

## Availability of Essential Medicines in the Remote Public Health Facilities in Malaysia

Izzati Mohd Farok<sup>1</sup>, Bibi Faridha Mohd Salleh<sup>1</sup>, Lau Ling Wei<sup>1</sup>, Ramli Zainal<sup>2</sup>

<sup>1</sup> Pharmacy Policy and Strategic Planning Division, Ministry of Health Malaysia

<sup>2</sup> Pharmaceutical Services Programme, Ministry of Health Malaysia

### Abstract

**Introduction:** Approximately one-third of the world population particularly in Africa and Asia lack consistent access to essential medicines. Providing access to medicines by ensuring availability of essential medicines is one of the objectives of a national medicine policy. Assessing the availability of essential medicines will help in understanding and identifying areas for improvement in the medicines distribution and stock management system.

**Objective:** This study aimed to assess the availability of essential medicines in remote health facilities in Malaysia.

**Methods:** A retrospective cross-sectional survey covering 20 remote health facilities in four states (Selangor, Pahang, Johor and Sarawak) in Malaysia was conducted. A basket of drugs consisted of 10 highly utilised essential medicines listed in the Malaysian National Essential Medicine List was used to measure the availability, stockout days and time between order and delivery of the selected essential medicines.

**Result:** On average, availability of the selected essential medicines at twenty remote health facilities was found to be more than 95%. Average medicines stockout days in the four states ranged from 0 to 12 days. At the same time, the study found that the average days between order and delivery of the medicines in the four states were between 6 to 13 days.

**Conclusion:** Availability of essential medicines in the rural health facilities was high (above 95%) and is in line with the recommendations from World Health Organisation (WHO) of 80% availability of essential medicines to ensure equitable access and rational use of medicines. It is recommended that an in-depth study is performed to look into the factors contributing to the medicines stockout and delays in medicines delivery in Malaysia.

**Keywords:** delivery time, essential medicines, medicines access, medicines availability, stockouts, remote facilities, Malaysia

**NMRR ID:** NMRR-17-2679-39128

### Corresponding author:

Izzati Mohd Farok

Pharmacy Policy and Strategic Planning Division,  
Ministry of Health Malaysia.

Lot 36, Jalan Universiti,

46200 Petaling Jaya,

Selangor.

Email: izzati.farok@moh.gov.my

## Introduction

Essential medicines are medicines that fulfil the healthcare needs of a population. These medicines should be available within the health systems at all times to ensure continuous access to safe, good quality and affordable medicines<sup>1</sup>. As reported by World Health Organization (WHO), one-third of the global population do not have regular access to essential medicines. It is estimated that more than 50% of the population in some of the lowest-income countries such as in Africa and Asia have no regular access to essential medicines<sup>2</sup>. Low availability of essential medicines in the public sector is often caused by a lack of public resources due to underfunding or under-budgeting, inaccurate demand forecasting, and inefficient public sector procurement and distribution of medicines<sup>3</sup>.

In Malaysia, the importance of essential medicines is emphasised in the Malaysian National Medicines Policy (MNMP). The MNMP promotes the availability of drugs through appropriate selection of medicines, improvement in the management of medicines procurement and the supply chain network, and through optimal utilisation of available financial resources to ensure sustainability of the healthcare system. The goal of the MNMP is to promote equitable access and rational use of safe, effective and affordable essential medicines of good quality to improve health outcomes for the people<sup>4</sup>.

A study carried out by Kamaruzaman *et al.* in 2005 reported that although the average availability of essential medicines in Malaysia was high being more than 95%, the availability in certain areas in Sabah was less than 80%<sup>5</sup>. WHO sets the target in its medium-term strategic plan (2008-2013) of which 80% of essential medicines should be available in all sectors to ensure equitable access and the rational use of medicines<sup>6</sup>. Availability of good quality, safe and affordable essential medicines may save lives, reduce suffering, and improve health with proper use. Insufficiencies in the supply and distribution of essential medicines may impair the effectiveness of care<sup>7</sup>.

