# SITUATION ANALYSIS OF DRUG PROCUREMENT SYSTEM IN PUBLIC HOSPITALS, OUDOMXAY PROVINCE LAO PEOPLE'S DEMOCRATIC REPUBLIC

**HOUMPHANH INTHAMOUNGKHOUN**

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…….
Mr. Houmphanh Inthamoungkhoun
Candidate

…….....
Assoc. Prof. Cha-oncin Sooksriwong,
Dr.PH. (Public Health Administration)
Major-advisor

……..
Assoc. Prof. Arthorn Riewpaiboon,
Ph.D. (Pharmacy)
Co-advisor

……..…
Prof. Banchong Mahaisavariya,
M.D., Dip. Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

……..
Assoc. Prof. Arthorn Riewpaiboon,
Ph.D. (Pharmacy)
Program Director
Master of Science in Pharmacy
Program in Pharmacy Administration
Faculty of Pharmacy
Mahidol University

Thesis
entitled

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was submitted to the Faculty of Graduate Studies, Mahidol University
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(Pharmacy Administration)
on
August 20, 2010

…….
Mr. Houmphanh Inthamoungkhoun
Candidate

……..…
Lect. Kusawadee Maluangnon,
Ph. D. (Pharmacy Administration)
Chair

……..…
Assoc. Prof. Cha-oncin Sooksriwong,
Dr.PH. (Public Health Administration)
Member

……..
Assoc. Prof. Arthorn Riewpaiboon,
Ph.D. (Pharmacy)
Member

……..…
Prof. Banchong Mahaisavariya,
M.D., Dip. Thai Board of Orthopedics
Dean
Faculty of Graduate Studies
Mahidol University

……..
Assoc. Prof. Chuthamanee Suthisisang,
Ph.D. (Pharmacology)
Dean
Faculty of Pharmacy
Mahidol University

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Houmphanh Inthamoungkhoun

SITUATION ANALYSIS OF DRUG PROCUREMENT SYSTEM IN PUBLIC HOSPITALS, OUDOMXAY PROVINCE, LAO PDR

HOUMPHANH INTHAMOUNGKHOUN 5137874 PYPA/M

M. Sc. in Pharm. (PHARMACY ADMINISTRATION)

THESIS ADVISORY COMMITTEE: CHA-ONCIN SOOKSRIWONG, Dr.PH. (PUBLIC HEALTH ADMINISTRATION); ARTHORN RIEWPAIBOON, Ph.D. (PHARMACY)

ABSTRACT

The objective of this study was to analyze situation of drug procurement by public hospitals in Oudomxay Province, Lao PDR. A cross-sectional survey was performed among the Provincial FDA, one Provincial hospital, and six district hospitals of Oudomxay Province, Lao PDR and at Sungneun Hospital, Thailand. Data collection on public hospital procurement process and performance was performed between November 2009 and April 2010. The results are composed of three parts: 1. Documentation on the current drug procurement system in Oudomxay Province, Lao PDR. 2. Problems of the current process, documented from 2 surveys: 1) the extent of medication wastage and cost among hospitals in Oudomxay Province, Lao PDR, and 2) the process of drug procurement conditions according to the WHO operational package for assessing, monitoring and evaluating country pharmaceutical situations (Guide for coordinators and data collectors WHO/TCM/2007.2) and operational principles for good pharmaceutical procurement (WHO/EDM/PAR/99.5). 3. Documentation on the case study of drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

The result of this research will benefit the development of more efficient drug procurement in Oudomxay Province, Lao PDR in the future.

KEY WORDS: DRUG PROCUREMENR / DRUG COST / MEDICATION WASTAGE / OUDOMXAY HOSPITAL

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| | |
|---|---|
| La0 PDR | Lao People's Democratic Republic. |
| FDA | Food and Drug Agency |
| WHO | World Health Organization |
| EML | Essential Medicines List |
| NDP | National Drug Policy |
| MOH | Ministry of Public Health |
| SIDA | Swedish International Development Co-operation Agency |
| GDP | Gross Domestic Product |
| NSC | National Statistic Center |

# CHAPTER I
# INTRODUCTION

Lao People's Democratic Republic (Lao PDR) is located in Southeast Asia. The total area is 236.800 square kilometers. There are 17 provinces. Laos is a least developed country, ranked as one of the poorest countries in the world. The gross domestic product (GDP) per capita in 2008 was USD 460, one of the lowest in the world National Statistics centre, 2008(NSC, 2008). The population is 6.7 millions (NSC, 2008) with a structure which is predominantly rural with more than 27% living in urban areas. The health sector is extremely under-financed and under-developed with only USD 5 per capita annual health expenditure. The health situation of the Lao PDR is characterized by a high prevalence of infectious diseases mainly affecting those who live in rural/remote areas. The burden of disease is dominated by malaria, acute respiratory infections, diarrhea, meningitis and dengue fever. (Ministry of Public Health (MOH), National Institute of Public Health 2008). Although the health status of the population has been improved during the last ten years, Laos PDR is still marked by low life expectancy. Overall, life expectancy at birth rate changed from 51 in 1995 to 57 years for men and 61 for women in 2008. The population growth rate 2.344%, birth rate 34.46 births/1,000 population, death rate 11.02 death/ 1,000 population (2008 est.). And the Lao PDR has started the transition period from a controlled to an open market economy with the launch of the "New Thinking" policy in 1986. To solve the problem of the lack of Essential Drug in public health facilities, the revolving drug funds were established in first major of health network on Lao PDR was have been to drug expenditure in health services and there are procured or biding to find the drug prices and the suppliers for quality of drug utilization in the public hospitals (3,4).

A National Drug Policy (NDP) was endorsed in Lao PDR in 1993. Since then, the implementation of the NDP has been supported by Swedish International Development Co-operation Agency (SIDA) for implementation of the NDP during a

first phase 1992-95 in three provinces, an expanded second phase in 1996-2000 in five provinces and a consolidation phase during 2001-2003. During the second phase, it was assessed that a new approach was necessary in order to achieve the goals of the programmer. the scope had widened and included the development of a drug law and regulation, development of standard treatment guidelines including the indicators to monitor its use, as well as the good pharmacy practice and rational use of drug indicators, drug information management of drug supply and health system research projects to improve the implementation of the NDP and bridge the gap between theory and practice.

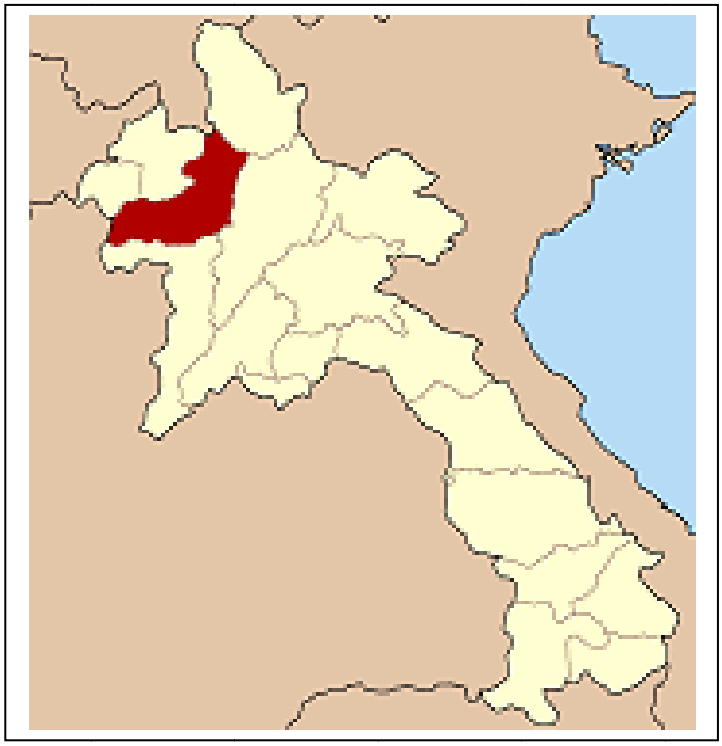

**Figure 1:** Map of Lao P.D.R. and Oudomxay Province.

Oudomxay province is located in North of Lao PDR. The total area is 15,370 square kilometers. Oudomxay is mountainous province; mountains cover more than 85% of area. The population is 272,280 people. There are a provincial hospital with 85 beds, six districts hospital with 15–25 beds each, 40 health centers with two beds per each and 345 drug kits with 345 communities in the province. The drug

procurement is more then 3.6 billions kip per year. (The government budget supported 5%, government revolving fund 92%, and grand aid 3%) (6). the current situation in which there are still inadequate the good process for drug procurement system. But, the drug use is increasingly in hospitals. Moreover, there is poor process of drug procurement in the hospitals of Oudomxay province. There are so many steps to procure and long time for the products receiving. The drug receiving in hospitals are sorted expire used and incorrect drug step of order. According to the Oudomxay provincial health department's summary report annually 2008s have from many hospitals. Are some drugs expire, so many drugs are takeover and some drug is not enough in hospital services. This indicates that the efficiency of the extent of medication wastage is probably still limited leading to inconsistent performance that could impact on the use of the Standard procurement Guideline published by the Ministry of Health. Accordingly, the current study is aimed to focus on the effectiveness of the established drugs procurement committees and to identify factors, which could influence the performance of these drug used evaluation. Therefore, the Oudomxay Provincial Health Department is finding to the solution for improvement of drug procurement for public hospitals. Because, the drugs procurement are the most important and cost-effective tools for health economic impact, prevention, treatment and alleviation of diseases in all health services and often a key factor for the success of a health sector reform in developing countries. Shortage of process for drugs procurement in health facilities may result in malformation and non-sustainability of health services. More than haft of all drug expenditures is publicly financed in Oudomxay. In contrast, in another households' self spending on medicines make up a larger proportion, sometimes is used to procure drugs and medical supplies, whereas health facilities usually face a lack of necessary equipment and essential drugs given this high expenditure, achieving improvements in efficiency, quality, appropriateness of drug procurement, and their distribution and utilization becomes a high priority, particularly in Oudomxay province.

For all public hospitals, good procurement control system is a vital important tool in managing hospital finance and operation. To determine whether public hospitals had drug procurement management to deliver effectiveness and

efficiency, the problem statements in this study have two main questions as followings:

1. What are problems of drug procurement among public hospitals in Oudomxay Province?
2. What should be the solution to problems?

## 1.1 Objectives

### 1.1.1 General objective

1.1.1 To analyze situation of drug procurement by public hospitals in Oudomxay Province, Lao PDR.

### 1.1.2 Specific objectives

1.2.1 To document the drug procurement system in Oudomxay Province, Lao PDR.

1.2.2 To find the problems of drug procurement in Oudomxay Province, Lao PDR.

1.2.3 To study the drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

## 1.2 Expected outcome and benefits

1.2.1 Detail of problems, were the wastage of medicines available in warehouse and dispensing room among publics hospitals, and cause of problems will provide information to existing system for improvement of drug procurement for public hospital and regional Provincial FDA in Oudomxay province, Lao PDR.

1.2.2 Appropriate practice guideline on drug procurement applicable in Oudomxay province, Lao PDR.

1.2.3 More efficient drug procurement

## 1.3 Definition of terms

Drug procurement with includes the main components:

1.3.1 Procure the most cost-effective drugs in the right quantities such as the procedures must also be in place that accurately estimates procurement quantities in order to ensure continuous access to the products selected without accumulating excess stock.

1.3.2 Select reliable suppliers of high-quality products such as the quality of products must be pre-selected, and that active quality assurance program me involving both surveillance and testing must be implemented.

1.3.3 Ensure timely delivery such as the procurement and distribution systems must ensure timely delivery of appropriate quantities to central or provincial stores and adequate distribution to health facilities where the products are needed.

1.3.4 Achieve the lowest possible total cost such as the lowest possible total cost, considering the actual procure price of drugs; hidden costs due to poor product quality, poor supplier performance or short shelf-life; inventory holding costs at various levels of the supply system; and operating costs and capital loss by management and administration of the procurement and distribution system.

## 1.4 Conceptual framework

The scope of this research will study the current drug procurement process at Oudomxay Province which includes Provincial FDA, one Provincial hospital, and six district hospitals. Then the problems of current process will be documented from 2 surveys: 1. the extent of medication wastage & cost among hospitals in Oudomxay Province, Lao PDR, 2. the process of drug procurement condition according to the WHO operational package for assessing, monitoring and evaluating country pharmaceutical situations: Guide for coordinators and data collectors

WHO/TCM/2007.2 and operational principles for good pharmaceutical procurement, WHO/EDM/PAR/99.5. A case study at Sungneun hospital Nakhornrachasima, Thailand will be observed as a model for improvement of drug procurement practice in Oudomxay Province, Lao PDR.

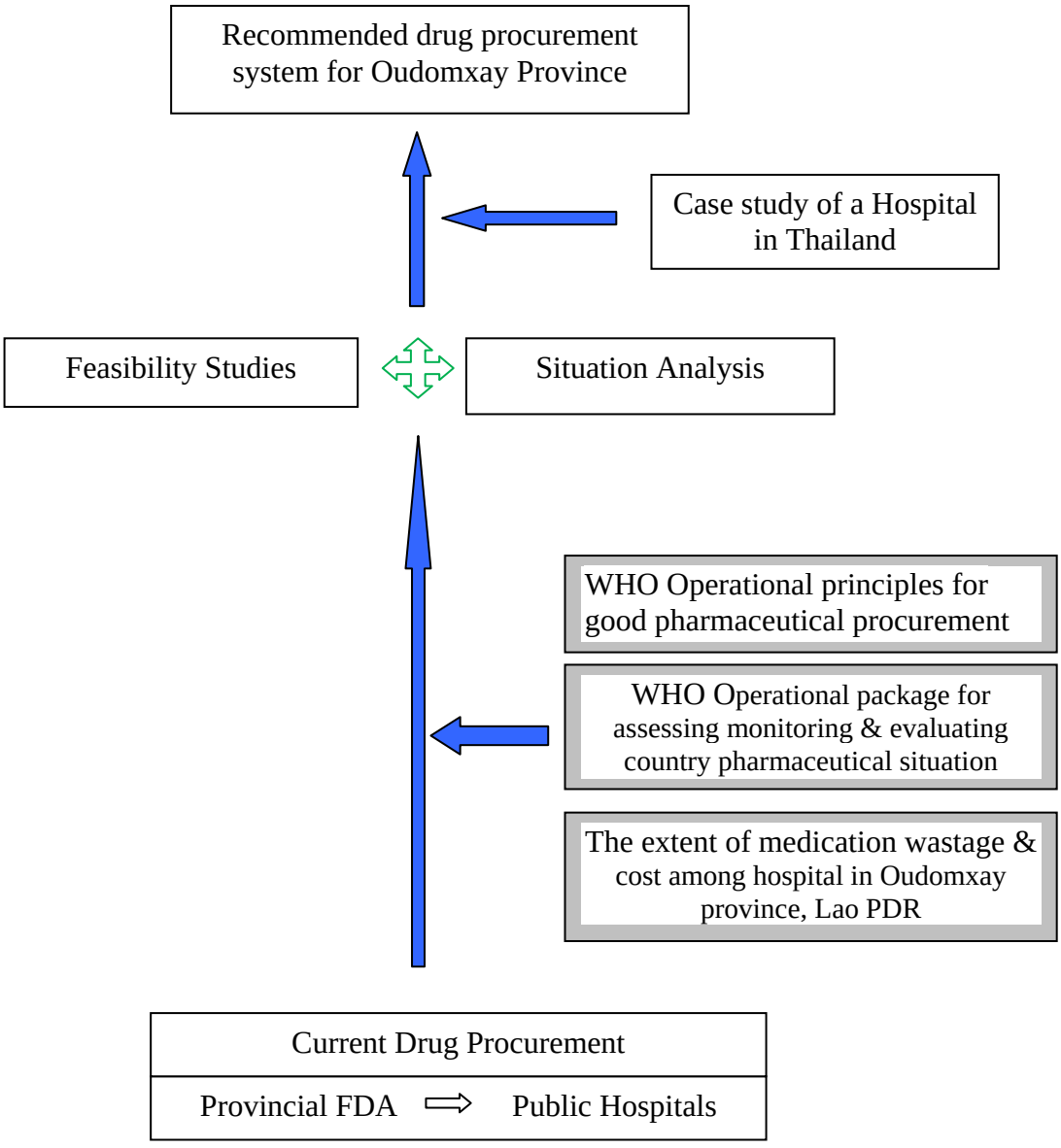


**Figure 2**: Conceptual framework of the study

# CHAPTER II
# LITERATURE REVIEW

The literature review is divided into three parts as the followings:

1. Drug procurement process
2. WHO guideline for good process of pharmaceutical procurement
3. WHO Operational package for assessing monitoring and evaluating country pharmaceutical situation

## 2.1 Drug procurement process

The drug procurement procedure is concerned with the 2 main categories as the drug procurement policy, and the drug procurement mechanism (25).

