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DrPH thesis

**Improving the use of medicines
in Community Health Centers, Timor-Leste**

**Michiyo Higuchi
Public Health & Policy Department
London School of Hygiene & Tropical Medicine**

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Abstract

While access to essential medicines has become recognised as a human right, problems concerning the inappropriate use of medicines have emerged. Medicines lose their therapeutic value and can impair both individual health and public health if inappropriately used. Inappropriate use of medicines diminishes the quality of healthcare and causes resources to be wasted, which is especially serious in under-resourced countries. To improve the use of medicines, the introduction of standard treatment guidelines (STGs) is suggested as a potential strategy.

The aim of this DrPH thesis is to study the use of medicines, focusing on adherence to new STGs in Community Health Centers (CHCs) in Timor-Leste. The country is now trying to establish an equitable and sustainable healthcare system under extremely resource-limited conditions. The study used mixed research methods, collecting data from randomly selected 20 rural CHCs, 1,799 retrospective samples from patient registration books, 583 prospective observations, and 55 semi-structured interviews of health personnel were collected.

Timor-Leste's medicine use was found, in general, to be acceptable. For example, use of injections was extremely low. Training, especially clinical nurse training, influenced knowledge of, attitudes to, and practical use of medicines and also prescribing adherence to STGs. Other factors that influenced the use of STGs were: health personnel's agreement with the policy concept and contents of STGs; health personnel's positive perception of the changes brought about by the introduction of STGs; development of STGs in a health policy framework: the fact that their STGs were easy to use repeatedly; and a supportive environment and systems to use STGs.

Constant socialisation and timely updates of STGs are necessary. Interrelation and consistency across policies and programs should be maintained. The position of training within the health policy framework should be clearly understood by the all people concerned. Follow-up supervision is needed both for individuals and the CHC. Anticipated support should be well functioning.

Integrating statement about DrPH

The Doctorate in Public Health (DrPH) programme of the London School of Hygiene & Tropical Medicine (LSHTM) is 'a professional doctorate that provides training in the skills crucial for leadership roles in public health'. Studying in the programme gave me an opportunity to prepare for a future career, which tries to contribute to a linkage between public health practice and research. The DrPH programme consists of three components: the taught component, the professional attachment, and the research project.

Taught component

The course began in October 2003 with the compulsory core units, which are required for all DrPH students: Evidence Based Public Health Practice, and Leadership, Management and Development. Both of them consider broad aspects of public health issues. Evidence Based Public Health Practice taught us integrated skills to deal with these issues; from how to identify a problem to how to disseminate research findings and how to put evidence into practice. Leadership, Management and Development provided theories and practice of management and organisational behaviour, which are vital for working in public health. These units helped me develop a way of thinking which was useful for conducting both my professional attachment and my research project.

While taking the compulsory core modules, I acquired basic knowledge of research in linear units: Basic Statistics, Extended Epidemiology, and Principles for Social Research. With DrPH optional modules, I registered for Qualitative Methodologies and Health Care Evaluation to learn research methodologies more deeply. I also occasionally attended sessions on Statistical Methods in Epidemiology and Advanced Statistical Methods in Epidemiology which were necessary for data analysis of the research project.

Two more optional study units were Teaching Health Professionals and Ethics, Public Health and Human Rights. I took Teaching Health Professionals just before my professional attachment at the clinical nurse training program in Timor-Leste. The unit developed ideas which helped me to understand the training program during the attachment. Unlike other modules, I did not expect direct, short-term benefits from Ethics, Public Health and Human Rights unit, but learned an invaluable life-long theme in the unit for my public health career.

Professional attachment

The purpose of the professional attachment is 'to learn how to design, develop and use public health *organisations* to deliver public health goals'. I did my professional attachment for five months from August, 2004 at the clinical nurse training program in Timor-Leste. I had a contract with the World Health Organization (WHO), Timor-Leste, as an intern for 12 weeks. Furthermore, I obtained special permission for an additional stay from the WHO Representative, Timor-Leste and continued the attachment until the end of 2004.

I expanded the given purpose of the professional attachment by considering the 'public health *program*' as a type of unit to deliver public health goals, and deemed the clinical nurse training program the 'host program'. The contract as an intern with the WHO necessitated making such modification. The clinical nurse training program is one of the national training programs for existing health professionals in Timor-Leste, held by the National Training Center for Health Education and Training (NCHET) under the Ministry of Health (MoH). The WHO, Timor-Leste, technically supports it. My intern work in the WHO was limited to the program. I realised I could observe and analyse the NCHET program during my work at the WHO. Therefore, I decided to study the clinical nurse training program and NCHET in the professional attachment even though my official status was as a WHO intern.

During the 3-month internship, I was fully involved with the program management team, attending training, follow-up visits, related meetings and so on. The main task assigned to me in the team was to evaluate the ongoing program. Relevant documents, reports and materials were reviewed to summarise the process of the program, and two surveys targeting ongoing and past training participants were carried out. At the end of the official internship (the end of October 2004), I submitted an assignment report, which was obligatory for a WHO intern. The report I made for the WHO later became part of an official document of the MoH.

In the professional attachment report, management of the clinical nurse training program was examined by using Henri Fayol's 'five activities of management' theory, and general organisational issues in the NCHET were analysed by applying the 7S McKinsey Framework. In addition to the assigned work, I reaped valuable information for the future research project from the professional attachment. Throughout the work, clinical nurses sustained me showing their willingness to learn and the potential abilities of local health personnel in the community.

Research project

The purpose of the DrPH research project is 'to help the student to learn about the role of research in public health practice'. DrPH theses are generally oriented towards public health practice. Based on this purpose, I conducted a research project entitled 'improving the use of medicines in Community Health Centers (CHCs) in Timor-Leste'.

Before enrolling in the school, I had the chance to work for rural CHCs in this new country as an NGO worker and expatriate district medical officer. My research questions concerning the use of medicines have been gradually developed since I worked with local health personnel. I found prescribing and dispensing medicines by local health personnel were vital for patients in rural areas. However, the reality in the CHC was hard. Experience during my Professional Attachment persuaded me to focus on their new STGs and related training.

Prior to the DrPH review in October 2005, a pilot project was carried out from the beginning of June to mid-August, 2005. The pilot project did not merely give me a chance to test preliminary data collection tools, but also provided good opportunities to arrange for the main field visit, including managerial affairs and on-the-job-training of research assistants. The main field visit started in November, 2005, and lasted for nearly one year.

This was the first time for me to conduct research that used 'mixed research methods'. The research required extensive research knowledge and skills in both qualitative and quantitative techniques, and was a great opportunity to integrate all that I have ever studied. For the qualitative part, the 'Framework Approach' was employed, and various statistical analyses methods were used for the qualitative components.

What I gained during the research project was not simply expertise in practising research. For example, I experienced tough negotiations as an independent researcher, and I also played a role as a manager in the research team that consisted of ten members of research staff. Teaching young people research knowledge, attitudes and skills was one of the most laborious tasks during the research project, but it was essential. The situation in a country where it was hard to obtain experienced data collectors did not allow me to escape from training staff members myself from the beginning.

Moreover, I had to overcome many contingencies during the research in a brand-new country where everything was still unpredictable. Above all, two events almost destroyed my plans for the research proposals. One was the MoH's sudden change in human resource allocation in my research target facilities, which forced me to revise the data

collection and analysis plans. The second was a time of social unrest during the data collection, which made the government stop functioning for a while and many people, including my staff members, were internally displaced. Fortunately, we were able to complete the data collection. However, these unanticipated events later affected the research both directly and indirectly.

Results of the research will provide useful information for the MoH in maintaining the quality of the health services in Timor-Leste, which will ultimately be beneficial to people in the community.

For me, the DrPH program has not been an easy course to finish. I often experienced very hard times during the process. Nevertheless, I can say the time I spent was precious. The program has equipped me for future work in a public health area.

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List of abbreviations

ARTI	Acute Respiratory Tract Infection
CHC	Community Health Center
CI	Confidence Interval
DHS	District Health Services
EML	Essential Medicines List
HP	Health Post
HSRDP	Health Sector Reconstruction and Development Project
ICIUM	International Conference on Improving the Use of Medicines
IMCI	Integrated Management of Child Illness
INRUD	International Network for the Rational Use of Drugs
MC	Mobile Clinic
MoH	Ministry of Health
NCHET	National Center for Health Education and Training
NGO	Non-Governmental Organization
ORS	Oral Rehydration Salt
OR	Odds Ratio
PHC	Primary Health Care
STG	Standard Treatment Guideline
TFET	Trust Fund for East Timor
UNTAET	United Nations Transitional Administration in East Timor
WHO	World Health Organization

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CHAPTER 1 Introduction

Modern medicines have become indispensable in our lives and healthcare. While the concept of 'essential medicines' has been introduced worldwide and access to essential medicines is now considered a human right, problems concerning the inappropriate use of medicines have emerged. The use of medicines is only one facet of a comprehensive healthcare activity. However, both healthcare service providers and users often expect medicines that are unnecessary and continue their needless and occasionally dangerous consumption. Improving the use of medicines is an issue of the quality of healthcare and effective use of limited resources. Although it is a relatively new research area, efforts to improve the use of medicines in under-resourced countries have been reported.

