SURVEY ON DRUG AVAILABILITY IN PUBLIC HEALTH FACILITIES IN THE PHILIPPINES 2012

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LIST OF ABBREVIATIONS AND ACRONYMS

4Ps	Pantawid Pamilyang Pilipino Program
BNB	Botica ng Barangay
ComPack	Complete Treatment Package
CCT	Conditional Cash Transfer Program
CHO	City Health Office
CHD	Center for Health Development
CI	Confidence interval
DMPA	Depot-medroxyprogesterone acetate
DOH	Department of Health
DOH REPS	Department of Health representatives
DSWD	Department of Social Welfare and Development
EU	European Union
HAI	Health Action for Information
HC	Health Center
HSPSP	Health Sector Policy Support Program
MDG	Millenium Development Goals
MHO	Municipal Health Office
NCPAM	National Center for Pharmaceutical Access and Management
NCR	National Capital Region
P100	P100 Treatment Pack Program
PNDF	Philippine National Drug Formulary
PHO	Provincial Health Office
PHTL	Provincial Health Team Leaders
PSU	Primary sampling unit
RHU	Rural health unit
SSU	Secondary sampling unit
WHO	World Health Organization

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EXECUTIVE SUMMARY

Introduction

Low drug availability has persisted as a major problem in several developing countries including the Philippines. The country's health sector reform program had sought to alleviate this problem through the P100 and its successor, the Complete Treatment Pack (ComPack) Program. The latter program runs alongside the Conditional Cash Transfer (CCT) Program of the Department of Social Welfare and Development (DSWD) otherwise known as the Pantawid Pamilyang Pilipino Program (4Ps) of the national government.

Two previous nation-wide surveys had been conducted to monitor levels of drug availability as one of the indicators of progress in health service delivery under the Health Sector Policy Support Program (HSPSP) II. This report presents the results of the recently conducted survey to assess levels of availability of essential drugs at the health facility and province levels and of drugs included in the ComPack program in the public sector in 2012.

Survey Objectives

The objectives of this survey were 1) to determine the mean percent availability of essential medicines in primary level health care facilities consisting of rural health units (RHUs), health centers (HCs) and Level 1 hospitals, and in higher level care, consisting of Level 2 to 4 hospitals; 2) to determine the mean province level drug availability in the two groups of facilities; and 3) to determine the percent availability of specific drugs listed in the DOH Complete Treatment Pack in RHUs and HCs in areas covered by the Conditional Cash Transfer (CCT) program of the government.

Methodology

A stratified two-stage cluster sampling design was implemented to obtain a nationally representative sample of the health facilities. Provinces from each of 3 income categories for provinces were selected with probabilities proportional to size. The National Capital Region and Palawan were purposedly taken in the sample. Within each province, random sampling of primary and higher level health care facilities was separately done. Using a basket list of essential drugs, surveyors collected drug availability data in the health facilities. In RHUs and HCs that were eligible for ComPack deliveries, availability of medicines included in the package was obtained in similar fashion.

Data from the field were checked and encoded. Analysis consisted of generating frequency distributions and descriptive statistics using a weighted analysis for the availability of essential drugs and unweighted analysis for the availability of ComPack medicines.

Results

Percent drug availability in a large majority (78%) of RHUs, HCs and Level 1 public hospitals was widely and evenly spread over an interval of 40% to 80%. Mean percent availability of essential drugs in 2012 was 53.6% (95%CI: 50.0%-57.2%) in primary level health care facilities. This was not much different from that in the preceding survey. Around 5% had very low availability of less than 10% of the drugs in the basket list. A common reason for low drug availability in the health facility was that most drugs were kept in the municipal offices instead. The other frequent reason was delay in drug procurement.

For Level 2 to 4 hospitals, mean percent drug availability was 44.3% (95%CI: 39.7%-49.0%). The increase from 2011 level was 6.5%. Around 72% had percent drug availability between 32% to 61%. There were 5% of these hospitals that had very low percentages drug availability, i.e. around 10% or less drugs. In these hospitals, supplies were mainly limited to parenteral drugs and intravenous fluids. Some hospitals had had no replenishment of supplies for a long period of time.

Province level drug availability in the primary level care facilities varied less and was mostly (14 of 20 provinces) between 50% to 65% with a mean of 54.0%. In contrast, province level drug availability in higher level facilities had a much bigger spread, from an extremely low 1.3% to the highest level at 64%. Majority (11 of 19) of the levels were between 35% to 50%. Mean province level availability in Level 2 to 4 hospitals was 40.8%.

Among the drugs in the basket list, antibiotics were most common items available. These were metronidazole 500 mg tablet, amoxicillin 500 mg capsule, co-trimoxazole 200 mg + 40 mg suspension/5 ml co-trimoxazole 800 mg + 160 mg tablet, found in around 70% or more of RHUs, HCs and Level 1 hospitals. Drugs for other indications that were on hand in similar proportions of facilities were paracetamol 500 mg tablet, metoprolol 50 mg tablet, metformin 500 mg tablet. Conversely, chlorpromazine 50 mg tablet was rarely found while only 20% had ranitidine 150 mg tablet.

In Level 2 to 4 hospitals, the same antibiotics plus ceftriaxone 1 gm vial, cefalexin 500 mg capsule and ciprofloxacin 500 mg tablet were available in more than 70%. Paracetamol 500 mg and ranitidine 150 mg were found in the same percentages of hospitals. On slightly smaller percentages (60% to 70%) of hospitals were antihypertensive drugs amlodipine 5 mg tablet and metoprolol 50 mg tablet and antidiabetic drug metformin 500 mg tablet present. On the lower side, no hospital kept beclometasone 0.5 mg/dose

inhaler. Dexamethasone 0.5 mg, carbamazepine 200 mg and chlorpromazine 50 mg tablets were also not likely to be found (<15% of facilities), as with the antihypertensive drugs enalapril 10 mg and hydrochlorthiazide 25 mg tablets.

Expired supplies were not commonly found in the facilities. Less than 8% of primary level care facilities and 4.0% of higher level facilities had 1 or 2 expired drugs in the list presented to the surveyors.

Majority (93%) of the RHUs and HCs were eligible for ComPack medicines deliveries. Of these, two-thirds had received at least one delivery. In recipient facilities, fast-moving drugs, mostly antibiotics and lagundi 300 mg tablet were available in between only 33% to 55%. In contrast, antihypertensive, antidiabetic and antihyperlipidemic drugs were still stocked in more than 90% of the recipient facilities.

As expected, availability of medicines in the ComPack list in recipient facilities was higher than in non-recipient facilities. In recipient facilities, the percentage with available stocks of same drugs in the ComPack list but coming from other sources was also much lower compared to availability of their ComPack counterparts.

Discussion

The survey team succeeded in obtaining a representative sample of health facilities in the country. Valid comparisons could be made with results of the previous surveys.

Insignificant changes seen in the levels of drug availability in primary care facilities from 2011 could be due to the very close proximity in time of data collection between the two surveys wherein no new large-scale interventions were introduced. The results, though, could provide satisfaction in that it corroborated the marked changes in drug availability levels that were seen from 2009 to 2011. As for Level 2 to 4 hospitals, the

observed change in levels between the two most recent surveys was more satisfactory because this represented more than 10% increase in drug availability which was the annual target under the HSPSP II. The progress in drug availability in Level 2 to 4 public hospitals, however, has yet to match the greater strides attained in the primary level care facilities.

Some practices and policies of the local units need to be changed because these were the reasons cited by facility staff for the low availability. These include the keeping of drugs in the municipal offices and stocking of parenteral drugs only and not oral medicines in the hospitals.

The results clearly indicated that the ComPack program of DOH was a very significant factor in improving drug availability in health facilities. Consequently, progress on improving drug availability would be dependent on the sustainability of the ComPack program of DOH. With forthcoming improvements in the ComPack program implementation such as the continued registration and profiling of members under the CCT program, which will make more areas eligible for delivery of these medicines, and the anticipated expansion of the list of drugs delivered under the ComPack program, future surveys would be expected to show further increases in drug availability at the national level.

Overstocking of ComPack drugs for non-communicable diseases that might lead to wastage and rationale use of antibiotics are identified as concerns related to the ComPack program. Improving the diagnostic capabilities of the health facilities and increasing awareness of the community regarding non-communicable diseases can lead to greater utilization of their respective treatment medicines. Reducing prevalence of irrational use of antibiotics can prevent occurrences of these essential drugs getting out of stock.

Conclusion and Recommendations

This study showed that the mean drug availability levels in 2012 in rural health units, health centers and Level 1 public hospitals was 53.6% and in Level 2 to 4 public hospitals, 44.3%. Mean province level drug availability was 56.2% and 40.6%, respectively, for the two groups of health care facilities. These levels were only slightly higher compared to those in 2011. Nevertheless, the marked improvements in drug availability from baseline values in 2009 that was seen in the previous survey were corroborated. Continued monitoring of drug availability levels at the national level using the same methodology should be done to determine further progress in this indicator.

Some apparent operational problems of the ComPack program, such as covering the rest of the eligible facilities and the disproportionate allocation of drugs within the deliveries, have to be addressed. The content of deliveries to the health facilities should be examined so that these match the recipient's actual needs and capabilities. The provision of diagnostic equipments and recruitment of corresponding staff to handle these, design and implementation of health education campaigns to increase awareness of non-communicable diseases and of the ComPack Program, and strict monitoring of the prescribing patterns for antibiotics are some interventions that can be considered.

INTRODUCTION

Availability and access to essential drugs at all levels of health care are important components of health service delivery. Essential drugs are selected to provide safe, effective prevention and treatment for the majority of communicable and non-communicable diseases. Drug availability in health care facilities is associated with quality care.

Inadequate drug availability has persisted as a big problem in developing countries, especially to the poor (MDG Gap Task Force Report 2012). The low level of drug availability in the primary health care setting in developing countries has been reported in several national and sub-national studies (World Health Organization/Health Action for Information (WHO/HAI) 2005). In a report published in Lancet using these studies, the Philippines had a poor mean availability of 22% for generic essential medicines in the public sector in 2005, the lowest among the Western Pacific countries (Cameron et al 2008).

In the Philippines, low drug availability was identified as a concern in the country's reform efforts to improve delivery, regulation and financing of health care. To increase patient's access to low cost quality medicines, the Department of Health (DOH) launched the P100 Program which provided affordable treatment packs for the whole duration of treatment for common diseases (NCPAM 2013). This program was modified by DOH to become the Complete Treatment Pack Program (ComPack) that made medicines for most common diseases available for free to the poorest members of the population, while retaining these medicines' access and affordability to other segments of the population. This program was to run alongside the Conditional Cash Transfer Program of the Department of Social Welfare and Development (DSWD) otherwise known as the Pantawid Pamilyang Pilipino Program (4Ps) of the national government.

The country's health sector reform program has received funding support from the European Union (EU) since 2007 under the Health Sector Policy Support Program (HSPSP) Phase I and II. To emphasize the significant role of drug availability in improving health care delivery, the EU stipulated the inclusion of the level of drug availability in public health facilities as one of the performance indicators to be monitored under the Phase II program (Dichosa 2009). It has been noted that the perception of low quality medicines and their lack of supplies, especially at the primary level, cause clients to shun these public health facilities for their health care needs (Globserver 2012).

Drug availability, however, is not yet included as a routinely collected data for performance monitoring of health facilities. Special surveys have to be designed and conducted to monitor this indicator. WHO/HAI has published recommended survey strategies to monitor medicine prices, availability, affordability and price components (WHO/HAI 2008). Both WHO/HAI-type surveys and national representative sample surveys have been done in the Philippines since 2002 (WHO/HAI 2005, Batangan and Juban 2009, Dichosa 2010, Sarol 2012). To monitor progress of drug availability in public health facilities, the DOH uses the nation-wide surveys, of which 3 have been completed including the survey reported here. The baseline survey was conducted to determine levels of drug availability in public health facilities in 2009 (Dichosa 2010) and the second survey was done to assess levels in 2011 (Sarol 2012). Both studies received financial support from the European Union.

The nation-wide drug availability surveys in the Philippines employed major features of the survey methodologies recommended by WHO/HAI for monitoring levels of drug availability in developing countries (WHO/HAI 2008). Specifically, the use of a basket list of essential drugs to measure drug availability at the facility level was utilized. Most of the drugs selected in these studies were in common with those used in several other countries using the

WHO/HAI methodology (HAI 2007). However, in the desire of DOH to obtain a national picture of drug availability in public health facilities, the sampling methodology deviated from WHO/HAI recommendation. Instead of the suggested purposive sampling of a few major areas as sites and then taking in each site one major hospital and its surrounding medicine centers (pharmacies) as sample units in the WHO/HAI surveys, the 2009 and 2011 Drug Availability Surveys of DOH used a two-stage probability sampling design to draw representative samples of public health facilities.

Results of these surveys showed that from baseline (2009) levels of 25% mean percent drug availability in primary level public health care facilities, that is, rural health units, health centers and Level 1 public hospitals (Dichosa 2010), this figure rose to 52% in the 2011 survey (Sarol 2012). Among the level 2 to 4 public hospitals, the mean percent drug availability increased to 40% in 2011 from similar levels of 25% in 2009. These results clearly suggested marked improvements in the level of drug availability during those years. At the province levels, these improvements in primary level facilities were apparently felt universally and not selectively.

This report covers the 3rd nation-wide survey conducted during the latter part of 2012 to further monitor progress of drug availability under HSPSP Phase II. The general methodology of the previous surveys was followed to allow valid comparisons across the three surveys. Only a few changes in the basket list of medicines were done. An added focus in the new survey was the availability of medicines included in the ComPack program of DOH.

SURVEY OBJECTIVES

The general objective of this survey was to measure the availability of essential drugs in public health facilities at all levels in 2012 in the country.

The specific objectives of the survey were as follows:

i. To determine the mean percentage of available essential drugs in rural health units (RHUs), health centers (HCs) and Level 1 public hospitals (primary level health care facilities) in 2012

ii. To determine the mean percentage of available essential drugs in Level 2 to 4 public hospitals (higher level health care facilities) in 2012

iii. To determine the mean provincial level percentage of available essential drugs in primary level health care facilities in 2012

iv. To determine the mean provincial level percentage of available essential drugs in Level 2 to 4 hospitals in 2012

v. To compare the levels of drug availability in health facilities in 2012 with the levels in 2009 and 2011

vi. To determine the percentage availability of specific drugs listed in the DOH Complete Treatment Pack in RHUs and HCs in areas covered by the Conditional Cash Transfer program of the government

SAMPLING DESIGN

Study Population

The target population was all public health facilities in the Philippines. The Autonomous Region of Muslim Mindanao (ARMM) was not included in the sampling frame due to peace and order problems and was therefore not represented in this survey. Two categories of public health facilities were studied separately:

Group A – Primary level health care facilities (RHUs, HCs and Level 1 public hospitals)

Group B – Higher level health care facilities (Level 2 to 4 public hospitals)

There were three different populations of interest in this survey. The first population of interest consisted of public sector health facilities providing primary level care (Group A) in the Philippines. For primary level health care facilities, the percentage of available essential drugs was obtained using a basket list of 20 drugs for this level. The totality of Level 2 to 4 public hospitals (Group B) in the Philippines was the second population of interest. Similarly, the percentage of available drugs was collected from each of these facilities in the sample, but using a longer checklist of 38 essential drugs. The set of all provinces was the third population of interest. The data on each sample province was the mean percentages of available drugs of all health facilities in the province.

