# Use of Prescription Medicines in Malaysia 2005

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## SUMMARY

**The National Medicines Use Survey (NMUS) which started in 2004 and is still ongoing was conducted with the intent to continuously and systematically collect data on the use of medicines, to provide an overview on the use of medicines in Malaysia. The objective of the NMUS is therefore to quantify the present state and time trends of medicines utilization at various levels of our health care system whether national, regional, local or institutional. From the data available, for the Year 2005, the most commonly used medicine in Malaysia were anti-diabetic medications, of which glibenclamide is the most common followed by metformin, were the top 2 of the list of drugs utilized in DDD/1000 population/day. Collectively, however, taking into account the various antihypertensives by therapeutic groups, anti-hypertensive medicines were more commonly used than anti-diabetics. Hypertension and diabetes mellitus are the two most prevalent chronic disorders in the country and thus, such high medicines utilization rates for these conditions are to be expected. From the general practice prescription data, it was estimated that a patient with hypertension was prescribed a median of only one (1) anti-hypertensive medication. This means, the vast majority of patients (81%) were on mono-therapy, which is hardly sufficient to achieve treatment target. Clearly then, given the prevalence of hypertension, many patients were not on drug treatment at all, and of those treated, their drug treatment are likely to be inadequate.**

**KEY WORDS:**
*National medicines use survey, Defined daily dose, Anatomical therapeutic chemical classification*

## INTRODUCTION

However, for the potential benefits of modern pharmaceuticals to be fully realized, there must be in place a properly functioning health system to ensure that medicines are accessible to the population, and that they are quality assured and used rationally. All countries are striving to meet these three key objectives, access, quality and rational use, in their pharmaceutical sector but with varying degree of success. For example, WHO estimated that a third of the world population lack access to essential medicine[1] half of pharmaceuticals are prescribed or dispensed inappropriately[2], and half of patients take their medications incorrectly[2] and only 20% of countries have well developed regulations to assure the safety, efficacy and quality of medicines available to their populations[3].

There is no doubt that Malaysia has made impressive improvement in health care in the last decade. In the pharmaceutical sector, the safety, efficacy and quality of medicines are better quality assured than ever with our own regulatory authority, the National Pharmaceutical Control Bureau (NPCB) playing a leading role in this respect. Counterfeit and poor quality medicines remain thankfully uncommon, unlike the situation in other countries[3]. On the objective of access to and rational use of medicine, one may surmise that the rising expenditure on healthcare in general and pharmaceutical in particular ought to translate into improving access, though data to support this is hard to come by.

With this in mind, National Medicines Use Survey (NMUS) was established. The NMUS is a project by Ministry of Health Malaysia to estimate the quantity and pattern of use of medicines in Malaysia. It is designed to collect data on an ongoing basis to provide an accurate estimate of usage over time. NMUS was launched in late 2004, and has collected sufficient amount of data to produce two reports on drug utilization.

## MATERIALS AND METHODS

The NMUS conducted several surveys from January 2005 till Dec 2005 in order to capture data at the various levels of the medicines supply and distribution system in the country. Data sources that are absolutely critical and/or accessible are targeted. This report describes the most commonly used medicines by therapeutic groups and by specific drugs. The scope was also limited to "prescription only" medicines and excludes over-the-counter medicines, traditional or herbal products and food supplements.

*Survey population, sampling and response or coverage rate*

The statistics presented in this report are derived primarily from medicines procurement and prescription. Collection of prescription data is limited to clinic practices, while hospital prescription is assumed to be included in hospital procurement data.

For the Ministry of Health pharmaceutical procurement, there was 100% coverage of the central tender for 128 hospitals and 69% coverage for local purchases done by individual hospitals. Forty-six of the 114 private hospitals, 100% (3 hospitals) of the University hospitals and 1 out of 3 army hospitals' pharmaceutical procurement were captured in this 2005 survey. Six hundred and ten (610) private general practitioners responded to the prescription survey and 55 of the private pharmacies responded to the pharmacy dispensing survey.

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*Data management*
The collected data, whether in databases or in paper or electronic data collection form must be compiled into a single database, appropriately processed and coded prior to statistical analysis.

The NMUS database was created in Ms SQL Server 2000. The application has three modules: Contact Management, Data Entry and Data Processing.

- Contact Management module is used to collect the establishment survey details, log and track all the correspondence documents with Source Data Producers (SDP), and forecast, plan and schedule the conduct of the survey.
- Data Entry module is used to collect the data submitted by the SDP in paper form. It has been designed to collect data from General Practitioner prescription survey and pharmacy dispensing survey.
- Data Processing module is used to clean, manage and process the medical data prior to statistical analysis. The automated data processing functionalities include Anatomical Therapeutic Chemical Classification system, Defined Daily Dose (DDD) Assignment, Total Dosage Calculation and Unit Conversion. The ATC Classification system, and the unit of measurement DDD is recommended by the WHO to be used for drug utilization research and for the purpose of comparisons of drug consumption statistics between countries, between regions or population groups within the country and to evaluate trends in drug use over time.