A new health system is now being established in the Democratic Republic of Timor-Leste (former East Timor, hereafter Timor-Leste). It reconstructed a nation under hard circumstances, and restored its sovereignty in May 2002. There are certain aspects of the quality of healthcare services in the Primary Health Care (PHC) facilities in this new country. For example, prescribing and dispensing medicines inappropriately by Community Health Center (CHC) personnel have been described although there is no objective data. No health program in Timor-Leste specifically centers on 'improving the use of medicines', but many activities include this component. The notion is incorporated in the country's 'drug policy', one of the macro-policy sections in the Health Policy Framework. Efforts to improve the use of medicines have been introduced into various programs through their training but little about the present situation faced by Timor-Leste in this regard is known.

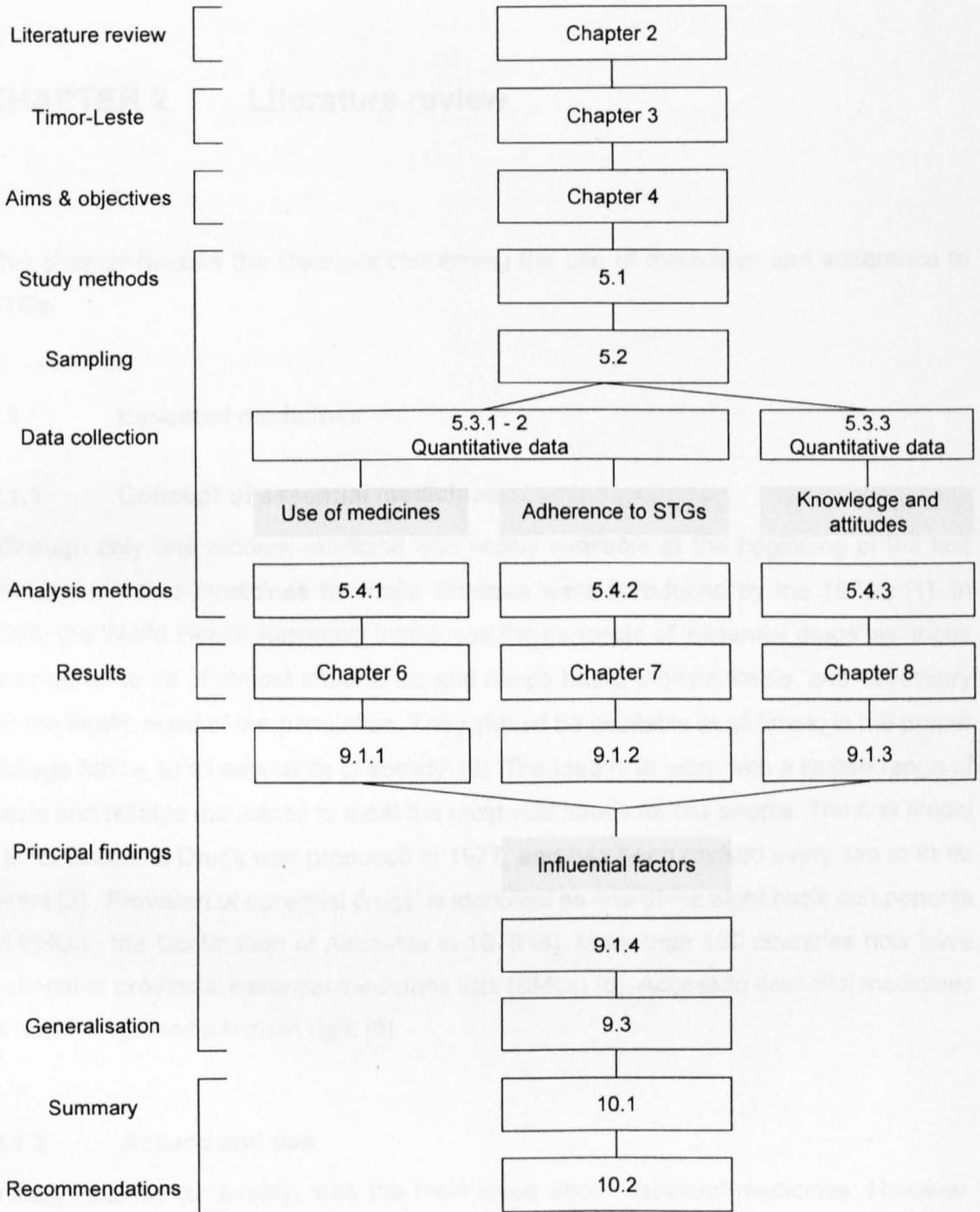
The thesis aims to study the use of medicines in rural CHCs in Timor-Leste, focusing on adherence to their new standard treatment guidelines (STGs). Nurses and midwives¹ who are working for rural CHCs with limited facilities in difficult conditions are targeted.

¹ In this thesis, 'health personnel' is used as a general term to indicate nurses (including 'managers') and midwives. Nurse assistants are excluded although they are also included in 'health personnel' in official documents of the Ministry of Health (MoH), Timor-Leste.

The study tries to contribute to the quality of CHC practice by improving their use of medicines through STGs for people living in resource-limited areas. The structure of this thesis is as follows:

Chapter 2 reviews the literature concerning the use of medicines and adherence to STGs. Chapter 3 describes the background of the research area. It provides information on the public health sector in Timor-Leste, including their new STGs. Chapter 4 establishes the aim, objectives, and research questions of the study. The scope and framework of the study are also presented in this chapter. Chapter 5 explains methods and data collection. In relation to this, the preparation process of the project and unanticipated events during the data collection are presented. Chapter 6 describes the use of medicines in Timor-Leste, applying international medicine use indicators. 'Prescribing indicators' are analysed by prescriber's training. Chapter 7 assesses adherence to STGs for three target diseases. Prescriber's individual adherence are analysed by prescriber characteristics and CHC's overall adherence are analysed by CHC characteristics. Chapter 8 describes health personnel's knowledge of and attitudes to the use of medicines and adherence to STGs based on individual interview data, which are qualitatively analysed. Chapter 9 integrates the results and discusses the study. Chapter 10 summarises the findings and makes recommendations for Timor-Leste's health system, other resource-limited areas and future research.

Figure 1-1 Structures of the thesis



CHAPTER 2 Literature review

This chapter reviews the literature concerning the use of medicines and adherence to STGs.

2.1 Essential medicines

2.1.1 Concept of essential medicines

Although only one modern medicine was widely available at the beginning of the last century, effective medicines for major illnesses were introduced by the 1970's [1]. In 1975, the World Health Assembly introduced the concepts of 'essential drugs' as 'those considered to be of utmost importance and hence basic, indispensable, and necessary for the health need of the population. They should be available at all times, in the proper dosage forms, to all segments of society' [2]. The idea is to work with a limited range of basic and reliable medicines to meet the most vital needs for the people. The first Model List of Essential Drugs was produced in 1977, and has been revised every two to three years [3]. 'Provision of essential drugs' is identified as one of the eight basic components of PHC in the Declaration of Alma-Ata in 1978 [4]. More than 150 countries now have national or provincial essential medicines lists (EMLs) [5]. Access to essential medicines is now recognised a human right [6].

2.1.2 Access and use

Initially, access (or supply) was the main issue about essential medicines. However, appropriate use of medicines has become another important argument [7, 8]. The WHO Conference of Experts, Nairobi in 1985 defined 'rational use' as follows: 'the rational use of drugs requires that patients receive medications appropriate to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community' [9].

'Inappropriate medication use' defined by Trostle is 'the distribution or consumption of drugs in ways that reduce or negate their efficacy or in situations where they are unlikely to have the desired effect'. The author also notes the concept of 'rational drug use' can

limit our understanding as the use of medicines often has a socio-cultural rationality that may not be consistent with clinical or scientific rationality [10]. What is rational in a medical sense may not be rational for the consumer [11]. It is important to note that simply improving physical access to medicines will not of itself solve the problems. In a review of the 25-year history of the Model List of Essential Medicines, 'irrational use of medicines' is indicated as one of four remaining critical barriers to closing the 'access gap' to essential medicines [12].