### 2.1.1 Drug procurement policy

In the overall management of a drug procurement policy, the following objectives have to be borne in mind: All essential drugs needed for health care should be available at all the times at all the health facilities, drugs use available should be of good quality and should be safe and systems of drug procurement should be such that quality drugs are procured at the most competitive prices. In spite of tremendous advance in the various fields of medicine, drugs have always remained and are likely to remain the core element in preventive as well as in curative health care. Medicinal drugs inclusive of contraceptives, nutritional supplements etc. are indispensable for the prevention, control, treatment and amelioration of a number of maladies that affect human beings. Interestingly, after personnel wager, pharmaceuticals are usually the largest item of expenditure within the public health sector budgets of each country. Therefore, it becomes imperative that such resources are utilized optimally. The WHO has been assisting its member countries in the formulation and implementation of national drug policies in order to reduce morbidity and mortality from common

illnesses by promoting the availability and accessibility to essential drugs (25). For achieving this goal, a major thrust has been placed on four access links, namely rational use, affordable price, sustainable financing and reliable health and supply systems. Furthermore, other aspects of the national drug policy relating to drug legislation and regulatory control, essential medicines production, training of human resources and technical cooperation among countries of the region, among other aspects, are supported in accordance with the priorities of the countries by WHO, the most developing countries suffer from an increased disease burden on account of overall poor health and hygiene conditions, and have limited capability to manufacture pharmaceuticals. Therefore, in these countries majority of pharmaceuticals are imported from external sources, thus, representing the health sector's major requirement for foreign exchange, which may seriously affect their balance of payment situation. In the area of pharmaceuticals, the theory of market competition under liberalized, globalised and privatized economies does not give any benefits to the consumer because, by and large, it is not the consumer who decides or chooses the drugs, but usually a doctor or a pharmacist makes this decision and it is often difficult to rationalize their motivation. In addition to this, the average doctor or pharmacist does not have expertise to independently assess the quality, safety or efficacy of each new drug in the market. A similar kind of price variation may occur within the country among various generic and proprietary-brand formulation produced by different manufacturers and the consumer remains completely unaware of such situations. For most developing countries, especially for the smaller ones, it is neither possible nor desirable to have their own manufacturing units for drug requirements in their countries (22). There is only weak evidence that average wholesale drug prices are lower in developing countries than in developed countries. Prices are often at least as high in poor countries while incomes are lower, suggesting a substantial limitation on patients' access to drugs, which may be unaffordable to most. For example, despite the large reductions in prices offered to the several manufacturers of anti-retroviral drugs prices as a share of GDP per capita in that country were not lower than those in the United States. There are several reasons why drug prices may be high in developing countries. First, tariffs, taxes, and monopoly distribution channels may keep the costs of medicines artificially high. Secondly, the governments may be unable to negotiate

significant price discounts with pharmaceutical firms. Small countries especially may not have sufficient potential demand, even through the public sector, to win price discounts. Thirdly, private insurance markets may not exist for large volumes of patients, implying that insurance firms could not negotiate steep discounts. Indeed, the majority of patients likely are not covered by either public or private health insurance, forcing them to absorb drug purchases into their household budgets. Finally, the pharmaceutical firms and their distributors in poor countries may find it more profitable to sell drugs in low volumes and high prices to wealthier patients with price-inelastic demand rather than in high volumes at low prices to poorer patients. There are concerns that if medicines were offered to poorer patients at lower prices the drugs could be resold in the higher-priced segment of the market (13,14). In this context, an inability to achieve “internal price differentiation” seems to result in lower willingness by pharmaceutical firms to service low-income patients. A related view is that the practice of health authorities in some richer countries to engage in “reference pricing” encourages pharmaceutical companies to set high prices in developing economies. In a reference pricing system, price controls in one country are based on an index of prices in comparison countries. To the extent that the comparison group includes developing economies, firms may prefer not to offer price discounts there. In view of the ever developing sophistication, modernization, automation and up gradation of manufacturing technologies competing environment, an efficient procurement system is the only way to improve access to medicines for the majority of the population within the given budgetary ceilings. Since availability of financial resources is always a constraint for developing countries, it becomes all the more important to improve efficiency in all aspects of management in the countries. Good procurement is a linchpin of access to quality and appropriate medicines. The WHO, in partnership with UNICEF, United Nations Population Fund (UNFPA) and the World Bank, has drawn on a common bank of extensive experience to produce “Operational Principles for Good Pharmaceutical Procurement”, to assist all involved in procurement to obtain lower prices, better quality and more reliable delivery of essential medicines, based on four strategic objectives: Procure the most cost-effective drugs in the right quantities, select reliable suppliers of high quality products, ensure timely delivery and achieve the lowest possible total cost. And especially as well as the 12 guiding principles of

good pharmaceutical procurement will show with the WHO guideline Operational principles for good process of pharmaceutical procurement(1).

### 2.1.2 Drug procurement mechanism

The mechanism of drug procurement for promotion of rational use of drugs is a non-profit organization which has introduced the centralized drug procurement system with the public hospitals with the technical support of the WHO. The objective of the mechanism of drug procurement was to ensure availability of good quality drugs with public hospitals and to promote rational drug use. Before the introduction of the system, it was nothing but a total chaos in the supply of medicines with the public hospitals in any country. And the health budget of the government was spent on drugs used to procure the drugs independently. The system was ruined by mismanagement and corruption. Many of drug procurement by the public hospitals were rarely needed while the required medicines were almost perennially in short supply. The introduction of this system has transformed the situation dramatically; the new system procures drugs centrally for half a dozen main and many smaller hospitals run by the government. Under the initiative, it was found that only a limited number of basic drugs were actually needed for treatment in almost the public hospitals. These were identified and procured centrally for supply to the public hospitals. Besides, in keeping with the WHO guidelines, the expensive combination drugs were kept out of the supply list. As a result of this, the actual cost of drugs to the public hospitals was cut by as much as half. A sea change could be brought about the procurement modalities, so that the drugs prescribed in the public hospitals are now being provided to patients free of cost (13,25).

The pooled procurement system is now in place for all state-run hospitals and primary health cares. The system has resulted in a fall in drug prices to the public hospitals by better quality assurance and less duplication of effort. The WHO has hence recommended extension of the Model to other countries (14).

The summary of drug used and plan of procurement are important aspect for process of drug procurement. The amounts of drugs used each drug item was had to be information for make sure to plane and drug item selection demand of drug

procurement planning. The each hospital is summaries amount drug used for past term and make plane for drug procurement in next term.

The drug storage and inventory control are important aspect of the total drug control system. Proper environmental control must be maintained wherever drugs and supplies are stored in the institution. Storage areas must be secure; fixtures and equipment used to store drugs should be constructed so that drugs are accessible only to designated and authorized personnel. Such personnel must be carefully selected and supervised. Safety also is an important factor, and proper consideration should be given to the safe storage of poisons and flammable compounds. Externals should be stored separately from internal medications. Medications stored in a refrigerator containing items other than drugs should be kept in a secured, separate compartment.

## 2.2 WHO guideline for good process of pharmaceutical procurement.

WHO was provided the structure of good process for pharmaceutical procurement for public hospitals guideline as the bellow?

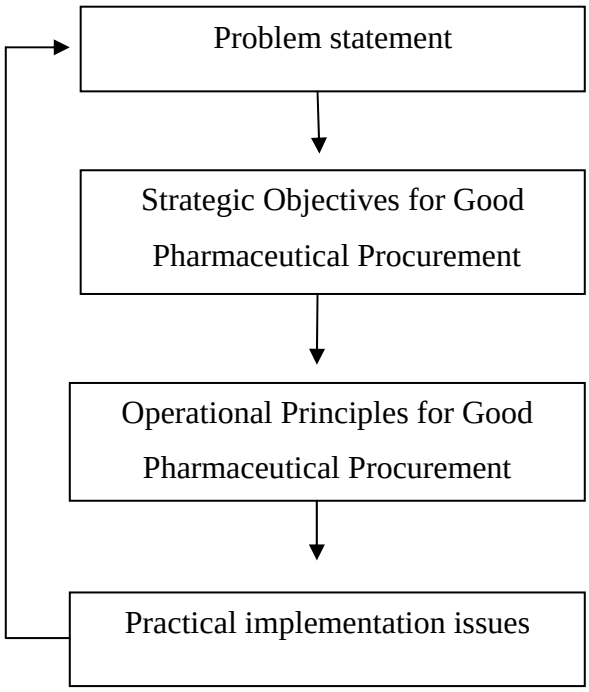


**Figure 3**: Structure of good process for pharmaceutical procurement

### 2.2.1 Problem statement

The pharmaceutical procurement is a complex process which involves many steps, agencies, ministries and manufacturers. Existing government policies, rules and regulations for procurement as well as institutional structures are frequently inadequate and sometimes hinder overall efficiency in responding to the modern pharmaceutical market. Market constraints differ from country to country. Public sector drug procurement must take place in the context of both the local pharmaceutical market and the international market. In many countries public health officials have limited experience in designing an optimal procurement system to fit their market context. An increasing number of countries have moved, or are moving, away from a pharmaceutical procurement and distribution system which is totally operated by the public sector, and are investigating various options for involving the private sector in order to enhance public health. Each of the models discussed in that book has advantages and disadvantages, and each presents a different challenge to effective procurement management. There are many steps in the procurement process. No matter what model is used to manage the procurement and distribution system, efficient procedures should be in place: to select the most cost-effective essential drugs to treat commonly encountered diseases; to quantify the needs; to pre-select potential suppliers; to manage procurement and delivery; to ensure good product quality; and to monitor the performance of suppliers and the procurement system. Failure in any of these areas leads to lack of access to appropriate drugs and to waste. In many public supply systems, breakdowns regularly occur at multiple points in this process. If there is an appearance of special influence on the selection of products and suppliers or if the procurement process is not managed in an efficient and transparent manner, interest among suppliers in competing for procurement contracts decreases, leading to fewer choices and higher prices for drugs. If the procurement system cannot guarantee access to funds at the time they are needed, drug shortages and procurement inefficiencies are inevitable. Government funds for procurement are, in some countries, released irregularly during the financial year. In some countries government regulations specify that funds must be spent in the year for which they are allocated or be returned to the treasury; this compounds the problem. Moreover, without mechanisms to monitor local performance and to ensure adherence to good

procurement practice, public health objectives may not be met and scarce funds may be wasted on inappropriate purchases. Contracting out parts of the procurement/distribution function may improve efficiency and reduce costs. But this will only be true if public health systems can properly monitor and manage such contracts. In many countries the necessary experience and information systems for this are lacking. In some countries initial decentralization of drug procurement was followed by pooled procurement by hospitals or cooperatives. Unbiased market information on product availability, comparative pricing, and product quality and supplier performance is difficult to obtain in many countries. Poor access to information is most common in countries where it is most needed in the light of inadequate regulation of the local market. This information deficiency can result in gaps in essential drug availability and in procurement of poor-quality products at unnecessarily high prices. It may also facilitate undue influence on the procurement process by special interest groups. Even if appropriate policies and procedures are in place, lack of properly trained staff in key positions can doom any procurement system to failure. While effective training programmers can remedy this problem, in many supply systems there is limited access to training in good procurement practices. Also unattractive public sector salaries and lack of career development tend to restrict capacity to attract and retain qualified staff (1,13).

There are main problems of drug procurement as summary:

- Inadequate rules, regulations and structures.
- Public sector staff with little experience in responding to market situations.
- Absence of a comprehensive procurement policy.
- Government funding which is insufficient and/or released irregularly.
- Donor agencies with conflicting procurement regulations.
- Fragmented drug procurement at provincial or district level.
- Lack of unbiased market information.
- Lack of trained procurement staff.

### 2.2.2 Strategic objectives for good pharmaceutical procurement

The twelve operational principles for good pharmaceutical procurement, which form the bulk of this document, are based on four strategic objectives. Both the strategic objectives and the operational principles are relevant to any public sector drug supply system, no matter what combination of public and private services is used to manage the system (1). There are 4 strategic objectives of pharmaceutical procurement as the follows:

2.2.2.1 Procure the most cost-effective drugs in the right quantities. The first strategic objective is that all organizations responsible for procurement, whether they are public, private non-profit or private for-profit, should develop an essential drugs list to make sure that only the most cost-effective drugs are purchased. Procedures must also be in place that accurately estimates procurement quantities in order to ensure continuous access to the products selected without accumulating excess stock.

2.2.2.2 Select reliable suppliers of high-quality products. The second objective is that reliable suppliers of high-quality products must be selected, and that active quality assurance programmers involving both surveillance and testing must be implemented.

2.2.2.3 Ensure timely delivery. The third strategic objective is that the procurement and distribution systems must ensure timely delivery of appropriate quantities to central or provincial stores and adequate distribution to health facilities where the products are needed.

2.2.2.4 Achieve the lowest possible total cost. The fourth objective is that the procurement and distribution systems must achieve the lowest possible total cost, considering four main components: the actual purchase price of drugs; hidden costs due to poor product quality, poor supplier performance or short shelf-life; inventory holding costs at various levels of the supply system; and operating costs and capital loss by management and administration of the procurement and distribution system.

### 2.2.3 Operational principles for good pharmaceutical procurement

The 12 guiding of operational principles for good pharmaceutical procurement as the follow:

2.2.3.1 Different procurement functions and responsibilities (selection, quantification, product specification, pre-selection of suppliers and adjudication of tenders) should be divided among different offices, committees and individuals, each with the appropriate expertise and resources for the specific function. Justification and explanation senior managers responsible for procurement must ensure that pharmaceutical procurement is carried out effectively, efficiently and in accordance with the country's policies, laws and regulations. The health system's procurement office, under various names, is normally responsible for actually managing the procurement function. Pharmaceutical procurement is a specialized professional activity that requires a combination of knowledge, skills and experience. Too often drug supply agencies are staffed by individuals with little or no specific training in pharmaceutical procurement. It is essential, therefore, that staff in key procurement and distribution positions be well trained and highly motivated, with the capability to manage the procurement process effectively. The procurement office should have at least one pharmacist as part of its senior staff, in addition to having pharmacists' expertise all along the pharmaceutical procurement chain.

2.2.3.2 Procurement procedures should be transparent, following formal written procedures throughout the process and using explicit criteria to award contracts. Justification and explanation Fairness and the perception of fairness are essential to attract the best suppliers and achieve the best prices. When the pharmaceutical tender process is less transparent and even secretive, it tends to be perceived as corrupt or unfair. There may be accusations of unfair influences. Whether true or not, such charges are damaging and suppliers, health care providers and the public lose confidence in the system. Unsuccessful suppliers may feel that they have no chance of winning and consequently withdraw from future tenders. As the pool of potential suppliers decreases to a small set, price competition decreases and procurement prices become much higher than necessary. The tender procedures should be transparent. Formal written procedures should be developed and be followed throughout the tender, and explicit criteria should be used to make procurement

decisions. Broad-based committees should have the sole authority to make contract awards. Tender adjudication should be done properly and the award of contracts and issuing of orders should be completed within the shortest period of time possible. Information on the tender process and results should be public, to the extent permitted by law. At the very least, both bidders and health personnel should have access to information on the successful suppliers and the prices for all winning contracts.

2.2.3.3 Procurement should be planned properly and procurement performance should be monitored regularly; monitoring should include an annual external audit. Justification and explanation in order to ensure that drugs are available where and when they are needed drug procurement must be carefully planned. Planners should consider factors such as access to suppliers; funding availability and timing; the number of levels in the logistics system; constraints of time and resources affecting procurement functions such as drug selection, quantification, tendering and contracting; the lead times at various levels of the system; import procedures; customs clearance; and access to transport. Practical aspects a reliable management information system (MIS) is one of the most important elements in planning and managing procurement. Lack of a functioning MIS or the inability to use it appropriately is a key cause of programmed failure. The MIS should track the status of each order and payment, and compile the information required for supplier monitoring, as discussed in operational Principle 11. It is important that the MIS also tracks the number of orders placed, payments made, and quantities actually purchased compared with estimates, purchases from all contract suppliers, and drug purchases from non-contract suppliers. In all but the smallest procurement systems, the procurement information system should be computerized in such a way as to facilitate tracking and reporting on performance by suppliers and by the health system. The procurement office should be required to report regularly on key procurement performance indicators, selected by senior managers. Some standard indicators include the planned versus actual items and quantities purchased; prices obtained versus average international prices; average supplier lead-time and service level; percentage of key drugs in stock at various levels of the supply system; and report on stock-outs.