*Statistical methods*
As explained above, the quantity of use of a medicine is expressed as, depending on the type of medicine, the number of DDDs per 1000 inhabitants per day or DDDs per inhabitants per year. These statistics are calculated as follows:

$$\text{DDDs/1000 inhabitants/day} = \frac{T*1000}{DDD*P*365}$$

$$\text{DDDs/1000 inhabitants/year} = \frac{T}{DDD*P}$$

*Where*
T is an estimate of the total quantity of the drug utilized in the year under consideration

DDD is the DDD assigned for the drug according to the ATC/DDD system

P is the mid-year population of Malaysia or the relevant area where the survey was conducted

365 refers to the 365 days in a year

In either case, an estimate of the total quantity of the drug being utilized in the year is required, and this must be expressed in the same unit as the DDD assigned for the drug. The statistical estimation of the totals varies depending on the survey method and the sampling design employed to collect the data, and if necessary with adjustment for incomplete data.

## RESULTS
The top 30 therapeutic groups by utilization in DDD/1000 population/day 2005 are shown as in Table I and the top 40 drugs by utilization in DDD/1000 population/day 2005 in Table II.

The most commonly used medicines in 2005 in Malaysia were anti-diabetic medications (3.6% of the population was on this), of which glibenclamide (1.3% of population) and metformin (1.2% of population) were the top two most commonly used drugs.

The various anti-hypertensive medications also figured very high on the top 30 list; beta-blockers was second (2.4% of population on this), followed by agents acting on the renin-angiotensin system (third on list, 2.1%), calcium channel blockers (fourth on list, 1.9%), and diuretics (seventh on list, 1.21%; though this include high ceiling diuretics not used for hypertension). Collectively, these anti-hypertensive medicines were more commonly used than anti-diabetics.

After anti-diabetic and anti-hypertensive medications, lipid modifying agents were the next most commonly used therapeutic group, of which simvastatin (0.8% of population) and lovastatin (0.6% of population) were the top two most commonly used lipid reducers.

Drugs for obstructive airway disease was the next most commonly utilized therapeutic group (1.3% of population). Anti-histamines for systemic use was a surprisingly highly used medicine (1.1% of population), mostly chlorphenamine and loratadine. Anti-bacterial medicines not surprisingly were widely used, amoxicillin was the most popular item in the group. Similarly, anti-rheumatic medicines were also commonly used (1.2% of population).

Other notable levels of medicine utilization observed (in terms of % of population on), were

- Drugs for acid related disorders such as peptic ulcers (0.5% of population)
- Systemic corticosteroids (0.5%)
- Psycholeptics (0.5% )
- Thyroid therapy (0.4%, mostly accounted by carbimazole 0.3%)
- Anti-epileptics (0.16%)
- Anti-gout medicines (0.18%)

## DISCUSSION
Hypertension and diabetes mellitus are the two most prevalent chronic disorders in the country (In 1996, prevalence of hypertension was 33%[4] and diabetes mellitus 8%[5]); thus in the light of known disease epidemiology, such high medicines utilization rates for these conditions are to be expected. Indeed one may question whether they were sufficiently high to ensure all in need of therapy were on treatment and properly controlled. From general practice prescription data, we estimated a patient with hypertension was prescribed a median of only one (1) anti-hypertensive medication. That is, the vast majority of patients (81%) were on mono-therapy, which is hardly sufficient to achieve treatment target[6]. Clearly then, given the prevalence of