2.1.3 Location of issues

Problems concerning medicines are widespread. On the one hand, issues of essential medicines overflow from the health sector to the economic and political ideologies [13]. Many of the problems surrounding medicine use can be tackled at a global level by many agencies, governments and pharmaceutical companies [14]. On the other hand, medicines are prescribed, dispensed and used in the community. A recent International Conference on Improving the Use of Medicines (ICIUM) divided its discussion into five: 1) international policies and systems, 2) national policies, systems and programs, 3) hospitals and in-patient care, 4) primary care and health providers, and 5) primary care and the community [15], which shows the extent of the issues.

2.2 Issues concerning the use of medicines

WHO estimates that more than half of all medicines are inappropriately prescribed, dispensed, or sold while about half of patients fail to take them correctly [16]. This section reviews literature on the use of medicines.

2.2.1 Examples of inappropriate use of medicines

Common issues of inappropriate use of medicines have been indicated. Problematic patterns of medicine use by healthcare providers can be summarized as follows: 1) over indication, especially for unnecessary antibiotics, injections and expensive (branded) medicines, 2) multi-drug use (or polypharmacy), and 3) incorrect use in terms of the dose and schedule [11, 16-21].

2.2.2 Negative consequences of inappropriate use of medicines

There is some evidence of the negative impact on health due to the inappropriate use of medicines, such as limited efficacy, adverse side-effects, iatrogenic diseases, antibiotic resistance. In addition to individual and public health outcomes, the inappropriate use of medicines is a threat to household as well as national health budgets [11, 16-20, 22]. Although people expect much from medicines, their faith is often unconfirmed and overvalued. If inappropriately used, medicines lose their therapeutic value, and could be harmful to health and an economic burden [19]. Using medicines inappropriately diminishes the quality of healthcare and causes resources to be wasted [22]. Furthermore, there is a psychosocial impact that makes people believe that there is 'a pill for every ill' [18], or to stimulate inappropriate patient demand that leads to reduced access due to stock-outs [16]. A previous study shows that prescriptions with more items are associated with poorer dispensing practice and patient knowledge, which suggests that even bio-medically less harmful medicines, like vitamins, can be risky [23].

2.2.3 System, healthcare providers, and users

Many interrelated factors influence the use of medicines. The health system, healthcare providers (mainly prescriber and dispenser) and patients and community are all involved in the therapeutic process [17]. Less attention has been paid in previous studies to the role of professionals compared to 'patient compliance'², and research on prescription and distribution of medications by health professionals to improve healthcare is recommended [10].

Although a lack of knowledge of health professionals is sometimes believed to play roles in inappropriate use of medicines, a review article on factors influencing antibiotic use indicates that evidence to support these assumptions is very limited. [24]. Rather, a study shows that knowing aetiology and differential diagnosis of diarrhoea is not associated with appropriate prescription of antibiotics [25]. In an ethnoepidemiological study, doctors prescribed less antibiotics and anti-diarrhoeal drugs when observed, and the authors discuss the variables other than technical skills that are involved in doctors' prescribing behaviour [26]. Some studies suggest that the prescriber is more influenced

² Nowadays, the word 'adherence' is preferred to 'compliance'; however, this phrase is used in this thesis in order to avoid confusion of 'health personnel behaviour to STGs' and 'patient behaviour to the prescription'. The difference between 'compliance' and 'adherence' is explained in 2.4.

by their own perceptions of patient expectations, their own preference, or social demands than individual patient expectations [27-32].

2.2.4 Steps of the healthcare process

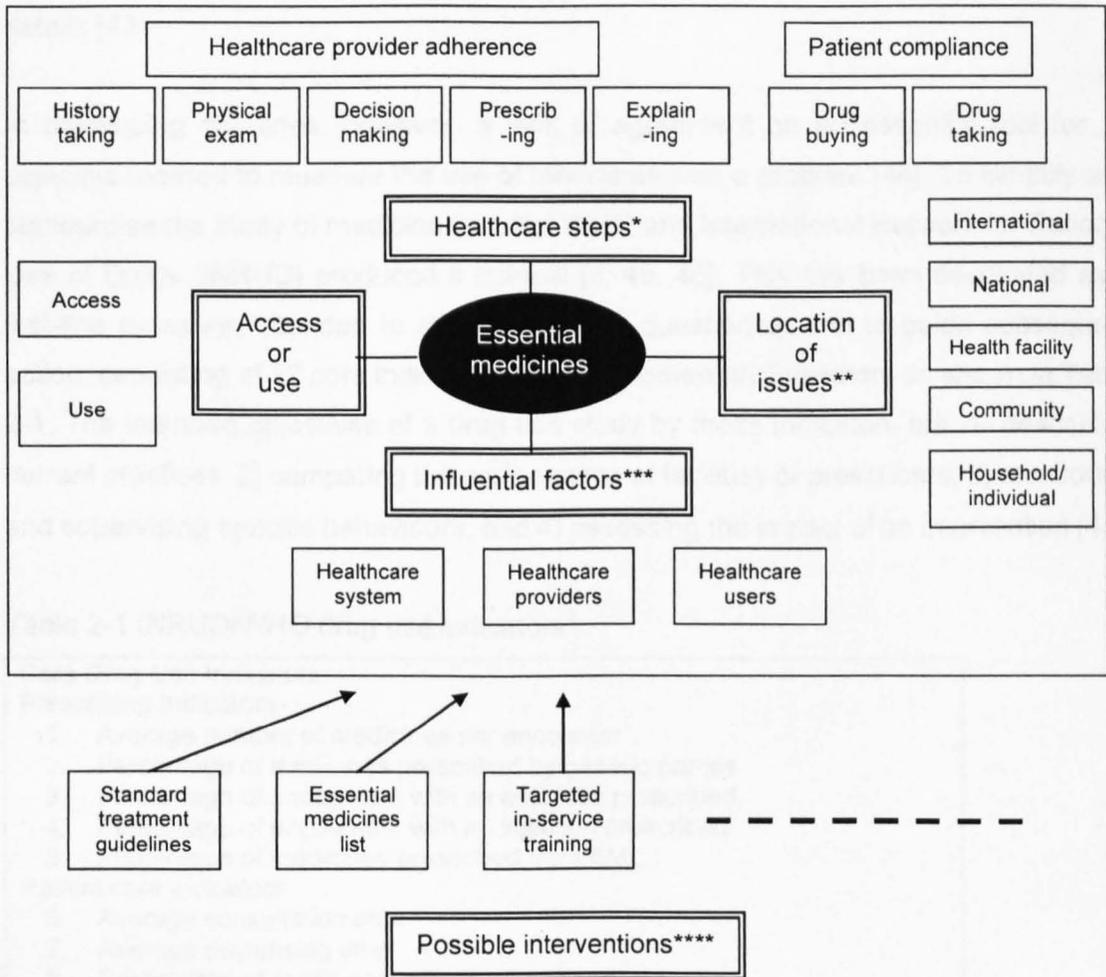
Medicines are used in both the bio-medical and local social context. Main 'actors', prescribers, dispensers and patients, are involved in using them. The process entails diagnosis, therapeutic plan, prescribing, dispensing and patient compliance with the treatment [18].

Five factors are identified to determine community effectiveness: efficacy of the treatment, diagnostic accuracy, healthcare provider adherence to appropriate treatment, patient compliance with the treatment, and coverage in target population [33]. These elements correspond to steps of the healthcare process (see Figure 1-1). Studies of Krause et al. in Burkina Faso investigate each of them to identify the steps with the greatest need for improvement. Only two percent of the patients received appropriate healthcare at every stage of the procedures. The studies find the patient-related steps such as drug-buying and drug-taking compliance yielded more satisfactory results than the provider-related steps, and improvement in earlier steps may have a particularly strong impact [34, 35].

2.2.5 Possible interventions to improve the use of medicines

Interventions intending to improve the use of medicines are reported; educational, managerial, regulatory and financial approaches have been implemented [11, 18, 36-38]. Although limited research on this issue is discussed as one of their findings, some strategies are recommended based on previous studies. STGs, EML, and targeted in-service training of health workers have been proven effective in some settings [22]. It has been indicated that merely distributing printed materials does not work well [39, 40]. Introducing STGs or EML alone is ineffective and needs to be combined with peer group development and training [18]. Due to the complexity of factors involved, it is unlikely that any single intervention will work in every situation [17]. It is suggested that all groups in the medication cycle need be touched in order to obtain meaningful changes in improving the use of medicines, not merely targeting one group such as users, health professionals, governments, and others [19].

