage and receipt are well managed. Each medicine is inspected upon arrival, and any damaged medicine or packaging is immediately returned to the distributor, ensuring no damaged medicines remain at the facility.

### Stage Drug Distribution

#### Accuracy of Drug Distribution

**Table 8.** Accuracy of drug distribution

Number of health centers served according to plan	Total number of health centers served by the distribution	Percentage (%)	Standard Ministry of Health 2010 (%)
8	8	100	100

Based on Table 8, the accuracy rate of drug distribution at the Tegal City Pharmacy Installation was recorded at 100%. Interviews with the Head of the Pharmacy Installation revealed that drug distribution is carried out routinely every two months to eight community health centers (Puskesmas) and runs according to schedule. Puskesmas experiencing drug shortages can directly submit requests to the Tegal City Pharmacy Installation outside of the distribution schedule, and will still receive timely service.

### Drug Availability Level

**Table 9.** Level of drug availability

No	Information	Types of Drugs	Percentage (%)
1	Drug Availability Level <10 Months	79	39.30
2	Drug Availability Level = 10 Months	21	10.45
3	Drug Availability Level >10 Months	101	50.25

Based on Table 9, of the 201 types of drugs available, 39.30% had an availability level of less than 10 months, 10.45% were available for exactly 10 months, and 50.25% had an availability of more than 10 months. The inaccuracy of drug availability that has not reached 100% is caused by the estimated procurement time, where in 2019 receipts several drugs were not provided by the Tegal City Health Office because stocks at the Community Health Center were considered sufficient, as well as drug shortages from the factory. The drug availability level at the Tegal City Health Office Pharmacy Installation varies between 0 and 31 months, reflecting the duration of the available drug supply. After calculations, the average drug availability was determined to be

around 10-11 months, so the Tegal City Pharmacy Installation set a minimum availability standard of 10 months.

According to (RI, 2014), drug availability is categorized as excess if it exceeds 18 months, is said to be safe if it is in the range of 12-18 months, is insufficient if it is less than 12 months, and is categorized as empty if it is less than 1 month. Based on the results of the study, in the Tegal City Pharmacy Installation there are 93 types of drugs (46.27%) which are included in the safe category, 2 types of drugs (1%) are excess, 79 types of drugs (39.30%) are insufficient, and 27 types of drugs (13.43%) are empty. The overall drug supply adequacy level is calculated at 47.26%, which is obtained from the number of drugs in the safe and excess categories compared to the total types of drugs, multiplied by 100%. This shows that in general the availability of drugs is still considered safe, because some drug stocks at the Community Health Center are considered sufficient so that the Pharmacy Installation does not need to add more supplies.

Previous research by Anglia (2019) confirmed that inaccurate drug planning is often caused by estimated procurement times. In certain budget years, the Health Office did not provide certain types of drugs because stocks at community health centers were still sufficient to support health services.

#### Average Empty Time of Drug

**Table 10.** Average medication empty time

Average number of days of drug shortage in 1 year (days)	Number of days in 1 year	Percentage (%)
100	365	27.50

Based on the calculation results, the number of days of drug shortages at the Tegal City Pharmacy Installation reached 20,175 days for 201 types of drugs, resulting in an average drug shortage of approximately 100 days per drug type per year. By dividing the average number of days of shortages by 365 days, the annual shortage percentage is 27.50%. This drug shortage occurs due to several factors, including the drug stock at the Community Health Center is still considered sufficient so that the Pharmacy Installation does not increase supplies, the untimely launch of the e-catalog at the beginning of the year resulting in late orders, the availability of drugs that are out of stock from the factory, the existence of ordering limits in the e-catalog, and late deliveries from suppliers who do not comply with the contract.

According to (Djatmiko, 2009), the ideal number for drug shortages is 0 days. However, shortages can still occur due to factors such as factory out-of-stock items, rising raw material prices, changes in disease patterns resulting in fewer drugs received than planned, and delays in distribution from the central government.

Solutions and recommendations for improving drug distribution are as follows. First, although the timeliness of distribution by the Tegal City Pharmacy Installation has been running well, regular evaluations are still needed, especially regarding the LPLPO reporting scheduled between the 1st and 10th of each month, to ensure unimpeded and more effective drug distribution. Second, for drugs categorized as lacking or out of stock, drug managers at the Pharmacy Installation need to coordinate and regularly supervise the Community Health Centers regarding drugs that are experiencing stagnation (no expenditure changes for one year).

The drug availability rate at the Tegal City Pharmacy Unit shows that 46.27% of drugs are in the safe category (12-18 months). Despite this safety rating, regular evaluation is still necessary to calculate drug needs at Community Health Centers (Puskesmas). Only around 1% of drugs are in the excess category. Although this is a low percentage, if a Puskesmas has excess stock, the drugs can be distributed to other Puskesmas experiencing shortages, as directed by the Pharmacy Unit staff.

This study analyzed the drug management system at the Pharmaceutical Installation of the Tegal City Health Office using 2019 data. The results showed that the accuracy of drug planning was not optimal, with an average reaching 184.22%, indicating overplanning (Rumbay et al., 2015). Compared to other studies in Semarang and Surakarta, Tegal showed improvements in storage and distribution, although challenges in planning and procurement—such as delays in the e-

catalogue system—still persist (Dianingtyas, 2022; Sylvania et al., 2012). The strength of this study lies in its comprehensive approach, as it not only evaluates technical indicators but also considers factors such as coordination, information systems, and local policy context (Bigdeli et al., 2018).

## CONCLUSION

Based on the research results, the availability of drugs in the Tegal City Pharmacy Installation is generally considered good with an availability level of 92.04%, approaching the minimum health service standard of 90%. However, some drugs are still found to be in excess, insufficient, or out of stock, requiring regular evaluation and coordination with the Community Health Center to adjust to actual needs. The procurement of generic drugs almost meets the minimum standard of 90% with a percentage of 88.97%, although there are obstacles such as delays in the e-catalog, factory shortages, and medical personnel's preference for non-generic drugs. The allocation of drug procurement funds, at 98.14% of the total need, is still insufficient to cover all needs, especially due to the increase in new disease cases and additional health programs. Drug management in the Pharmacy Installation has been running well, as evidenced by the absence of expired or damaged drugs, and the accuracy of drug distribution reaching 100%. Although the availability of drugs in the safe category of 46.27% is quite good, the average time for drug shortages still reaches 100 days per drug type per year, which is influenced by procurement delays and limitations of the e-catalog system. Therefore, regular training is needed for drug management officers, optimization of information systems, routine evaluation of drug needs, and active coordination between Pharmacy Installations, Community Health Centers, and local governments to increase the effectiveness and efficiency of drug management. This study's findings can strengthen the implementation of JKN by improving drug planning, targeted distribution, and more equitable availability of essential medicines. Issues such as e-Catalogue delays, Fornas mismatches, and weak inter-unit coordination highlight the need for integrated systems, regular training, and routine evaluations to make JKN services more effective and responsive to real medicine needs in the field.

The local government can improve coordination between the Health Office, Community Health Centers (Puskesmas), and the TPOT team through several concrete steps. First, by forming a regional drug coordination team that includes representatives from each unit to jointly plan and evaluate drug needs. Second, by developing an integrated drug information system so that stock and demand data can be accessed in real time by all parties. Third, by establishing clear coordination and reporting SOPs to ensure structured communication across units. Fourth, by conducting regular training for drug management staff to ensure a consistent understanding of procedures. In addition, performance evaluations and reward systems should be implemented to recognize units with the best coordination. Finally, universities or pharmaceutical experts should be involved as partners to support continuous evaluation and system improvement.

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