**Table I: Top 30 Therapeutic groups by Utilization in DDD/1000 population/day 2005**

| n | ATC | Therapeutic group | Public | Private | Total |
|---|---|---|---|---|---|
| 1 | A10 | Drugs Used In Diabetes | 27.2982 | 8.5582 | 35.8564 |
| 2 | C07 | Beta Blocking Agents | 17.6430 | 6.0770 | 23.7199 |
| 3 | C09 | Agents Acting On The Renin-Angiotensin System | 14.0994 | 7.0660 | 21.1654 |
| 4 | C08 | Calcium Channel Blockers | 14.4420 | 4.8424 | 19.2844 |
| 5 | C10 | Lipid Modifying Agents | 9.5495 | 9.0349 | 18.5844 |
| 6 | R03 | Drugs For Obstructive Airway Diseases | 8.8141 | 4.7442 | 13.5583 |
| 7 | C03 | Diuretics | 8.1720 | 4.0487 | 12.2207 |
| 8 | M01 | Antiinflammatory And Antirheumatic Products | 4.2187 | 7.5511 | 11.7698 |
| 9 | R06 | Antihistamines For Systemic Use | 5.7836 | 5.3744 | 11.1580 |
| 10 | J01 | Antibacterials For Systemic Use | 3.5320 | 6.0044 | 9.5363 |
| 11 | B01 | Antithrombotic Agents | 4.9768 | 4.3798 | 9.3566 |
| 12 | C01 | Cardiac Therapy | 3.2021 | 3.3546 | 6.5567 |
| 13 | N05 | Psycholeptics | 3.8167 | 1.9859 | 5.8026 |
| 14 | A02 | Drugs For Acid Related Disorders | 2.0122 | 3.1497 | 5.1619 |
| 15 | H02 | Corticosteroids For Systemic Use | 1.5774 | 3.5370 | 5.1144 |
| 16 | H03 | Thyroid Therapy | 1.3160 | 2.9791 | 4.2951 |
| 17 | C02 | Antihypertensives | 3.1635 | 0.3405 | 3.5040 |
| 18 | M04 | Antigout Preparations | 1.0330 | 0.7430 | 1.7760 |
| 19 | N03 | Antiepileptics | 1.3009 | 0.3089 | 1.6099 |
| 20 | N06 | Psychoanaleptics | 0.8536 | 0.6957 | 1.5492 |
| 21 | N07 | Other Nervous System Drugs | 0.4368 | 0.7994 | 1.2363 |
| 22 | J04 | Antimycobacterials | 0.8000 | 0.2633 | 1.0633 |
| 23 | N04 | Anti-Parkinson Drugs | 0.7075 | 0.1996 | 0.9072 |
| 24 | M05 | Drugs For Treatment Of Bone Diseases | 0.4807 | 0.3043 | 0.7851 |
| 25 | P01 | Antiprotozoals | 0.4789 | 0.1770 | 0.6559 |
| 26 | N02 | Analgesics | 0.3333 | 0.1487 | 0.4819 |
| 27 | J02 | Antimycotics For Systemic Use | 0.0628 | 0.2903 | 0.3531 |
| 28 | L02 | Endocrine Therapy | 0.1598 | 0.1812 | 0.3410 |
| 29 | J05 | Antivirals For Systemic Use | 0.1908 | 0.0887 | 0.2794 |
| 30 | B03 | Antianemic Preparations | 0.1309 | 0.1026 | 0.2335 |