Figure 2-1 Summary of issues surrounding essential medicines



Adapted from: *[34, 35] **[15] ***[17] ****[22]

2.3 Medicine use indicators

'Indicators' are explicitly defined and measurable items that state the structure, process or outcomes of care [41]. Indicators do not provide definitive answers but indicate potential problems that might need addressing [42].

They have been developed across Europe, primarily for hospital care [42]. For example in England and Wales, it has been suggested that up to 400 different prescribing indicators have been developed to assess the appropriateness of prescribing in general practice [43]. Reasons for the development of prescribing indicators are that prescribing is an important issue in quality of care, and is associated with costs. It is necessary to

have proxies to give an indication of prescribing performance without examining the details [43].

In developing countries, however, a lack of agreement on an essential tool for an objective method to measure the use of medicines was a problem [44]. To simplify and standardise the study of medicine use, the WHO and International Network for Rational Use of Drugs (INRUD) produced a manual [3, 45, 46]. This has been developed as a first-line measure, intended to stimulate further questioning and to guide subsequent action, consisting of 12 core indicators and complementary indicators as shown in Table 2-1. The intended objectives of a drug use study by these indicators are: 1) describing current practices, 2) comparing the performance of facilities or prescribers, 3) monitoring and supervising specific behaviours, and 4) assessing the impact of an intervention [44].

Table 2-1 INRUD/WHO drug use indicators³

Core Drug Use Indicators
Prescribing Indicators
1. Average number of medicines per encounter
2. Percentage of medicines prescribed by generic names
3. Percentage of encounters with an antibiotic prescribed
4. Percentage of encounters with an injection prescribed
5. Percentage of medicines prescribed from EML
Patient care indicators
6. Average consultation time
7. Average dispensing time
8. Percentage of medicines actually dispensed
9. Percentage of medicines adequately labelled
10. Percentage of patients with knowledge of correct dosage
Health Facility Indicators
11. Availability of EML
12. Percentage of key medicines in stock

Source: [44]

In 1993, the use of medicines in 12 developing countries was assessed by using these standardised indicators [47]. Some discussions on the indicators have been published; adaptation of indicators in hospital care [48]; questions about 'consultation time' and 'dispensing time' for investigating the quality of care [49]; a possibility of misleading results by drug use indicators to assess improvement of the quality of care [50]; 'labelling scores' and 'knowledge score' to be added to the original indicators [51]; usefulness of 'percentage of patients who received adequate antibiotic doses' as a prescribing indicator [52], and so on.

³ The manual originally uses 'drug' in 1993; however, 'medicine' has been recently used in WHO reports that use these indicators. Updated expressions of the indicators are used in this thesis.

Original indicators, however, are still used in developing countries. In a 2004 report more studies based on the indicators were added [53]. The average number of medicines per encounter was 1.3 or 4.4, and antibiotics were prescribed between one to three quarters of patients in these countries. In one country, 74 percent of patients received injections. In another country, only 27 percent of patients correctly answered dosage schedule of the medicines that they had received [53].

2.4 Standard treatment guidelines (STGs)

This subsection reviews previous studies on STGs. Various terms such as 'clinical guidelines', 'practice guidelines' and 'treatment guidelines' are used in the literature, and they are included in this review. The term 'STGs' is used in this thesis.

2.4.1 Definition and benefits of STGs

According to the definition by the Institute of Medicine, 'clinical guidelines' are 'systematically developed statements to assist practitioner and patient decisions about appropriate healthcare for specific clinical circumstance' [54]. STGs have become a familiar part of clinical practice across countries since the 1990's. STGs became necessary because of issues that healthcare systems are facing: rising healthcare costs, variations in service delivery, and the desire of health professionals and of patients to provide or to receive the best care [55]. STGs are principally established to improve quality of and effectiveness of healthcare [56-58], and to minimise potential harm [55]. STGs are known to effect both process and outcome of healthcare [57]. They can benefit patients, healthcare providers, and healthcare systems [55, 59].

For example, patients can receive improved health outcomes promoted by STGs in the same manner wherever they are treated. STGs also have prospects to empower patients by providing information and to promote distributive justice by exhorting better service delivery [55]. A potential contribution to impact on disadvantaged populations and health inequities is advocated, although previous STGs have rarely focused on equity issues [60, 61]. An effect of STGs on patient satisfaction is suggested [62].

From the healthcare provider's standpoint, they can learn from explicit recommendations in STGs when they are uncertain about how to proceed, as well as when health professionals feel themselves outdated. STGs also improve the consistency of care [55].

STGs can help health professionals employ evidence-based medicine without significantly increasing their workload [63].

Countries where resources are limited do need STGs that can be applied to local practice. The fact that financial resources are insufficient and there is no money to waste requires effective healthcare provision, which can be helped by STGs [64]. Furthermore, where information and human resources are scarce, STGs' contribution to evidence-based medicine is important [63].

2.4.2 Implementation of STGs

Using STGs improves the use of medicines, when they are not merely distributed but implemented with educational and/or managerial approaches [11, 22, 36, 57]. Introducing STGs with training health personnel has been shown to be effective in previous studies [65-71]. Active strategies to introduce STGs, for example, peer group discussion, self-assessment and feedback sessions, are suggested [68, 72, 73]. In some studies, educational interventions to implement STGs are combined with managerial approaches such as supervision [65, 70]. STGs and an EML should be developed together to be actively implemented [22, 59]. As the second ICIUM recommends, what are effective strategies to encourage improving adherence to STGs for appropriate use of medicines is now one of the key questions that need to be addressed [74].

Since interventions in previous studies are dependent on local factors, evidence for an effective intervention in one setting is not always useful in another setting [40]. There are various impediments to put evidence into practice in developing countries. Strategies used in industrial nations are unlikely to be successful in under-resourced countries, and locally adapted STGs are required [63]. Although the number of studies from developing countries is increasing, evidence for effective practice is still restricted [11, 40]. More evidence from developing world is needed.

2.4.3 'Adherence' and 'compliance'

The term 'compliance' has been widely used for a long time to describe patient's behaviour; whether the patient follows the prescription given by the health personnel [75]. 'Compliance' implies the patient takes orders from the healthcare provider [19] and the idea entailed blaming patients [76]. 'Adherence' is another term to concern with patient behaviour in relation to prescribed medicines. Compared with 'compliance', 'adherence' underlies the importance of patient's active attitudes and requires the patient's

agreement to the recommendations [19, 75, 76]⁴. It is believed that these two terms should be differentiated [76], and 'compliance' is being replaced by 'adherence' [75].

As recognition of the importance of STGs, these words, 'compliance' and 'adherence', are also used in relation to health personnel's behaviour towards STGs; whether the health professional follows the recommendations in the STGs⁵.

2.4.4 Possible factors influencing adherence to STGs

It is not always easy for health personnel to adhere to STGs. Various theories / models have been developed to understand factors influencing adherence to STGs, which mainly try to understand barriers to adherence. 'Putting evidence into practice' is considered to be a similar theme with adherence to STGs, and related literature is included in the review.

STGs have tried to change clinical practice for the better. However, change is often resisted when it occurs in the workplace [77]. Previous studies have shown that health professionals are also resistant to changing their daily practice [78-81] and that this can be a barrier to adherence to STGs [82]. Groi discusses the best way of making changes in clinical practice. Different phases of the changing process are suggested: dissemination, adaptation, implementation and maintenance. Each phase has obstacles and appropriate strategies to overcome them [83].

The existence of STGs does not guarantee that they are used in practice [84]. Cabana et al. identify seven themes of barriers to physician adherence to STGs using a 'professional perception model', based on a review of 76 studies; lack of awareness, lack of familiarity, lack of agreement with guidelines, lack of self-efficacy, lack of expectancy, lack of motivation, and external factors are found. The authors then develop a 'knowledge attitudes behaviour framework'. Awareness and familiarity influence knowledge while agreement, self-efficacy, expectancy and motivation mainly affect attitudes [82, 85]. Schouten et al. apply this framework in their qualitative study to

⁴ The term 'concordance' is recognised as a further step, which considers patient believes and wishes [19, 75].