2.2.3.4 Public sector procurement should be limited to an essential drugs list or national/local formulary list. Justification and explanation No public or private health care system in the world can afford to purchase all drugs circulating in the market within its given budget. Resources are limited and choices have to be made. A limited list of drugs for procurement, based on an essential drugs list or drug formulary, defines which drugs will be regularly purchased and is one of the most effective ways to control drug expenditure. A nationally developed formulary or selection based on the essential drugs concept has been used in both industrialized and developing countries' health systems for more than twenty years. This allows the health system to concentrate resources on the most cost-effective and affordable drugs to treat prevailing health problems. The selection of drugs based on a national formulary or national list allows for concentrating on a limited number of products. Larger quantities may encourage competition and lead to more competitive drug prices. Reducing the number of items also simplifies other supply management activities and reduces inventory-carrying costs. Practical aspects some public and private health systems strictly limit procurement to drugs listed on an essential drugs list. However, in most cases some mechanism exists to address special needs, allowing the occasional procurement of non-list drugs after approval by senior officials.

2.2.3.5 Procurement and tender documents should list drugs by their international Nonproprietary Name (INN), or generic name. Justification and explanation The INN is widely accepted as the standard for describing drugs on a procurement list or tender request. Although this is most obviously applicable when purchasing drugs which are available from multiple sources, generic description should also be used when purchasing single source products. When purchasing products which present potential problems with pharmaceutical equivalence or bio-equivalence the procurement request should specify the quality standards but not mention specific brands. Practical aspects this does not mean that brand-name suppliers should be barred from tender participation; they may offer the most cost-effective product, and in fact may offer more competitive prices for certain branded drugs than generic competitors. However, all drugs supplied to the public health system should be properly labeled in accordance with standards laid down by law (or

in accordance with labeling instructions), including the INN featured prominently in addition to the brand name that may be on the label.

2.2.3.6 Order quantities should be based on a reliable estimate of actual need. Justification and explanation an accurate quantification of procurement requirements is needed to avoid stock-outs of some drugs and overstocks of others. In addition, if suppliers believe the estimated procurement quantities are accurate, they are more willing to offer the lowest competitive price on an estimated-quantity supply contract. Practical aspects past consumption is the most reliable way to predict and quantify future demand, providing that the supply pipeline has been consistently full and that consumption records are reasonably accurate. Such consumption data must be adjusted in the light of known or expected changes in morbidity patterns, seasonal factors, service levels, prescribing patterns and patient attendance. The downside of basing quantification only on past consumption is that any existing patterns of irrational drug use will be perpetuated. In many countries consumption data are incomplete or do not reflect real demand because the supply pipeline has not always been full and drug use has not always been rational. In such cases the morbidity-based and extrapolated consumption techniques may be used to estimate procurement requirements. These techniques, particularly the morbidity-based method, should also be used periodically to check on the rationality of past consumption, by comparing actual consumption with the estimated need to treat common diseases based on standard treatment protocols and epidemiological data. When funds are not available to purchase all drugs in the quantities which were estimated to be needed, it is necessary to prioritize the procurement list to match available financial resources. Various techniques such as Vital Essential and Nonessential (VEN) Analysis, Therapeutic Category Analysis and ABC Analysis can be used to select priorities and reduce the quantities of less cost-effective drugs. A VEN priority list should be defined in advance of any decision related to reducing procurement. These tools are discussed in detail elsewhere.

2.2.3.7 Mechanisms should be put in place to ensure reliable financing for procurement. Good financial management procedures should be followed to maximize the use of financial resources. Justification and explanation Potential sources of funds for pharmaceutical procurement include government

financing, user fees, health insurance, community co-financing and donor financing. These options vary in terms of their efficiency, equity and sustainability. The most important considerations for procurement are total funds available, adequate access to foreign exchange and the regularity with which funds are available. It is the responsibility of governments and senior managers to establish appropriate and reliable funding for public drug procurement as a high priority, and to implement mechanisms which provide adequate funding on time to support public sector procurement. Efficient financial management systems are especially important if funds are limited and procurement priorities must be set. Being able to order drugs when needed and to pay for them on delivery has a very positive effect on reducing both prices and stock-outs and on increasing supplier confidence in the procurement system. Prompt, reliable payment can have as great an influence on bringing down drug prices as bulk discounts. Practical aspects financial mechanisms such as decentralized drug purchasing accounts may help the procurement cycle to operate independently of the treasury cycle. Revolving drug funds can help achieve this separation by establishing their own bank accounts and their own working capital. An aspect of financing which is sometimes overlooked is funding for the procurement process itself. Procurement services may be part of the warehouse and distribution operation or set up as a separate office. In either case salaries or operational costs of the procurement office must be covered by the users. Options include: support through the government budget; periodic payment from users at the beginning of the procurement cycle, based on the projected value of the total procurement, or at the end of the cycle, based on the actual value of total shipments; regular payment from suppliers, based on a percentage of the invoiced value of the shipment, although this method may be contrary to some countries' procurement integrity regulations; payment from users in the form of a flat annual fee, based on total expenses divided by the total number of areas and independent institutions served. There is some risk in tying a procurement office's reimbursement to the value of purchases by user facilities, as this may create an incentive for the procurement office to increase, rather than decrease, prices and purchases. Therefore, if this sort of approach is used, checks and balances must be put in place, such as a requirement that all major procurement decisions be made by user representatives.

2.2.3.8 Procurement should be effected in the largest possible quantities in order to achieve economies of scale; this applies to both centralized and decentralized systems. Justification and explanation larger procurement volume makes favorable prices and contract terms more likely, by increasing suppliers' interest in bidding and by providing them with an incentive to offer a competitive price. Practical aspects a higher volume for single items may be achieved through pooling of procurement volume from many facilities or from several states or countries, by restriction of the drug list or by elimination of duplication within therapeutic categories. A large contract awarded to one supplier by no means implies that the entire volume must be shipped at once. Many procurement services specify, as part of contract terms, divided deliveries over the period of the contract or to multiple delivery points. Some supply systems use estimated quantity tenders, with orders placed throughout the contract period as needed. In decentralized procurement programmers, one way to sustain procurement volume is to negotiate prices centrally for a list of essential drugs and allow provinces, districts or health facilities to order the drugs as needed from the contract supplier. These strategies allow for optimal use of available storage and transport capacity, facilitate inventory management and ease cash flow constraints.

2.2.3.9 Procurement in the public health sector should be based on competitive procurement methods, except for very small or emergency orders. Justification and explanation there are four main methods for purchasing drugs. Three of them are competitive: restricted tenders, open tenders and competitive negotiations. The fourth method is direct negotiation with a single supplier. Since inducing supplier competition is a primary key to obtaining favorable pricing, the public sector should use competitive methods for all but very small or emergency purchases. This assumes, of course, that there are multiple suppliers for the items needed. Practical aspects as long as drug quality and service reliability are assured, competition should be increased to the point at which drug prices are as low as possible. In situations where most or all of the products in a therapeutic category are single-source or branded products, the number of different drugs in a therapeutic category can be reduced through cost-effectiveness analysis. Competition can be induced by therapeutic class tendering. For example, among the newer antibiotics there may be several which are

therapeutically similar, at least for specific indications. A therapeutic class tendering means that offers are requested on two, three or more therapeutically similar but generically different products. The selection of the most cost-effective drugs within a therapeutic category should be done by the national essential drugs committee, not by the procurement office.

2.2.3.10 Members of the purchasing groups should purchase all contracted items from the suppliers which holds the contract. Justification and explanation except in those systems where each health facility negotiates prices and purchases drugs individually, public pharmaceutical procurement systems are seen as purchasing groups. Normally, group purchasing achieves lower prices than would be available to the same group of health facilities if they purchased individually. These discounts are based on the fact that facilities which are part of the purchasing group will purchase contract items only from the selected contract supplier, as long as that supplier is able to perform. This is called sole-source commitment. If group members are free to make separate deals for contract items with other suppliers at will, the suppliers who participate in tenders will have little incentive to offer the best possible discounts to the purchasing group. Practical aspects sole-source commitment must be monitored and enforced. Monitoring is particularly important in systems where prices are negotiated centrally and ordering is done by individual health facilities. Suppliers that do not win contracts in a competitive tender may offer more competitive prices on a short-term basis in an attempt to split the purchasing group. If group members do not resist such price dumping, the prices at subsequent tenders will rise to previous unfavorable high levels.

2.2.3.11 Prospective suppliers should be pre-qualified, and selected suppliers should be monitored through a process which considers product quality, service reliability, delivery time and financial viability. Justification and explanation pre- and post-qualification procedures help to eliminate substandard suppliers, if properly managed. Pre-qualification is the procedure of evaluating supplier capacity and reputation before bids are solicited for specific products. This is the preferred procedure, especially for ongoing drug procurement systems. Although substantial time is required to establish an initial list of pre-qualified suppliers, once this has been done the lowest pre-qualified tendered for each product is deemed to be

qualified, which expedites adjudication and contract award. Post-qualification evaluates the suppliers after bids have been received. If there are numerous offers from unknown suppliers there may be long delays in awarding contracts, as it will be necessary to validate suppliers' capacity to supply good-quality products. Practical aspects most established procurement systems use some form of restricted tender with pre-qualification, soliciting bids only from suppliers that have been pre-qualified. Procurement systems using restricted tenders with pre-qualification should make continuous efforts to seek out potential new suppliers in order to maintain competitive pressure on established suppliers that had been pre-qualified previously. Drug regulatory authorities may provide relevant information regarding new suppliers. The process for evaluating new suppliers can include formal registration, formal inspection, and reference checks with past clients and international agencies, test purchases in small quantities and informal local information-gathering. Countries that do not have functional regulatory agencies and drug quality control laboratories must make vigorous efforts to check references of new suppliers and should buy only from those suppliers that are known to provide quality products. One important aspect of quality assurance is the concept of "traceability". The supplier must be able to trace the product to the finished product manufacturer, and the latter must be able to trace the ingredients to their producers, all in a transparent manner. In addition to using pre- or post-qualification procedures, successful procurement offices ensure continued good supplier performance through a formal monitoring system which tracks lead time, compliance with contract terms, partial shipments, quality of drugs, remaining shelf-life, compliance with packaging and labeling instructions, etc. A cumulative file for each supplier should have copies of registration papers, references, special correspondence, complaints and other anecdotal supplier information. The information system should track chronologically the number and value of tender contracts awarded, and the value of total purchases from the supplier by year and performance for each tender.

2.2.3.12 Procurement procedures/systems should include all assurances that the drugs purchased are of high quality, according to international standards. Justification and explanation four components make up an effective quality assurance system: selecting reliable suppliers of quality drugs; using existing

mechanisms, such as the WHO certification scheme on the quality of pharmaceutical products moving in international commerce; establishing a programmer of product defect reporting; and performing targeted quality control testing. The selection of suppliers that are known to provide high-quality products as discussed in operational principle 2.3 is the primary key to ensuring drug product quality. When using new suppliers whose products are not familiar in the country, the procurement system must be particularly alert to product quality issues. Practical aspects some products vary substantially in formulation and bio-availability from supplier to supplier. When this difference is therapeutically significant, purchasing offices should be cautious about making changes in supplier from year to year, and particularly about accepting unknown suppliers. Even when new products are completely equivalent in content and effect, changes in dosage form can be problematic, requiring patient and provider re-education. For drugs used in chronic diseases there should be a significant cost benefit before changes are made. The WHO certification scheme on the quality of pharmaceutical products moving in international commerce is a way of exchanging information on the supplier between the regulatory authorities of the exporting country and those of the importing country. It does not constitute an absolute assurance of product quality but does provide a mechanism for ascertaining that a drug product comes from a reputable source. The certificate is as independent and reliable as the regulatory authority that issues it.

All shipments from suppliers should be physically checked on receipt. A formal system should be established which encourages health workers to report potential problems with poor products qualities ideally using pre-printed, simple reporting forms. All reports should be carefully assessed to establish the need for laboratory testing and appropriate follow-up action must be taken, including product recall if warranted. The reporter should be informed about the results and the action taken, even if products are not defective, in order to encourage continued participation in the reporting programmer. Product defect reports and results should be recorded as part of the supplier monitoring system. If supplier selection is managed effectively it is not necessary to carry out quality control testing on every batch of every drug received. Many procurement agencies limit routine testing to new suppliers and to sensitive products. However, all public drug supply systems should have access to

quality control laboratories to test suspect drug products. Unfortunately, not all governments have been able to sustain government-operated laboratories. In some countries a college of pharmacy or an independent laboratory may have the required testing facilities. Also, quality control laboratories in industrialized countries will provide drug analyses against payment. If analyses must be performed by foreign laboratories, foreign exchange problems may be reduced by requiring the suppliers of suspect products to pay the laboratory directly, with the arrangement clearly described in the purchase contract. Financing for quality control testing is a difficult problem in many countries, and governments and donors should collaborate to find viable solutions.

### 2.2.4 Practical implementation issues

The twelve operational principles for good pharmaceutical procurement practices aim to improve pharmaceutical procurement by ministries of health, supply agencies, nongovernmental organizations and other organizations involved in drug supply. When introducing and using these principles, the following should be kept in mind. The operational principles should be used to develop standard operational procedures. These twelve principles constitute the minimum conditions for a reliable and cost-effective drug procurement system. They should be used as the basis for developing a set of more detailed standard operational procedures, taking into account the specific institutional circumstances and market conditions under which the system must operate. Standard operational procedures must be actively implemented and monitored. The operational principles and the standard operational procedures must be supported by the national drug policy, regulations and legislation. International agencies and other external organizations which give technical or financial support to the national drug supply system should be asked to support and promote their implementation. Good drug procurement is only possible within a well-managed drug supply system Standard operational procedures can improve drug procurement only if they are implemented within a well-managed drug supply agency. This agency may be a classic government central medical store, an autonomous or semi-autonomous supply agency, an independent nongovernmental agency or some other form of supply agency. Critical factors for the performance of drug supply agencies include: qualified

senior management; adequate personnel policies; a broad- based board for planning and following up the overall work; proper contract terms between the government and the contractor; and reliable financing and accounting systems. The right purchasing and inventory control model should be chosen Procurement can be done through a single annual tender, through a schedule of periodic tenders throughout the year, through a perpetual inventory system in which procurement is initiated as soon as stocks fall below a certain level, or through a combination of such systems. The choice depends on a variety of factors, including the type of drugs used (expensive drugs, short shelf-life, high or low consumption rate), the geographical situation, local production capacity, total consumption and others. The geography is important since more isolated areas tend to purchase less frequently. Local production capacity allows greater flexibility and more frequent deliveries. High-volume items may be purchased practical implementation issues more frequently throughout the year. The choice of purchasing and inventory model affects the direct cost of the drug, staff requirements (frequent purchases need more staff time) and inventory costs (less frequent procurement requires more warehouse space). At a certain stage, an effective computerized system should be introduced to manage inventory control. This should probably be done in phases, with the system developed or backed up by a local company. A well-functioning manual inventory control system can be converted into a computerized one. Legislation and regulations may need to be adapted National legislation and regulations provide the necessary legal foundation for procurement procedures, contract enforcement, financial authority, staff accountability and other critical aspects of procurement. Existing legislation and regulations may be fully consistent with the twelve core principles. Often, however, legislative or regulatory changes will be needed. A common problem is that the general rules for drug procurement by the public sector do not take account of the specialized procurement requirements of buying pharmaceuticals. The challenge may be not only to identify the changes which are needed, but also to convince the relevant legal and financial authorities that pharmaceutical procurement does in fact require a different approach. Some examples of specific requirements are: separation of the key procurement functions, the need for financial audit, mandatory use of generic names, the need for product registration (which should also apply to the public sector but is often ignored)

and formal supplier qualification (17). Other related issues are pricing policies and ethical criteria for drug promotion. A capacity needs to be built pharmaceutical procurement is a specialized professional activity which requires a combination of knowledge, skills and experience. Too often drug supply agencies are staffed by individuals with little or no specific training in pharmaceutical procurement. It is essential, therefore, that staff in key procurement positions be well trained and highly motivated. Training may be organized through national or international courses, through apprenticeships with international supply agencies or supply agencies in other countries, or by enlisting experienced short-term or long-term support from external technical advisers. International and bilateral agencies should support the national procurement system development assistance through loans, grants and other financial mechanisms is intended to contribute to long-term health sector development. External technical assistance is intended to build local capacity and to develop sustainable systems, and should therefore be consistent with the policies of the country. It is essential that development assistance reinforces good pharmaceutical procurement practices and aims at sustainability, rather than undermining or delaying the national development of such practices. From a development point of view, investing in teaching good procurement practices may be more important than just procuring the drugs. To achieve good drug procurement practices in decentralized systems the role of the central government should be made clear (19). It would usually be its responsibility to guarantee the safety and efficacy of all drugs circulating in the market and in the health system, and to monitor the performance of the decentralized procurement system. In addition, the central government may tender for the prices of the drugs, for direct delivery systems.