**Table II: Top 40 Drugs by Utilization in DDD/1000 population/day 2005**

| n | ATC | Drugs | Public | Private | Total |
|---|---|---|---|---|---|
| 1 | A10B B01 | Glibenclamide | 10.9231 | 1.9997 | 12.9228 |
| 2 | A10B A02 | Metformin | 9.1975 | 2.7895 | 11.9870 |
| 3 | C07A B02 | Metoprolol | 10.6187 | 1.0397 | 11.6584 |
| 4 | C08C A05 | Nifedipine | 9.5203 | 1.0908 | 10.6112 |
| 5 | C07A B03 | Atenolol | 6.4350 | 3.9213 | 10.3563 |
| 6 | C10A A01 | Simvastatin | 2.8973 | 5.4087 | 8.3060 |
| 7 | C09A A04 | Perindopril | 6.0259 | 1.0429 | 7.0689 |
| 8 | C08C A01 | Amlodipine | 3.9237 | 2.6909 | 6.6146 |
| 9 | B01A C06 | Acetylsalicylic acid | 3.7934 | 2.4324 | 6.2258 |
| 10 | C10A A02 | Lovastatin | 5.3584 | 0.6636 | 6.0220 |
| 11 | A10B B09 | Gliclazide | 3.4366 | 1.8662 | 5.3028 |
| 12 | C03C A01 | Furosemide | 3.3789 | 1.3548 | 4.7337 |
| 13 | C09A A02 | Enalapril | 3.1080 | 1.1079 | 4.2159 |
| 14 | C09A A01 | Captopril | 3.5133 | 0.3598 | 3.8731 |
| 15 | C03A A04 | Chlorothiazide | 3.7072 | 0.0359 | 3.7431 |
| 16 | M01A B05 | Diclofenac | 1.4783 | 2.2399 | 3.7183 |
| 17 | R03A C02 | Salbutamol | 3.4157 | 0.2726 | 3.6883 |
| 18 | R06A B04 | Chlorphenamine | 2.7969 | 0.3991 | 3.1960 |
| 19 | H03B B01 | Carbimazole | 0.5594 | 2.5261 | 3.0855 |
| 20 | M01A G01 | Mefenamic acid | 1.3606 | 1.7135 | 3.0741 |
| 21 | R03B A02 | Budesonide | 1.1585 | 1.7650 | 2.9235 |
| 22 | H02A B06 | Prednisolone | 1.0848 | 1.5624 | 2.6472 |
| 23 | C02C A01 | Prazosin | 2.2932 | 0.1050 | 2.3982 |
| 24 | A10A D01 | Insulin (human), intermediate acting combined with fast acting | 1.8981 | 0.2938 | 2.1920 |
| 25 | J01C A04 | Amoxicillin | 0.6914 | 1.4541 | 2.1455 |
| 26 | C01E B15 | Trimetazidine | 1.0461 | 1.0695 | 2.1156 |
| 27 | R06A X13 | Loratadine | 0.5321 | 1.3401 | 1.8722 |
| 28 | R06A E07 | Cetirizine | 0.3803 | 1.4465 | 1.8268 |
| 29 | C10A A05 | Atorvastatin | 0.2281 | 1.5762 | 1.8042 |
| 30 | R03D A04 | Theophylline | 1.3809 | 0.4001 | 1.7810 |
| 31 | H02A B02 | Dexamethasone | 0.2967 | 1.4303 | 1.7270 |
| 32 | A02B C01 | Omeprazole | 0.4546 | 1.2120 | 1.6666 |
| 33 | A02B A02 | Ranitidine | 0.8601 | 0.7352 | 1.5953 |
| 34 | C09C A01 | Losartan | 0.6740 | 0.8777 | 1.5517 |
| 35 | M04A A01 | Allopurinol | 0.9639 | 0.5355 | 1.4994 |
| 36 | C01D A08 | Isosorbide dinitrate | 1.2741 | 0.1517 | 1.4258 |
| 37 | R06A D02 | Promethazine | 1.1025 | 0.3044 | 1.4069 |
| 38 | R03C C02 | Salbutamol | 0.7096 | 0.6626 | 1.3722 |
| 39 | C03A A03 | Hydrochlorothiazide | 0.2448 | 1.0941 | 1.3389 |
| 40 | B01A C05 | Ticlopidine | 0.6441 | 0.6647 | 1.3088 |

hypertension, many patients were not on drug treatment at all, and of those treated, their drug treatment are likely to be inadequate, consistent with survey showing only 6% of Malaysian patients with hypertension on drug treatment did achieve blood pressure control[4].

This utilization pattern is in sharp contrast to Australia (the only country in the region with available medicine use statistics[7]), where lipid reducers (atorvastatin and simvastatin), followed by anti-hypertensives (ramipril and diltiazem hydrochloride), and salbutamol dominated its top five drug list in year 2005 followed by irbesartan, omeperazole, frusemide, asprin and sertraline taking the next five places. Anti-asthmatics is not on the Malaysia top ten drug list, which is to be expected considering the difference in asthma prevalence between the two countries[8], while the relatively lower use of lipid reducers (only 1.7% of population compared with 7% or higher in Australia) definitely suggests under-utilization of lipid reducers, even if past survey has shown lower prevalence of hypercholesterolemias in Malaysia[9]. Another interesting contrast is simvastatin (sixth on the list) and lovastatin (tenth on the list) are commonly used in Malaysia, while atorvastatin topped the Australian list (atorvastatin is twenty-ninth on the Malaysian list), clearly indicating preference for low-priced generics in Malaysian practice, in the absence of public reimbursement unlike in Australia.

Regarding the wide use of anti-histamines, drugs for acid disorders, systemic corticosteroids, psycholeptics, thyroid therapy, anti-epileptics, and anti-gout medicines in the Malaysian population, little is known about the epidemiology and treatment of the diseases for which these medicines are indicated in Malaysia. They deserve further investigation.

Some of the limitations when interpreting the data are that a medicine may have several indications while the DDD is based on the main indication in adults, medicines procured or prescribed or dispensed, as presented here may not necessarily be consumed, DDD may be difficult to assign for medicines with multiple ingredients, topical products, antineoplastic and anaesthetic agents, newly introduced medicines may yet to have DDD assigned and finally, the DDD assigned to a drug is primarily based on other countries' experience and may not reflect the commonly prescribed adult dose in Malaysia.

## CONCLUSION

Anti-hypertensive, anti-diabetic and lipid reducers are the three most highly utilized medicines and this correlates with the known high prevalence of diabetes, hypertension and hyperlipidaemia although their treatment may still be inadequate. Information on utilization or underutilization of medicines are important for the planning of interventions to improve the use of medicines. The National Medicines Use Survey will continue to be an ongoing activity to track the utilization of medicines, which will change with time due to various reasons such as ageing population, discovery of new medicines or changing lifestyle of the population.

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