⁵ The main theme of this research is *health personnel adherence to STGs*. *Patient adherence to prescription* is sometimes mentioned in this connection. Although 'adherence' is preferred to 'compliance' nowadays, the phrase 'patient compliance' is used in this thesis to avoid confusion between two topics.

present factors influencing physician adherence to STGs for community-acquired pneumonia, focusing on antibiotic use. They classify their findings into internal and external barriers. The internal barriers are further categorised: cognitive components (physician knowledge), and affective components (physician attitudes). External factors are found in the guidelines themselves, social context and organisational context [86]. Espeland and Baeheim use Cabana's model to identify barriers to physician adherence to guidelines for ordering plain radiography for back pain. They found some new barriers and rearrange the framework categorising into three major types of barriers: knowledge-related, attitude/feeling-related, and external barriers. The external barriers they identify are: guideline-related, patient-related, and setting-related barriers [87]. Barriers to improving clinical practice suggested by Oxman & Flottorp are related to practice environment (organisational context), prevailing opinions (social context) and knowledge and attitudes (professional context) [88]. Grol & Wensing summarise theories and models relating to implementing change in diabetic care. According to this, theories / models are related to individual professionals, social context, or organisational and economic context [89]. Studies explain that some features of STGs influence adherence to the STGs [82, 86, 90-92].

There are some variations in these theories that try to understand factors influencing health personnel adherence to STGs. In summary, previous studies tell us that the main influential factors of adherence to STGs are: 1) individual professional knowledge, 2) professional attitudes, and 3) external factors, including working environment and STG-related factors.

CHAPTER 3 Timor-Leste

This chapter provides background information on the research area. The process of the health system rehabilitation and development with limited recourses is described. Timor-Leste's drug policy and Timor-Leste versions of STGs are explained.

3.1 Overview of Timor-Leste

Timor-Leste⁶ is a small, newly founded country with a population of 924,642, which was counted for the first census in 2004, and is 15,410 Km² in area [93, 94]. Its sovereignty was restored on May 20, 2002 after 2.5 years of the United Nations Transitional Administration in East Timor (UNTAET) and more than 450 years of occupancy by other countries.

Since 1975, the territory had been unevenly integrated and practically administered by Indonesia. People had the chance to vote for independence by Popular Consultation in August 1999; however, after the result was announced that 78.5 percent of people refused to remain under Indonesian rule, serious violence and destruction occurred in every corner of the country. Many East Timorese were killed and as many as 500,000 were displaced from their homes, about a half them leaving the territory, in some cases by force. [95, 96]. In addition to this, the administrative system became dysfunctional⁷. It was reported as 'a complete collapse of state structures' with over 40 percent decrease in economic production and over 70 percent destruction of infrastructure [97]. UNTAET's mandate was not only to provide security and maintain law and order in the territory, but also to establish an administration and to assist in the development of civil and social services [98]. East Timor has had to build everything from scratch, and several efforts to build a new nation have been made by the Timorese with international assistance.

⁶ The nation gives its official name in English as 'the Democratic Republic of Timor-Leste' after it restored its sovereignty in May 2002. Before that, documents written in English usually use 'East Timor'. This chapter followed each original document that was referred to.

3.2 Health system rehabilitation and development after the crisis

3.2.1 Brief history in rehabilitation phase

The health sector was not exempt from this serious situation. For example, health facilities were targeted and 80 percent of them were at least partially disrupted [99]. Very few people had experience in policy making and health administration. The remaining Timorese medical doctors numbered only around 25 [100]. The Central Health Authority⁸, which was established for health system rehabilitation, tried to retain ownership and keep many of the initiatives going during this rehabilitation process. The process is characterised by coordination and management of international assistance [101-103]. The sector-wide program supported by the World Bank-administrated trust fund came to be centrally located in the rehabilitation and development of the health system [104].

In February 2000, the Interim Health Authority, which was composed of Timorese health professionals and international advisers, started to coordinate health issues throughout the country. The Interim Health Authority was in charge of planning and executing the Health Sector Rehabilitation and Development Program (HSRDP), funded by the Trust Fund for East Timor (TFET), which became effective in July 2000 [105]. The Interim Health Authority changed its name to the Division of Health Services and became one of the divisions under the Minister of Social Affairs in the first Transitional Cabinet in July 2000. Under coordination by the Division of Health Services, the 'leading NGO (non-governmental organizations)' provided medical and health services as well as district health administration, together with local health personnel. These NGOs also participated in designing and implementing the first District Health Plans in the HSRDP. By August 2001, senior health staff at national and district levels had taken up their positions [106] and the first recruitment process for other health personnel including CHC level staff was completed [107]. A plan that leading NGOs would continuously support newly established District Health Services (DHSs⁹) emerged at one stage [108],

⁷ One of the possible reasons was that many Indonesians who were previously in higher positions in the 'provincial government' as well as in the private sector had left.

⁸ The Ministry of Health was officially established in September 2001. Central Health Authority here refers to the Ministry of Health and its preceding forms (Interim Health Authority and the Division of Health Services) as expressed in a monograph by the main members of the Interim Health Authority and the Division of Health Services.

⁹ DHS is the same meaning with DHO (district health office) in Timor-Leste. When indicating a specific office, they write, for example, 'DHS Dili', and when using the term as plural, they write DHSs in their documents.

but finally the work was handed over from international staff to the Timorese, and district 'leading NGOs' finished their missions by December 2001 [109]. The Division of Health Services was promoted to the Ministry of Health (MoH) when the second cabinet was organized in September 2001.

The people's right to have health and medical care is explicitly stated in the new constitution [110]. There are two important documents in the Timor-Leste policy and planning principles that relate to healthcare services: the relevant sections of the National Development Plan and East Timor's Health Policy Framework. The MoH intends to achieve its vision to promote 'Healthy East Timorese people in a healthy East Timor'. 'Equity', 'efficiency' and 'sustainability' are emphasised in the process of health system establishment [111, 112]. The health sector is known for its progress in building policy, institutions and management capacity [97].

3.2.2 Basic Package of Health Services

In the Health Policy Framework, the MoH identified a package of services that will ensure greater coverage and impact for the majority of the people. The basic package consists of 'essential health services and cost effective interventions to prevent and control or treat problems causing the highest burden of diseases in the country'. These services and interventions are delivered within the district health system at CHCs, Health Posts (HPs) and Mobile Clinics (MCs) in order to meet 80-90 percent of the public health and curative needs of the people at a cost the government can afford [112]. In addition to service delivery, service support and health system development, the basic package of health services guides strategic planning and development of protocols, guidelines and monitoring of service provision [113]. The framework of the basic package of services is shown in Table 3-1.

Table 3-1 The Basic Package of Health Services in Timor-Leste

Level of services	Intervention component	Essential and priority interventions	Essential but lesser priority interventions
Community Level Health Post-Level 1 Health Center-Level 2 Health Center-Level 3 Health Center-Level 4	Monitoring Prevention Health promotion Diagnosis Treatment Referral Rehabilitation	Maternal health - nutrition - reproductive health - family planning Child health - immunization - IMCI Communicable diseases - tuberculosis - malaria - leprosy	Environmental health - food handling Non-communicable disease - trauma - mental health - oral health - muscular-skeletal - cardiovascular

Source: [114]

3.2.3 Level of health facilities (health service configuration)

Four levels of public healthcare facilities are available in the district health services as the first contact with healthcare. Moreover, there are five referral hospitals and one national hospital in the country. Allocation of human and material resources and establishment of a clinical referral system are based on this level. A summary of the level of health facilities is indicated in Table 3-2. A Level 3/4 CHC (CHC with beds and doctors) or hospital is located in the main town of every district, and a few exceptions apart, each of remaining sub-districts has a Level 2 CHC (CHC without beds and doctors)¹⁰.

Table 3-2 Summary of the level of health facilities in Timor-Leste

Facility	Level	Staff	Location	No. of beds	No. of locations*
Mobile Clinic	Level 1 (outreach)	from HP or CHC	remote communities	---	114
Health Post	Level 1	1 - 2	sub-district sites	0	177
Community Health Center	Level 2	5 - 7	sub-district center	0	59
Community Health Center	Level 3 or 4	10 -14 incl. GPs	district capital	- 20	8
Referral Hospital		40-50 incl. specialists**	district capital	24	4
Baucau Referral Hospital		137 incl. specialists	center of the eastern region	114	1
Dili National Hospital		330 incl. specialists	capital	260	1

* Minor variations in these numbers can be in different documents (sometimes in different sections in the same document).

** limited specialities

Source : [113]

3.2.4 Human resources

A major imbalance in the workforce was a serious problem for re-building the nation; in general, there were few senior (decision-making level) officers and specialists while there were so many ex-junior employees that the new government could not afford to employ all of them. The problem was seen across all sectors.