## 2.3. WHO operational package for assessing monitoring and evaluating country pharmaceutical situation.

The objectives of this part will be to give the complexity of the pharmaceutical sector, a systematic method of gathering data is very important for assessing access, quality and rational use of medicines. And these should be to assess country capacity, such as available infrastructure, logistics and human resources to

support the pharmaceutical sector and implement national medicines policies, monitor the implementation of national medicines policies, measure the impact of implementation strategies, evaluate the progress towards identified objectives the complexity of the pharmaceutical sector, with multiple and cross-cutting factors that can influence access to and rational use of quality medicines, makes it is extremely important to have a systematic method for assessing the pharmaceutical situation at country, regional and global levels (25). Pharmaceutical sector assessment, monitoring and evaluation aim to answer the following vital questions: do people have access to essential medicines are people getting medicines that are safe, effective and of good quality are these medicines being used properly currently we have insufficient information to answer such questions, but as part of its commitment to assisting countries to improve access to and use of quality medicines, the WHO has been developing tools to monitor and evaluate pharmaceutical situations for assessment, monitoring and evaluation underpin evidence-based policy development and strategic planning, and therefore every aspect of WHO's an activity in pharmaceuticals in general and essential medicines in particular. These processes can be complex for a number of reasons, it is difficult to establish a sustainable system of regular assessment, monitoring and evaluation; resources are not consistently allocated to these tasks and there is limited advocacy for them. Furthermore, many efforts to develop tools have been exhaustive, but impractical and in the past, most tools included indicators that were difficult to collect, especially on a regular basis. An indicator for monitoring national drug policies includes approximately 120 indicators covering structure, process and outcomes of various national medicines policy components. Another set of indicators, developed by management sciences for health, focuses on rapid assessment of strengths and weaknesses in the pharmaceutical sector.

The WHO operational package for assessing, monitoring and evaluating country pharmaceutical situations is intended as a useful tool for researchers, policy-makers, planners and others who need to use standardized measurement tools to gather data and other information. The tools presented here have already been used for several years at global and country levels. In addition, the operational package can be used by international agencies and donors, by professional groups and nongovernmental organizations.

The WHO process for pharmaceutical monitoring and assessment uses a hierarchical approach with three groups of indicators such as: Level I, Level II and Level III. These provide a standard methodology to follow progress over time and to compare situations in different facilities.

Level I indicators provide a rapid means of obtaining information on the existing infrastructure and key processes of each component of the pharmaceutical sector. The indicators are assessed by using a short questionnaire completed at national level at a regular time interval, allowing measurement of trends and comparisons of the situation over a period of time. The results provide a range of descriptions of existing structures and processes, and can illustrate the country's capacity to implement policy in specific areas of the pharmaceutical sector areas which are listed in the next section. The WHO database is updated using data and other information from the Level I survey. Analyses are also used in reports, publications and as references when giving country data. In addition, results can serve as a checklist for countries, and as a basis for doing rapid assessment of the structures and process of their pharmaceutical sector.

Level II health facility indicators provide systematic data to measure outcomes on access (affordability and availability of key medicines and geographical accessibility of dispensing facilities) and rational use of quality medicines, including some indication of the quality of medicines at health facilities and pharmacies. Data on these indicators are collected through systematic surveys of public health facilities, public and private pharmacies and public warehouses. The processes involved are detailed in this package. The results of country surveys can be used to indicate the extent to which the objectives set by the pharmaceutical sector - specifically the government and the national medicines policy - have been achieved. The results show the areas and gaps that should be addressed and which strategy can be prioritized for facilities, districts and countries. Global comparison can also be used to establish norms in access, use and, to some degree, quality of medicines made available from health facilities. Subsequent sections of this document focus on the technical aspects and logistics of doing a Level II facility indicator survey.

Level III indicators are a more detailed and expanded list of indicators covering key components and areas such as those elaborated in several indicator

documents in medicine pricing, medicine supply management, rational drug use and regulatory capacity assessment. The countries can use any of these set of indicators as baseline assessment and follow up studies depending on needs and capabilities. The tools necessary to gather most of this information have been brought together in this document. This operational package provides the following:

A Guide for Coordinators and Data Collectors of the Level II Facility Survey detailing operational procedures to carry out the indicator survey, with step-by-step procedures on administrative preparation (budget, training plan and schedule) and technical requirements (training and field-testing, surveying, analysis and reporting). Training slides are also provided.

• The annexes contain the technical descriptions of Level II facility indicators and the sampling process. Survey forms are included, and graphs and tables can be generated from the analysis template.

• The Level I questionnaire, which is sent to countries once every four years to update global pharmaceutical data, is included in the annexes. It can also serve as a rapid assessment and checklist for countries to check current the pharmaceutical structure and processes of their national pharmaceutical systems.

• A diskette that contains Level II facility survey forms, summary forms and training slides. All stakeholders in the pharmaceutical sector can use indicator based on assessment of the pharmaceutical situation to inform priorities and set targets. They can also use regular monitoring of the sector through indicator-based studies to assess strengths and weaknesses of strategies to improve the provision of pharmaceuticals. Indicators provide policy-makers and managers with a clear picture of national and institutional problems. Policy-makers and managers can refer to study results when developing strategies to strengthen the pharmaceutical sector. Results can also be used to synchronize policies (22).

The WHO includes approximately 120 indicators covering structure, process and outcomes of various national drug policies components. Several countries have used it to monitor and evaluate their pharmaceutical situations. Another set of indicators, developed by management sciences for health, focuses on rapid assessment of strengths and weaknesses in the pharmaceutical sector. Guide for coordinators and data collectors, was developed to provide a practical indicator-based tool that can be

implemented regularly without investing large amounts of human or financial resources. The package relies on a hierarchical approach to monitoring built around three groups of core indicators. The core indicators are easy to collect using standardized methodologies, small samples of data and simple survey techniques. These core indicators systematically measure the most important information needed to gain a comprehensive picture of the pharmaceutical situation in a country (25).

The indicator was monitored by group level (Level I and Level II) as the following advantages:

• It offers flexibility to those interested in information on the country pharmaceutical situation: rapid assessment of key pharmaceutical components; monitoring outcome and achievement of key objectives of the pharmaceutical policy; and in-depth assessment of specific system components.

• It provides practical methods for regularly monitoring NMPs and their components.

• It encourages regular reporting and exchange of pharmaceutical information among facilities, districts, regions, government and nongovernmental agencies as well as international organizations.

These indicators are assessed using a short questionnaire completed at the national level. The national medicines policy that covers the public and private sectors, a written implementation plan and the integration of medicine and health policies provide a basic framework to organize and improve the pharmaceutical system. They also assist in coordinating the functions and strategies of each component as they are being implemented. Regular monitoring helps to inform the national medicines policy and its implementation. Regulatory system (regulatory authority, marketing authorization, licensing, regulatory inspection, control of narcotics and stupifiants quality control, Pharmacovigilance, counterfeit medicines, dispensing and prescribing, promotion and advertising) legislation/regulations on medicine manufacturing, promotion and advertising, sales, distribution, dispensing and prescribing must be in place. A medicines regulatory authority should be able to efficiently regulate these activities through registration of products, licensing and inspection of manufacturers, importers and pharmacies, control of counterfeiting, control of narcotics and stupifiants and monitoring of adverse medicine reactions. Legislation directed at

generic prescribing, dispensing and substitution can help increase access to essential medicines in both the private and public sectors. Quality control of pharmaceuticals should cover all activities to ensure patients receive safe, efficacious and high-quality medicines. There should be a medicines quality control laboratory to test medicines prior to registration and at various points in the distribution system. Medicines supply system - access and availability of essential medicines, especially at public sector facilities, are affected by how medicines are purchased and distributed and how medicines are managed in the health system. Medicines financing access and availability are also affected by how much money the government can allocate to the medicines pricing policies, financing schemes (such as insurance programmers and user fees) and medicine donations. Production and trade - activities ranging from repackaging to formulation of products to developing new medicines are important in assessing the pharmaceutical sector. Implementing flexibilities in public health can increase access to medicines (20,23). Rational use of medicines, the medicines policies can often have greater impact with effective use of strategies to improve the prescribing and dispensing practices of health workers.

# CHAPTER III
# METHODOLOGY

## 3.1 Study design.

This study is a descriptive cross-sectional survey research.

## 3.2 Study location

The study locations were Thailand at Sungneun hospital Nakhornrachasima Province, and Lao PDR at Provincial food and drug agency (Provincial FDA) and seven public hospitals in Oudomxay Province, as the follows; La district hospital, Namor district hospital, Gna district hospital, Beng district hospital, Hoon district hospital, Parbeng district hospital, Provincial hospital, and Provincial FDA's warehouse.

## 3.3 Study period

The development of major drug procurement indicators was performed between August 2009 and October 2009. Data collection on public hospital procurement process and performance was performed between November 2009 and April 2010.

## 3.4 Study instruments

The instruments of this study were the data collection form and interview questionnaire, as follow;

**3.4.1 The instruments for the study of current situation of drug procurement are,**

3.4.1.1 Data record form for the extent of medication wastage of 50 drug items high procurement cost in 2008 from Oudomxay Provincial FDA which is shown in the appendix A.

3.4.1.2 The interviewing questionnaires to find the current knowledge of three official groups participating in drug procurement, with number 1, 2 and 3, these forms are shown in the appendix B, C, and D.

3.4.1.3 Data record form of WHO operational package for assessing, monitoring and evaluating country pharmaceutical situations: Guide for coordinators and data collectors WHO/TCM/2007.2 by survey form: Public health facility pharmacy/dispensary with indicators are the percentage of key medicines available and medicines expired, average stock out duration and adequate record keeping, adequate conservation conditions and handling of medicines in storeroom and dispensing area are shown in the appendix E, F and G.

**3.4.2 Interviewing Record form**

Interviewing the officials at Sungneun hospital Nakhornrachasima Province, Thailand and observation of work process were recorded in the form developed by the researcher.

## 3.5 Study populations

**3.5.1 The samples for interviewing at public hospital in Oudomxay Province, Lao PDR were:**

3.5.1.1 The hospital administrators; one from each hospital, totals 7 administrators.

3.5.1.2 The hospital pharmacists; two from each hospital, total 14 pharmacists

3.5.1.3 The hospital physicians; two from six district hospitals and five from Provincial hospital, total 17 physicians.

**3.5.2.** The hospital staffs of Sungneun hospital Nakhornrachasima Province, Thailand; were one hospital administrator, one hospital physician, and two hospital pharmacists.

## 3.6 Data collection methods

There were three methods used in data collection:

### 3.6.1 Data extraction

3.6.1.1 The record 50 drugs which high procurement cost from Oudomxay Provincial FDA information.

3.6.1.2 The data recorded by survey form of WHO operational package for assessing, monitoring and evaluating the current situations of drug procurement in public hospitals, Oudomxay Province such as the survey form 1 of WHO/TCM/2007.2 to analyze the percent of key medicines available and medicines expired, the survey form 4 of WHO/TCM/2007.2 to analyze the average stock out duration and adequate record keeping, survey form 5 of WHO/TCM/2007.2 to analyze the adequate conservation and handing of medicines in storeroom and dispensing area, and survey form 7 of WHO/TCM/2007.2 to analyze the rational medicine use per prescribing indicator form.

### 3.6.2 Interviewing

By questionnaires number 1, 2 and 3 for knowledge, possibility and participation of administrators, pharmacists and physicians in public hospitals at Oudomxay Province, Lao PDR.

3.6.2.1 The first questionnaire was used to interview administrators about methods, problems, and suggestions for improvement the existing procurement method.

3.6.2.2 The second questionnaire was used to interview the hospital pharmacists about the drug procurement problems, knowledge, idea and participation within the process of drug procurement in each public hospital.

3.6.2.3 The third questionnaire was used to interview the

hospital physicians about the prescribing behavior idea and participation within the process of drug procurement.

**3.6.3 Observation**.

Observe the drug procurement method in Sungneun hospital Nakhornrachasima Province, Thailand.

## 3.7 Data analysis

Data were analyzed by the SPSS for windows 14.0 statistic software quantitative and descriptive statistics were used to explain the characteristic of respondents, the process, and performance of drug procurement system. The analyses are presented into two parts as the follows:

**Part 1**: The situation and problems of drug from questionnaires to find out the situation of process and performance of drug procurement. The information obtained was qualitative and quantitative data. The results are presented on the table number 1-16.

The results of table 1 to table 9 were analyzed by SPSS for windows 14.0; the descriptive statistics and cross tabulation were used to describe the characteristic of respondents the process, the problems and performance of drug procurement system.

The results of table 10 to table 16 were calculated by formularies to explain the characteristic and procedure of drugs management and drugs evaluation as follows:

1. The Percentage of medicines in stock and medicines expired (table 10, 11) was calculated by:

$$A = N1 \times 100 / N$$

Where A = Average percent of each medicines in warehouses

N1 = Number of each medicines in warehouses of public hospitals studies

N = Number of public hospitals studied

$$A' = E \times 100 / N$$

Where A' = Average percent expired medicines on shelves of key medicines studied

E = Number of expired medicines on shelves in warehouse of public hospitals studies

N = Number of public hospitals studied

1. Percentage of records cover at least 6 months within the past 12 months of public hospitals classify by each key medicines to treat common conditions (Table 12) were calculated by:

PR = H1 / H x 100

Where PR = Percentage of record of the key medicines studied in public hospitals.

H1 = Number hospitals recorded cover at least six months within previous 12 months.

H = Number hospitals (8 public hospitals) were studied.

2. The average days out off stock per year (table 13) were calculated by:

AD = H1 / H x 100

Where AD = Average percentage of days which medicines are out off stock per year in public hospitals at Oudomxay Province

H1 = Number days which medicines are out off stock in eight Public hospitals

H = Number hospitals (8 public hospitals) are studied.

3. Percentage of records cover at least 6 months within previous 12 months and average day medicines are out off stock per year of eight public hospitals. (table 14) were calculated by:

AR = R1 / N x 100

Where AR = Average percent recording of public hospitals

R1 = Number medicines recorded of public hospitals

N = Number of key medicines (15 key medicines) are studied

AD = D1 x 365 / D2 x AR

Where AD = Average days out off stock per year of public hospitals

D1 = Number of days out off stock per year of public hospitals

365 = Number of days in year

D2 = Number of days covered by the review (at least six Months)

AR = Average percent recording of public hospitals

4. Percentage of adequate conservation conditions and handling of medicines in warehouse and dispensing room (table 15) were calculated by:

PW= NS / N x 100

Where PW = Percent of warehouse is true in practices checklist

NS = Number of warehouse is true in public hospitals

N = Number of public hospitals are studied

PD = ND / N x 100

Where PD = Percent of dispensing room is true in practices checklist

ND = Number of dispensing room is true in public hospitals

N = Number of public hospitals are studied

5. Percentage of adequate conservation conditions and handling of medicines in warehouse and dispensing room of public hospitals(table 16) were calculated by:

PSH = NT / NC x 100

Where PSH = Percent of warehouse is true in public hospitals

NT = Number of practices checklist is true in warehouse of public hospitals

NC = Number of practices checklist in public hospitals studied

PDH = NTD / NC x 100

Where PDH = Percent of dispensing room is true in public hospitals

NTD = Number of practices checklist is true in dispensing room of public hospitals

NC = Number of practices checklist in public hospitals studied

**Part 2:** The qualitative information was collected by open questionnaires and observation.

# CHAPTER IV
# RESULTS

The result of this study is divided into three main parts as follows:

1. Drug procurement system in Oudomxay Province, Lao PDR in 2008.
2. Problems of drug procurement in Oudomxay Province, Lao PDR.

2.1 The external medicinal wastage among public hospitals, Oudomxay Province in 2008

2.2 The practices in warehouses and dispensing room of public hospitals, Oudomxay Province according to WHO survey form of operational package for assessing monitoring and evaluating the current situation of drug procurement.

3. Drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

## 4.1 Drug procurement system in Oudomxay Province, Lao PDR on 2008.

The process of drug procurement for public hospitals at the Provincial FDA of Oudomxay Public Health Department was obtained by researcher's observation. There are three methods of the drug procurement among public hospitals as the follows:

### 4.1.1 At the hospital level;

The procurement method was group bidding at a frequency of four times per year. Six steps to drug procurement process were employed, each public hospital submitted their summarized drug used reports, drug in store, and drafted the drug procurement plan for next quarter to the Provincial FDA for assessment and finding the suppliers every three months. The drug prices and suppliers could change from time to time according to the agreement of bidding committee and suppliers. All drug procurement process between the public hospitals and suppliers was controlled by the

Provincial FDA, as shown in the figure 2. The value of drug procurement covered 92 percent of drug procurement among public hospitals of Oudomxay Provincial Health Department (92% 0f 3.6 billion kip/year). It was the only method to resume the cost of drug services from patients or revolving drug fund of public hospitals

| Steps | Public hospitals | Provincial FDR | Suppliers | Time |
|---|---|---|---|---|
| 1 | Making plan to procure | | | 3 days |
| 2 | | Summery for bidding | | 5 days |
| 3 | (Used and services for three months) | | Selection and calculate | 3 days |
| 4 | | Bidding and contracting with winner of bidding | | 1 days |
| 5 | | | Preparation to supply | 7 days |
| 6 | Receiving and checking | | | 1 day |
| Time total for term | | | | 20 days |

**Figure 4**: Summary the procedure of the hospitals procurement method**.**

### 4.1.2 At the Provincial FDA level;

The Provincial FDA made plans and procured for all public health sector and public hospitals. The bidding occurred once per year. The main goals were to support essential drugs to the rural area at the time of diseases outbreak and disaster situation, and to the poorest patients.

### 4.1.3 Donation from the Non Government Agencies and other Nation Agencies.

The grant aid helped some special communities in developing village drug kits and package drugs.

## 4.2. Problems of drug procurement in Oudomxay Province, Lao PDR.

### 4.2.1 The external medicinal wastage among public hospitals, Oudomxay Province in 2008

The profiles of each public hospital in Oudomxay Province are presented in the table 1. Totally there were 18 physicians technical, and 10 pharmacists working for seven public hospitals, 185 patient beds, and average 289 out- patients per day. The value of drug procurement of each institute ranged from 40 mil- 2.8 billion kip per year or 3,611 billion kip per year by average. The value of stock balanced by the end of year 2008 ranged from 4.56 million - 1.7 billion kip. It was found that the stock value was approximately 50 % of drug procured value in that year.

Table 1: General information of hospital in Oudomxay Province

| Category | Hospitals/ Provincial FDA | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | FDA |
| 1. Number of beds | 15 | 15 | 15 | 15 | 25 | 15 | 85 | n/a |
| 2. Number of physicians | 1 | 1 | 1 | 0 | 2 | 1 | 12 | n/a |
| 3. Number of pharmacists | 1 | 0 | 1 | 1 | 0 | 0 | 3 | 4 |
| 4. Number of out patients/day | 18 | 15 | 23 | 25 | 45 | 28 | 135 | n/a |
| 5. Numbers of drug used | 112 | 132 | 108 | 143 | 127 | 152 | 282 | 67 |
| 6. Total cost procurement /year.(million kip) | 40 | 36 | 60 | 120 | 280 | 160 | 2,800 | 115 |
| 7. Total of drug cost balanced by the end of 2008.(million kip) | 4.56 | 9.87 | 23.1 | 23.0 | 10.4 | 34.1 | 1,700 | 97 |

Remark: The exchange: 1$ USD = 8,348.65 kip which the Lao Development bank 0n 25th Dec, 2008.

Regarding the extent medication wastage at public hospitals, the samples were top 50 drugs with high procured value of each public hospital. The drugs list is in table 2.

Table 2 List of drugs included for study.

| No | Name's drugs | ST | Type | Method | Buy | Used | Balance | Cost/ unit | Cost's buy | Cost's used | Wastage | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Amount | Cost |
| 1 | Acid Folic | 5mg | Tab | | | | | | | | | |
| 2 | Albendazol | 200mg | Tab | | | | | | | | | |
| 3 | Aluminum | 500mg | Tab | | | | | | | | | |
| 4 | Amoxycillin | 500mg | Tab | | | | | | | | | |
| 5 | Ampicilline | 500mg | Cap | | | | | | | | | |
| 6 | Bromhexine | 5mg | Tab | | | | | | | | | |
| 7 | Buscopan | 10mg | Tab | | | | | | | | | |
| 8 | Cefaline | 500mg | Cap | | | | | | | | | |
| 9 | C P M | 4mg | Tab | | | | | | | | | |
| 10 | Cimethidine | 400mg | Tab | | | | | | | | | |
| 11 | Cloxacilline | 500mg | Cap | | | | | | | | | |
| 12 | Cotrimoxazol | 480mg | Tab | | | | | | | | | |
| 13 | Diazepam | 5mg | Tab | | | | | | | | | |
| 14 | Diclofenac | 50mg | Tab | | | | | | | | | |
| 15 | Doxycicline | 100mg | Cap | | | | | | | | | |
| 16 | Ergot rate | 0.25mg | Tab | | | | | | | | | |
| 17 | Erythromycin | 250mg | Tab | | | | | | | | | |
| 18 | Fer sulfate | 200mg | Tab | | | | | | | | | |
| 19 | Hidil | 300mg | Tab | | | | | | | | | |
| 20 | Metronidazol | 500mg | Tab | | | | | | | | | |
| 21 | Neurobion | 250 mg | Tab | | | | | | | | | |
| 22 | Ofloxacin | 200mg | Tab | | | | | | | | | |
| 23 | Paracetamol | 500mg | Tab | | | | | | | | | |
| 24 | Penicillin- V | 400000 IU | Tab | | | | | | | | | |
| 25 | Phanticone-F | 500mg | Tab | | | | | | | | | |
| 26 | Piroxicam | 10mg | Tab | | | | | | | | | |
| 27 | Prenisolone | 5mg | Tab | | | | | | | | | |

| No | Name's drugs | ST | Type | Method | Buy | Used | Balance | Cost/ unit | Cost's buy | Cost's used | Wastage | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Amount | Cost |
| 28 | Salbutamol | 5mg | Tab | | | | | | | | | |
| 29 | Terpine | 105mg | Tab | | | | | | | | | |
| 30 | Vit-B1 | 100mg | Tab | | | | | | | | | |
| 31 | Vit-B6 | 20mg | Tab | | | | | | | | | |
| 32 | Vitamin-C | 100mg | Tab | | | | | | | | | |
| 33 | Amacone | 240 ml | FL | | | | | | | | | |
| 34 | ORAL | 20.5mg | Sash | | | | | | | | | |
| 35 | D1/3S. | 500ml | Set | | | | | | | | | |
| 36 | D10W. | 1000ml | Set | | | | | | | | | |
| 37 | D5S | 1000ml | Set | | | | | | | | | |
| 38 | D5W | 1000ml | Set | | | | | | | | | |
| 39 | NSS | 1000ml | Set | | | | | | | | | |
| 40 | Ringer-Lactate | 1000ml | Set | | | | | | | | | |
| 41 | Amoxicilline | 1g | Amp | | | | | | | | | |
| 42 | Ampicilline | 1g | Amp | | | | | | | | | |
| 43 | Cefaline | 1g | Amp | | | | | | | | | |
| 44 | Ceftriazone | 1g | Amp | | | | | | | | | |
| 45 | Cimethidine | 200mg | Amp | | | | | | | | | |
| 46 | Diclofenac | 75mg | Amp | | | | | | | | | |
| 47 | Gentamycine | 80mg | FL | | | | | | | | | |
| 48 | Paracetamol | 300mg | Amp | | | | | | | | | |
| 49 | Penicillin | 1M | Vial | | | | | | | | | |
| 50 | Procaine | | Amp | | | | | | | | | |

As the result of 3 procurement systems there was drug wastage in each hospital. The information on wastage is described as follow (Table 3): 1. Average number of drugs wasted in hospital was 5.25 ± 3.41 items, 2. Percent of items wasted/total number was 10.5%, 3. The total values of drug wastage were 2.53 ±5.44

million kip, 4. Percentage of drug wastage to total drug procurement was 0.56 %, 5. Percentage of drug wastage to value of drug in store was 1.06 %.

Table 3: General information of 50 drug items sample in eight public hospitals

| No | Category | Mean ± SD (range) |
|---|---|---|
| 1 | Average number of drugs wasted in hospital | 5.25 ± 3.41 (2 - 13) |
| 2 | Percent of items wasted/total number | 10.5 ± 6.82 (2 - 26) |
| 3 | Total cost of procurement/year 2008 | 451.4 ±952.3 (36 -2,800) |
| 4 | Cost of drug balanced in store at the end of 2008 ( million kip) | 237.75 ±591.5(4.56 - 1,700) |
| 5 | Cost of drug wasted in 2008 (million kip) | 2.53 ±5.44 (0.2 - 16) |
| 6 | Percent cost of drug wasted/cost procured | 0.56 ±0.57 (0.02 - 13.9) |
| 7 | Percent cost of drug wasted/cost of balanced in stock | 1.06 ±0.91 (0.05 – 16.5) |

Remark: The exchange: 1$ USD = 8,348.65 kip which the Lao Development bank 0n 25$^{th}$ Dec, 2008.

Table 4 presents the wastage of 50 drugs classified by method of procurement on the average item of wastage with 0.75% by hospital procurement, 2.25% by FDA procurement, and 0.37% by grant aid donation. The percentage of items wastage compare with items procured in 50 drug items are average drug items of wasted with 1.9% by hospital procurement, 23.3% by Provincial FDA procurement, and 18.75% by grant aid procurement. The average cost of wastage was about 0.03 million kip by hospital procurement, 2.3 million kip by Provincial FDA procurement, and 0.07 million kip by grant aid procurement. The percentage of average waste cost compared with procurement cost was 0.04% by the hospital procurement, 5.41% by the Provincial FDA procurement, and 2.48% by grant aid procurement. The average of maximum cost procurement is 143.6 million kip by the hospital procurement method, but the percentage of medicine wastage items were 23.3% by the Provincial FDA procurement method.

Table 4: Wastage of 50 drug items classified by each method of procurement

| Category | Hospitals method | FDA method | Grant aid method |
|---|---|---|---|
| | Mean ± SD (Range) | Mean ± SD (Range) | Mean ± SD (Range) |
| 1. Items of wastage | 0.75 ±0.88 (0 - 2) | 2.25 ±4.4 (0 - 13) | 0.37 ±0.51 (0 - 1) |
| 2. Percent of items wastage | 1.5 ±1.76 (0 - 4) | 4.5 ±8.8 (0 - 26) | 0.75 ±1.02 (0 - 2) |
| 3. Cost of procurement | 143.62 ±166.54 (0 - 521) | 24.12 ±37.49 (1 - 115) | 5.16 ±7.25 (0 - 22) |
| 4. Cost of wastage | 0.03 ±0.05 (0 - 0.13) | 2.3 ±5.9 (0 - 17) | 0.07 ±0.17 (0 - 0.5) |
| 5. Percent of wastage cost by procurement cost | 0.04 ±0.06 (0 - 0.17) | 5.41 ±5.43 (0 - 14.56) | 2.48 ±6.78 (0 - 19.28) |

The knowledge of public hospital administrators, physicians, and pharmacists regarding the process of drug procurement were assessed by interview.

Table 5 presents general information of interviewees. There are 42.8% of hospital director and 57.1% of hospital deputy director which education are medical bachelor 42.9% and medical assistant 57.1%. Among pharmacists, 21.4% were chief of pharmacy, 50% technical pharmacists, and 28.6% pharmacist assistants with education pharmacist 7.1% and assistant pharmacist 92.9%. Among physicians, 47.1% were chief of section, 52.9% medical technique with education as specialist 11.8%, medical technique 17.6% and medical assistant 70.6%.

Table 5: General information of interviewees

| Questions/ Answers | Number (N) | Percent |
|---|---|---|
| 1. Hospital administrators | | |
| 1.1 Position | | |
| - Director | 3 | 42.9 |
| - Deputy director | 4 | 57.1 |
| 1.2 Education | | |
| - Medical bachelor | 3 | 42.9 |
| - Medical assistant | 4 | 57.1 |
| 2. Pharmacists in charge | | |
| 2.1 Position | | |
| - Chief of pharmacy | 3 | 21.4 |
| - Technical | 7 | 50 |
| - Assistant | 4 | 28.6 |
| 2.2 Education | | |
| - Pharmacist | 1 | 7.1 |
| - Assistant pharmacist | 13 | 92.9 |
| 3. Physicians | | |
| 3.1 Position | | |
| - Chief of section | 8 | 47.1 |
| - Technical | 9 | 52.9 |
| 3.2 Education | | |
| - Specialist | 2 | 11.8 |
| - Physician | 3 | 17.6 |
| - Physician assistances | 12 | 70.6 |

**N**= Number of interviewees with each title

Table 6 presents the knowledge of public hospital administrators in drug procurement process. Only 71.4% could answer correctly that the procurement occurred four times per year. All of them knew about the drug expire and drug shortage, committees for procurement, and discussion with Physician for drug procurement. They knew about the emergency drug procurement in hospital and emergency procurement at 71.4% and 42.9% respectively.

Table 6: Knowledge of hospital administrators

| Questions/Answers | Number (N) | Percent |
|---|---|---|
| 1. Times per year for drug procurement | | |
| Two times | 1 | 14.3 |
| Four times | 5 | 71.4 |
| Seven times | 1 | 14.3 |
| 2. Knowing about drug expire in hospital | 7 | 100 |
| 3. Knowing about drug shortage in hospital | 7 | 100 |
| 4. Emergency drug procured in hospital | 5 | 71.4 |
| 5. Emergency procured by FDA | 4 | 57.1 |
| 6. Committees for procurement | 7 | 100 |
| 7. Discussed with Physician for drug procurement | 7 | 100 |

N= Number of answer with each question

Table 7 presents the knowledge and practice of physician with process of drug procurement. They knew about the hospital drug list at 58.8% and hospital drug list enough for prescribing 70.6%. For the other questionnaires, the physician made drug list for drug procurement 82.4%, the physician discuss with pharmacist for new drug 64.7%, and the physician prescribing for hospital drug list 76.5%.

Table 7: Knowledge and practice of physicians

| No | Questions/ Answers | Percent | | |
|---|---|---|---|---|
| | | Yes, | No, | NO information |
| 1 | Hospital drug list | 58.8 | 41.2 | 0 |
| 2 | Number of Drug listed in hospital enough for treatment | 70.6 | 29.4 | 0 |
| 3 | Physicians request for drugs procurement | 82.4 | 17.6 | 0 |
| 4 | Requesting to buy new drug for hospital | 64.7 | 35.3 | 0 |
| 5 | Prescribed available in hospital drug list | 76.5 | 11.8 | 11.8 |

Table 8 presents the knowledge and practice of pharmacists. All of them knew about the drugs account to monitor, the drug expire and drug shortage in hospital, and the committee for drug procurement. But they knew about the recording, the emergency drug procurement, discussion with physician for drug list of hospital, hospital drug list for physician, at 64.3%., 64.3%, 92.9%, 78.6% respectively. They knew that the hospital drug list within national drug list 50 % and the hospital drug list sufficient for physician describing 64.3%.

Table 8: Knowledge of pharmacists in drug procurement practices in eight public hospitals.

| No | Questions/ Answers | Percent | | |
|---|---|---|---|---|
| | | Yes, | No, | No information |
| 1 | Drugs account to monitor in the hospital | 100 | 0 | 0 |
| 2 | The recording | 64.3 | 14.3 | 21.4 |
| 3 | Drug expire in hospital | 100 | 0 | 0 |
| 4 | Drug shortage in hospital | 100 | 0 | 0 |
| 5 | Emergency drug procurement in hospital | 64.3 | 28.6 | 7.1 |
| 6 | Committees for procurement in hospital | 100 | 0 | 0 |
| 7 | Discussed with physicians for drug list in hospital | 92.9 | 0 | 7.1 |
| 8 | Hospital drug list for physicians | 78.6 | 21.4 | 0 |
| 9 | Knowing hospital drug list within national drug list | 50 | 0 | 50 |
| 10 | Knowing hospital drug list sufficient for describing | 64.3 | 35.7 | 0 |

Table 9 presents the procurement practice of pharmacist. Only 57.1%knew that the drug procurement was four times per year. All of them knew about process of emergency procurement and the times of warehouse checking.

Table 9: Procurement practice of pharmacists

| Questions/Answers | Number (N) | Percent |
|---|---|---|
| 1. Times for drug procurement | | |
| No, information | 6 | 42.9 |
| 4 time per year | 8 | 57.1 |
| 2. Emergency procured by: | | |
| Hospital | 7 | 50 |
| Provincial FDA | 7 | 50 |
| 3. Times per year for warehouse checking | | |
| 4 time per year | 7 | 50 |
| 12 time per year | 7 | 50 |

N= Number of interviewees which each the question

**4.2.2 The practice at warehouses and dispensing rooms of public hospitals according to WHO survey form of operational package for assessing monitoring and evaluating the current situation of drug procurement.**

The survey form of WHO/TCM/2007.2 for assessing monitoring and evaluating the current situation of drug procurement was implemented. Table 10 presents the percentage of hospitals where available for medicines surveyed and found expired of medicines surveyed. The medicines used to treat common condition were the survey list. The sample of calculations is presented:

The average percent of key medicines in warehouses and average percentage expired medicines on shelves of public hospitals was calculated by the formularies that examples as the follows:

4.2.2.1 Average percent of Tetracycline ointment 5mg available in warehouses of each public hospital:

7 x 100 / 8 = 87.5

Where 87.5 = average percent of Tetracycline ointment 5mg in warehouses of public hospitals.