As recommended by WHO, process and outcome indicators (PR 27, PR 29 and OT 1) were collected to assess the effectiveness of the distribution system and the management of drugs at the local level and assess the attainment to make essential medicines available to the whole population in Malaysia<sup>9</sup>. The general aim of this report is to understand the performance of distribution system and efficacy of drug stock management in remote health facilities. Specifically, the objective is to measure the availability of essential medicines in remote health facilities in Malaysia.

## Methods

The methodology was adopted from the World Health Organization protocol - 'Indicators for monitoring national drug policies – a practical manual, second edition, 1999'<sup>9</sup>.

### *Survey Design*

A cross-sectional survey was carried out at selected public health facilities. Data were retrospectively collected from existing records and inventory control documents for a period of 3 years, starting from January 2014 until December 2016. This research was registered with the National Medical Research Register with NMRR identification number NMRR-17-2679-39128.

### *Survey Instrument Development*

Data collection forms were adopted from the WHO protocol<sup>9</sup>. Data collectors from the selected facilities were nominated and informed about the methodology and how to fill in the data collection forms to ensure consistency in results.

### *Sampling method and fielding*

#### Selection of facilities

A multi-stage sampling method was used in this study. At the initial stage, cluster sampling of states was carried out according to the geographical regions of Malaysia. The 15 states in the country was

divided into five geographical regions: northern, middle, southern, eastern coastal and eastern. Four geographical regions were selected and one state was sampled from each region. The included states were Selangor (middle zone), Johor (southern zone), Pahang (eastern coastal zone), and Sarawak (eastern zone). The next stage involved systematic sampling of remote public health facilities in these four selected states using Microsoft Excel. The definition of remote health facility was a facility situated at a location of fewer than 100,000 inhabitants. A sample size of 20 remote public health facilities was adopted as recommended in the WHO protocol, considering of limitations in human and financial resources and logistical constraints. The list of remote public health facilities selected is as listed in Appendix 1.

#### Selection of medicines

A basket of drugs consisted of 10 essential medicines was identified. These medicines are essential medicines listed in the Malaysian National Essential Medicine List and at the same time had high utilisation based on the Malaysia Statistics on Medicine 2010. The list of the ten medicines is enclosed in Appendix 2.

#### Definition of ordering, stock out and availability

To measure the duration between order and delivery, term or major orderings were identified. Term or major ordering is a scheduled and consistent ordering of medicines according to the time period whereby the stocks can last for as defined by individual public health facilities. For staggered supplies of order, the percentage of the number of items and the quantity of each item received at the remote health facilities must be 80% and above. Stock out is defined as the period when the medicine is out of stock in the remote public health facility's store. If medicine was available through a loan from other facilities, the medicine was still considered as out of stock from the store. Availability means the medicine is available at the remote health facilities on the day the survey was carried out.

#### Data collection, management, and analysis

Official letters for data collection were sent to the participating facilities in Decembers during the study period. The data collection was conducted for a period of one month. Reminder calls were made to the respondents during this time. After receiving the completed forms, responses were reviewed and clarification was sought from the respondent if any information was unclear or missing. Three (3) indicators were measured. The first indicator was 'Average time between order and delivery from central store to remote facilities'. The second indicator was 'Average stock out duration for a basket of drugs in a sample of remote facilities', and the third indicator was 'Number of drugs from a basket of drugs available in a sample of remote health facilities'. Data were analysed as descriptive statistics using SPSS Version 20.

### **Results**

Twenty (20) remote public health facilities in Malaysia were surveyed. These health facilities were situated at a distance of more than 100 kilometres from a town of 100,000 inhabitants. Table 1 showed that in Selangor, the average availability of a basket of drugs was found to be 100% in 2014 and dropped slightly to 96.7 % in 2015. It remained constant in 2016. In Pahang, the average availability of a basket of drugs improved remarkably from 98.3% to 100% in 2014 to 2015 but declined to 95% in 2016. In Johor, availability of drugs remained the same for the first two years but dropped 2.5% in 2016. In Sarawak's remote public health facilities, 100% of a basket of drugs were available throughout the three years.