The Health Policy Framework from the newly established MoH indicates 'undersupply in certain types of health personnel' or 'loss of senior professional in the health services' [112]. It implies a scarcity of medical doctors was one of the major concerns for the new

¹⁰ The source of Table 3.2 was published in May 2005. However, a substantial change was made in human resource allocation plan later in the end of 2005, during data collection for this thesis. This issue will be explained in 5.6.1.

healthcare system at its inception. Other documents indicate the shortage of doctors with actual numbers: the number of remaining East Timorese doctors after the crisis in 1999 was around 25 [100]; only 14 doctors delivered direct healthcare services in 2002, with half of the physicians working at Dili National Hospital [115]; a report in 2002 estimated doctor/patient ratio by 2005 at 1:13,000 [116]. However, employing expatriate medical doctors caused a financial burden; it was reported in 2005 that 50% of the total budget would be personnel costs, which was 'skewed by the relatively high salaries' paid to expatriate doctors [113].

The National Health Workforce Plan published in May 2005 indicates there were 73 doctors posted in 2005, of which only 27 were Timorese¹¹. The plan projects one doctor for every 8,000 people by 2015 from 1:12,666 in 2005, which will require 185 Timorese and 23 expatriate doctors 10 years later [113]. Since 'a doctor cannot reside in every CHC at the sub-district level' with the planned numbers, it is suggested that doctors make regular clinical visits to the sub-districts (Level 2 CHC), and the role of the clinical nurse practitioners are discussed as 'doctor substitutes' in the plan [113].

Unlike the low number of physicians, Timor-Leste had an 80 percent retention rate of nurses and midwives after the crisis, which amounted to 2,000 people [117]. Among them, 850 were employed at public healthcare facility levels for the first recruitment in 2002 [118]. The MoH document of May 2005 shows that 820 nurses, including 119 assistant nurses, and 274 midwives are in post [113]. Nearly all nurses and midwives were educated under the Indonesian educational system. 'Basic nursing school', 'midwifery school' and 'academy' were the main educational courses for them during the Indonesian time¹². Basic nursing school was a vocational high school, which required three years after compulsory education. The majority of nurses in Timor-Leste are basic nurses. To be a midwife, a basic nurse studied for one more year at midwifery school. Academy was a 3-year diploma course after high school (either vocational or general), which was considered higher education. There was a nursing academy in East Timor for a short period during the Indonesian time, but no midwifery academy. Apart from a small number of doctors and dentists, very few health professionals graduated from universities in Indonesia.

¹¹ The document, however, mentions nine of these 27 Timorese doctors were on study leave then.

3.2.5 Training for existing health personnel

Human resource development is listed as one of six policy areas in the Health Policy Framework and is identified as 'one of the biggest challenges in ensuring health for all in East Timor' [112]. The MoH's guideline for training and development for health personnel addresses the priority development needs of the health services [119].

Because of the scarcity of doctors, the roles of nurses and midwives in clinical work have had to be expanded when compared with the Indonesian time and UNTAET time. However, their 'under-qualified and lower-skilled clinical practices with inadequate supervision and direction' was pointed out and training of nurses and midwives to fulfil their new roles was recommended. The MoH once suspended pre-service training (formal education) for new nursing students after the remaining students graduated, and prepared for a new educational system. Instead, it focused on in-service training for existing nurses and midwives [113]. Many training programs for nurses and midwives have been conducted against this background. At the beginning, implementing training relied heavily on international aid agencies. Some of them were thought 'ad hoc', not focusing on prioritized health service needs, and were therefore of questionable long-term benefit [113]. The National Center for Health Education and Training (NCHET) was established in 2002 under the MoH, and since then it has managed health professional training in collaboration with international assistance. Among various kinds of training managed by NCHET, clinical nurse training and training for Integrated Management of Child Illness (IMCI) were organized on a particularly large scale¹³.

An idea of clinical nurse training occurred in an early stage of health system development although the name was changed several times, such as Nurse Practitioner, Public Health Nurse or Clinical Nurse [115, 120, 121]. The clinical nurse training program is a six-month¹⁴ certificate program to develop human resources to manage basic illnesses and conditions in PHC facilities. It started in February 2003, and every CHC had one nurse trained in the program by mid-2005 [113]. The training consists of 17 modules

¹² Assistant nurses have a shorter educational background than basic nurses. The MoH is planning to discontinue this position in 2013 [113].

¹³ 'Clean and safe delivery' training was also implemented on a large scale, with 2-week training for 338 members of health personnel [113]. As the training was specifically for delivery, this thesis does not discuss this training.

¹⁴ Trainees gather in the training center for three months and study by themselves at their own CHC (self-learning component) for three months.

including management of 11 illnesses or health conditions and essential medicines for the illnesses. It also includes 'comprehensive patient management'. An overview of the clinical nurse training is shown in Table 3-3.

Table 3-3 Clinical nurse training in Timor-Leste and 'comprehensive patient management approach'

Contents	
Illnesses /health conditions	Other modules
<ul style="list-style-type: none"> - Acute respiratory tract infection - Malaria - Diarrhoea - Tuberculosis - Intestinal parasites - Dengue - Skin infections - Malnutrition - Anaemia - Pregnancy - Wound and trauma (incl. first aid) 	<ul style="list-style-type: none"> - Introduction - Health promotion - Immunization - Infection prevention - Essential medicines - Nurse's code of ethics and clinical nurse's scope of works
Comprehensive patient management approach	
<ul style="list-style-type: none"> (1) General danger signs (2) General information and history (3) Physical examination (4) Clinical decision making and classification (5) Therapy (6) Consultation with doctors and referral (7) Counselling¹⁵ and follow-up (8) Health education and promotion 	

Source: [122]

IMCI has been internationally developed and promoted by the UNICEF and WHO to assess the most common symptoms among children under five years old; cough / difficulty breathing, fever, diarrhoea and ear problems as well as nutritional status and immunization status [123, 124]. In Timor-Leste, the program was locally adapted and implemented at a very early stage of the rehabilitation of the country [125, 126]. In contrast to the clinical nurse training, the training period per person for IMCI is short (two weeks), while much larger numbers of health personnel were targeted; by May 2005, 319 members of health personnel had been trained in the IMCI program [113]¹⁶.

¹⁵ In Timor-Leste's STGs in, it does not mean 'psychotherapy' as usually used, but is considered to have a similar meaning to 'patient education' or 'information given to the patient'.

¹⁶ According to the presentation given by an IMCI program officer in June 2005, 381 people had been trained [126].

3.3 Drug policy

The drug policy in Timor-Leste also appeared in the Health Policy Framework paper as one of six macro-policy areas. The framework paper indicates that East Timor had 'frequent problems of supply at the delivery point and inappropriate use' during Indonesian time and 'has relied initially on the contribution of NGOs and UN agencies through donations' during the transitional period to independence. In 2001, an Autonomous Medical Supply System was introduced and the first national EML was drafted [112].

When International 'leading NGOs' handed over district work to the DHSs, it was required that medicines be provided and procured by the MoH and managed by DHSs and CHCs. Withdrawing from separate international donations, provision and management of the medicines for public health facilities eventually shifted to AMSS at the end of 2001 [105]. The Autonomous Medical Supply System became the Autonomous Drug and Medical Equipment Service by a decree in 2004, and is planned to be a public enterprise [127].

The second national EML was published in 2004 and advocates that the EML is 'the precursor for the revised Standard Treatment Guidelines'. This second version of the EML is characterized by four points. Firstly it was developed in collaboration with vertical programs such as IMCI, clinical nurse training program and so on. Secondly, each medicine in the list indicates the level of health facility (e.g. CHC Level 2) to be used¹⁷. This levelling of medicines corresponds to the referral system. Thirdly, it considers the costs of treatment and each medicine has a price indicator¹⁸. Finally it recommends 'rational drug use' [128].

¹⁷ For example, co-trimoxazol indicates all facility level (Level 1, Level 2, Level 3/4 and Hospital), but chloramphenicol tablet only indicates Level 3/4 and Hospital. Some medicines specify specialist use only.

¹⁸ such as 'S', 'M', 'L', 'XL', 'XXL' and 'XXXL'

3.4 STGs in Timor-Leste

In its 2002 Health Policy Framework paper, the MoH planned to issue 'National Treatment Guidelines' to ensure rational use of available medicines by all health workers [112]. Nationwide standardization of practice was applied in the policy.

3.4.1 Timor-Leste versions of STGs

Timor-Leste MoH seldom uses the term 'standard treatment guidelines' in its official documents. Standard treatment guidelines do not appear in a publication entitled 'STGs'. Instead, standard clinical practice is recommended in several kinds of 'textbook', 'manual', 'guidebook' and 'protocol'. They have been developed for and disseminated through various national health programs for disease control / patient management, for example, the clinical nurse training program, the IMCI program, the malaria management program, the safe motherhood program and so on. National standard treatment or management of an illness is usually indicated in flowcharts or classification tables (occasionally in statements) in the material of a program. They are developed based on the Basic Package of Health Services policy. The medicines used in these STGs are listed in the national EML. All of them were introduced during training for health professionals [113].