7 = number of Tetracycline ointment 5mg in warehouses of public hospitals.

8 = number of public hospitals studied.

4.2.2.2 Average percent of Tetracycline ointment 5mg expired on shelves of each public hospital:

3 x 100 / 8 = 37.5

Where 37.5 = average percent of Tetracycline ointment 5mg expired on shelves of public hospitals.

3 = number of public hospitals has Tetracycline ointment 5mg expired on shelves.

8 = number of public hospitals studied

The availability of these medicines were found at every institute; Amoxicilline tablet 500mg, Berberine tablet 50mg, Diclofenac tablet 50mg, Penicillin tablet 400,00 IU, Oral rehydration salt 20.5mg, Dextrose 5% with salt 0.9 % 1L, Ringer lactate infusion 1,000ml, Iodine (Beta dine 30ml), and Cotrimoxazol tablet 480mg. While Tetracycline ointment 5mg, ChloroqIUne tablet 250mg, Acetyl salicylic

acid 500mg, and Ferrous tablet 200mg were available at 87.5% of the hospitals. Acid Folic tablet 5mg and Albendazol tablet 200mg were available at 50.0% of the hospitals. Cotrimoxazol tablet 480mg, Tetracycline ointment 5mg, and ChloroqIUne tablet 250mg were found expired in 25%, 37.5%, and 12.5% of the hospitals respectively.

Table 10: Percentage of medicines in warehouse and medicines expired of eight public hospitals in Oudomxay province classify by key medicines to treat common condition

| No | Key medicines to treat common conditions | percent medicines in warehouses | Percent expired medicines on shelves |
|---|---|---|---|
| 1 | Amoxicillin tablet 500mg | 100 | 0 |
| 2 | Berberine tablet 50mg | 100 | 0 |
| 3 | Diclofenac tablet 50mg | 100 | 0 |
| 4 | Penicillin tablet 400,00 IU | 100 | 0 |
| 5 | Oral rehydration salt 20.5mg | 100 | 0 |
| 6 | Dextrose 5% with salt 0.9 % 1L | 100 | 0 |
| 7 | Ringer lactate infusion 1,000ml | 100 | 0 |
| 8 | Iodine (Beta dine 30ml) | 100 | 0 |
| 9 | Cotrimoxazol tablet 480mg | 100 | 25 |
| 10 | Tetracycline ointment 5mg | 87.5 | 37.5 |
| 11 | ChloroqIUne tablet 250mg | 87.5 | 12.5 |
| 12 | Acetyl salicylic acid 500mg | 87.5 | 0 |
| 13 | Ferrous tablet 200mg | 87.5 | 0 |
| 14 | Acid Folic tablet 5mg | 50 | 0 |
| 15 | Albendazol tablet 200mg | 50 | 0 |

Table 11 presents the percentage of available medicines in warehouse and expired medicines on shelves of 15 medicines surveyed in eight public hospitals

Average percent of medicines in warehouses and expired medicines on shelves of each public hospital are calculated by the formularies as the follows:

4.2.2.3 Average percent of medicines in warehouses of Namor hospital;

14 / 15 x 100 = 93.33

Where 93.33 = average percent of medicines studied in warehouses of Namor hospital.

14 = number medicines found in warehouses of Namor hospital.

15 number medicines (15 key medicines) studied

4.2.2.4 Average percent of expired medicines on shelves of Namor hospital;

2 / 14 x 100 = 14.29

Where 14.29 = average percent expired medicines on shelves of Namor hospital.

2 = number medicines expired on shelves of Namor hospital.

14 = number medicines found in warehouses of Namor hospital.

Gna hospital and Provincial hospital had all 15 medicines available (100%). Namor hospital, Beng hospital, and Parbeng hospital had 93.33% of medicines surveyed available, while La hospital and Hoon hospital had only 86.67 %. Provincial FDA had number of medicines available at 66.67%.

Regarding the percentage of number drug expired; Provincial hospital, Namor hospital, La hospital, and Provincial FDA had at 13.33 %, 14.29 %, 7.69 %, and 10.00 % respectively.

Table 11 Percentage of medicines in warehouse and expired medicines on shelves of eight public hospitals in Oudomxay province classify by each public hospital.

| No | Public hospitals | Average percent medicines in warehouse | Average percent expired medicines on shelves |
|---|---|---|---|
| 1 | Gna hospital | 100 | 0 |
| 2 | Provincial hospital | 100 | 13.33 |
| 3 | Namor hospital | 93.33 | 14.29 |
| 4 | Beng hospital | 93.33 | 0 |
| 5 | Parbeng hospital | 93.33 | 0 |
| 6 | La hospital | 86.67 | 7.69 |
| 7 | Hoon hospital | 86.67 | 0 |
| 8 | Provincial FDA | 66.67 | 10.00 |

The availability of drug inventory record which covered at least 6 months of the previous year at each hospital was checked. (Table 12) Eleven medicines had inventory records as reqIUred per the survey form. Except the records of Berberine tablet 50mg and Acetyl salicylic acid 500mg were found at 87.5 % of hospitals and the records of Acid Folic tablet 5mg and Albendazol tablet 200mg were found only 62.5 % of hospitals.

4.2.2.5 The average percent of record medicines in warehouses of Acid Folic tablet 5mg was calculated by the formularies as the follows:

5 / 8 x 100 = 62.50

Where 62.50 = percentage of Acid Folic tablet 5mg record found.

5 = number hospitals has Acid Folic tablet 5mg recorded cover at least six months within previous 12 months.

8 = number hospitals (8 public hospitals) studied

Table 12: Percentage of records cover at least 6 months within the past 12 months of public hospitals classify by each key medicines to treat common conditions

| No | Key medicines to treat common conditions | Percent of records |
|---|---|---|
| 1 | Amoxicillin tablet 500mg | 100.00 |
| 2 | ChloroqIUne tablet 250mg | 100.00 |
| 3 | Cotrimoxazol tablet 480mg | 100.00 |
| 4 | Diclofenac tablet 50mg | 100.00 |
| 5 | Ferrous tablet 200mg | 100.00 |
| 6 | Penicillin tablet 400,000 IU | 100.00 |
| 7 | Oral rehydration salt (ORS) 20.5mg | 100.00 |
| 8 | Dextrose 5% with salt0.9 % infusion 1,000ml | 100.00 |
| 9 | Ringer lactate infusion 1,000ml | 100.00 |
| 10 | Iodine (Beta dine 30ml) | 100.00 |
| 11 | Tetracycline ointment 5mg | 100.00 |
| 12 | Berberine tablet 50mg | 87.50 |
| 13 | Acetyl salicylic acid 500mg | 87.50 |
| 14 | Acid Folic tablet 5mg | 62.50 |
| 15 | Albendazol tablet 200mg | 62.50 |

The number of day that key medicines treated common conditions were out off stock in the previous year at each the public hospital in Oudomxay Province were recorded by the researcher (Table 13).

Fourteen items out of fifteen items of key medicines were out off stock ranged 13 - 66 days per year. Penicillin tablet 400,000 IU and Amoxicillin 500mg capsule were out of stock more than 2 months per year. Acetyl salicylic acid 500mg, ChloroqIUne tablet 250mg, Cotrimoxazol tablet 480mg, Ringer lactate infusion 1,000ml, Albendazol tablet 200mg and Oral rehydration salt 20.5 mg. were out off stock more than one month or nearly two months per year. Average days out off stock per year of Penicillin tablet 400,000 IU in public hospitals of Oudomxay Province was calculated by the formularies that example as the follows:

4.2.2.6 Average days out off stock of Penicillin tablet 400,000 IU in a hospital within 180 days recorded

= Total days out off stock of Penicillin tablet 400,000 IU in 8 public hospitals / 8

= 15+56+26+23+24+28+45+45 / 8 = 262 / 8 = 32.75 days

(Average days out off stock of Penicillin tablet 400,000 IU per year (365 days)).

= 32.75 x365/ 180 = 66.41 days

Table 13: Average days out off stock per year of medicines in public hospitals of Oudomxay Province was classified by each key medicine to treat common conditions

| No | Key medicines to treat common conditions | Average days out off stock per year |
|---|---|---|
| 1 | Penicillin tablet 400,000 IU | 66.41 |
| 2 | Amoxicilline tablet 500 mg | 64.13 |
| 3 | Acetyl salicylic acid tablet 500 mg | 45.12 |
| 4 | ChloroqIUne tablet 250 mg | 44.86 |
| 5 | Cotrimoxazol tablet 480 mg | 40.30 |
| 6 | Ringer lactate infusion 1,000 ml | 35.23 |
| 7 | Albendazol tablet 200 mg | 33.97 |
| 8 | Oral rehydration salt (ORS) 20.5 mg | 32.44 |
| 9 | Diclofenac tablet 50 mg | 27.63 |
| 10 | Ferrous tablet 200 mg | 27.63 |
| 11 | Dextrose 5% with salt0.9 % infusion 1,000 ml | 20.53 |
| 12 | Acid Folic tablet 5mg | 19.01 |
| 13 | Berberine tablet 50mg | 14.95 |
| 14 | Iodine (Beta dine 30ml) | 13.43 |
| 15 | Tetracycline ointment 5mg | 0.00 |

When look at each hospital, the percentage of records for all medicines surveyed and total number of days which all medicines were out of stock per year are shown in Table 14. 100% recorded were found at Provincial FDA, Provincial hospital and Gna hospital. 93.33 % recorded were at Beng hospital and Parbeng hospital, and

86.67 % recorded at Namor hospital, La hospital and Hoon hospital. The sample of calculation of average percent medicines records of Namor hospital is:

4.2.2.7 The calculation for the records

(13 / 15) x 100 = 86.67

Where 6.67 = average percent medicines recording of Namor hospital.

13 = number of medicine records at least 6 months within the past 12 months of Namor hospital.

15 = number of medicines (15 items) studied in each public hospital.

Table 14 also presents number of days of all medicines which were out off stock in a year. The calculation is:

4.2.2.8 Average days of all medicines which were out off stock in a year = (Total days out of stocks/ numbers of items found out of stock) x (365/180)

= Total eqIUvalent number of days out off stock per year of each key medicine in 15 key medicines studies / 15:

Examples: The eqIUvalent number of days out off stock per year of Folic Acid tablet 5mg;

= 60 x (365/180) = 121.67

Where 60 = number of days out off stock of Folic Acid in 6 months

(365/180) = number of days in a year/ number of days in 6 months

121.67 = eqIUvalent number of days out off stock per year of Folic Acid

4.2.2.9 Average days out off stock of Provincial hospital per year;

= (121.67+101.39+70.97+91.25+81.11+10.14+50.69+48.67+ 30.42+30.42+44.61)/11

= 45.42 days

Where 11 = number of drugs were out off stock in Provincial hospital.

45.42 = number of days out off stock in Provincial hospital.

Table 14: Percentage of records cover at least 6 months within previous 12 months and average day medicines are out off stock per year of eight public hospitals.

| No | Public hospitals | Percent of records | Average days out off stock per year |
|---|---|---|---|
| 1 | Provincial FDA | 100.00 | 25.55 |
| 2 | Provincial hospital | 100.00 | 45.42 |
| 3 | Gna hospital | 100.00 | 30.69 |
| 4 | Beng hospital | 93.33 | 44.03 |
| 5 | Prarbeng hospital | 93.33 | 22.16 |
| 6 | Namor hospital | 86.67 | 44.61 |
| 7 | La hospital | 86.67 | 44.30 |
| 8 | Hoon hospital | 86.67 | 31.20 |

Eleven standards checklist of World Health Organization operational package for assessing monitoring and evaluating country pharmaceutical situation of adequate conservation conditions and handing of medicines in storeroom and dispensing area in each the public hospital at Oudomxay Province, Lao PDR is presented in Table 15.

Three practices were 100% found at storeroom and dispensing area were Tablets/capsules were not manipulated by naked hand, medicines were stored first-expiry-first out, and area was free from moisture (e.g. leaking ceiling, roof, drains, taps, etc.).

Only 12.5% had a cold storage in the facility of warehouse and 25% in the dispensing area. And regularly filled temperature chart for the cold storage at only 12.5% of both at the warehouse and dispensing area.

The conditions in the warehouse as windows that can be opened or there are air vents, no evidence of pests in the area, and no medicines stored directly on the floor were 87.5%, 50%, and 37.5% respectively. The conditions in the dispensing area regarding the same measures were better at 87.5%, 100%, and 87.5% respectively.

The percentage of warehouse and dispensing room of practices checklist in public hospitals of Oudomxay Province which was calculated as the follows:

4.2.2.10 Percent warehouse which medicines were not stored directly on

the floor in public hospitals was;

= number of warehouses which medicines were not stored directly on the floor X100/ number warehouse of public hospitals is studied

= 3 x 100/8 = 37.5

Table 15: Percentage of adequate conservation conditions and handling of medicines in warehouse and dispensing room of public hospitals in Oudomxay Province classify by practical checklist.

| No | Practices Checklist | Percent of warehouse | Percent of dispensing room |
|---|---|---|---|
| 1 | Tablets/capsules are not manipulated by naked hand. | 100 | 100 |
| 2 | Medicines are stored first-expiry-first out. | 100 | 100 |
| 3 | Area is free from moisture (e.g. leaking ceiling, roof, drains, taps, etc.) | 100 | 100 |
| 4 | Direct sunlight cannot enter the area (e.g. window panes are painted or there are curtains/blinds to protect against the sun). | 100 | 87.5 |
| 5 | There are windows that can be opened or there are air vents. | 87.5 | 87.5 |
| 6 | There is no evidence of pests in the area. | 50 | 100 |
| 7 | Medicines are not stored directly on the floor. | 37.5 | 87.5 |
| 8 | Medicines are stored in a systematic way (e.g. alphabetical, pharmacological) | 25 | 50 |
| 9 | There is a method in place to control temperature (e.g. roof and ceiling with space between them in hot climates, air conditioners, fans, etc.). | 25 | 37.5 |
| 10 | There is a cold storage in the facility. | 12.5 | 25 |
| 11 | There is a regularly filled temperature chart for the cold storage. | 12.5 | 12.5 |

Table 16 presents the practicing of eight public hospitals in the warehouse and dispensing room about adequate conservation conditions and handling of medicines. It was found that the practice at the Provincial FDA was 100 % conformed to the 11 items on the checklist. The least score for the warehouse goes to Beng hospital at 27.27 %, and the least for the dispensing area goes to Namor hospital at 54.55 %.

4.2.2.1.1 The calculation for the score is;

= number of "True" practices in checklist x 100/ number of items in checklist

= 6 x 100 / 11 =54.55%

Table16: Percentage of adequate conservation conditions and handling of medicines in warehouse and dispensing room of public hospitals in Oudomxay Province classify by each public hospital.

| No | Public hospital | Percent of warehouse | Percent of dispensing room |
|---|---|---|---|
| 1 | Provincial FDA | 100 | 100 |
| 2 | La hospital | 63.64 | 63.64 |
| 3 | Nga hospital | 63.64 | 72.73 |
| 4 | Provincial hospital | 54.55 | 63.64 |
| 5 | Parbeng hospital | 54.55 | 63.64 |
| 6 | Hoon hospital | 45.45 | 81.82 |
| 7 | Namor hospital | 45.45 | 54.55 |
| 8 | Beng hospital | 27.27 | 63.64 |

## 4.3. Drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

During 13-24 July, 2009 at Sungneun hospital Nakhornrachasima Province, Thailand, drug procurement system was studied. The administrative officers; the hospital administrator, one physician, and two pharmacists were interviewed about the process of drug procurement.

The hospital administrator provided the information of the drug procurement system of Sungneun hospital which had to comply with the policy of Ministry of Health of Thai government 2545BE of procurement law (2). The Ministry of Health had committees for drug procurement namely the committee for policy makers, committee for planning and pricing negotiate, etc.., to control and evaluate the practicing of any public hospitals in Thailand. But at Sungneun hospital, there were four committees namely; the drug list, the drug used evaluation, the procurement planning committee, and the pricing negotiation and order agreement committee. These committees had the responsibility in the management, controlling, monitoring, and evaluating the procedure of drug procurement within the Provincial Public Health. The procurement system was the group bidding. Once a year the medium prices and appropriate suppliers were set, then each hospital member could order medicines for hospital services many times per year, according to drug used in the hospital.