The results in Table 2 showed that Sarawak and Pahang had a median of zero stock out duration for three consecutive years. Nevertheless, the stock out days ranged from a minimum of zero days to maximum of 43 days and a minimum of zero days to maximum of 141 days respectively. In

Selangor, the median stock out days was zero in 2014 and remained zero in 2015 but increased slightly to 4 days in 2016. On the other hand, in Johor, the median stock out days increased from 2.5 days in 2014 to 14 days in 2015 and further rose to 16.5 days in 2016.

Table 3 showed the average time between order and delivery from the central store to remote public health facilities from 2014 to 2016. In Selangor, the median average delivery time in 2014 was seven days and increased to eight days in 2015. In 2016, the median average delivery time decreased to six days with a maximum of 10 days. In Pahang, the median average delivery time was six days with a minimum of 1 day and a maximum of 32 days. As seen in the table, Johor’s remote public health facilities had a reduction of the median average delivery time from 11 days in 2014 to four days in 2016. Sarawak had the highest average delivery time. The remote public health facilities had a median delivery time of 13 days. Nevertheless, the average delivery time showed a reducing trend over the three years.

Table 1: Average percentage availability of a basket of drug in 20 remote public health facilities

State	Average availability, % mean (SD), median (range)			Average
	2014	2015	2016	
Selangor	100	96.7 (5.8) 100 (90-100)	96.7 (5.8) 100 (90-100)	97.8 (4.4) 100 (90-100)
Pahang	98.3 (4.1) 100 (90-100)	100	95(5.8) 95 (90-100)	97.7 (4.3) 100 (90-100)
Johor	97.5 (5) 100 (90-100)	97.5 (5) 100 (90-100)	95 (5.8) 95 (90-100)	96.7 (4.9) 100 (90-100)
Sarawak	100	100	100	100

\* SD – standard deviation

Table 2: Average stock out days of a basket of drugs in 20 remote public health facility stores

State	Average stock out days, number of days mean (SD), median (range)			Average
	2014	2015	2016	
Selangor	9.6 (31.0) 0 (0-163)	7.4 (11.3) 0 (0-36)	13.0 (18.9) 4.0 (0-81)	10.0 (21.8) 0 (0-163)
Pahang	4.5 (9.3) 0 (0-34)	12.1 (18.6) 0 (0-68)	10.5 (21.6) 0 (0-141)	9.0 (17.5) 0 (0-141)
Johor	12.0 (20.2) 2.5 (0-73)	18.9 (24.2) 14.0 (0-96)	27.1 (27.9) 16.5 (0-87)	19.4 (24.9) 11.5 (0-96)
Sarawak	0.3 (1.8) 0 (0-13)	0.13 (0.7) 0 (0-5)	1.9 (7.5) 0 (0-43)	0.8 (4.5) 0 (0-43)

Table 3: Average time between order and delivery of medicines in 20 remote public health facilities

State	Average time between order and delivery, number of days mean (SD), median (range)			
	2014	2015	2016	Average
Selangor	7.0 (4.4)	8.8 (2.7)	5.7 (2.1)	7.3 (11.9)
	7.0 (2-20)	8.0 (6-15)	6.0 (2-10)	7.0 (2-20)
Pahang	8.7 (5.7)	8.6 (4.9)	9.6 (7.4)	9.0 (6.1)
	6.0 (2-22)	7.0 (3.22)	7.0 (1-32)	6.0 (1-32)
Johor	11.2 (7.2)	10.8 (8.6)	8.5 (7.4)	10.1 (7.8)
	11.0 (2-26)	7.0 (2-34)	4.0 (1-24)	7.0 (1-34)
Sarawak	17.0 (11.7)	15.3 (10.1)	13.5 (8.6)	15.3 (10.2)
	14.0 (2-64)	13.0 (2-54)	11.0 (1-37)	13.0 (1-64)