Unit of Observation	Variable to be studied
Primary level health care facility	Percentage of available drugs in a public primary level health care facility using a list of 20 essential drugs
Higher level hospital	Percentage of available drugs in a Level 2 to 4 public hospital using a list of 38 essential drugs
Province	Mean percentage of available drugs in all primary level public health care facilities in the province Mean percentage of available drugs in all Level 2 to 4 public hospitals in the province

Sampling Design

This survey employed a stratified two-stage cluster sampling design. Stratification of provinces was based on average annual income level of the province. The purpose of stratification of provinces according to income level was to ensure that the bigger strata in terms of number of health facilities were adequately represented in the national sample, thus achieving better precision for the overall estimates. Income class classification of provinces was known to be highly correlated with population size, which also correlated with number of health facilities (RHUs, HCs and hospitals).

Provinces were grouped according to the prescribed classification by income category by the Department of Finance (Department Order D.O. No.23-08: Prescribing the New Income Brackets for the Re-classification of Provinces, Cities and Municipalities - Effective July 29, 2008). These groupings were defined as follows:

Category	Average Annual Income of Province
1st	P 450M or more
2nd	P 360M or more but less than P 450M
3rd	P 270M or more but less than P 360M
4th	P 180M or more but less than P 270M
5th	P 90M or more but less than P 180M
6th	Below P90M

Since there were few provinces that belonged to the 3rd to 6th Classes, these categories were lumped together as one stratum. Two areas were taken in the sample with certainty: National Capital Region (NCR) and Palawan province. NCR was chosen because of its distinct size and characteristics while Palawan was purposively selected as a special area of interest by the National Center for Pharmaceutical Access and Management (NCPAM). These areas were treated as strata in the analysis. In summary, the strata for the sampling were as

follows: 1) Income Level 1 provinces; 2) Income Level 2 Provinces; 3) Income Level 3 to 6 Provinces; 4) NCR and 5) Palawan.

The province was the primary sampling unit (PSU) in the different strata except for NCR and Palawan wherein the PSUs were the health facilities. Prior to sampling of provinces, the listing of all public health facilities in every province was obtained from DOH. For sampling purposes, cities were not treated as separate entities for selection in the first stage. Instead, these were considered as parts of the provinces which geographically encompassed their boundaries. The listing of public health facilities in the city was augmented to that of the province where the former was located. For example, all public health facilities in Cebu City were included in Cebu province.

The provinces were then selected with probabilities proportionate to size (PPS). Size referred to the total number of rural health units, health centers and Level 1 public hospitals in the provinces and its interior cities. After a province was selected in the first stage, health facilities in that province were selected by simple random sampling. Separate sampling was done for primary level health care facilities (Group A) and higher level health care facilities (Group B).

For NCR and Palawan, simple random sampling of the health facilities was employed.

Sample Size

In determining the sample size requirements for this survey, several factors that included budget, feasibility, duration of field work and personnel requirements, as well as specifications for precision of estimates, were considered. Early on, it was decided that one week would be allotted for each province such that data collection should be comfortably completed within 5 working days, giving allowance for possible delays or unforeseen

difficulties in the field work. Sample size was iteratively calculated until a good combination of number of provinces and health facilities within each province that met the desired precision levels was obtained.

The total sample size of primary health care facilities requirement was calculated at 275 to meet the specified margin of error of ±4.0% with 95% level of confidence in estimating the over-all mean percentage drug availability in the primary level health care facilities. The design effect due to cluster sampling, estimated based on data on intracluster correlation from the previous survey and the average number of facilities within province, was incorporated in this calculation of sample size. This approach to estimating the total sample size requirements was deemed conservative since the benefit of stratification in obtaining more precise estimates had not been factored in. The derivation of sample size requirements is described in Appendix A.

The sample size for primary level health care facilities required 20 provinces to be sampled. The number of provinces in the sample had an expected margin of error of at ±3.0% with 95% level of confidence in estimating the mean province level drug availability.

The allocation of the number of provinces in the sample to the different strata was made proportional to the number of primary level health care facilities in each stratum. This resulted to 10 provinces in Income Level 1, 4 in Income Level 2 and 4 in Income Level 3 to 6 taken in the sample. NCR and Palawan were then added to the list of sample provinces.

In the bigger provinces, 14 primary level health care facilities were randomly chosen, except for Bulacan and Cebu, which had 15 each. The additional 1 province in the latter provinces was the result of including inadvertently a health facility that was supposed to be reserved and used only when a replacement was deemed necessary. In the smaller provinces that had 14 or less facilities, all were automatically included in the sample. For Level 2 to 4

hospitals, 5 were drawn from the bigger provinces. If the province had less than 5 or less in this category of hospitals, all were taken in the survey. For NCR, 31 health centers and Level 1 public hospitals and 22 Level 2 to 4 public hospitals were selected randomly. In NCR, 30 sites was actually the requirement but for the same reason of inadvertently taking in a reserved sample unit, an additional facility was covered.

During the field operations, some health facilities were found to be difficult to access due to the topographical characteristics of the province and weather conditions at the time of survey. Given a limited period to cover all health facilities in a province, these circumstances compelled the surveyors to replace inaccessible health facilities. Attempting to include all these areas would have resulted in long delays and heavy logistic problems to the survey team. Among the provinces, Abra and Palawan had the most number of replacements with 4 and 3 health facilities, respectively.

Replacements were kept to a minimum as much as possible by the team. Over-all, the coverage of sampling plan was considered successful. The total replacements accounted for only 3% of the final sample. Only one facility, a level 3 hospital in NCR was missed due to problems with getting permission to obtain data on drug availability.

The table below shows the distribution of the health facilities included in the sample by province. The number of replacements per province is also indicated.

Table 1. Actual sample sizes of primary level and higher level health care facilities by province

Stratum	Province	Primary level facilities		Higher level facilities	
		Actual sample size	Replace-ments	Actual sample size	Replace-ments
Income Level 1	Albay	14	1	4	0
	Bulacan	15	0	5	0
	Cebu	15	1	5	0
	Iloilo	14	0	5	0
	Misamis Oriental	14	0	5	0
	Pangasinan	14	0	5	0
	Quezon	14	0	5	0
	Sultan Kudarat	14	1	2	0
	Tarlac	14	0	4	0
	Zamboanga del Norte	14	0	3	0
Income Level 2	Aklan	14	0	1	0
	Northern Samar	14	1	2	0
	Nueva Vizcaya	14	0	2	0
	Sarangani	12	0	0	0
Income Level 3 to 6	Abra	14	4	1	0
	Catanduanes	14	0	3	0
	Kalinga	14	0	1	0
	Marinduque	9	0	2	0
National Capital Region	National Capital Region	31	0	21[1]	0
Palawan	Palawan	14	3	5	0

[1] One level 3 hospital was not covered due to problems getting permission to conduct the survey

DATA COLLECTION

Survey Team

A team of field data collectors was recruited for the study. The team consisted of graduates from nursing, pharmacy, public health, medical technology and food science courses. More than half of the team participated in the previous drug availability survey. The team underwent training on the survey data collection procedures before being deployed in the field. A pilot testing of the data collection forms was done in health facilities in Makati City.

Each province was covered by a pair of surveyors and a monitor except for NCR and Palawan where 4 surveyors were assigned. Visits to the provinces were coordinated with the assistance of the National Center for Pharmaceutical Access and Management (NCPAM). Courtesy calls to local government officials (governors and mayors), directors of the DOH Regional Centers for Health Development, provincial health officers (PHOs), city/municipal health officers (CHOs/MHOs), public health team leaders (PHTLs), DOH representatives (DOH-REPS) and Botica ng Barangay (BNB) coordinators were done by the survey team before proceeding with the data collection. Assistance was sought by the survey team from the local agencies in facilitating the visits to the health facilities. Majority of the regional and provincial health offices provided transportation and accommodation to the surveyors and monitors during the survey. In many instances, PHTLs, DOH-REPs, and BNB coordinators accompanied the data collectors during the visits to the health facilities.

Data Collected

Data collection forms were developed for this survey to obtain details on the health facility (name of the health facility, location and the person-in-charge of dispensing medicines (pharmacist, physician, nurse or midwife)) and drug availability. To assess drug availability in the facility, basket lists of essential drugs were prepared by NCPAM. Three separate lists were prepared: list of essential medicines for Group A health care facilities (RHUs, HCs and Level 1 public hospitals), list for Group B higher level hospitals (Level 2 to 4 public hospitals) and list of ComPack medicines for RHUs and HCs in CCT areas.

The basket lists of medicines were based on the following:

i. listed on the Philippines National Drug Formulary, current edition
ii. medicines expected to be available at the level of health care of the facilities
iii. medicines that were indicated for the most common causes of morbidity in the country.

Majority of the medicines in the basket lists were commonly included in the WHO/HAI surveys and in the previous national surveys by DOH. Only three drugs in the basket list of essential medicines for primary care used in the 2011 survey were replaced, captopril 25 mg tablet, furosemide 40 mg tablet and loperamide 2mg tablet with enalapril 10 mg tablet, chlorpromazine 50 mg tablet and povidone-iodine 10% solution. For the list of medicines included in higher level care hospitals, the same changes were made. In addition, atenolol 50 mg tablet and nifedipine 20 mg MR tablet were replaced by bisacodyl 5 mg tablet, ibuprofen 400 mg tablet and Phenobarbital 120 or 130 mg/ml 1 ml ampule injectable. The basket lists of drugs are shown in the data collection form in Appendix B.

Inside the health facilities, the surveyor sought the person-in-charge of dispensing medicines to patients. After explaining the nature and purpose of the survey, the surveyor

handed the appropriate basket list of essential medicines to this person and requested him/her to bring out stocks of medicines in the list. The surveyor then inspected the drugs and recorded the availability and expiry status of each drug in the forms. If the specified form and dose of a drug was not available, the surveyors noted if other dose formulations were presented. Though not really required for drugs in the basket list, reasons for their unavailability of drugs were written down in the form if volunteered by the attending staff. This information provided additional checks that were useful in improving the quality of data.

Operational Definition of Variables

Drug available – a drug was considered available in the health facility when all the following conditions are met at the time of survey visit:

1. the drug was kept within the facility; it was not kept in another location such as a local official's (e.g. governor, mayor, etc.) residence or office;
2. a pharmacist or person-in-charge was present to dispense the drug if a client needed it at that moment;
3. the drug was put out of its storage place by the pharmacist (or person-in-charge) and presented to the surveyor in a reasonable amount of time; if it took more than an hour for the drug to be presented, it was considered unavailable;
4. the surveyor was able to determine the form of the drug and check its expiry date;
5. at least one stock of the drug was presented and not expired
6. the drug presented was in the form and dosage as stipulated in the basket list, which was based on the Philippine National Drug Formulary

Percent drug availability in health facility – the number of drugs available divided by the number of drugs in the basket list multiplied by 100.

Drug available with substitution – a drug was available when all conditions stated above for meeting requirements of 'drug available' were satisfied, except for the last condition wherein the drug was presented in the same form but different dosage that was convertible to the stipulated dosage in the basket list. For example, amoxicillin 250 mg capsule and amlodipine 10 mg tablet were accepted as substitutes for amoxicillin 500 mg capsule and amlodipine 5 mg tablet, respectively. Oral rehydration solution 75 mmol/L sodium (Na) replacement and ferrous sulfate (equivalent to 60 mg elemental iron) + 250 mcg folic acid were special cases. Oral rehydration solution with reduced osmolarity equivalent of Na of 50 or 90 mmol/liter was accepted as substitute for 75 mmol/liter, while for ferrous sulfate + folic acid, any tablet/capsule containing ferrous sulfate or ferrous fumarate and folic acid only and intended as nutritional supplementation during pregnancy would do.

Percent drug availability with substitution in health facility – the number of drugs available including substitutes divided by the number of drugs in the basket list multiplied by 100.

Province-level drug availability in health facilities – the mean of the percentage drug availability in all health facilities. This was computed separately for each category of health facility, i.e., for RHUs, HCs and Level 1 public hospitals and for Level 2 to 4 public hospitals.

Eligible for delivery of ComPack medicines – a health facility that was located in a city or municipality that had started registration and profiling of indigent members for to the CCT (4Ps) program.

Recipient facility of ComPack medicines – a health facility that had received at least one delivery of ComPack medicines.

Fast-moving drug – a drug in the ComPack list was considered fast-moving if at least 80% of the stocks received of this drug were dispensed within one quarter. Most of the

pharmacists or persons-in-charge were familiar with this definition of fast-moving drugs as they were required to regularly submit reports on the movement of ComPack drugs to DOH.

DATA PROCESSING

Checking of all forms for completeness, accuracy and consistency was done by the surveyors and monitors. Data from the forms were then encoded using a data entry program created using Epiinfo 7. Double-data entry was performed. The two separately encoded data sets were then compared to identify encoding errors. Discordant data were then referred back to the forms and corrected in the master data sets. Once the checking for encoding was finalized, the Epiinfo 7 data sets were then converted to Stata data sets. These data sets were then processed further for detecting encoding errors, specifically out-of-range values and inconsistencies using a validation program, also written in Stata. Correction for errors detected by the validation program was done directly on the Stata data sets. Cross-tabulations were then generated to verify that invalid codes and inconsistencies had all been corrected.

A Stata program that created variables for drug availability for each drug based on the operational definitions and for percent drug availability for each facility was then run on the data sets. The created variables were then stored in a new Stata data set. Calculation of mean percent availability for each province was also done. A separate Stata data set containing the province level drug availability was created.

DATA ANALYSIS

Prior to generating statistical analysis, another Stata data set containing the variable for the stratum, province, population sizes for each stratum and province (which respectively, were the variables in Stata that represented the finite population corrections for the primary and secondary sampling units) and sampling weights was merged with the encoded data set on drug availability.

Data analysis consisted of frequency tabulations and descriptive statistics. For the analysis of drug availability using the health facility and province as units of observation, both weighted and unweighted estimation of population parameters were done. The sampling weight was the inverse of the sampling probability of selection of each observation. Details of the weighted analysis are described in the Appendix C. For the analysis of the ComPack medicines in RHUs and HCs, only unweighted analysis was employed.

All statistical outputs were generated using Stata Ver 10.1 software. For the weighted analysis, the Stata SVY module was used in generating the frequency tabulations, over-all estimates and their standard errors.

The Results section presents outputs based on the weighted analysis of drug availability, unless otherwise specified. The weighted analysis provided more accurate estimates of the standard errors than unweighted analysis. Nevertheless, the results of unweighted analysis of drug availability at the health facility and province levels are shown in Appendix D for reference. Over-all, there were little differences in the point estimates of means and proportions using both analyses. Results for the analysis of ComPack medicines were based on unweighted analysis.