The hospital physician provided information about medicines used in the hospital which were convenient. The drug controlling in hospital was performed by electronic software and hospital pharmacists were able to provide medicines on time.

The hospital pharmacists told about the drug procurement method at Sungneun hospital. After Provincial drug procurement committees found out the suppliers and medium prices, Sungneun hospital could make orders where necessary for drug used in hospital and could place orders many times in a year according to the criteria of Provincial drug procurement committees. Then, pharmacists reported about drug used, drug evaluation and problems of medicines in hospital warehouse to the hospital administrator, hospital drug procurement committees and Provincial drug procurement committees every month. But in case of emergency the pharmacists in hospital could make order with suppliers. When some medicines were at risk to expire

early, the pharmacists could exchange with suppliers or with other hospitals that were member of Provincial drug procurement committees, as soon as possible.

In reality, Sungneun hospital is convenient in implementing because there are many factors are pushed the administration, keeping, and services effectively such as:

- The human resource, the regulations, the development of materials and location.
- The communication network, the transportation and with the suppliers are very convenient.
- The drug respondent to the Sungneun hospital is easy and qIUckly.
- The connecting and the medicines exchange with other hospitals are possible.

# CHAPTER V
# DISCUSSION

The discussion is divided into three parts as following:

1. Drug procurement system in Oudomxay Province, Lao PDR on 2008.
2. Problems of drug procurement in Oudomxay Province, Lao PDR.

2.1 The extent of medicinal wastage among public hospitals, in 2008

2.2 The practice at warehouses and dispensing rooms of public hospitals according to WHO survey form of operational package for assessing monitoring and evaluating the current situation of drug procurement.

3. Drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

## 5.1 Drug procurement system in Oudomxay Province, Lao PDR on 2008.

There are three methods of drug procurement used in Oudomxay Province, but only two methods are selected for discussion with drug procurement situation.

The first method is the hospital procurement method. This method is more important than other procurement methods in public hospitals of Oudomxay Province because its cost covered 92 percent of drug procurement of public hospitals in Oudomxay Province per year. And there is group bidding four times per year but the process and steps in practice of this method is not strict enough because it takes long time; almost one month for drug receiving and also different prices of medicines services in public hospitals from time to time. Therefore, the public hospitals in Oudomxay Province have medicines shortage, medicines expired and medicines wastage, which are presented in part 2 of this chapter. On behalf, this procurement method is only one method to reimburse for the cost of drug services from patients or revolving drug fund of public hospitals. As a result, the public hospitals of Oudomxay

Province would find the solutions and formularies appropriately for development to this procurement method to be qualities.

The second method is the Provincial FDA procurement method for supporting the public health sectors in the rural area when diseases spreading, for the poorest patients and disaster situation but the survey was also found medicines wastage in warehouse of public hospitals by this procurement method but some public health sectors have no diseases spreading that is the cause of problem of medicines wastage within public hospitals.

Although, the third methods is not included in this discussion but it is also important because if the public health sectors need grant aid they have to make proposal for medicines services of public health sectors. Furthermore, it was important to consider how data will be collected. Some methods might be routinely available from practices recording and reporting systems, whereas other methods might require a special survey. Theoretically, indicators indicated how well drug procurement system performance was, but they did not indicate why the performance was good or poor. To identify the difference of WHO guideline for good drug procurement methods (2), we used a qualitative data collection to evaluate drug procurement process within the next part.

In conclusion, the development of performance indicators in drug procurement system should be taken into consideration with time and budget in the area of data collection. Main indicators should also be carefully selected to represent the goal of drug procurement system.

## 5.2 Problems of drug procurement in Oudomxay Province, Lao PDR.

### 5.2.1 The extent of medicinal wastage among public hospitals, in 2008

The extent medication wastage could be one indicator of drug procurement for public hospitals in Oudomxay Province.

It was found from the survey that cost of drug wastage in 2008 for those fifty drug items were high. The cost wastage by Provincial FDA, hospital and grant aid methods was 2.3, 0.03 and 0.07 million kip per year respectively. The drug wastage came from each method of drug procurement. But when compare the cost of wastage

among Provincial FDA methods, hospital method, and grant aid method; it was found that the Provincial FDA method produced the highest waste, higher than grant aid and hospital procurement methods. This is the evidence for the Provincial FDA to improve its procurement process in order to serve the needs of public hospitals under supervision more effectively.

At the hospital level, the health personnel related to drug utilization and procurement; the hospital administrators, physicians and pharmacists, had knowledge of drug procurement system at 71.4%, 58.8% and 57.1% respectively. The physicians did not realize about the hospital drug list. Therefore, the participants who are responsible for drug procurement of public hospitals should understand more about drug procurement procedures. Especially, the hospital administrators must clearly understand the process of drug procurement in hospital. Educating the hospital staff on hospital drug management should result in better drug management. When the staff did not understand system of drug procurement deeply; this would lead to drug wastage in above mentioned hospitals.

**5.2.2 The practice at warehouses and dispensing rooms of public hospitals according to WHO survey form of operational package for assessing monitoring and evaluating the current situation of drug procurement.**

The outcome of three methods on drug procurement, the practices about drug dispensing, and storage were measured by the WHO survey form. A drug list of key medicines to treat common conditions was used as a representative for this measure. Eight out of fifteen drug items were found available and not expired in every health institute surveyed, which were the outcome of proper drug procurement. But Tetracycline ointment 5mg and Chloroquine tablet 250 mg were found both shortage and expired. The availability of Folic acid tablet 5 mg and Albendazol tablet 200mg were available at 50% of places surveyed. These evidences confirmed that it is necessary to improve provincial drug procurement system.

The stock records of each drug were checked. Not all medicines were recorded for their stock movement during at least six months within previous year. Folic acid tablet 5 mg and Albendazol tablet 200mg were at highest percentage of unrecorded; this evidence might relate with the incidence of poor availability.

Regarding the matter of number of days that key medicines were out off stock per year in public hospitals of Oudomxay Province, all the medicines had records showed days out off stock about 13 - 66 days per year. Especially, the Penicillin tablet 400,000 IU and Amoxycillin tablet 500 mg had days out off stock per year more than two months. The cause might relate to the prescribing behavior of the physicians or the incidence of infections in the community. This finding is serious because it means that the infections are not eliminated and the patients can spread their infections to other person in the community or turn to be more serious conditions. However, Tetracycline ointment 5mg was never out off stock in any hospital and provincial FDA. This medicine had stock record at every hospital (100%). But when checked with table 10, which revealed the present of this medicine on shelf at the time surveyed, only 87.5% of hospitals had Tetracycline ointment 5mg, and 37.5% of hospitals had expired form on shelves. This evidence leads to the question of reliability and quality of the stock management in the hospitals. The problems of incorrect data sent to the provincial FDA might make the FDA unable to procure medicines at proper amount.

The practice of management medicines in warehouse and dispensing room of public hospitals in Oudomxay Province were assessed along the application of eleven standards checklist of World Health Organization operational package for assessing monitoring and evaluating country pharmaceutical situation of adequate conservation conditions and handing of medicines in storeroom and dispensing area. It was found that all of public hospitals had problems.

Three practices were 100% found at storeroom and dispensing area were tablets/capsules were not manipulated by naked hand, medicines were stored first-expiry-first out, and area was free from moisture (e.g. leaking ceiling, roof, drains, taps, etc.). These practices protected the medicines from contamination and instability.

Major problems are the cold chain medicines which need proper storage temperature. Only 12.5% had a cold storage in the facility of warehouse and 25% in the dispensing area. And regularly filled temperature chart for the cold storage at only 12.5% of both at the warehouse and dispensing area. These conditions will deteriorate the quality of cold chain medicines. However some warehouses had evidence of pests in the area, so there should be a regular cleaning process.

## 5.3 Drug procurement practice at Sungneun hospital Nakhornrachasima, Thailand.

The observation of drug procurement method at Sungneun hospital Nakhornrachasima Province, Thailand will be a model for the practicing of better drug procurement procedure for public hospital in Oudomxay Province.

The hospital administrator of Sungneun hospital well understood the drug procurement system, especially the regulations which are based on the policy of Ministry of Health of Thai government 2545 of procurement law (2).

The hospital physicians were also clear about the medicines used in the hospital. The system was convenient because the drug list and drug controlling in hospital was controlled by electronic software and hospital pharmacists were able to provide medicines on time.

The hospital pharmacists were most responsible and had good practices in drug dispensing. Especially, they paid more care when dispensing medicines which look similar or Look Alike and Sound Alike (LASA). Furthermore, receiving units such as ward, outpatient pharmacy department were assigned to re-check medicines before dispensing to the patient.

In reality, Sungneun hospital is convenient in implementing because there are many factors supported such as province group procurement, the effective administrative team, records keeping and utilization. On the other hand, the communication network, the transportation and with the suppliers are very convenient.

## 5.4 The limitation of studies

The study had several potential limitations that should be considered when interpreting these data.

5.4.1 These data were collected from only one Province, so the result might not explain the current situation of the whole country. There should be more models besides the situation of drug procurement in Oudomxay Province.

5.4.2 The cross-sectional study was conducted in this study. Therefore, it could not compare with the outcome indicators within the same public hospitals at the other year period.

5.4.3 Some data especially in public hospital would confidentially be kept for official reasons. Thus, some questions were not answered.

5.4.4 Some respondents tended to answer the questionnaire invalid or differ from actual practice.

# CHAPTER VI
# CONCLUSIONS AND RECOMMENDATIONS

The drug procurement in public hospitals of Oudomxay Province, Lao PDR is different from other public hospitals of Lao PDR and also hospital studied in Thailand. Because it is located in mountainous area more than 85% and the transportation is not convenient in implementation if compare with other Province of Lao or the hospital studied in Thailand. According to objectives of the national drugs policy of Lao PDR as follow (15):

1. Provide the essential drugs for the public health sectors in the rural area, especially those are diseases spreading and poorest patients by the opportunity drugs prices.

2. Make sure to be the drugs qualities and safety to the patients by the health officials.

3. Promote traditional medicines use for the public health sectors.

The two objectives of the national drug policy were relative with the drug procurement process. Therefore, these will help to find the solutions to better drug procurement system. The cost of drug procurement per year of public hospitals in Oudomxay Province about 3.6 billion kip but also the cost of medication wastage is about 5 %, that representing to the problems of drug management within each public hospital. As a result, the Ministry of Public Health has issued the Principle of Good Procurement And Dispensing Practices which facilitated four subsystems; selection, procurement, distribution, and utilization. Some principles and guidelines such as effective procurement, increase turnover rate and reduce stock value were implemented to save drug budget which was extremely limited. So far, no study has been conducted to assess the current system of drug procurement process and performance among public hospitals in Oudomxay Province, Lao PDR.

The existing studies have insufficient information on drug procurement indicators in relation to the good drug procurement processes. Moreover, the practice

in drug procurement process has been studied for each warehouse and dispensing room of public hospitals. This study was a descriptive cross-sectional survey research.

The objectives explored the process of drug procurement process, also develop and evaluate the performance indicators of drug procurement process. The study was conducted in one part as the practices of drug procurement processes in warehouses and dispensing room of public hospitals in Oudomxay Province, Lao PDR by survey form of WHO operational package for assessing monitoring and evaluating country pharmaceutical situation, it is also found the extent medicinal wastage and the processing of drug procurement among public hospitals in Oudomxay Province, Lao PDR on 2008. That statistics were used to explain the process and performance of drug procurement system. Nevertheless, the results of the first part revealed that three methods of drug procurement of public hospitals in Oudomxay Province were selected as major drug procurement system. Within the three methods, only two methods (Provincial FDA method and Hospital method) described drug procurement. Two methods in drug procurement were found the percentage of medication wastage and percentage of drug procurement process. For example, within the Provincial FDA procurement has the percentage of medication wastage among public hospitals in 2008, and the Hospital procurement also has the percentage of error in process of drugs procurement took from the procures preparing until drugs receiving about one month per time purchasing order. Although, three methods of drug procurement did not cover all aspects of the Balanced Scorecard, they represented the goals of the improving drug procurement in public hospitals of Oudomxay Province.

From sample of the 50 drug items by high cost procured of each public hospital has procurement cost about 40 mil - 2.8 bill kip per year and the extent medication wastage is about 5 % of each public hospital which had high percentage of cost wastage 2.53±5.44 (0.2 - 16) of Mean ± SD (Range) if we compare criteria allowed by Ministry of Public Health (0.05%). 71.4% of the hospital administrators understand drug procurement within public hospital. The physicians attended to the process of drug procurement in public hospital at 76.5 %. The procurement practices of pharmacists are the relative with the drug wastage because there are 42.9 % of hospital pharmacists did not know any information about drug procurement procedure in the hospital. The processes in drug procurement, drug receiving, drug storage,

report showed significant differences in each public hospital. Moreover, some practices were not performed properly in all respondents such as drugs keeping, drugs dispensing, drugs receiving with expiration dates more than one year in recording and controlling humidity in stocks of each public hospital.

In the drug procurement performance, indicators from the development of major drug procurement indicators were used to measure the drug procurement performance in each public hospital. The high outcome indicators indicated low performance. Most hospital had the value of the percentage of days out off stock and the percentage of drug shortage at dispensing rooms. The percentages of practice errors in warehouse and dispensing room are high to 5.7% of practices checklist. In 2008 each hospital has list of drug expired 2 - 13 items and the cost of drug expired 200,000 - 16,000,000 kip (1$ us = 8,348.65kip). The average day of drug out off stock in each public hospital studied about 22 - 45 days per year, higher average days of drug out off stock per year than other was Provincial hospital. Although, the drug procurement value was not selected as a major outcome indicator but it was important indicator that represented the efficiency of drug procurement system in minimizing extent medication wastage. It was found that hospital group procurement method had lower drug wastage value than the other procurement methods in public hospitals of Oudomxay Province. In public hospitals, the drug procurement costs are showed significant difference in each public hospital. It could be indicated that these characteristic and processes would help to obtain better outcomes.

To identify the best practice in drug procurement of public hospitals were classified by practices checklist value per warehouse and dispensing room found that 4 of them lower than other practices checklist at 25 % warehouse and 50 % dispensing room of medicines are stored in systematic way. At 25 % warehouse and 50 % dispensing room of the temperature controlling. At 12.5 %, warehouse and 25 %, dispensing room of the cold storage. At 12.5 %, warehouse and 12.5 %, dispensing room of regularizes filled temperature chart for cold storage.

Referring to the public hospital structures include participants which has total physicians of 18, total pharmacists of 10, and the less official staff are assistants who are trained for assisting drug procurement processes.

When consider the total score of outcome indicators associated with the drug procurement process and drug wastage value, it was found that the total score of drug wastage in public hospitals were increased. This is probably because some respondents tended to answer the questionnaire invalid or differ from actual practice. However, it could not identify the drug procurement process indicators associated with provincial level because the responded of drug procurement process was relative which policy and respondent of center (Department of Food and Drug, Ministry of Public Health).

## 6.1 Conclusion

When categorized the extent medication wastage, according to the procurement methods and practices of public hospitals in Oudomxay Province, Lao PDR. There were differences in the drug procurement practices. Most public hospitals had good practices in drug procurement processes. However, some processes were not performed properly among public hospitals and respondents such as procurement preparing, procurement practices, receiving drugs with expiration dates more than one year, recording, keeping and controlling in the warehouse. Therefore, the result indicated that public hospitals with good procurement characteristics and processes would have good outcome indicators. The characteristics and processes that could lead to the better outcomes were WHO guideline for good drug procurement system, and the lesson learn from the group procurement method at Sungneun hospital Nakhornrachasima Province, Thailand. If drug procurement process was followed these characteristic and processes, their outcome indicators such as the percentage of drug in stock, expired drugs, practice in warehouse and dispensing room, costs of expired drugs in a year, average days out off stock per year of drug procured in year would be better. Another important finding was the method of good drug procurement process for each public hospital in Oudomxay Province. Furthermore, pubic hospitals could be developed the process of drug procurement system were more likely to have better process and outcome indicators than those with higher procurement practices value. We found that each public hospital that possessed better outcomes had a distinct practice. So in conclusion, only one best process cannot lead to best outcome but

rather many best distinct practices from each public hospital should be considered as a combination of best practice.

## 6.2 Recommendations

### 6.2.1 Recommendation for the structure of drug procurement process

Base on the drug procurement process of public hospitals in Oudomxay Province which should be developed the structure of drug procurement process within three sections namely: first section is the regulations and procedures, to the practicing for procedures of drug procurement process, should be simple and short procedures for the drug procures practicing. Second, the human resource should be developed the skill which the official stuff whose are worked for drug procurement process by the opportunities skill training up. Third, the places and materials were necessity for qualities saving, especially warehouse and dispensing room of each public hospital must have shelve for drug keeping, materials for dispensing drugs and / or cold gent for special drug saving.