## Discussion

According to the WHO, access to medicines can be addressed in relation to the physical availability of essential medicines and stockout duration, and affordability and prices of medicines. Apart from that, it can also be discussed using data on access to health facilities<sup>8</sup>. In this report, availability of essential medicines, stockout duration and time between order and delivery of medicines were discussed. The findings showed that the availability of essential medicines on the day of survey remained high with more than 96% of medicines were kept in the remote public health facilities. These findings were consistent with a study by Kamaruzaman *et al.* in 2005 that was conducted in 20 randomly selected public health facilities in Malaysia. It was reported that the availability of essential medicines in public health facilities was 95.4%<sup>5</sup>.

Alternatives are available even though some of the medicines were not available or out of stock. For example, tablet simvastatin 40mg was available to substitute for simvastatin 20mg which was not available in some remote public health facilities. Purchasing tablet simvastatin 40mg was a good option because it made the medicine readily available for patients requiring simvastatin 20 mg by halving the 40mg dose and it also reduces the total amount spent on simvastatin. Referring to the Consumer Price Guide by the Pharmaceutical Services Division Malaysia, the price for a tablet of Simvastatin 40mg which can make up for two doses of simvastatin 20mg is cheaper compared to a single dose of simvastatin 20mg<sup>9</sup>.

In an efficient distribution system, the time between order and delivery should be approximately the same for each order and as short as possible depending on the distance and the number of intermediate levels<sup>10</sup>. Sarawak had the longest time between ordering and delivery of medicines as compared to other states. Most of the medicine distribution centres or suppliers are based in Peninsular Malaysia. From Peninsular Malaysia to Sabah and Sarawak, medicines are transported by air or water transport, which might explain the delay of the delivery time to the public district drug stores in these areas. The transportation system is not as established as in Peninsular Malaysia and this could also be a contributing factor to a more extended delivery time to the remote public health facilities<sup>5</sup>. Inevitable setbacks such as weather, tide and water levels might affect shipment of medicines logistically. Therefore, supplying to remote health facilities becomes a challenge.

Stock out is the period where the medicine is out of stock in the store of the remote public health facility. Comparing the stock out duration of essential medicines in remote public health facilities, three states were found to have an average median of zero-day stock out, except Johor. Despite these, the maximum stock out day indicated a stock management challenge for all states. In a verbal conversation with pharmacists in the public health facilities in Selangor and Pahang, the stock

outs of some essential medicines were mainly due to financial constraints which usually happened at the end of the year, thus delaying procurement and supply from the suppliers. However, the real causes of stock outs require further investigation.

During the stock out periods, patients still received their supplies through remaining medicine stocks at the dispensing counters, and stocks received or on loan from other health facilities. On the other hand, even though drug distribution in Sarawak covers a wide area, it had an average stock out of less than one day. This could be attributed to the effectiveness of public district drug stores in organising the distribution of stocks to the health facilities. Also, the adherence to proper scheduling of drug stock management is also important since these public remote health facilities are located miles away from the district drug store.

There are a few limitations in our study. Due to limited resources and logistical constraints, northern zone was not included in the study. In addition, the high turnover rate of data collectors in the remote health facilities was observed and this might have contributed to inconsistency in data collection. Nevertheless, frequent verbal clarification was conducted to minimise the inconsistency.

### **Conclusion**

The availability of essential medicines at selected remote public health facilities in Malaysia was high with the availability of more than 95%. This is in line with the WHO's recommendation of 80% of essential medicines availability to ensure equitable access and the rational use of medicines. The overall performance of distribution system and efficacy of drug stock management in remote health facilities can be improved to ensure that medicines are efficiently distributed throughout the country and patients have access to continuous supply of medication.