RESULTS

Essential Drug Availability in Rural Health Units, Health Centers and Level 1 Public Hospitals

The distribution of the percent of essential drugs available in RHUs, HCs and Level 1 public hospitals is shown in Figure 1. The graph shows large variability in the percent drug availability in these facilities. Drug availability was widely distributed over the range of 0 to 90%. A large proportion of the health facilities (77.6%) were quite flatly spread between 40 to 80% drug availability, with slight peaks at 55% and 70%. Around one-fifth (18.3%) were below 40%, with decreasing proportions towards the lower end.

Only 4.1% had greater than 80% drug availability. The highest number of essential drugs recorded in all sample facilities was 18, equivalent to 90% drug availability. Three facilities (0.9%) were found with this number.

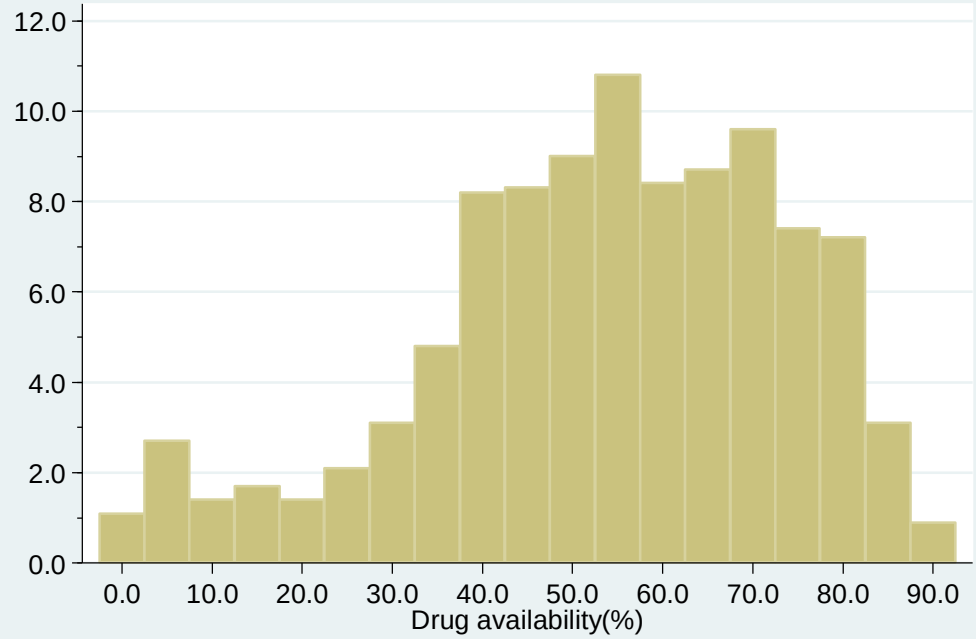
On the lower end, 5.2% of facilities had drug availability of 0 to 10%, that is, 0 to only 2 drugs in the list. Three (3) facilities were recorded with 0% availability. In these facilities, none of the drugs in the survey list could be presented to our surveyor.

Occasionally, drugs other than those provided in the ComPack deliveries were kept and dispensed at the municipal offices instead of the rural health units. This was the most frequent reason provided by RHUs with very low drug availability. This practice was found spread over a number of provinces although it was not necessarily followed by all municipalities in the province. The other common reason for non-availability of drugs was delay in drug procurement.

The mean percent drug availability in this group of health facilities was category of 53.6% with standard deviation of 20.2%. The coefficient of variation was 37.7%, indicating a relatively large variation in the percent drug availability. This was corroborated by the large

spread in the frequency distribution depicted in Figure 1. The median level was 55.0%, that is, around half of the health facilities had 55.0% or higher drug availability.

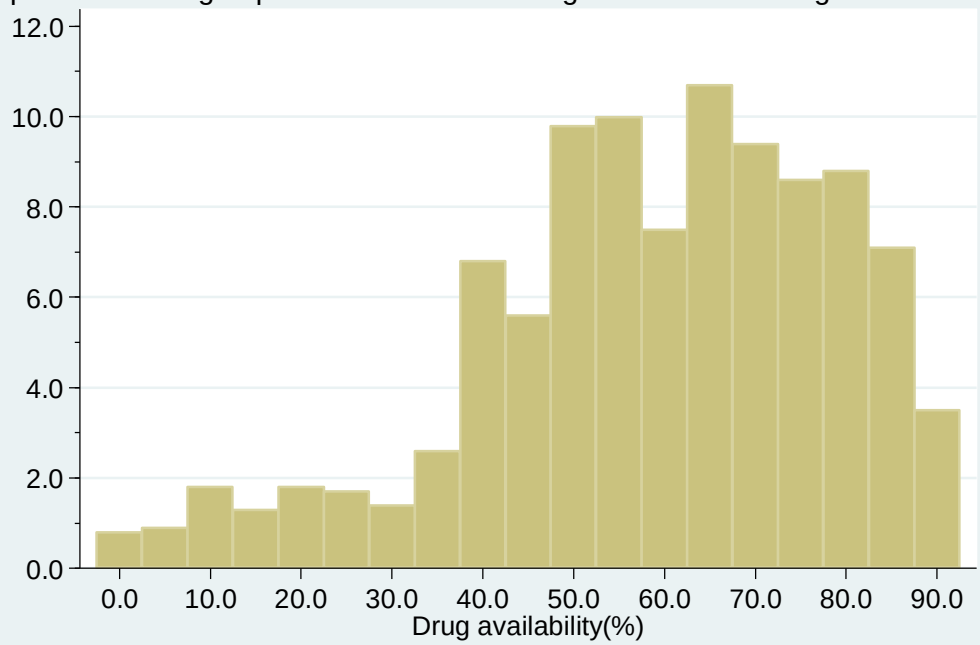
Figure 1. Distribution of rural health units, health centers and level 1 public hospitals according to percent of essential drugs available



Allowing for a less restrictive measurement of drug availability wherein a drug was considered available when the dosage of this drug stipulated in the basket list could be obtained by simply altering the amount taken, e.g. doubling or halving, the same drug available in a different dosage at the health facility, another measure of drug availability was calculated. The resulting distribution of percent drug availability expectedly shifted to the right since this indicator could only increase and not possible to decrease (Figure 2). For instance, the percent of facilities where drug availability was 50% or more increased from the 65.2% to 75.6% when substitution of drug dose was allowed. The mean percent drug availability with dosage substitution was calculated at 58.8% (sd= 20.0%), an increase of

around 5%, equivalent to an additional 1 drug available in the list per facility. Consequently, the median level also increased to 60.0%.

Figure 2. Distribution of rural health units, health centers and level 1 public hospitals according to percent of essential drugs available allowing substitution

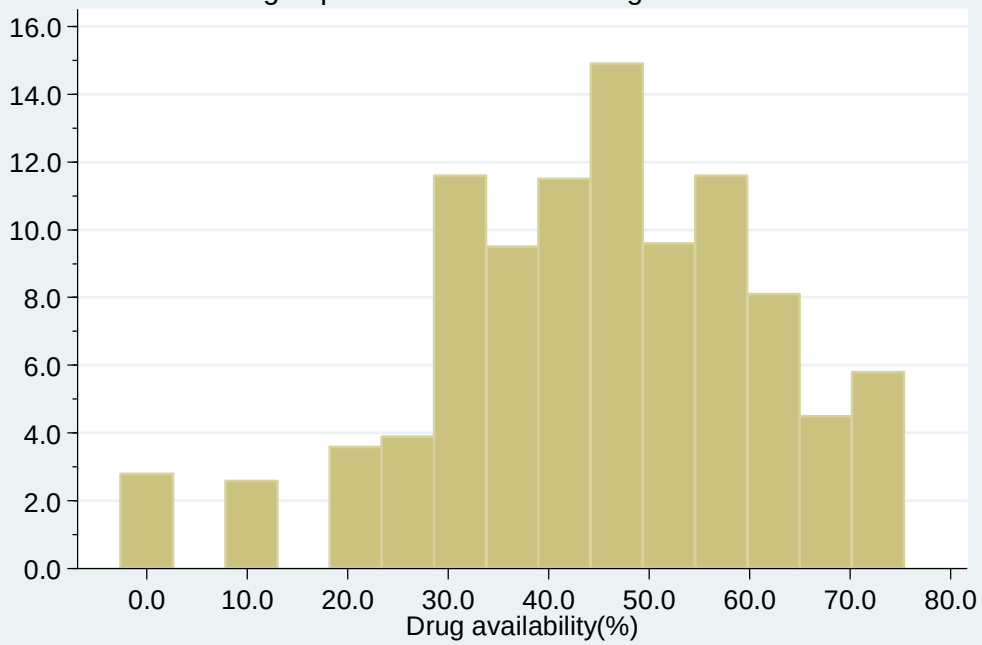


Essential Drug Availability in Level 2 to 4 Public Hospitals

The percent of essential drugs available in the higher level hospitals was also obtained using a longer list of essential medicines. The distribution of this measure is shown in Figure 3. Out of 38 drugs in the list, the highest number of drugs available attained by any of the Level 2 to 4 hospitals in the sample was only 28, or 73.7% drug availability. As in the lower category of health facilities, there was a large variation in the percent drug availability across Level 2 to 4 hospitals. Around 71.5% of the values were spread over the range of 31.6% to 60.5%, equivalent to 12 to 23 drugs available. Modal values were 42.1% and 44.7% drug availability, equivalent to 16 and 17 drugs, respectively. Around 10% of the hospitals were in

the highest range of percent drug availability between 68.4% to 73.7%. Hospitals with very low drug availability were occasionally encountered in the survey. There were 5.4% of hospitals who had drug availability of 10.5% or lower, that is, 4 or less drugs in their stocks. One hospital was even found with no drugs available.

Figure 3. Distribution of level 2 to 4 public hospitals according to percent of essential drugs available

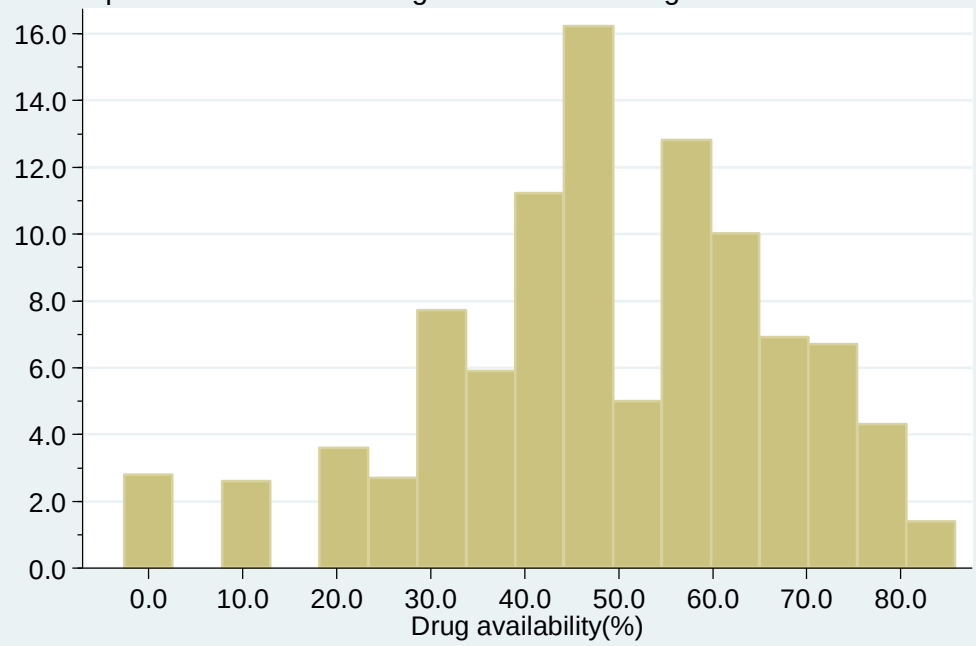


Some common reasons for drug non-availability among the lowest ranked Level 2 to 4 hospitals were obtained. Two hospitals each from NCR and Marinduque focused only on keeping parenteral drugs, intravenous fluids or emergency drugs. Oral medicines were not likely to be available inside these hospitals. Two hospitals from Northern Samar were with the least number of drugs seen during the survey. Accordingly, these hospitals had not received any supply of medicines for a long time already.

The mean percent drug availability in Level 2 to 4 hospitals was 44.3% with standard deviation of 16.3%. The corresponding coefficient of variation was similarly high at 36.8%. Half of the hospitals had 44.7% drug availability or lower (median).

Using drug availability indicator that allowed for substitution of dosage, the distribution moved to the right (Figure 4). The proportion of hospitals with 50% or higher drug availability increased to 47.4%, up from 39.5% using the more restricted definition (Figure 3). Maximum percent drugs available now reached 81.6%, equivalent to 31 drugs. The mean of the percent drug availability went up to 47.9% (sd=18.0%) while the median also increased to 47.4%. On the average, 2 more drugs in the basket list were considered available when dose substitution was accepted in the definition of acceptability.

Figure 4. Distribution of level 2 to 4 public hospitals according to percent of essential drugs available allowing substitution



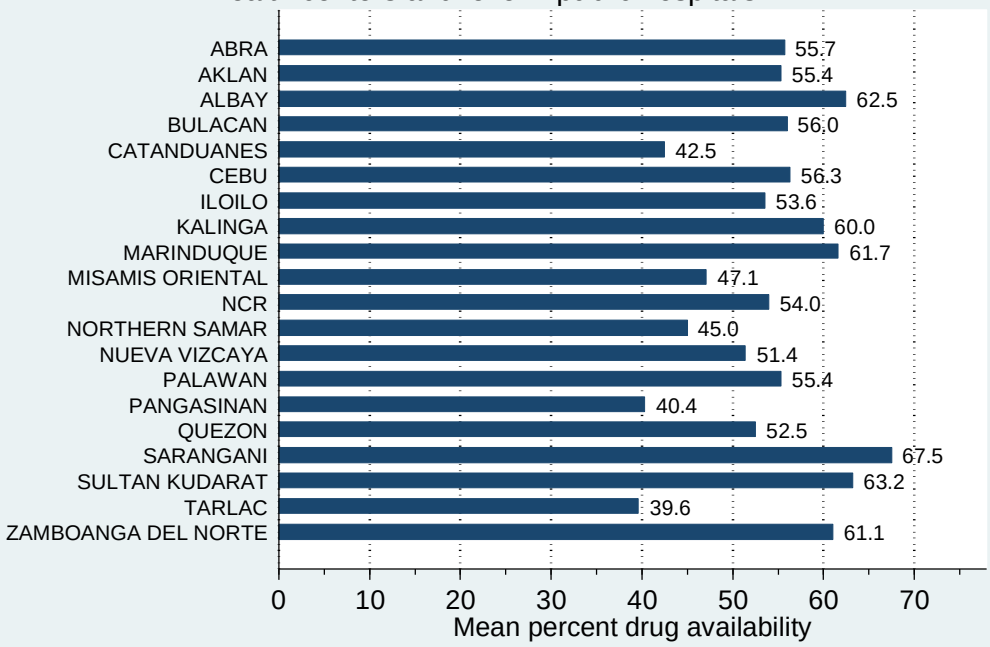
Province Level Drug Availability

For each category of health facilities, the mean of the percent drug availability across all health facilities in the province was obtained. This is referred to as the province level drug

availability. The listing of province level drug availability in the RHUs, HCs and Level 1 public hospitals is shown in Figure 5, while that for the Level 2 to 4 public hospitals is seen in Figure 6.