### 6.2.2 Recommendations for hospital pharmacist from this study

Base on the results of this study, the followings are the recommendations: There should be a development of practice key performance indicators of drug procurement in Oudomxay Province, Lao PDR to be used as reference among WHO guideline and good process of hospital method in Thailand.

There were some drug procurement processes in this study that should be improved as the followings:

6.2.2.1 The group bidding by Provincial Public Health should facilitate to negotiate with the suppliers to integrate the buying power of committee for better prices. The sub public hospitals should be evaluated annually before bidding drugs to ensure that the vendors provided quality products and services as well as to reduce the out of stock and over keeping in warehouse. More concerns should be given to the methods of determining the quantity of drug procurement. As the result of this study, the public hospitals that used minimum stock level, maximum stock level,

past and present for next order drug procurement by using these effective methods to be procured the quantity of drug needed.

6.2.2.2 Upon receiving drugs, there should be designated persons to inspect the packages, the integrity of containers and the completeness and legibility of drugs. i.e., the drug name, strength, and expiry date. More importantly, stocks nearing expiry dates should not be accepted unless it could be used before expiration. The storage conditions especially the temperature chart for cold storage, were not well controlled and appropriately documented. There should be staff person assigned to strictly monitor of the storage condition.

6.2.2.3 The dispensing room did not have any methods to prevent incorrect dispensing such as name, strength, dosage form etc. Therefore, such methods as using labels or highlights on drug that look similar in order to differentiate those items should be used to prevent incorrect dispensary.

6.2.2.4 The sub public hospital should have drug procurement reported to Provincial committee including the planning for term of drug procurement.

### 6.2.3 Recommendations to the further studies

Base on the results of this study, the following research topics are recommended for further study:

6.2.3.1 The WHO guideline for good drug procurement would help generate useful information to improve and more accurate the drug procurement of public hospitals in Oudomxay Province.

6.2.3.2 The finding of the new method for group procurement besides grouping by locations of hospitals is recommended. Alternative group procurement such as grouping by high cost-rare case drug should also be studied.

6.2.3.3 The system developing in drug procurement such as just-in-time, prime vendor system would help increase the efficiency in drugs management.

6.2.3.4 Exploring the problems and obstacles of drug procurement among public hospitals in Oudomxay Province, Lao PDR by the survey form and standard check list of WHO was the guideline for improving drug procurement process in public hospital of Oudomxay Province, Lao PDR.

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# APPENDICES

# APPENDIX A

# DATA COLLTION FROM OF 50 DRUG ITEMS IN PUBLIC HOSPITALS, OUDOMXAY PROVINCE.

| No | Name's drugs | ST | Type | Method | Buy | Used | Balance | Cost/ unit | Cost's buy | Cost's used | Wastage | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Amount | Cost |
| 1 | Acid Folic | 5mg | Tab | | | | | | | | | |
| 2 | Albendazol | 200mg | Tab | | | | | | | | | |
| 3 | Aluminum | 500mg | Tab | | | | | | | | | |
| 4 | Amoxacilline | 500mg | Tab | | | | | | | | | |
| 5 | Ampicilline | 500mg | Cap | | | | | | | | | |
| 6 | Bromhexine | 5mg | Tab | | | | | | | | | |
| 7 | Buscopan | 10mg | Tab | | | | | | | | | |
| 8 | Cefaline | 500mg | Cap | | | | | | | | | |
| 9 | C P M | 4mg | Tab | | | | | | | | | |
| 10 | Cimethidine | 400mg | Tab | | | | | | | | | |
| 11 | Cloxacilline | 500mg | Cap | | | | | | | | | |
| 12 | Cotrimoxazol | 480mg | Tab | | | | | | | | | |
| 13 | Diazepam | 5mg | Tab | | | | | | | | | |
| 14 | Diclofenac | 50mg | Tab | | | | | | | | | |
| 15 | Doxycicline | 100mg | Cap | | | | | | | | | |
| 16 | Ergot rate | 0.25mg | Tab | | | | | | | | | |
| 17 | Erythromycin | 250mg | Tab | | | | | | | | | |
| 18 | Fer sulfate | 200mg | Tab | | | | | | | | | |
| 19 | Hidil | 300mg | Tab | | | | | | | | | |
| 20 | Metronidazol | 500mg | Tab | | | | | | | | | |
| 21 | Neurobion | 250 mg | Tab | | | | | | | | | |

| No | Name's drugs | ST | Type | Method | Buy | Used | Balance | Cost/ unit | Cost's buy | Cost's used | Wastage | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | Amount | Cost |
| 22 | Ofloxacin | 200mg | Tab | | | | | | | | | |
| 23 | Paracetamol | 500mg | Tab | | | | | | | | | |
| 24 | Penicillin- V | 400000 IU | Tab | | | | | | | | | |
| 25 | Phanticone-F | 500mg | Tab | | | | | | | | | |
| 26 | Piroxicam | 10mg | Tab | | | | | | | | | |
| 27 | Prenisolone | 5mg | Tab | | | | | | | | | |
| 28 | Salbutamol | 5mg | Tab | | | | | | | | | |
| 29 | Terpine | 105mg | Tab | | | | | | | | | |
| 30 | Vit-B1 | 100mg | Tab | | | | | | | | | |
| 31 | Vit-B6 | 20mg | Tab | | | | | | | | | |
| 32 | Vit-C | 100mg | Tab | | | | | | | | | |
| 33 | Amacone | 240 ml | FL | | | | | | | | | |
| 34 | ORAL | 20.5mg | Sash | | | | | | | | | |
| 35 | D1/3S. | 500ml | Set | | | | | | | | | |
| 36 | D10W. | 1000ml | Set | | | | | | | | | |
| 37 | D5S | 1000ml | Set | | | | | | | | | |
| 38 | D5W | 1000ml | Set | | | | | | | | | |
| 39 | NSS | 1000ml | Set | | | | | | | | | |
| 40 | Ringer | 1000ml | Set | | | | | | | | | |
| 41 | Amoxycillin | 1g | Amp | | | | | | | | | |
| 42 | Ampicilline | 1g | Amp | | | | | | | | | |
| 43 | Cefaline | 1g | Amp | | | | | | | | | |
| 44 | Ceftriazone | 1g | Amp | | | | | | | | | |
| 45 | Cimethidine | 200mg | Amp | | | | | | | | | |
| 46 | Diclofenac | 75mg | Amp | | | | | | | | | |
| 47 | Gentamycine | 80mg | FL | | | | | | | | | |
| 48 | Paracetamol | 300mg | Amp | | | | | | | | | |
| 49 | Penicillin | 1M | Vial | | | | | | | | | |
| 50 | Procaine | | Amp | | | | | | | | | |

# APPENDIX B

# QUESTIONNAIRE FFORM 1

# INTERVIEW FOR HOSPITAL ADMINISTRATORS

ID. ___ ___ _

Date of Interview: / /2009

Hospital's Name: _____

Name of interviewer:_____

Name of interviewee:_____

**Part 1: Personal information.**

1. Position of interviewee_____

2. Education of interviewee?

❍1 high education; ❍2 Bachelor; ❍3 Otter_____

**Part 2: Participant in drug procurement of hospital**.

1. How many items of medicines used in your hospital? _____items
2. How many times per year for drug procurement in your hospital?
   _____times and cost/time_____?
3. Do you have expired medicines in your hospital?
   ❍1 Yes; ❍2 No
4. How many items of expired medicines? _____ Items
5. How much of wastage (cost)? _____
6. Do you have drug shortage for service during procurement?
   ❍1 Yes; ❍2 No
7. Do you have emergency drug procurement?
   ❍1 Yes; ❍2 No
8. How many percent is your emergency procurement?___-__%
9. Who procured for you? _____

10. Do you ever discus with medical doctor that the list of medicine before procurement? ❍1Yes; ❍2No

11. What information and indicator for procurement in your hospital?

_____

_____

12. What do you amend for the expired medicine in your hospital?

_____

_____

13. What do you amend when some medicine to be torn in your hospital?

_____

_____

14. The convenience and inconvenience in your hospital for drug procurement?

_____

_____

15. What do you think for drug procurement in your hospital?

_____

_____

# APPENDIX C
# QUESTIONNAIRE FORM 2
# INTERVIEW FOR HOSPITAL PHARMACISTS

ID. ___ ___ __

Date of Interview: / /2009

Hospital's Name: _____

Name of interviewer: _____

Name of interviewee:_____

**Part 1: Personal information.**

1. Position of interviewee_____

2. Education technique of interviewee?

❍1 Specialist; ❍2 Pharmacists; ❍3 Otters_____

**Part 2: Participant in drug procurement of hospital**.

1. How many items of medicines used in your hospital? _____items

2. How many times per year for drug procurement in your hospital? ____ Times

3. Do you have account for medicines monitoring in your hospital?

❍1 Yes; ❍2 No

4. Do you usually account recorded for medicines monitoring in your hospital?:

❍1 a day; ❍2 a week; ❍3 a month

5. Do you have expired medicines in your hospital?

❍1 Yes; ❍2No

6. How many items of medicines expire? _____ Items

7. Where do you get medicines expire?

❍1 Procures; ❍2 grand aid; ❍3Others_____

8. How much of wastage (cost)? _____

9. What kind of expired medicines? (find the medicines account)

❍1 Oral; ❍2 Injections; ❍3 Other_____

10. Do you have medicines expire within national drug list?

❍1 Yes; ❍2 No

11. Do you have no some medicines for service during procurement?

❍1 Yes; ❍2 No

12. How long have you preparation for drug procurement?

❍1 a week; ❍2 two week; ❍3 a month

13. There are matching drug list in the hospital and drug list in the description?

❍1 Yes; ❍2 No

14. Do you make drug list for hospital for the medical doctors?

❍1 Yes; ❍2 No

15. Do you have procurement committee?

❍1 Yes; ❍2 No

16. Do you ever discus with medical doctor that the list of drug before buying?

❍1 Yes; ❍2 No

17. How many times per month did you check your warehouse?

❍1 a time; ❍2 two time; ❍3 three times

# APPENDIX D
# (QUESTIONNAIRE FORM 3)
# INTERVIEW FOR HOSPITAL PHYSICIANS

ID. ___ ___ __

Date of Interview: / /2009

Hospital's Name: _____

Name of interviewer: _____

Name of interviewee: _____

**Part 1: Personal information.**

1. Position of interviewee_____

2. Education of interviewee?

❍1 Specialist; ❍2Physician; ❍3Medical assistance

**Part 2: Participant in drug procurement of hospital**.

1. Could you know how many items of medicines used in your hospital?

❍1 Yes; ❍2 No

2. Do you have the drug list ?

❍1 Yes; ❍2 No

3. Do you think that the number of drug listed in hospital enough for treatment?

❍1 Yes; ❍2 No

4. Have you ever sent a request note for drugs that you wan to use to pharmacist?

❍1 Yes; ❍2 No

5. Did you request pharmacist to buy new drug for hospital?

❍1 Yes; ❍2 No

6. Did you prescribed drugs available in hospital drug list?

❍1 Yes; ❍2 No

7. What information and indicator for describing in your hospital?

_____

_____

_____

8. How do you solve in case the medicines almost expire in your hospital?

_____

_____

_____

9. There are convenience and inconvenience in your hospital for describing?

_____

_____

_____

10. What do you think for drug procurement in your hospital?

_____

_____

_____

# APPENDIX E

# SURVEY FORM 1: PUBLIC HEALTH FACILITY PHARMACY/DISPENSARY

Indicator: % key medicines available; % medicines expired

Facility: drugs store and dispensing room; interviewee: Date:

Region: Investigator

| No | Key medicines to treat common conditions [A] | In stock Yes=1, No=0 [B] | Expired medicines on shelves Yes=1, No=0 [C] |
|---|---|---|---|
| 1 | Acid Folic tablet 5mg | | |
| 2 | Albendazol tablet 200mg | | |
| 3 | Acetyl salicylic acid 500mg | | |
| 4 | Amoxacilline tablet 500mg | | |
| 5 | Chloroquine tablet 250mg | | |
| 6 | Cotrimoxazol tablet 480mg | | |
| 7 | Diclofenac tablet 50mg | | |
| 8 | Fer sulfate tablet 200mg | | |
| 9 | Penicillin tablet 400,00UI | | |
| 10 | Oral rehydration salt (ORS) 20.5mg | | |
| 11 | Dextrose 5% with salt0.9 % infusion 1,000ml | | |
| 12 | Ringer lactate infusion 1,000ml | | |
| 13 | Iodine (Beta dine 30ml) | | |
| 14 | Tetracycline ointment 5mg | | |
| 15 | Berberine tablet 50mg | | |

# APPENDIX F

# SURVEY FORM 2: PUBLIC HEALTH FACILITY PHARMACY/DISPENSARY

Indicator: Average stock out duration, adequate record keeping

Facility: drugs store and dispensing room; interviewee: Date: ___

Region: Investigator

| No | Key medicines to treat common conditions [A] | Records cover at least 6 months within the past 12 months Yes=1, No=0 [B] | Only collect data for medicines with records covering at least 6 months within the past12 moths | | |
|---|---|---|---|---|---|
| | | | number of days out of store [C] | Number of days covered by the review (at least 6 months) [D] | Equivalent number of days per year [E]=Cx365/D [E] |
| 1 | Acid Folic tablet 5mg | | | | |
| 2 | Albendazol tablet 200mg | | | | |
| 3 | Acetyl salicylic acid 500mg | | | | |
| 4 | Amoxacilline tablet 500mg | | | | |
| 5 | Chloroquine tablet 250mg | | | | |
| 6 | Cotrimoxazol tablet 480mg | | | | |
| 7 | Diclofenac tablet 50mg | | | | |
| 8 | Fer sulfate tablet 200mg | | | | |
| 9 | Penicillin tablet 400,00UI | | | | |
| 10 | Oral rehydration salt (ORS) 20.5mg | | | | |
| 11 | Dextrose 5% with salt 0.9 % infusion 1,000ml | | | | |
| 12 | Ringer lactate infusion 1,000ml | | | | |
| 13 | Iodine (Beta dine 30ml) | | | | |
| 14 | Tetracycline ointment 5mg | | | | |
| 15 | Berberine tablet 50mg | | | | |

# APPENDIX G

# SURVEY FORM 3: PUBLIC HEALTH FACILITY PHARMACY/DISPENSARY

Indicator: Adequate conservation conditions and handling of medicines in storeroom and dispensing area

Facility: drugs store and dispensing room; interviewee: Date:

Region: Investigator

| No | Checklist | Storeroom True=1, False =0 [A] | Dispensing Area/Room True=1, False =0 [B] |
|---|---|---|---|
| 1 | There is a method in place to control temperature (e.g. roof and ceiling with space between them in hot climates, air conditioners, fans, etc.). | | |
| 2 | There are windows that can be opened or there are air vents. | | |
| 3 | Direct sunlight cannot enter the area (e.g. window panes are painted or there are curtains/blinds to protect against the sun). | | |
| 4 | Area is free from moisture (e.g. leaking ceiling, roof, drains, taps, etc.) | | |
| 5 | There is a cold storage in the facility. | | |
| 6 | There is a regularly filled temperature chart for the cold storage. | | |
| 7 | Medicines are not stored directly on the floor. | | |
| 8 | Medicines are stored in a systematic way (e.g. alphabetical, pharmacological) | | |
| 9 | Medicines are stored first-expiry-first out (FEFO). | | |
| 10 | There is no evidence of pests in the area. | | |
| 11 | Tablets/capsules are not manipulated by naked hand. | | |

# BIOGRAPHY


| | |
|---|---|
| **NAME** | Mr. Houmphanh Inthamoungkhoun |
| **DATE OF BIRTH** | 28 April 1970 |
| **PLACE OF BIRTH** | Laungprabang, Lao P.D.R. |
| **INSTITUTIONS ATTENDED** | University of Health, 1990-1995<br>Bachelor of Pharmacy,<br>Lao PDR.<br>Mahidol University, 2008-2010<br>Master of Science in Pharmacy<br>(Pharmacy Administration)<br>Thailand. |
| **HOME ADDRESS** | Monethai Village,<br>Xay District, Oudomxay Province,<br>Lao P.D.R.<br>Tel: +856-81-212-131<br>Mobile: +856-20-557- 820-52<br>E-mail: houmphanh11@yahoo.com |
| **POSITION & OFFICE** | Provincial Food and Drug,<br>Department of Public Health<br>Oudomxay Province, Lao P.D.R. |