### **Acknowledgement**

We would like to thank the Director General of Health Malaysia for his permission to publish this article. The authors would also like to acknowledge Dr. Hasenah binti Ali and Madam Nur'Ain Shuhaila binti Shohaimi from the Pharmacy Policy and Strategic Planning Division and Mr. Fahmi bin Hassan from the Pharmacy Practice and Development Division for their opinions and contributions in this research.

### **Conflict of Interest Statement**

No external funding was received and the authors declared no conflict of interest.

### **References**

1. Essential Medicines. World Health Organization 2017. Available from: [http://www.who.int/topics/essential\\_medicines/en/](http://www.who.int/topics/essential_medicines/en/)
2. WHO Medicines Strategy 2004–2007. Geneva: World Health Organization. 2004. Available from: <http://apps.who.int/medicinedocs/en/d/Js5416e/>
3. IMS Institute for Healthcare Informatics. Understanding the Role and Use of Essential Medicines Lists April 2015.
4. Malaysia National Medicines Policy 2<sup>nd</sup> Edition, Ministry of Health Malaysia.
5. Kamaruzaman S, Mohamed I. M. Ibrahim. Are Essential Medicines in Malaysia Accessible, Affordable and Available? *Pharmacy World and Science*. December 2005, Volume 27, Issue 6, pp 442–446.
6. Bazargani, Y.T., Ewen, M., de Boer, A., Leufkens, H.G. and Mantel-Teeuwisse, A.K., Essential medicines are more available than other medicines around the globe. *PLoS One*, 2014. 9(2), p.e87576.

7. Loius N. *et al.* Assessment of essential medicines stock-outs at health centers in Burera District in Northern Rwanda. *Rwanda journal Series F: Medicine and Health Sciences* Vol 2 No 1, 2015.
8. WHO Operational package for assessing, monitoring and evaluating country pharmaceutical situations. Guide for coordinators and data collectors. World Health Organization. 2007. <http://apps.who.int/medicinedocs/documents/s14877e/s14877e.pdf>
9. Brudon, P.; Rainhorn, J.; Reich, M.R. Indicators for monitoring national drug policies. A practical manual second edition. World Health Organization. 1999. <http://apps.who.int/medicinedocs/pdf/whozip14e/whozip14e.pdf>
10. Consumer Price Guide. Pharmaceutical Services Programme, Ministry of Health Malaysia. Available from: <https://www.pharmacy.gov.my/v2/en/apps/drug-price>
11. Yang, H.; Dib, H.H.; Zhu, M.; Qi, G.; Zhang, X. Prices, availability and affordability of essential medicines in rural areas of Hubei Province, China. *Health Policy and Planning*. 2009, 25(3), 219-229.

## Appendix 1

### LIST OF SELECTED REMOTE PUBLIC HEALTH FACILITIES

#### Selangor

Tanjung Karang Health Clinic  
Sungai Besar Health Clinic  
Sekinchan Health Clinic

#### Pahang

Damak Health Clinic  
Bukit Betong Health Clinic  
Pekan Awah Health Clinic  
BandarTun Razak Health Clinic  
Bandar Jengka Health Clinic  
Cheroh Health Clinic

#### Johor

Mersing Kanan Health Clinic  
Endau Health Clinic  
Labis Health Clinic  
Bekok Health Clinic

#### Sarawak

Bintangor Health Clinic  
Song Health Clinic  
Lawas Health Clinic  
Batu Niah Health Clinic  
Kanowit Hospital  
Selangau Health Clinic  
Sri Aman Health Clinic

## Appendix 2

### BASKET OF DRUGS

Tablet Amlodipine 5mg  
Tablet Gliclazide 80mg  
Tablet Perindopril 4mg  
Tablet Metformin 500mg  
Tablet Hydrochlorothiazide 25mg

Tablet Metoprolol 100mg  
Tablet Chlorpheniramine 4mg  
Tablet Acetylsalicylic acid 300mg  
Tablet Frusemide 40mg  
Tablet Simvastatin 20mg