There was relatively less heterogeneity in the province level drug availability in RHUs, HCs and Level 1 public hospitals across provinces. The mean percent drug availability among primary level health care facilities in provinces had a limited range between 39.6% in Tarlac to 67.5% in Sarangani. Nine (9) provinces were clustered in the range of 51.4% to 56.3% while another group of 5 provinces had mean percent drug availability from 60.0% to 63.2%. A smaller group of 3 provinces had between 39.6% to 42.5% drug availability in RHUs, HCs and Level 1 public hospitals.

Figure 5. Province-level drug availability in rural health units, health centers and level 1 public hospitals



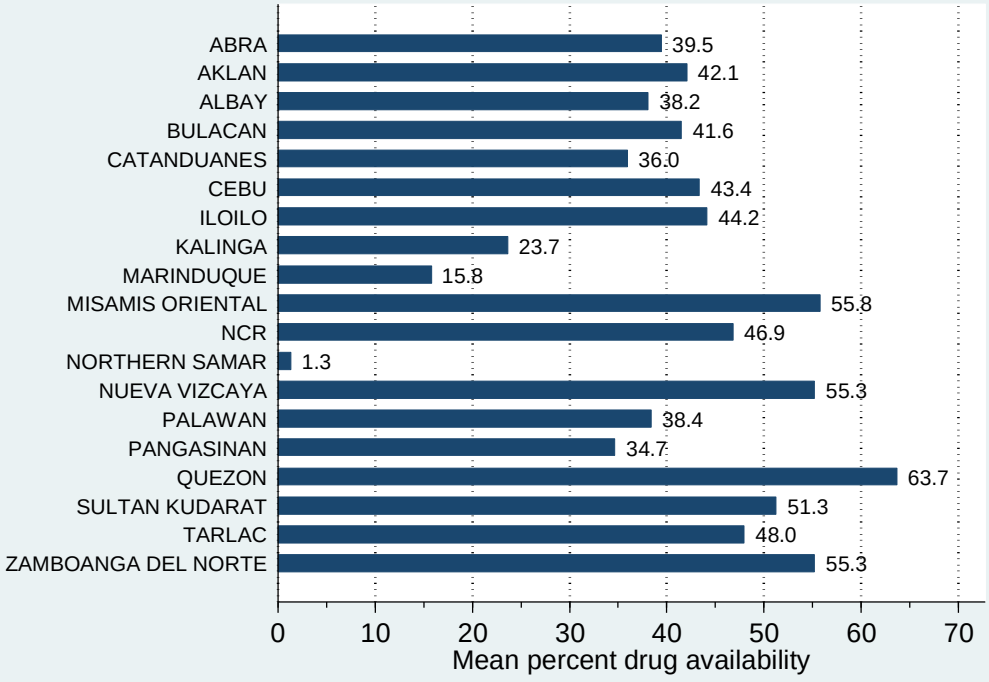
The mean of the province level drug availability in the primary level health care facilities was 54.0% while the standard deviation was only 7.8%. Median value was 55.4%,

which meant half of the provinces had mean drug availability in RHUs, HCs and Level 1 public hospitals below 55.4%.

In contrast to the lower level of health services, province level drug availability in Level 2 to 4 hospitals was characterized by large variations (Figure 6). The mean percent drug availability was extremely low at 1.3% in Northern Samar, which had 2 secondary level hospitals in the sample. One hospital in this province had no drugs while another one had only 1 drug available during the survey. The province with the next lowest availability, was Marinduque, which also had 2 hospitals included. As earlier reported, Marinduque focused only on parenteral drugs and intravenous fluids.

The highest province level was a mean percent drug availability of 63.7% in Quezon. This value was rather outlying and remarkable. Five hospitals were included in this province. Four hospitals had between 24 to 27 unexpired drugs presented to the surveyors. These hospitals occupied several of the highest percentile ranks in the distribution.

Figure 6. Province-level drug availability in level 2 to 4 public hospitals



Drug availability in Level 2 to 4 hospitals at the province level was typically between 34.7% to 48.0%. Eleven of the 19 provinces fell within this range of drug availability. Four provinces were clustered in the 51.3% to 55.8% range. The mean percent drug availability of the rest of the provinces were scattered outside these ranges.

The presence of an extremely low province level value pulled down the mean drug availability in Level 2 to 4 public hospitals across provinces to 40.8%. This also resulted in a larger standard deviation of 14.8% across provinces. Median province level drug availability was 42.1%.

Comparison to Previous Drug Availability Surveys

The mean level of drug availability in public health facilities in 2012 was compared to those obtained in the 2009 and 2011 surveys (Table 2). There was only an insignificant change in the drug availability levels in RHUs, HCs and Level 1 public hospitals from 2011 (51.7%) to 2012 (53.6%, 95%CI: 50.0%-57.2%). In the Level 2 to 4 hospitals, there was an absolute increase of 6.5%, from 37.8% in 2011 to 44.3% (95%CI: 39.7%-49.0%) in 2012.

Table 2. Comparison of mean percent drug availability in baseline, 2011 and 2012 surveys

	2009			2011			2012		
Facility Level	n	Mean	95% CI	N	Mean	95% CI	n	Mean	95% CI
RHUs/HCs and Level 1 public hospitals	234	24.8%	21.0%-28.5%	288	51.7%	47.9%-55.4%	292	53.6%	50.0%-57.2%
Level 2 to 4 public hospitals	65	25.8%	22.3%-29.4%	89	37.8%	33.6%-41.9%	80	44.3%	39.7%-49.0%

At the province level, there was likewise only a minimal change in drug availability in RHUs, HCs and Level 1 hospitals (Table 3). In this survey, the mean of the province level drug availability in primary level health care facilities was 56.2%. This was slightly higher than 52.3%

in 2011. For Level 2 to 4 hospitals, the mean province level drug availability increased a little to 40.7% in this survey from 37.5% in the previous one.

Table 3. Comparison of mean provincial level drug availability in baseline, 2011 and 2012 surveys

	2009			2011			2012		
Facility Level	N	Mean	95% CI	N	Mean	95% CI	n	Mean	95% CI
RHUs/HCs and Level 1 public hospitals	16	25.1%	20.4%-29.7%	19	52.3%	47.9%-56.7%	20	56.2%	51.8%-60.7%
Level 2 to 4 public hospitals	16	26.3%	21.4%-31.3%	19	37.5%	32.5%-42.6%	19	40.7%	33.6%-47.7%

Availability of Specific Drugs in the Basket List

This survey identified drugs in the basket lists that were commonly available and those that were less likely to be found. The availability of each drug in the actual dose and form specified in the list and in convertible doses (substitution) were obtained (Table 4).

In rural health units, health centers and Level 1 public hospitals, at least one drug from the analgesics/antipyretics, antibacterials, antihypertensives, amebecides, oral hypoglycemics and antiseptics was commonly found.

Paracetamol 500 mg tablet, an analgesic and antipyretic drug, was found in 78.0% of facilities. This was the highest percentage among the drugs. However, its suspension and syrup forms in 120 or 125 mg/5ml dose were available in only a third (32.9%) of the facilities. A substantial percentage of the facilities instead had the 250 mg/5ml dose formulation. All together, paracetamol suspension or syrup was available in 62.6% of RHUs, HCs and Level 1 hospitals.

Four antibiotics were among the most frequently found drugs. Metronidazole 500 mg tablet was available in 73.2%, amoxicillin 500 mg capsule in 70.7%, co-trimoxazole 200 mg + 40 mg suspension/5 ml in 70.5% and co-trimoxazole 800 mg + 160 mg tablet in 69.5% of the

facilities. The availability of tablet and suspension forms of co-trimoxazole increased by as much as 6.9% and 2.6%, respectively, if other dosages of the drug formulations were counted as substitutes. The 3 other antibiotics were on hand in less than half of the facilities: cefalexin 500 mg capsule, ciprofloxacin 500 mg tablet and metronidazole 125 mg/5ml suspension.

Table 4. Percentage of rural health units, health centers and Level 1 public hospitals wherein specific drug was available (n=292)

	Drug availability (same dose and form)		Allowing substitution	
Key medicines (Generic name)	Weighted percentage	Std error	Weighted percentage	Std error
Amoxicillin 500 mg capsule	70.7	4.0	72.4	3.9
Cefalexin 500 mg capsule	45.6	3.3	46.3	3.4
Chlorpromazine 50 mg tablet	0.8	0.5	2.2	0.9
Ciprofloxacin 500 mg tablet	46.2	3.3	46.2	3.3
Co-trimoxazole 200 mg + 40 mg/5 ml suspension	70.5	3.6	73.1	3.3
Co-trimoxazole 800 mg + 160 mg tablet	69.5	3.6	76.4	3.1
Enalapril 10 mg tablet	45.8	4.5	46.2	4.6
Ferrous sulfate (60 mg Fe) with folic acid (250 mcg)	23.2	3.9	64.1	4.0
Glibenclamide 5 mg tablet	65.3	4.2	65.3	4.2
Hydrochlorthiazide 25 mg tablet	55.8	4.0	55.8	4.0
Metformin 500 mg tablet	72.4	3.7	72.4	3.7
Metoprolol 50 mg tablet	75.4	2.9	79.7	2.6
Metronidazole 500 mg tablet	73.2	3.1	73.2	3.1
Metronidazole 125 mg/5 ml suspension	42.1	4.0	42.1	4.0
Oral rehydration salt (ORS 75-replacement)	51.5	4.8	68.1	4.0
Paracetamol 120 or 125 mg/5 ml syrup or suspension)	32.9	3.1	62.6	4.0
Paracetamol 500 mg tablet	78.0	2.9	78.3	2.8
Povidone-iodine 10% solution	74.0	3.3	74.0	3.3
Ranitidine 150 mg tablet	19.7	3.0	22.7	3.0
Simvastatin 20 mg tablet	60.3	4.5	62.4	4.5
Median drug availability	58.1		64.7	

The antihypertensive drug, metoprolol 50 mg tablet was next highest drug available at 75.4%. Counting those facilities that presented metoprolol 100 mg tablet instead of 50 mg, metoprolol availability reached 79.7%, even higher than that for paracetamol 500 mg tablet.

The other antihypertensive drug in the list, enalapril 10 mg tablet was presented in 45.8% of the facilities.

A large proportion of facilities also kept the oral hypoglycemic drugs metformin 500 mg tablet (72.4%) and glibenclamide 5 mg tablet (65.3%). Other drugs that reached availability in 70% or more of the facilities were povidone-iodine 10% solution (74.0%), an antiseptic, and simvastatin 20 mg tablet and hydrochlorthiazide 25 mg tablet were not as highly available as those above but these were still present in majority of the facilities.

Among the least likely drugs in the list that were found, chlorpromazine 50 mg tablet stood out. The 50 mg tablet form of this anti-psychotic drug was found in only 2 of the 292 facilities surveyed, equivalent to weighted percentage of 0.8%. Adding the relatively more common 100 mg tablet form of chlorpromazine increased slightly this availability to 2.2%. Ranitidine 150 mg tablet, a drug for peptic and gastric ulcers, was next least available with only 1 of 5 (19.7%) facilities. Ferrous sulfate with folic acid was actually commonly found in the health facilities (62.7%). However, it came in a wide variety of dosage formulations. Its specified equivalent to 60 mg elemental iron with 250 mcg folic acid form was found in only 23.2%.

Median drug availability was 58.1%. This meant that as much as 58.1% of the facilities had half or less of the drugs in the list.

A similar analysis of drug availability in Level 2 to 4 hospital pharmacies was done. The results suggested that there was wider variability in the sets of drugs that were present in Level 2 to 4 hospitals (Table 5). Only 6 of the drugs were commonly found, that is, these were stocked in at least 75% of the hospitals. Majority (21 of 38) of the drugs in the list could be found in not more than 45% of the hospitals. In about a third of the drugs (13 of 38), their availability did not even reach 35% of the hospitals.

Table 5. Percentage of Level 2 to 4 public hospitals wherein specific drug was available (n=80)

	Drug availability (same dose and form)		Allowing substitution	
Key medicines (Generic name)	Weighted percentage	Std error	Weighted percentage	Std error
Aciclovir 200 mg tablet	4.2	1.9	9.2	2.6
Amlodipine 5 mg tablet	61.7	5.6	64.2	5.6
Amoxicillin 500 mg capsule	82.5	5.9	82.5	5.9
Beclometasone 0.05 mg/dose inhaler	0.0	0.0	0.0	0.0
Bisacodyl 5 mg tablet	35.2	7.7	37.5	7.6
Carbamazepine 200 mg tablet	8.6	2.5	9.8	2.7
Cefalexin 500 mg capsule	79.2	6.4	79.2	6.4
Ceftriaxone 1 gm vial	82.7	3.3	82.7	3.3
Chloramphenicol 125 mg/5 ml suspension	35.2	5.8	35.2	5.8
Chloramphenicol 500 mg capsule	41.3	4.5	41.3	4.5
Chlorpromazine 50 mg tablet	7.0	2.5	7.0	2.5
Ciprofloxacin 500 mg tablet	73.5	4.4	73.5	4.4
Co-amoxiclav 625 mg tablet	51.7	7.8	51.7	7.8
Co-trimoxazole 200 mg + 40 mg/5 ml suspension	65.9	4.7	75.2	4.6
Co-trimoxazole 800 mg + 160 mg tablet	74.8	5.1	76.0	5.1
Dexamethasone 0.5 mg tablet	14.9	4.6	16.3	4.7
Diclofenac 50 mg capsule/tablet	44.2	7.2	45.8	7.5
Doxycycline 100 mg capsule	50.7	6.7	50.7	6.7
Enalapril 10 mg tablet	6.5	2.2	15.0	3.3
Ferrous sulfate (60 mg Fe) with folic acid (250 mcg)	13.3	4.3	36.3	6.4
Glibenclamide 5 mg tablet	34.3	7.3	34.3	7.3
Gliclazide 80 mg tablet	27.1	4.7	29.6	5.1
Hydrochlorthiazide 25 mg tablet	3.3	1.6	3.3	1.6
Ibuprofen 400 mg tablet	21.1	6.9	28.7	7.8
Isosorbide dinitrate 10 mg tablet	20.8	4.4	33.1	4.6
Metformin 500 mg tablet	63.3	4.9	63.3	4.9
Metoprolol 50 mg tablet	65.0	5.6	68.5	5.1
Metronidazole 500 mg tablet	83.6	4.1	83.6	4.1
Metronidazole 125 mg/5 ml suspension	53.9	6.9	53.9	6.9
Omeprazole 20 mg capsule/tablet	64.7	7.3	68.3	6.5
Oral rehydration salt (ORS 75-replacement)	40.4	6.7	54.6	7.0
Paracetamol 120 or 125 mg/5 ml syrup or suspension)	41.6	6.5	72.2	6.2
Paracetamol 500 mg tablet	88.3	5.5	88.3	5.5
Phenobarbital 120 or 130 mg/ml, 1ml ampule injectable	33.9	4.7	35.2	4.9
Povidone-iodine 10% solution	70.4	7.5	70.4	7.5
Ranitidine 150 mg tablet	72.4	5.3	74.3	5.6
Salbutamol 0.1 mg dose inhaler	22.3	6.5	22.3	6.5
Simvastatin 20 mg tablet	44.0	6.3	49.8	6.3
Median drug availability	42.8		50.3	

Paracetamol 500 mg tablet was the most commonly available drug in the list. Around 9 of 10 (88.3%) hospitals presented this drug during the survey. Its suspension or syrup form was available in 72.2%. Only 41.6% had paracetamol suspension or syrup at the dose of 120 or 125 mg/5ml which was specified in the basket list.