3.4.2 Extracts of STG contents

This study will target acute respiratory tract infections (ARTIs), malaria and diarrhoeal diseases and focus on clinical nurse training textbooks and the IMCI chart-book as Timor-Leste versions of 'STGs'. Key flowcharts and classification tables in the training textbooks and chart-book used for this study are attached in Appendix 1. The following are extracts from the contents.

ARTIs¹⁹

Three points are key to ARTI management. 1) The illness should be clinically classified between categories: the upper ARTIs or lower ARTIs (adults); or severe pneumonia, pneumonia or 'no pneumonia' (children). 2) An antibiotic is needed for lower ARTIs and

¹⁹ based on flowcharts and classification tables in the clinical nurse training textbook for ARTIs (p17, 18, 34, 35) and the IMCI chart-book (p2)

pneumonia. 3) No antibiotic is recommended for most types of upper ARTIs and 'no pneumonia'.

Malaria²⁰

Both the clinical nurse training textbook for malaria and IMCI chart-book are based on the National Protocol of Malaria Management. Malaria management where a blood smear test was not available (in most of Level 2 CHCs) is based on clinical decision. Treatment for clinically suspected malaria patient needs to cover both *P. falciparum* and *P. vivax*, which are reported to be equally present in Timor-Leste. Giving chloroquine and sulfadoxine + pyrimethamine (hereafter Fansidar) at the same time for a clinically suspected malaria patient is recommended.

Diarrhoea²¹

For diarrhoeal patient management, two kinds of classification are recommended: severity of dehydration (mild dehydration, moderate dehydration and severe dehydration) and type of diarrhoea (acute diarrhoea without bloody stool, dysentery and persistent diarrhoea). Key recommendations for diarrhoeal patient management are as follows. 1) Acute diarrhoeal patients without bloody stools with moderate or milder dehydration is that they be orally rehydrated and do not need an antibiotic. 2) Antibiotic therapy is only recommended for dysentery. 3) Treatment for persistent diarrhoea is based on the possible cause: diet for children with malnutrition, anti-helminthic for suspected parasitosis and metronidazole for suspected giardiasis.

Antibiotics

Fourteen kinds of antibiotic, ten oral forms and four injections, are listed in the Timor-Leste EML for the Level 1-2 facility²². Injections, which are principally for

²⁰ based on National Protocol of Malaria Management, Timor-Leste, 1.3 Malaria without complications (pp. 4-5), 1.5 Treatment failure (pp. 6-7), and flowcharts in Appendixes (pp. 14-15, 17)

²¹ based on classification tables in the clinical nurse textbook for diarrhoea (pp. 13-15 and 21) and the IMCI chart-book (p. 3)

²² Listed oral antibiotics are amoxicillin, cloxacillin, phenoxymethylpenicillin, azithromycin, ciprofloxacin, co-trimoxazol, doxycycline, erythromycin, metronidazole, and nalidic acid. Listed injectable antibiotics are ampicillin, procaine benzylpenicillin, chloramphenicol, and gentamicin.

emergency use before referring the patients with a serious condition to the upper level facility, are indicated 'E' in the list.

Vitamins

In the EML for the Level 1-2 facility, only vitamin A and multivitamins are listed in the 'vitamins and mineral' section and folic acid in the 'anti-anemia medicines' section. Clinical indications of these medicines in Timor-Leste's STGs are limited²³. The STGs for the three target diseases of this study (ARTIs, malaria and diarrhoea) do not recommend a vitamin prescription.

²³ According to the STGs in the clinical nurse textbooks and IMCI chart books, indications for these vitamins are as follows; vitamin A for children with complicated measles, and vitamin A, multivitamin and folic acid for cases with moderate malnutrition. ('below red line' of growth monitoring chart but more than 70% of the median weight for height). The STGs for the three target diseases of this study (ARTIs, malaria and diarrhoea) do not recommend a vitamin prescription.

CHAPTER 4 Aims and objectives

This chapter establishes the aims and objectives of the thesis as well as the research questions to be studied. The scope and framework of the study are also explained

4.1 Aims

To study the use of medicines in rural CHCs in Timor-Leste, focusing on adherence to the standard treatment guidelines (STGs).

4.2 Objectives

The objectives of the planned research are:

- Objective 1. To describe the use of medicines in rural CHCs in Timor-Leste;
- Objective 2. To assess health personnel's adherence to the newly introduced STGs;
- Objective 3. To describe health personnel's knowledge and attitudes in relation to their use of medicines and adherence to their new STGs;
- Objective 4. To identify factors that influence the use of the STGs; and
- Objective 5. To make recommendations to improve the use of medicines in rural CHCs through the STGs.

4.3 Research questions

The following research questions are based on the objectives of the study:

(Objective 1)

- (1) What are the characteristics of Timor-Leste's medicine use in CHCs?
- (2) Is there a difference in prescribing indicators by prescriber's training?

(Objective 2)

- (3) How much do health personnel adhere to the newly introduced STGs?
- (4) What prescriber characteristics and CHC characteristics are associated with prescribing adherence to STGs?

(Objective 3)

- (5) How well do health personnel know the newly introduced STGs?
- (6) What do they think about their own practice regarding the use of medicines and adherence to their new STGs?
- (7) What do they think has changed since the introduction of their new STGs?
- (8) What are the difficulties in using their new STGs in the local context?

(Objective 4)

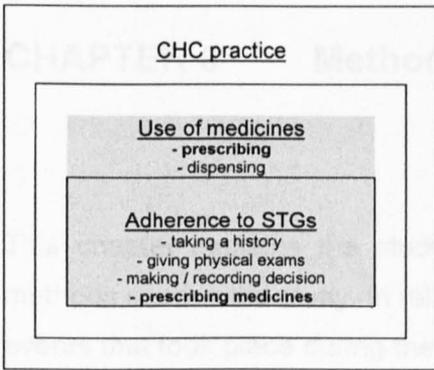
- (9) What are the factors that influence the use of medicines and adherence to STGs?

4.4 Scope and framework of the study

This research studies the use of medicines, focusing on adherence to STGs. As stated in chapter 2, there are several healthcare steps in the use medicines and adherence to STGs. The main focus of this research is the prescribing step.

In previous studies, using STGs is suggested as one of the key interventions to improve the use of medicines. In this research, however, looking into the cause and effect association between the use of STGs and the use of medicines is not the main purpose. Rather, this research considers adherence to STGs as a part of the use of medicines. In particular, when addressing the prescribing step, terms like 'prescribing practice ' and 'prescribing adherence' are used, and the latter is considered as a part of the former. The research is investigating factors that influence the use of medicines, focusing on adherence to STGs, both of which are a part of CHC practice. Figure 4-1 presents the scope of this study.

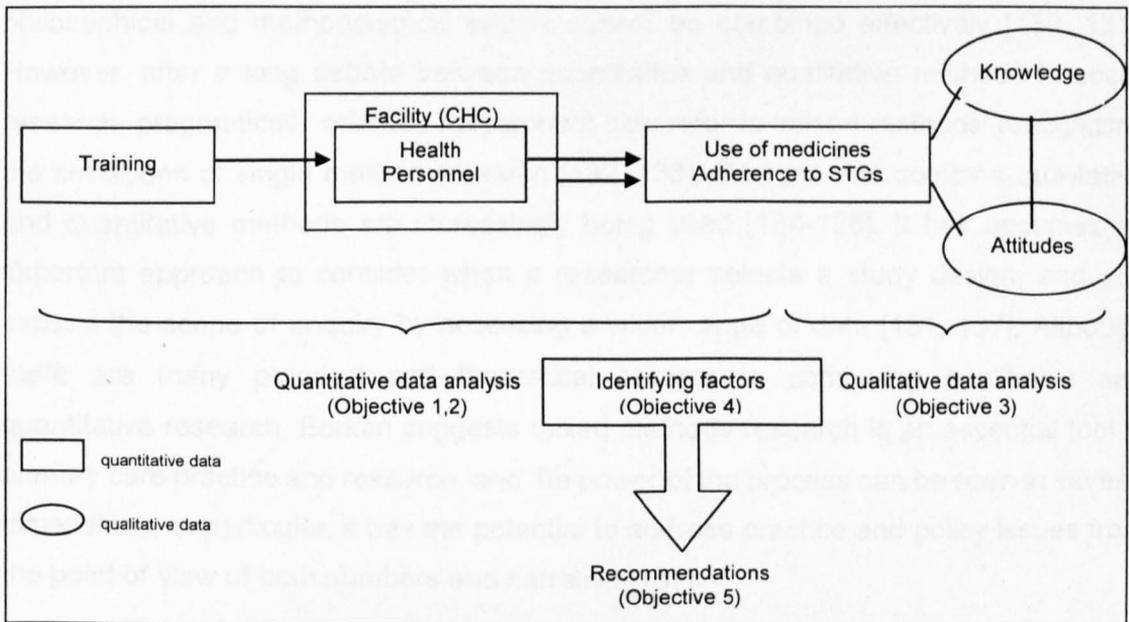
Figure 4-1 CHC practice , use of medicines and adherence to STGs



shadowed area = scope of the study

This study assumes that the two kinds of training in Timor-Leste, clinical nurse training and IMCI training, that have introduced their new STGs, influence the use of medicines and adherence to STGs. In the quantitative analysis, the use of medicines and adherence to STGs is quantified. Adherence to STGs is analysed by prescriber characteristics and CHC characteristics, including individual training and CHC's overall training input. To understand the context, health personnel's knowledge and attitudes are described based on the interview data, which are analysed qualitatively. Quantitative and qualitative data are then integrated to identify factors that influence the use of medicines focusing on adherence to STGs, and based on all of these findings, recommendations are presented. The figure below shows the framework of this study.