Metronidazole 500 mg tablet was also highly available in Level 2 to 4 hospitals with 83.6%, and so with other antibiotics, ceftriaxone 1 gm vial, amoxicillin 500 mg capsule, cefalexin 500 mg capsule, co-trimoxazole 800 mg + 160 mg tablet and 200 mg + 40 mg/5 ml suspension and ciprofloxacin 500 mg tablet which were seen in more than 70% of the facilities. Unlike in the lower category of health facilities, ranitidine 150 mg tablet was highly available in Level 2 to 4 hospitals. More than 70% of these facilities had this drug. Povidone-iodine 10% solution was also at the same level of availability.

A number of essential drugs in the list were unlikely to be available even in these higher levels of hospital care. Beclometasone 0.05 mg/dose inhaler, a treatment for asthma, was totally absent in all public hospitals surveyed. Aciclovir 200 mg tablet was seen in only 4.2% of the hospitals. Including other doses of this tablet, it was available in 9.2%. Compared to availability of metoprolol 50 mg and amlodipine 5 mg tablets, enalapril 10 mg and hydrochlorthiazide 25 mg tablets were apparently not drugs of choices as antihypertensives in the public hospitals. Only a small percentage of hospitals, 6.5% and 3.3%, respectively, had these drugs on hand. Chlorpromazine 50 mg tablet for anti-psychosis and carbamazepine 200 mg tablet for epilepsy, were also missing in more than 90% of the hospitals. Dexamethasone 0.5 mg tablet, treatment for allergy, was available in only 15%. Only a third (34.3%) of the hospitals had glibenclamide 5 mg tablet. This percent was only half of that in the lower category of health care facilities. The other antidiabetic drug, gliclazide 80mg tablet, was even

less available at 27.1%. Chances were also small to find the drugs salbutamol 0.1 mg dose inhaler, ibuprofen 400 mg tablet and isosorbide dinitrate 10 mg tablet in the hospitals.

Median drug availability was 42.8%. This indicated that more than 57% of the hospitals had half or less of the drugs in the list.

Family Planning Commodities

In the rural health units and health centers in the sample, the survey also looked into the availability of three family planning commodities: oxytocin, pills and depot-medroxyprogesterone acetate (DMPA) injectables.

Pills and DMPA had similar percentages of RHUs and HCs wherein these commodities were available (Table 6). Sixty-three percent of these facilities had pills and DMPA. Oxytocin was less common with only 38.5% of facilities that stored this commodity during the survey.

Table 6. Percentage of rural health units and health centers wherein specific family planning commodity was available (n=251)

Family planning commodity	Weighted percentage	Std error
Oxytocin	38.5	3.2
Pills	63.4	3.7
DMPA	62.6	3.5

Expired Drugs

There were 25 facilities (7.4%) that had presented drugs that were already expired[2] at the time of survey (Table 7). Twenty-two of these had one expired drug found while another 3 had 2 expired drugs. The equivalent weighted percentages of these facilities were 5.9% and 1.5%, respectively.

[2] Note: In the earlier results for drug availability, expired drugs were not counted as available. Drug availability was counted as drug presented that was unexpired. See operational definition.)

Table 7. Distribution of rural health units, health centers and Level 1 public hospitals according to number of expired drugs found (n=292)

Number of expired drugs	No of facilities	Weighted percentage	Std error
None	268	93.0	2.0
1	22	5.9	1.6
2	3	1.5	0.8

Among the drugs in the list, povidone-iodine 10% solution was the most frequently found expired item (Table 8). Ten of the RHUs, HCs and Level 1 hospitals showed expired supplies of povidone-iodine solution. Co-trimoxazole 800 mg + 160 mg tablet was the next common drug that was found expired with 6 facilities. Further check showed possible clustering of these facilities with expired drugs. Three facilities with expired povidone-iodine came from Pangasinan, while another two were from Abra. Two facilities with expired co-trimoxazole tablets were from Sultan Kudarat. Other expired drugs found were glibenclamide 5 mg tablet, ferrous sulfate with folic acid tablet, metoprolol 50 mg tablet, amoxicillin 500 mg tablet, metformin 500 mg tablet, metronidazole 500 mg tablet, metronidazole 125 mg/5 ml suspension and oral rehydration solution. In addition, the oxytocin supply in one health facility was found already expired.

Expired drugs were less common occurrences in the Level 2 to 4 hospitals. Only 3 (4.0%) hospitals were found with one expired drug each (Table 9). These drugs were co-trimoxazole 200 mg + 40 mg/5 ml suspension, salbutamol 0.1 mg dose inhaler and enalapril 10 mg tablet.

Table 8. Number of facilities with specific expired drug found

Expired drug found	No of facilities
Povidone-iodine 10% solution	10
Co-trimoxazole 800 mg + 160 mg tablet	6
Glibenclamide 5 mg tablet	3
Ferrous sulfate (60 mg Fe) with folic acid (250 mcg)	2
Metoprolol 50 mg tablet	2
Amoxicillin 500 mg capsule	1
Metformin 500 mg tablet	1
Metronidazole 500 mg tablet	1
Metronidazole 125 mg/5 ml suspension	1
Oral rehydration solution (ORS 75 replacement)	1

Table 9. Distribution of Level 2 to 4 public hospitals according to number of expired drugs found (n=80)

Number of expired drugs	No of facilities	Weighted percentage	Std error
None	77	96.0	2.2
1	3	4.0	2.2

Availability of Stocks of Medicines in the Complete Treatment Package (ComPack Meds)[3]

This survey also looked into the availability of stocks of medicines included in the Complete Treatment Package Program (ComPack) of DOH. Rural health units and health centers in areas covered by the Conditional Cash Transfer (CCT) Program of the Department of Social Welfare and Development (DSWD) were eligible to receive ComPack medicines. The CCT was otherwise known as the 4Ps program of the government. Table 10 shows the distribution of these facilities according to whether they were located in CCT cities and municipalities. Of the 251 RHUs and HCs, 233 (92.8%) were inside CCT areas, making them eligible for receiving ComPack medicines from DOH.

[3] Results of analysis of data on ComPack medicines are based on unweighted analysis.

Table 10. Distribution of rural health units and health centers according to whether or not they were inside CCT areas

Part of CCT area	No of facilities	Percent
Yes	233	92.8
No	18	7.2
Total	251	100.0

Of those eligible facilities, 154 or about two-thirds had received deliveries of ComPack medicines (Table 11). Majority (60.4%) started receiving ComPack medicines during the last quarter of 2011 (Table 12). This period was the expected time of deliveries stated in the DOH Department Memorandum No 2011-0165. One-fifth (19.5%) of the health facilities got their first delivery during the succeeding quarter, from January to March, 2012. The rest of the facilities received their first supply of ComPack medicines in more recent quarters. Three facilities mentioned that they had their first deliveries prior to September 2011. The respondents might have confused the ComPack deliveries with an earlier similar program of DOH called P100 Program wherein designated packs of selected medicines was made available for a price of P100 or less.

Table 11. Distribution of eligible rural health units and health centers according to whether or not they had received ComPack medicines from DOH

Received ComPack medicines	No of facilities	Percent
Yes	154	66.1
No	79	33.9
Total	233	100.0

Table 12. Distribution of rural health units and health centers who had received ComPack medicines according to date of first delivery

Date of First Delivery	No of facilities	Percent
Apr – June 2011	3	1.9
Oct – Dec 2011	93	60.4
Jan – March 2012	30	19.5
Apr – June 2012	9	5.8
Jul – Sep 2012	10	6.5
Oct – Dec 2012	7	4.5
Not known	2	1.3
Total	154	100.0

ComPack medicines were supposed to be delivered quarterly to the health facilities. Majority of the RHUs and HCs (68.8%) had 3 or 4 deliveries of ComPack medicines at the time of survey (Table 13). This would coincide with the majority of the facilities who had their first deliveries between September 2011 to March 2012. Two facilities claimed to have received 6 deliveries of ComPack medicines already. One–tenth had so far received only one delivery.

Table 13. Distribution of rural health units and health centers who had received ComPack medicines according to number of deliveries received

Number of deliveries	No of facilities	Percent
1	15	9.7
2	21	13.6
3	45	29.2
4	61	39.6
5	8	5.2
6	2	1.3
Not known	2	1.3
Total	154	100.0

Compack medicines were initially intended to be given free to indigent members of the community who were registered in the 4Ps program. This rule had been relaxed recently to

expand the beneficiaries of the ComPack program, provided that this would not negatively affect the availability of medicines for the 4Ps members. Some health facilities continued to stick to the original instructions. The results of this survey showed that there was equal division of the facilities according to the exclusivity/non-exclusivity of the ComPack medicines for 4Ps members (Table 14).

Table 14. Distribution of rural health units and health centers who had received ComPack medicines according to whether or not the ComPack medicines were considered exclusive for 4Ps members only

Exclusive for 4Ps members	No of facilities	Percent
No	76	49.4
Yes	77	50.0
Not known	1	0.6
Total	154	100.0

The availability of stocks of ComPack drugs was obtained. Anti-hypertensive, anti-cholesterol and anti-diabetic drugs and mebendazole and sambong were highly available in the health facilities who had received ComPack medicines (Table 15). More than 90% of the recipient facilities still had stocks of anti-hyertensive drugs metoprolol, amlodipine, aspirin, and hydrochlorthiazide, anti-diabetic drugs glibenclamide, gliclazide and metformin, anti-hyperlipidemia drug simvastatin, and anti-helmintic drug mebendazole. Stocks from ComPack of two other, anti-hypertensive drugs, enalapril and losartan, and sambong were available in more than 80% of these facilities.

Table 15. Percentage availability of specific drugs in rural health units and health centers who had received ComPack medicines

Key Medicine	No of facilities available	Percent
Amlodipine 10 mg tablet	149	96.8
Amoxicillin 250 mg/5 ml powder/granules for suspension	66	42.9
Amoxicillin 500 mg capsule	52	33.8
Aspirin 80 mg tablet	151	98.1
Ciprofloxacin 500 mg tablet	62	40.3
Cloxacillin 125 mg/5 ml powder for suspension/syrup, 60 ml	114	74.0
Cloxacillin 500 mg capsule	69	44.8
Co-trimoxazole 200 mg + 40 mg/5 ml, 60 ml suspension	80	51.9
Co-trimoxazole 400 mg + 80 mg/5 ml, 60 ml suspension	74	48.1
Co-trimoxazole 800 mg + 160 mg tablet	94	61.0
Doxycycline 100 mg capsule	79	51.3
Enalapril 10 mg tablet	133	86.4
Erythromycin 500 mg tablet	82	53.2
Glibenclamide 5 mg tablet	146	94.8
Gliclazide 80 mg tablet	144	93.5
Hydrochlorthiazide 25 mg tablet	149	96.8
Lagundi 300 mg tablet	64	41.6
Losartan 50 mg tablet	128	83.1
Mebendazole 100 mg/5 ml suspension	143	92.9
Metformin 500 mg tablet	143	92.9
Metoprolol 50 mg tablet	150	97.4
Metronidazole 500 mg tablet	111	72.1
Sambong 250 mg tablet	134	87.0
Simvastatin 20 mg tablet	148	96.1

On the other hand, anti-biotic drugs in the ComPack deliveries were less available in the recipient RHUs and HCs. Only one-third (33.8%) still had amoxicillin 500 mg capsules. ComPack stocks of ciprofloxacin tablet, amoxicillin powder/granules for suspension, cloxacillin capsules, and co-trimoxazole suspension (both doses), doxycycline capsules and erythromycin tablets were available in around half or less of the facilities. The availability of stocks of lagundi tablets from ComPack deliveries was also similar to these drugs at 41.6% of the facilities.

The major reason for non-availability of Compack medicines for all drugs was getting out-of-stock (Table 16). Occasionally, the reason for non-availability of a specific drug was that this drug was not included in the ComPack delivery to the health facility. Enalapril tablets, metronidazole suspension, ciprofloxacin tablet, co-trimoxazole suspension, doxycycline capsules were the most commonly missed items in the package deliveries. A few facilities also distributed stocks of ComPack medicines to other units (e.g. barangay health stations) that left them with no more stocks to present during the survey.

The fast-moving ComPack medicines were identified in this survey. A drug was considered fast-moving if at least 80% of the stocks received of this drug were dispensed within one quarter. The antibiotic drugs, amoxicillin capsules and powder/granules for suspension, cloxacillin capsules, co-trimoxazole suspension (both doses), and ciprofloxacin tablet, were considered fast-moving according to more than 70% of the recipient facilities (Table 17). Lagundi and co-trimoxazole tablets were also very fast-moving, according to 82.9% and 75.3% of facilities. On the other hand, the anti-hypertensive drugs hydrochlorthiazide, enalapril, aspirin, and amlodipine, anti-diabetic drugs gliclazide, glibenclamide, and metformin, anti-hyperlipidemia drug simvastatin, and anti-helmintic drug mebendazole were considered not-fasting by a vast majority (>70%) of the RHUs and HCs. Fast-moving ComPack drugs were associated by their lower availability in the health facilities. The unavailability of fast-moving ComPack drugs was most likely due to their getting out-of-stock (Table 16).

Table 16. Frequency of reasons for non-availability of specific drugs in rural health units and health centers who had received ComPack medicines

Key Medicine	Number of facilities unavailable	Reasons for unavailability of ComPack medicines				
		Not yet availed	Out of stock	Cannot be found	Given to other units	Not known
Amlodipine 10 mg tablet	5	1	4	0	0	0
Amoxicillin 250 mg/5 ml powder/granules for suspension	88	1	83	1	1	2
Amoxicillin 500 mg capsule	102	3	97	0	2	0
Aspirin 80 mg tablet	3	1	2	0	0	0
Ciprofloxacin 500 mg tablet	92	10	80	0	2	0
Cloxacillin 125 mg/5 ml powder for suspension/syrup, 60 ml	40	1	37	0	2	0
Cloxacillin 500 mg capsule	85	1	81	0	2	1
Co-trimoxazole 200 mg + 40 mg/5 ml, 60 ml suspension	74	6	66	0	2	0
Co-trimoxazole 400 mg + 80 mg/5 ml, 60 ml suspension	80	10	68	0	2	0
Co-trimoxazole 800 mg + 160 mg tablet	60	0	57	0	3	0
Doxycycline 100 mg capsule	75	10	64	1	0	0
Enalapril 10 mg tablet	21	14	7	0	0	0
Erythromycin 500 mg tablet	72	5	66	0	1	0
Glibenclamide 5 mg tablet	8	1	5	0	2	0
Gliclazide 80 mg tablet	10	4	5	1	0	0
Hydrochlorthiazide 25 mg tablet	5	2	2	0	0	1
Lagundi 300 mg tablet	90	8	79	1	2	0
Losartan 50 mg tablet	26	2	24	0	0	0
Mebendazole 100 mg/5 ml suspension	11	2	8	0	1	0
Metformin 500 mg tablet	11	4	7	0	0	0
Metoprolol 50 mg tablet	4	1	3	0	0	0
Metronidazole 500 mg tablet	43	10	32	0	1	0
Sambong 250 mg tablet	20	3	16	0	1	0
Simvastatin 20 mg tablet	6	0	4	1	1	0

Surveyors noted common remarks given by responsible staff in the health facility related to the ComPack deliveries. During the survey, it was observed in many facilities that very small quantities of these drugs had been dispensed. The reason for the slow movement of anti-diabetic and anti-hyperlipidemic drugs was that these could not be prescribed without

the necessary laboratory testing for their indications. Furthermore, several facilities reported that in spite of their slow movement, additional supplies of the same drugs came with the subsequent ComPack deliveries, thus, aggravating the over-stocking of these drugs and increasing the chances that these supplies would expire before these can be used. To mitigate this problem, it was reported that some of these supplies were given to the higher level hospitals in their respective provinces.

On the other hand, occasionally, supplies of anti-biotic drugs accordingly came in very small quantities. Since these drugs were typically fast-moving, this resulted in their quickly getting out-of-stock. Many responsible health staff underscored the disproportionate allocation of drug supplies to the distribution of health complaints of patients who consulted the health centers.

Table 17. Distribution of rural health units and health centers who had received ComPack medicines according to whether or not specific drug is fast-moving, by drug

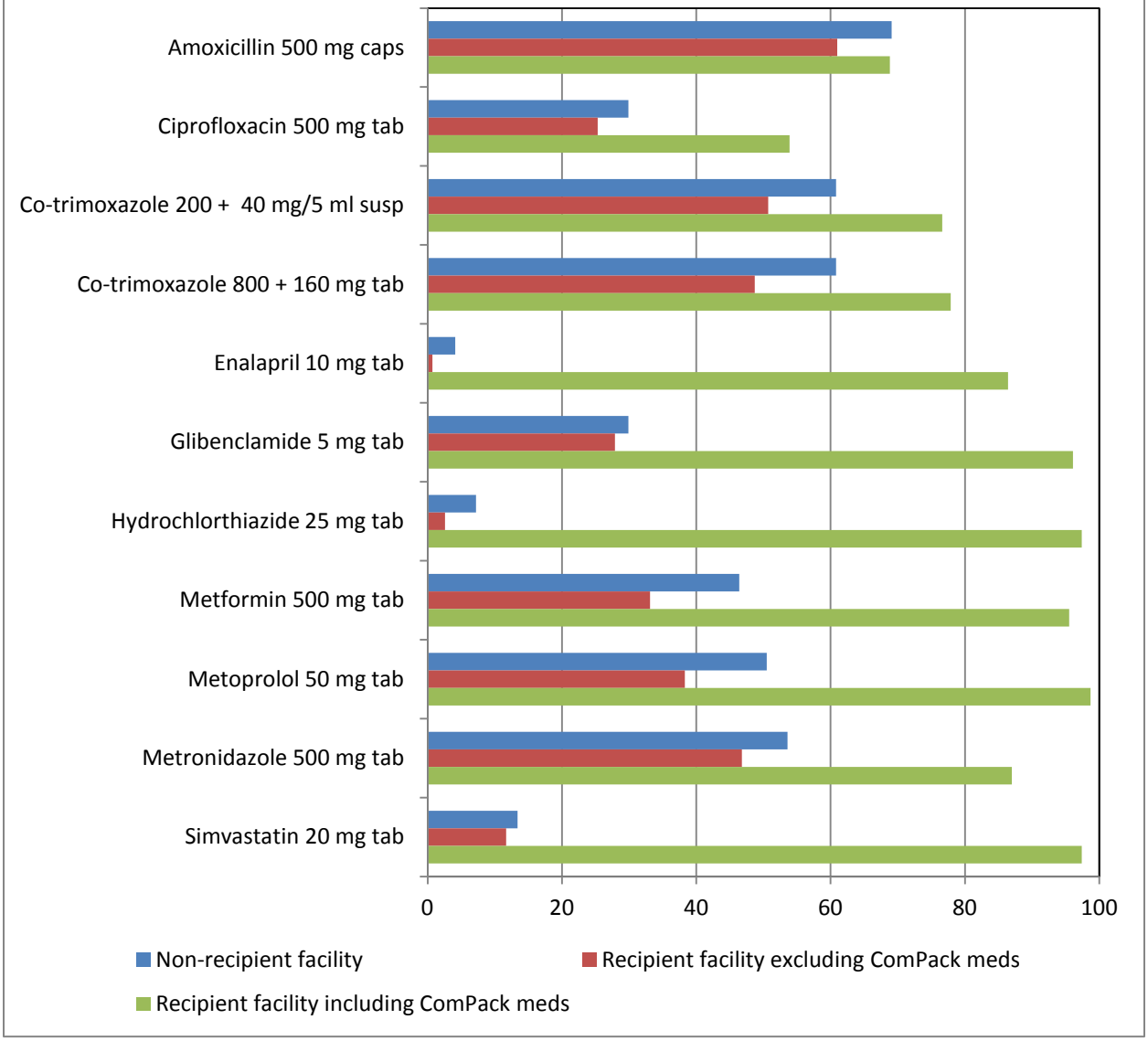
Key Medicine	Number of facilities that received drug	Is drug fast-moving?					
		Yes		No		Not known	
		No	Percent	No	Percent	No	Percent
Amlodipine 10 mg tablet	153	45	29.4	103	67.3	5	3.3
Amoxicillin 250 mg/5 ml powder/granules for suspension	153	123	80.4	24	15.7	6	3.9
Amoxicillin 500 mg capsule	151	130	86.1	14	9.3	7	4.6
Aspirin 80 mg tablet	153	17	11.1	131	85.6	5	3.3
Ciprofloxacin 500 mg tablet	144	105	72.9	33	22.9	6	4.2
Cloxacillin 125 mg/5 ml powder for suspension/syrup, 60 ml	153	92	60.1	53	34.6	8	5.2
Cloxacillin 500 mg capsule	153	121	79.1	25	16.3	7	4.6
Co-trimoxazole 200 mg + 40 mg/5 ml, 60 ml suspension	148	117	79.1	26	17.6	5	3.4
Co-trimoxazole 400 mg + 80 mg/5 ml, 60 ml suspension	144	112	77.8	27	18.8	5	3.5
Co-trimoxazole 800 mg + 160 mg tablet	154	116	75.3	31	20.1	7	4.5
Doxycycline 100 mg capsule	144	67	46.5	74	51.4	3	2.1
Enalapril 10 mg tablet	140	14	10.0	122	87.1	4	2.9
Erythromycin 500 mg tablet	149	83	55.7	61	40.9	5	3.4
Glibenclamide 5 mg tablet	153	25	16.3	122	79.7	6	3.9
Gliclazide 80 mg tablet	150	18	12.0	128	85.3	4	2.7
Hydrochlorthiazide 25 mg tablet	152	9	5.9	139	91.4	4	2.6
Lagundi 300 mg tablet	146	121	82.9	19	13.0	6	4.1
Losartan 50 mg tablet	152	62	40.8	86	56.6	4	2.6
Mebendazole 100 mg/5 ml suspension	152	17	11.2	129	84.9	6	3.9
Metformin 500 mg tablet	150	44	29.3	103	68.7	3	2.0
Metoprolol 50 mg tablet	153	57	37.3	90	58.8	6	3.9
Metronidazole 500 mg tablet	144	59	41.0	80	55.6	5	3.5
Sambong 250 mg tablet	151	56	37.1	90	59.6	5	3.3
Simvastatin 20 mg tablet	154	27	17.5	121	78.6	6	3.9

Contribution of ComPack Medicines Deliveries to Drug Availability in Health Facilities

Eleven (11) drugs in the basket list were included in the Complete Treatment Package list. These commonly listed drugs allowed the assessment of the extent of the contribution of ComPack medicine deliveries to the drug availability in RHUs and HCs. For each drug in this common set, the percentage of health facilities that had available this specific drug was determined and compared between recipient and non-recipient health facilities of ComPack medicine deliveries. In addition, in recipient facilities, the surveyors noted whether this drug came from the ComPack deliveries or other sources, e.g. local government procurements, donations from external agencies, was recorded.

Figure 7 shows these comparisons. There were great differences in the percentages of facilities that had the listed drugs available between recipient and non-recipient facilities. Simvastatin 20 mg, hydrochlorothiazide 25 mg and enalapril 10 mg tablets were infrequently available in non-recipient RHUs and HCs, with 13.4% or less that had these on hand. In recipient facilities, these drugs were present in between 86.4% to 97.4% of them. Glibenclamide 5 mg tablet was found in 96.1% of recipient facilities but only in a third of the non-recipient ones. Metoprolol 50 mg, metformin 500 mg and metronidazole 500 mg tablets were available in around half of non-recipient facilities. Their availability was found in 87.0% or more of the recipient facilities. Except for metronidazole, the above drugs were treatment for non-communicable diseases.

Figure 7. Availability of Drugs in ComPack List in Recipient and Non-Recipient RHUs and HCs



Four antibiotics common in the basket and ComPack lists were not as highly available as the drugs for non-communicable diseases in recipient facilities. This was mainly due to the fast-movement of these drugs. These drugs were amoxicillin 500 mg capsule, co-trimoxazole 200 mg + 40 mg/5 ml suspension and 800 mg + 160 mg tablet and ciprofloxacin 500 mg tablet, which were present in 68.8%, 76.6%, 77.9% and 53.9%, respectively. However, compared to non-recipient

facilities, availability of these drugs in recipient facilities was still considerably higher, except for amoxicillin 500 mg tablet. In non-recipient facilities, amoxicillin was present in 69.1%, both co-trimoxazole suspension and tablet in 60.8% and ciprofloxacin in 30%.

The high availability of several commonly listed drugs was evidently due to the deliveries of ComPack medicines. If ComPack medicine deliveries were not counted in these recipient facilities, only 0.7%, 2.6% and 11.7% had enalapril, hydrochlothiazide and simvastatin, respectively, that were acquired from other sources. Glibenclamide, metformin and metoprolol from non-ComPack sources were available in about a third of the recipient facilities (between 27.9% to 38.3%). These drugs for non-communicable diseases were available in more than 86% of recipient facilities when ComPack supplies were counted in. On a smaller but still significant magnitude, the availability of anti-biotic drugs in the ComPack list also was also augmented in the recipient facilities. Another consistent trend shown in Figure 7 was the higher percentage of non-recipient facilities than recipient facilities that had these commonly listed drugs that did not come from ComPack deliveries. The percentages of non-recipient facilities with co-trimoxazole 200 mg + 40 mg/5 ml suspension and 800 mg + 160 mg tablet, metformin 500 mg tablet and metoprolol 50 mg tablet were higher by 10% or more than in recipient facilities when ComPack stocks were not counted.

DISCUSSION

Coverage of Survey

This nation-wide survey is the 3rd in the planned series of surveys to monitor drug availability as one of the performance indicator under the Health Sector Policy Support Program (HSPSP) II. Similar methodologies were employed with only slight modification in the list of essential drugs in the basket list to ensure valid comparisons of mean drug availability levels across the 3 surveys. These changes could have caused a small drop in availability of drugs in the primary care list. A more detailed check showed that the replacements were less available than the medicines they replaced (analysis not shown). Over-all, the sampling plan was executed with minor deviations. Only one health facility in the sample list was not covered, while replacement of sample areas was minimal at 3%. Thus, the sample can be considered representative of the populations studied.

The conduct of this survey, as in the previous ones, was generally successful due to excellent coordination and support provided by NCPAM and regional, provincial, and city/municipal health offices. The survey team did not encounter serious problems related to data collection. All health facilities were receptive and cooperative. A drug availability survey that employs a nationally representative random sample is generally feasible in the country. Data on drug availability using a basket list of drugs to be inspected can be collected with very high quality.

Progress in Drug Availability Levels

Mean drug availability in primary level health care facilities was found to be 53.6%. This was hardly an increase from the 51.7% drug availability level in the primary health care facilities in

the 2011 survey (Sarol 2012). Median level drug availability remained at 55.0%. At the province level, the mean drug availability was 56.2%, compared to 52.3% in 2011. A possible reason for apparent very small changes in drug availability is the close proximity of the time of survey. In the absence of new large-scale interventions targeted to increase drug availability, no significant changes could be expected. For Level 2 to 4 hospitals, there was an increase in mean drug availability of 6.5% from 37.8% in the 2011 survey to 44.3% in this survey. The change in mean provincial level was smaller though, from 37.5% in 2011 to 40.6%.

In the monitoring of progress in drug availability, the results in this survey could be cause for satisfaction. Even if in this survey there were no apparent significant changes in drug availability in primary level health care facilities in the public sector from the preceding survey, it validated the marked improvement in drug availability from the baseline level of 24.8% in 2009 that had been so far achieved (Dichosa 2010, Sarol 2012). As for Level 2 to 4 hospitals, the observed change in levels between the two most recent surveys was more satisfactory because this represented more than 10% increase in drug availability, which was the annual target under the HSPSP II (Dichosa 2010). The progress in drug availability in Level 2 to 4 public hospitals, however, has yet to match the greater strides attained in the primary level care facilities. In this study, two provinces were found to have extremely low levels of essential drugs available in this category of hospitals. The attention of the responsible officials in these hospitals should be called to inform them of the negative consequences of this situation to their constituents and to initiate moves to remedy this problem.

Reasons for Low Drug Availability in Health Facilities

In health facilities with low drug availability, a common reason was that the medicines were kept in places other the health facility, often in the municipal offices. The motives for such practice are questionable. Local government officials should realize that this could lead to lower utilization of public health services. First, there is additional effort on the part of the clients of health services to obtain these medicines. Secondly, the public might perceive that access to these medicines services are restricted depending on political inclinations.

Low priority given by local officials to drug procurement seemed to be another underlying reason for low drug availability. Some health facilities had no drugs because there had been no purchases of such for some period of time already. Some hospitals were content with keeping only emergency drugs and not oral medicines, perhaps because no budget was allocated for the latter. The absence of these medicines in the health facilities would inevitably result to greater out-of-pocket expenses of patients.

Family Planning Commodities

There were substantial changes in the availability of specific planning commodities in RHUs and HCs between the 2011 survey and this one. Availability of oral contraceptive pills increased from 48.3% in 2011 to 63.4%. The reverse was seen for oxytocin. The availability of this commodity in this study was lower at 38.5%, compared to 55.2% in 2011.

Expired Drugs

Expired drugs were found in 7.4% of the primary level care facilities. This was similar to the 8.3% result in the 2011 survey. In Level 2 to 4 hospitals, there were 4.0% with expired drugs, lower than the previous finding of 7.8% in 2011. There were some indications of clustering of facilities with expired drugs. It is possible that these supplies had come from the same sources. A stricter monitoring of expired drugs at the province level could further reduce the incidence of expired drugs.

Contribution of Complete Treatment Pack Program of DOH to Over-all Drug Availability

The objectives of this survey were augmented to include assessment of availability of ComPack medicines. More than 90% of RHUs and HCs were already part of the Conditional Cash Transfer (CCT) program, also called 4Ps, of the Department of Social Welfare and Development and thus were eligible for ComPack deliveries. Two-thirds (66.1%) of the eligible RHUs and HCs have so far received at least one delivery of ComPack medicines.

There were big differences in the percentages of RHUs and HCs with available drugs in the ComPack list between recipient and non-recipient facilities. In recipient facilities, the percentage of facilities with available stocks of same drugs in the ComPack list but coming from other sources was also much lower compared to availability of their ComPack counterparts. These results clearly indicated that the ComPack program of DOH was a very significant factor in improving drug availability in health facilities. These differences in availability of specific drugs between recipient and non-recipient facilities and between ComPack and non-Compack sources of drugs in recipient

facilities were much greater for non-communicable drugs than for antibiotics. Undoubtedly, the availability of drug treatments for non-communicable diseases in a large proportion of RHUs and HCs was made possible only because of the ComPack deliveries. Otherwise, these drugs were apparently not procured by these facilities from elsewhere. The smaller difference in antibiotics could be due to the larger availability of the antibiotics in non-recipient facilities and to the fast-movement of these drugs in the recipient facilities.

Consequently, progress on improving drug availability would be dependent on the sustainability of the ComPack program of DOH. In this study, one third (33.9%) of eligible facilities had yet to receive ComPack deliveries. In many of them, surveyors noted preparatory groundwork such as the registration and profiling of 4P members were being conducted. Once completed, deliveries of ComPack medicines to these facilities could be initiated. This will reduce the likelihood of encountering facilities with very low number of drugs available. According to NCPAM, the expansion of the list of drugs included in the ComPack set is also being studied. With these possible improvements in the ComPack program implementation, future surveys would be expected to show further increases in drug availability at the national level

For future deliveries, the quantities of each medicine in the ComPack list that are given to health facilities need to be examined. Some RHUs and HCs were overwhelmed with large stocks of drugs for non-communicable diseases that they could not promptly dispense. These could lead to wastage of medicinal supplies if left to simply expire. This could be avoided by limiting deliveries of these medicines to levels that would be reasonably dispensed over a given period. This over-supply could also be the result of underreporting or underdiagnosis of hypertension, hyperlipidemia and diabetes. The intended beneficiaries of these medicines were not being seen at these facilities.

One solution would be to improve the diagnostic capabilities of these facilities by providing the required laboratory equipments and hiring of qualified personnel. Some of the health staff met lamented that this was their dilemma. To further reduce this underdetection, education campaigns to increase awareness and encourage sick people to seek care of health professionals should be implemented.

On the other hand, some facilities reportedly got short supplies of the faster-moving antibiotics. NCPAM should determine the projected demands for these drugs in the facilities and match these before making deliveries. A related concern about fast-moving drugs that must be examined is rationale use of these drugs. Being readily available in the ComPack deliveries, it is possible that antibiotics were being dispensed without careful thought of their appropriateness for the patient's illness condition.

The ComPack program could potentially have a beneficial effect on improving health services and thereby health status, especially to the poor members of the population. This study, however, focused only on their availability. The actual utilization of ComPack drugs and satisfaction of their intended beneficiaries have yet to be studied.

CONCLUSIONS AND RECOMMENDATIONS

The national survey on drug availability in the public health facilities in 2012 had been completed. Given the actual coverage, the sample can be considered a good representative sample, allowing valid comparisons with the previously done surveys.

This study showed that the mean drug availability levels in 2012 in rural health units, health centers and Level 1 public hospitals was 53.6% and in Level 2 to 4 public hospitals, 44.3%. Mean province level drug availability was 56.2% and 40.6%, respectively, for the two groups of health care facilities. These levels were slightly higher compared to those in 2011. The marked improvements in drug availability from baseline values in 2009 that was seen in the previous survey were corroborated.

Continued monitoring of drug availability levels at the national level should be done to determine further progress in this indicator. With the on-going ComPack program of DOH, drug availability levels are expected to further improve. Similar methodologies in this survey can again be used because of their feasibility.

This study also showed that majority of RHUs and HCs in CCT areas have already received deliveries of ComPack medicines from DOH. Over-all levels of drug availability increased as a result. The ComPack deliveries made it possible for some drugs, especially for non-communicable diseases, to be available in the RHUs and HCs.

However, NCPAM should take a close look at the movement of the drugs in the ComPack list. Large stocks of non-communicable drugs were piling up and left unused in some facilities. Improving the diagnostic capabilities of the facilities and health seeking behavior can alleviate this problem. On the other, anti-biotics were reportedly received in insufficient quantities in the

packages such that these easily got out-of-stock and short of the needs of the communities. The rational use of these medicines need to be examined.

Finally, a study on the utilization of ComPack medicines and the satisfaction of its beneficiaries should be conducted. This will determine the impact of this program on the improvement of health service delivery in the Philippines.

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APPENDICES

APPENDIX A

SAMPLE SIZE CALCULATION

Sample Size Calculation

RHUs, HCs and Level 1 Public Hospitals in Provinces

The sample size for RHUs, HCs and Level 1 public hospitals was computed as follows. This survey specified an absolute margin of error of ±4.0% with 95% confidence on the estimated mean percentage of available drugs in public primary level health care facilities in the country. From the 2011 survey, the standard deviation of the percentage of available drugs in Group A health facilities was 19.6%. Intracluster correlation was also calculated at 0.15. Given the specifications and assuming the obtained values from the 2011 study, the required sample size of 275 was obtained. This sample size incorporated a design effect of 2.95 since the number of secondary sampling units is set to 14. The total sample size of the primary level public health facilities was 296, which was the total from taking 14 facilities each in 19 provinces (=266) and 30 from NCR.

Other factors were also taken into consideration, especially in determining the number of primary sampling units (i.e. provinces) and number of facilities (public primary level health care facilities and Level 2 to 4 hospitals per province). Within provinces, the standard deviation of 18.1% for the percentage of available drugs for primary level health care facilities from the 2011. For a desired (absolute) margin of error of ±7.5% (with 95% confidence) at the province level, the required sample size is 14 health facilities. In this calculation, finite population correction was applied using an average of 35 health care facilities per province based on 2011 survey sampling frame.

One of the objectives was to determine the mean province level percentage of drug availability. The baseline survey yielded a standard deviation of 7.6% of the province level percent drug availability. To obtain a desired margin of error of ±3.0% with 95% confidence, 20 provinces were required for the sample size.

NCR Health Centers and Level 1 Public Hospitals

For NCR, the health centers and Level 1 public hospitals were considered the primary sampling units. NCR was treated as a separate stratum for sampling purposes. However, it was also considered as another domain where an estimate of the mean percentage of available drugs in health facilities was also desired with specified precision. The standard deviation of percentage of available drugs was found to be 14.1% within NCR. Thirty (30) health centers and primary level hospitals would be sufficient to meet a margin of error of ±5% with 95% confidence in NCR.

Level 2 to 4 Public Hospitals in Provinces

The overall standard deviation was found to be 17.1% in the 2011 survey. A specification of ±4.0% margin of error for estimating mean percentage of available drugs with 95% confidence yielded a sample size of 71 under simple random sampling design. The intracluster correlation from the baseline study was 0.06. With a sample size of 5 hospitals per province, the derived design effect was 1.24. This resulted to a total required sample of 88 hospitals. Potentially, the

total sample size could reach 117 if all selected 19 provinces had at least 5 hospitals each and 22 were required in NCR. The final sample was expected to be smaller since several selected provinces would have less than 5 Level 2 to 4 hospitals.

NCR Level 2 to 4 Public Hospitals

The standard deviation of percentage of available drugs in Level 2 to 4 public hospitals was 19.8% in NCR. Given this, the required number to meet ±6% margin of error with 95% confidence was 22 hospitals, incorporating finite population correction using total population of 48 hospitals.

APPENDIX B.

DATA COLLECTION FORMS

Drug Availability Among Public Health Facilities
COVER FORM (FORM 1)

Introductory Statement

Good <morning/afternoon>, I am <name of surveyor>, a data collector of the Drug Availability Study being conducted by the Department of Health. I would like to ask your help in checking whether a set of key medicines are available in your drug dispensary. I will show you a list of medicines and if you could please provide me a sample of each of the medicines specified in the list. This survey will take only 30 minutes to 1 hour of your time. Thank you very much for your cooperation.

Health Facility Information
Province: _____
Name of Health Facility: _____
Level of Health Facility (check one): ☐ Rural Health Unit ☐ Health Center ☐ Level I Hospital
Name of Surveyor: _____
Person Responsible at Health Facility Drug Dispensary:
Name: _____
Position: _____

Instructions for Surveyor:
If the health facility is a Rural Health Unit (RHU), Health Center (HC) or a Level I public hospital, please use SURVEY FORM 1.
If the health facility is a Level II, III or IV public hospital, please use SURVEY FORM 2.
If the health facility is a Rural Health Unit (RHU), Health Center (HC) that has been a recipient of DOH Complete Treatment Packs, use SURVEY FORM 3.

Result of Visit
Date of Scheduled Visit: _____ (mm/dd/yyyy)

Result (check one) of survey: ☐ Completed; ☐ Partly completed; ☐ Not done

If partly or not completed, why? _____

_____

Date of Scheduled Callback: _____ (mm/dd/yyyy)

Result (check one) of survey: ☐ Completed; ☐ Partly completed; ☐ Not done

If partly or not completed, why? _____

_____

SURVEY FORM 1
Public Health Facility Pharmacy/Drug Dispensary
List A (For RHUs, HCs and Level I Public Hospitals)

No	Key Medicines (Generic Name)	Available (encircle)		Expired* (encircle)				Remarks
1	Amoxicillin 500 mg capsule	NO	YES	NO	YES	NK	NA	
2	Cefalexin 500 mg capsule	NO	YES	NO	YES	NK	NA	
3	Chlorpromazine 50 mg tablet	NO	YES	NO	YES	NK	NA	
4	Ciprofloxacin 500 mg tablet	NO	YES	NO	YES	NK	NA	
5	Co-trimoxazole 200 mg + 40 mg suspension, 60 mL	NO	YES	NO	YES	NK	NA	
6	Co-trimoxazole 800 mg + 160 mg tablet	NO	YES	NO	YES	NK	NA	
7	Enalapril 10 mg tablet	NO	YES	NO	YES	NK	NA	
8	Ferrous sulfate tablet with folic acid (60 mg elemental iron + 250 mcg folic acid/tablet or capsule)	NO	YES	NO	YES	NK	NA	
9	Glibenclamide 5 mg tablet	NO	YES	NO	YES	NK	NA	
10	Hydrochlorothiazide 25 mg tablet	NO	YES	NO	YES	NK	NA	
11	Metformin 500 mg tablet	NO	YES	NO	YES	NK	NA	
12	Metoprolol 50 mg tablet	NO	YES	NO	YES	NK	NA	
13	Metronidazole 500 mg tablet	NO	YES	NO	YES	NK	NA	
14	Metronidazole 125 mg/5mL (as benzoate) suspension, 60 mL	NO	YES	NO	YES	NK	NA	
15	Oral rehydration salt (ORS 75-replacement)	NO	YES	NO	YES	NK	NA	
16	Paracetamol 125 mg/5 mL or 120 mg/5 mL syrup/suspension, 60 mL	NO	YES	NO	YES	NK	NA	
17	Paracetamol 500 mg tablet	NO	YES	NO	YES	NK	NA	
18	Povidone-Iodine 10% solution (60 mL or 120mL or 1 gallon)	NO	YES	NO	YES	NK	NA	
19	Ranitidine 150 mg tablet	NO	YES	NO	YES	NK	NA	
20	Simvastatin 20 mg tablet	NO	YES	NO	YES	NK	NA	
21	Oxytocin for Basic Emergency Maternal Obstetrics & Neo-natal Care (BEMONC)	NO	YES	NO	YES	NK	NA	
22	Pills (Low dose COC, Progestin only pills)	NO	YES	NO	YES	NK	NA	
23	Injectables (DMPA)	NO	YES	NO	YES	NK	NA	
24	IUD TCU380A	NO	YES	NO	YES	NK	NA	
25	SDM cycle beads	NO	YES	NO	YES	NK	NA	
Remarks on Data Collection Activity:								

*NK – Not known, NA – Not Applicable

Drug Availability Among Public Health Facilities
COVER FORM (FORM 2)

Introductory Statement
Good <morning/afternoon>, I am <name of surveyor>, a data collector of the Drug Availability Study being conducted by the Department of Health. I would like to ask your help in checking whether a set of key medicines are available in your drug dispensary. I will show you a list of medicines and if you could please provide me a sample of each of the medicines specified in the list. This survey will take only 30 minutes to 1 hour of your time. Thank you very much for your cooperation.

Health Facility Information
Province: _____
Name of Health Facility: _____
Level of Health Facility (check one): ☐ Level I ☐ Level II ☐ Level III ☐ Level IV
Name of Surveyor: _____
Person Responsible at Health Facility Drug Dispensary:
Name: _____
Position: _____

Instructions for Surveyor:
If the health facility is a Rural Health Unit (RHU), Health Center (HC) or a Level I public hospital, please use SURVEY FORM 1.
If the health facility is a Level II, III or IV public hospital, please use SURVEY FORM 2.
If the health facility is a Rural Health Unit (RHU), Health Center (HC) that has been a recipient of DOH Complete Treatment Packs, use SURVEY FORM 3.

Result of Visit
Date of Scheduled Visit: _____ (mm/dd/yyyy)

Result (check one) of survey: ☐ Completed; ☐ Partly completed; ☐ Not done

If partly or not completed, why? _____

_____

Date of Scheduled Callback: _____ (mm/dd/yyyy)

Result (check one) of survey: ☐ Completed; ☐ Partly completed; ☐ Not done

If partly or not completed, why? _____

_____

SURVEY FORM 2
Public Health Facility Pharmacy/Drug Dispensary
List B (For Level II, III and IV Public Hospitals)

No	Key Medicines (Generic Name)	Available (encircle)	Expired* (encircle)	Remarks
1	Aciclovir 200 mg tablet	NO YES	NO YES NK NA	
2	Amlodipine 5 mg (as besylate or camsylate) tablet	NO YES	NO YES NK NA	
3	Amoxicillin 500 mg capsule	NO YES	NO YES NK NA	
4	Beclomethasone 0.05 mg/dose (as dipropionate) inhaler	NO YES	NO YES NK NA	
5	Bisacodyl 5 mg tablet	NO YES	NO YES NK NA	
6	Carbamazepine 200 mg tablet	NO YES	NO YES NK NA	
7	Cefalexin 500 mg capsule	NO YES	NO YES NK NA	
8	Ceftriaxone 1 gram vial	NO YES	NO YES NK NA	
9	Chloramphenicol 125 mg/5 mL suspension	NO YES	NO YES NK NA	
10	Chloramphenicol 500 mg capsule	NO YES	NO YES NK NA	
11	Chlorpromazine 100 mg tablet	NO YES	NO YES NK NA	
12	Ciprofloxacin 500 mg tablet	NO YES	NO YES NK NA	
13	Co-amoxiclav 625 mg tablet	NO YES	NO YES NK NA	
14	Co-trimoxazole 200 mg + 40 mg suspension, 60 mL	NO YES	NO YES NK NA	
15	Co-trimoxazole 800 mg + 160 mg tablet	NO YES	NO YES NK NA	
16	Dexamethasone 0.5 mg tablet	NO YES	NO YES NK NA	
17	Dicloflenac 50 mg capsule/tablet (as sodium or potassium)	NO YES	NO YES NK NA	
18	Doxycycline 100 mg capsule	NO YES	NO YES NK NA	
19	Enalapril 10 mg tablet	NO YES	NO YES NK NA	
20	Ferrous sulfate tablet + folic acid (equiv to 60 mg elemental iron + 250 mcg folic acid)	NO YES	NO YES NK NA	
21	Glibenclamide 5 mg tablet	NO YES	NO YES NK NA	
22	Gliclazide 80 mg tablet	NO YES	NO YES NK NA	
23	Hydrochlorothiazide 25 mg tablet	NO YES	NO YES NK NA	
24	Ibuprofen 400 mg tablet	NO YES	NO YES NK NA	

25	Isosorbide dinitrate 10 mg tablet	NO	YES	NO	YES	NK	NA	
26	Metformin 500 mg tablet	NO	YES	NO	YES	NK	NA	
27	Metoprolol 50 mg tablet	NO	YES	NO	YES	NK	NA	
28	Metronidazole 500 mg tablet	NO	YES	NO	YES	NK	NA	
29	Metronidazole 125 mg/5 mL (as benzoate) suspension, 60 Ml	NO	YES	NO	YES	NK	NA	
30	Omeprazole 20 mg capsule/tablet	NO	YES	NO	YES	NK	NA	
31	Oral rehydration salt (ORS 75-replacement)	NO	YES	NO	YES	NK	NA	
32	Paracetamol 125 mg/5 mL or 120 mg/5 mL syrup/suspension, 60 mL	NO	YES	NO	YES	NK	NA	
33	Paracetamol 500 mg tablet	NO	YES	NO	YES	NK	NA	
34	Phenobarbital 120 mg/mL (130 mg/mL), 1mL ampule inj	NO	YES	NO	YES	NK	NA	
35	Povidone-Iodine 10% solution (60 mL, 120mL or 1 gallon)	NO	YES	NO	YES	NK	NA	
36	Ranitidine 150 mg tablet	NO	YES	NO	YES	NK	NA	
37	Salbutamol 0.1 mg dose, 200 doses (as sulfate) inhaler	NO	YES	NO	YES	NK	NA	
38	Simvastatin 20 mg tablet	NO	YES	NO	YES	NK	NA	
	Remarks on Data Collection Activity							

*NK – Not known, NA – Not Applicable

SURVEY FORM 3

Public Health Facility Pharmacy/Drug Dispensary

Availability of ComPack Medicines (For RHUs and HCs)

1. Province: _____
2. Name of Health Facility: _____
3. Is this RHU or HC in an area covered by the CCT program of DSWD? __ Yes __ No
4. Has this RHU or HC received deliveries of ComPack medicines? __ Yes __ No (End of Interview)
5. When was the first delivery made? _____ (indicate month and year)
6. When was the last delivery made? _____ (indicate month and year)
7. How many times have ComPack medicines been delivered to this facility? _____
8. Are ComPack medicines exclusively given to patients registered in the CCT program only? __ Yes __ No

No	Drug	Is drug available?	If not available, why? 1- No delivery ever of drug 2- Out of stock 3- Cannot be located 4- Other, specify NA- Not applicable	Other reasons for drug unavailability	Is drug fast-moving?
1	Amlodipine 10mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
2	Amoxicillin 250mg/5mL powder/ granules for suspension, 60mL	No Yes	1 2 3 4 NA		No Yes DK NA
3	Amoxicillin 500mg capsule	No Yes	1 2 3 4 NA		No Yes DK NA
4	Aspirin 80mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
5	Ciprofloxacin 500mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
6	Cloxacillin 125mg/5mL, powder for suspension/syrup, 60mL	No Yes	1 2 3 4 NA		No Yes DK NA
7	Cloxacillin 500mg capsule	No Yes	1 2 3 4 NA		No Yes DK NA
8	Cotrimoxazole 200mg+40mg/5mL, 60mL suspension	No Yes	1 2 3 4 NA		No Yes DK NA
9	Cotrimoxazole 400mg+80mg/5mL, 60mL suspension	No Yes	1 2 3 4 NA		No Yes DK NA
10	Cotrimoxazole 800mg+160mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
11	Doxycycline 100mg capsule	No Yes	1 2 3 4 NA		No Yes DK NA
12	Enalapril 10mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
13	Erythromycin 500mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
14	Glibenclamide 5mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
15	Gliclazide 80mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
16	Hydrochlorothiazide 25mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
17	Lagundi 300mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
18	Lagundi 600mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
19	Losartan 50mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
20	Mebendazole 100mg/5mL suspension	No Yes	1 2 3 4 NA		No Yes DK NA
21	Metformin 500mg tablet/film coated	No Yes	1 2 3 4 NA		No Yes DK NA
22	Metoprolol 50mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
23	Metronidazole 500mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
24	Sambong 250mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
25	Sambong 500mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA
26	Simvastatin 20mg tablet	No Yes	1 2 3 4 NA		No Yes DK NA

APPENDIX C.

DESCRIPTION OF PROCEDURE FOR WEIGHTED ANALYSIS

Weighted Analysis

Calculation of Sampling Weights for Each Health Facility

The sampling of the first stage clusters, that is, the provinces, except for Metro Manila and Palawan, was done with probabilities proportionate to size. The sampling frame used was the list of provinces categorized into the three income levels as described in the Sampling Design section. The numbers of RHUs, HCs and Level 1 public hospitals in the province and its interior cities was used to denote the sizes for the probabilities of selection of primary sampling units. The data for these numbers were provided by the central DOH office in Manila. The first stage sampling probability, $\mathrm{p}_{1\mathrm{si}}$, for each province was calculated as follows:

$$\mathrm{p}_{1si} = \frac{\mathrm{N}_{\mathrm{si}}}{\mathrm{N}_{\mathrm{s}}} * \mathrm{k}_{\mathrm{s}}$$

where N_{si} = RHUs, HCs and Level 1 public hospitals in Province I; N_{s}= number of RHUs, HCs and Level 1 public hospitals in stratum s (income category level) where the province belonged; and k_{s} = number of provinces selected in the stratum s

During the visits to the selected provinces, a new listing of all RHUs, HCs and Level I hospitals was obtained. In some provinces, there were differences found between this listing and that previously provided in the central DOH office. These differences could be due to the unupdated listing of health facilities (e.g. new facilities, closing of facilities) and duplication errors in the records of the central office. From this information, probabilities of selection at the second stage, $\mathrm{p}_{2\mathrm{si}}$ were computed as follows:

$$\mathrm{p}_{2\mathrm{si}} = \frac{n_{si}}{\mathrm{N}'_{\mathrm{si}}}$$

where n_{si}= the sample size of RHUs, HCs and Level I hospitals in province i in stratum s; $\mathrm{N}'_{\mathrm{si}}$= the updated number of RHUs, HCs and Level I hospitals in the sampling frame for province i in stratum s.

The intent was to achieve equal probabilities of selection (EPSEM) of health facilities at the primary level of care in each stratum. However, due to the changes in actual numbers of facilities in the sampling frame found during the period of survey operations, slight variations in the probabilities of selection of secondary units resulted.

For Level 2 to 4 hospitals, the same provinces selected for the sampling of RHUs, HCs and Level I public hospitals were used. The second stage probability of selection of Level 2 to 4 public hospitals, $\mathrm{p}_{2\mathrm{si}(2)}$, was calculated as

$$\mathrm{p}_{2\mathrm{si}(2)} = \frac{n_{si(2)}}{\mathrm{N}'_{\mathrm{si}(2)}}$$

where $n_{si(2)}$ = the sample size of Level 2 to 4 public hospitals in province i in stratum s (this was either 5 or the total number of Level 2 to 4 public hospitals in province i if less than 5); $N'_{si(2)}$ = the number of Level 2 to 4 public hospitals in province i in stratum s.

Note that the probabilities of selection of Level 2 to 4 hospitals between provinces were not equal (not EPSEM) because the first stage selection was based on number of facilities at the primary level care while the second stage selection was based on the number of Level 2 to 4 hospitals.

For NCR, the probability of selection of health centers and Level 1 public hospitals was

$$p_{M1} = \frac{31}{N'_{M1}}$$

where N'_{M1} = number of health centers and Level I public hospitals in the sampling frame for NCR. The sample size of the health centers and Level 1 public hospitals in NCR was 31.

The probability of selection of Level 2 to 4 public hospitals in NCR was

$$p_{M2} = \frac{22}{N'_{M2}}$$

where N'_{M2} = number of Level 2 to 4 public hospitals in the NCR list.

For Palawan, the probability of selection of health centers and Level 1 public hospitals was

$$p_{P1} = \frac{14}{N'_{P1}}$$

where N'_{P1} = number of health centers and Level I public hospitals in the sampling frame for Palawan. The sample size of the health centers and Level 1 public hospitals in Palawan was 14.

The probability of selection of Level 2 to 4 public hospitals in Palawan was 1 since there were exactly 5 of these hospitals found in this province and the sample size was 5.

Finally, sampling weights were derived by getting the reciprocal of the product of the first stage and second stage probabilities of selection.

Estimation of Parameters

For the weighted analysis, estimates of the over-all mean was calculated by

$$\hat{\bar{x}} = \frac{\sum_{s=1}^{k}\sum_{i=1}^{s}\sum_{j=1}^{n_{si}} w_{ij}x_{ij}}{\sum_{s=1}^{k}\sum_{i=1}^{s}\sum_{j=1}^{n_{si}} w_{ij}}$$

where x_{ij}= the obtained value for the j^{th} facility in the i^{th} province in stratum s, w_{ij}= corresponding sampling weight of this facility, $j = 1,2,..,n_{si}$; $i = 1,2,..,s$; $s = 1,2,..,k$

The standard errors of the mean values were calculated using the Taylor linearized variance estimation. All weighted analyses were produced using STATA Ver 10.1, specifically using the SVY features of the software.

APPENDIX D

RESULTS OF WEIGHTED AND UNWEIGHTED ANALYSIS

Table 18. Distribution of RHUs, HCs and Level 1 public hospitals according to percent availability of essential drugs

Percent drug availability	Frequency of facilities	Unweighted percentage	Weighted percentage
0.0	3	1.03	1.07
5.0	7	2.40	2.69
10.0	4	1.37	1.45
15.0	5	1.71	1.70
20.0	4	1.37	1.41
25.0	5	1.71	2.09
30.0	10	3.42	3.09
35.0	16	5.48	4.84
40.0	22	7.53	8.18
45.0	25	8.56	8.28
50.0	27	9.25	9.04
55.0	29	9.93	10.79
60.0	28	9.59	8.44
65.0	27	9.25	8.71
70.0	25	8.56	9.58
75.0	21	7.19	7.40
80.0	22	7.53	7.22
85.0	9	3.08	3.12
90.0	3	1.03	0.91

Table 19. Distribution of RHUs, HCs and Level 1 public hospitals according to percent availability of essential drugs with substitution

Percent drug availability	Frequency of facilities	Unweighted percentage	Weighted percentage
0.0	2	0.7	0.8
5.0	3	1.0	0.9
10.0	4	1.4	1.8
15.0	4	1.4	1.3
20.0	5	1.7	1.8
25.0	4	1.4	1.7
30.0	3	1.0	1.2
35.0	8	2.7	2.0
40.0	21	7.2	6.6
45.0	19	6.5	6.4
50.0	25	8.6	8.5
55.0	30	10.3	11.1
60.0	23	7.9	8.0
65.0	33	11.3	10.7
70.0	25	8.6	8.7
75.0	24	8.2	8.6
80.0	24	8.2	8.8
85.0	22	7.5	7.6
90.0	13	4.5	3.7

Table 20. Distribution of Level 2 to 4 public hospitals according to percent availability of essential drugs

Percent drug availability	Frequency of hospitals	Unweighted percentage	Weighted percentage
0.0	1	1.3	1.0
2.6	2	2.5	1.8
7.9	1	1.3	0.7
10.5	1	1.3	1.9
21.1	3	3.8	3.6
23.7	3	3.8	3.7
26.3	1	1.3	0.3
28.9	1	1.3	2.3
31.6	5	6.3	9.3
34.2	5	6.3	4.9
36.8	4	5.0	4.6
39.5	3	3.8	1.6
42.1	8	10.0	9.9
44.7	7	8.8	9.7
47.4	5	6.3	5.2
50.0	2	2.5	3.6
52.6	5	6.3	6.0
55.3	3	3.8	5.3
57.9	4	5.0	6.3
60.5	4	5.0	5.2
63.2	3	3.8	2.9
65.8	1	1.3	0.7
68.4	3	3.8	3.8
71.1	2	2.5	3.0
73.7	3	3.8	2.8

Table 21. Distribution of Level 2 to 4 public hospitals according to percent availability of essential drugs with substitution

Percent drug availability	Frequency of hospitals	Unweighted percentage	Weighted percentage
0.0	1	1.3	1.0
2.6	2	2.5	1.8
5.2	0	0.0	0.0
7.9	1	1.3	0.7
10.5	1	1.3	1.9
21.1	3	3.8	3.6
23.7	1	1.3	1.1
26.3	2	2.5	1.6
29.0	2	2.5	3.5
31.6	2	2.5	4.2
34.2	1	1.3	0.7
36.8	4	5.0	5.2
39.5	7	8.8	8.7
42.1	3	3.8	2.5
44.7	8	10.0	12.8
47.4	4	5.0	3.4
50.0	4	5.0	5.0
52.6	0	0.0	0.0
55.3	5	6.3	5.0
57.9	5	6.3	7.8
60.5	5	6.3	7.5
63.2	2	2.5	2.5
65.8	4	5.0	5.0
68.4	2	2.5	1.9
71.1	3	3.8	3.7
73.7	2	2.5	3.0
76.3	3	3.8	3.6
79.0	1	1.3	0.7
81.6	2	2.5	1.4

Table 22. Means and confidence intervals of percent drug availability in RHUs, HCs and Level 1 public hospitals

Indicator	Unweighted			Weighted		
	N	mean	95% CI	n	mean	95% CI
Percent drug availability (same dose and form)	292	53.8	51.5 – 56.1	292	53.6	50.0 – 57.2
Percent drug availability (with substitution)	292	59.3	57.0 – 61.6	292	59.2	55.8 – 62.5

Table 20. Means and confidence intervals of percent drug availability in Level 2 to 4 public hospitals

Indicator	Unweighted			Weighted		
	N	mean	95% CI	n	mean	95% CI
Percent drug availability (same dose and form)	80	44.0	40.2 – 47.8	80	44.3	39.7 – 48.9
Percent drug availability (with substitution)	80	48.0	43.8 – 52.2	80	48.0	42.9 – 53.0