Figure 4-2 Framework of the study



CHAPTER 5 Methods and data collection

This chapter explains the study methods, data collection techniques, and analysis methods used in the study. In relation to this, the preparation process for the project and events that took place during the field visits are also described in the sub-sections.

5.1 Study methods

This study relies on both quantitative and qualitative data. The use of medicines and adherence to STGs is quantified using retrospective sampling and prospective observation to outline the situation. The results are then analysed statistically to investigate an association between prescribing adherence and health personnel characteristics and facility characteristics. Health personnel's knowledge and attitudes are derived through individual interviews using semi-structured interview topics, and then qualitatively analysed to describe the context. Factors that influence the use of STGs are identified, thus converging findings from both methods.

One of the rationales for mixing quantitative and qualitative data is 'to better understand the issue by converging numeric trends and the detail' [129]. Some believe that their philosophical and methodological origins cannot be combined effectively [130, 131]. However, after a long debate between quantitative and qualitative methods in social research, pragmatically oriented researchers now refer to 'mixed methods' recognizing the limitations of single method research [132, 133]. Designs that combine qualitative and quantitative methods are increasingly being used [134-136]. It has become an important approach to consider when a researcher selects a study design, and can expand the scope of enquiry by accessing a wider range of data [131, 137]. Although there are many practical and theoretical barriers to combining qualitative and quantitative research, Borkan suggests mixed methods research is an essential tool in primary care practice and research, and the power of the process can be seen in several dimensions. In particular, it has the potential to address practice and policy issues from the point of view of both numbers and narrative [137].

According to Stange, the goal of mixed methods is to integrate and objectify a phenomenon while retaining an understanding of local meaning [138]. This is an

important aspect of mixed methods research for this study. As a brand new country, information is still scarce in Timor-Leste. Quantifying a phenomenon while understanding local context was beneficial. Creswell et al. identify five criteria of mixed methods research design: a rationale, the types of data and their prioritisation, implementation and integration. They then classify design models of mixed methods research based on these criteria [139]. How and when to integrate the data is suggested in the different research design models. [140]. Applying Creswell's classification, a design model of this research was triangulation. Quantitative data and qualitative data were collected during the same time period and equally prioritised. Both sets of data are analysed separately and compared and constructed at the interpretation stage in the discussion.

5.2 Sampling methods and sample size

Two-stage sampling was used for this study. The first stage was random sampling of CHCs. The second stage, in a selected CHC, was sampling cases for the quantitative data and choosing interviewees from health personnel for the qualitative data.

5.2.1 First stage sampling

Twenty CHCs were randomly sampled²⁴ by using a random table from 44 Level 2 CHCs that met the inclusion criteria. In order to meet the international standard, the number of facilities was decided based on an international manual for medicine use indicators [44]. The locations of CHCs are shown in Figure 5-1.

There are 65 CHCs in the whole country, of which 56 are Level 2²⁵. Apart from a few exceptions, there are neither laboratory nor inpatient facilities in Level 2 CHCs, and there had been no doctor or plan to appoint doctors for at least 10 years at the end of 2005²⁶.

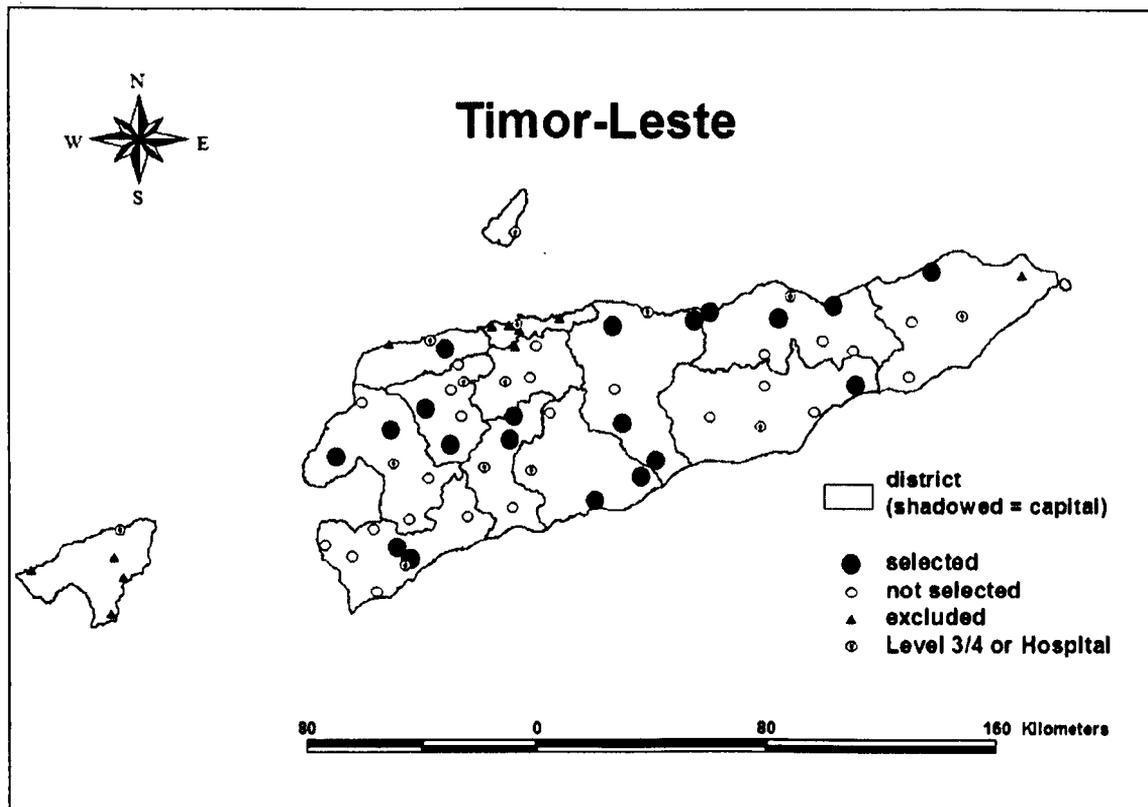
²⁴ Data could not be collected in two CHCs that were originally selected. The data collection team could not reach one CHC because of the extremely difficult road conditions and could not obtain CHC consent in another. After withdrawal of these two CHCs, two more CHCs were randomly sampled from the rest of CHCs.

²⁵ These numbers are based on the CHC name list for sampling which was obtained from the MoH on February 3, 2006. They are different from Table 3.2.

²⁶ The change in the human resource allocation plan at the end of 2005 is explained in 5.5.

Level 2 CHCs are principally allocated in sub-district centers where there is no district centre. Twelve Level 2 CHCs were excluded from this study: four in the enclave district, five in the capital city, two where the pilot project had been conducted, and three where the pre-test had been conducted (two of pilot and pretest CHCs are in the capital city)²⁷.

Figure 5-1 Location of CHCs



GIS data: WHO, Timor-Leste

5.2.2 Second stage sampling

Quantitative data

In every CHC, 100 retrospective cases were randomly sampled from patient registration books in 2005, and 30 consecutive cases were prospectively observed during the visit. All collected data were used to investigate the use of medicines (objective 1). For assessing adherence to STGs (objective 2), only cases recorded with at least one of three target diseases (ARTIs, malaria and diarrhoea) were used.

The sample sizes for quantitative data collection also referred to the WHO/INRUD

²⁷ The enclave was excluded because of transportation difficulties, and the capital city was excluded because living conditions and other situations are very different from rural areas.

manual, but the feasibility of data collection was also taken into account. For practical reasons, sample sizes in each facility were fixed and were not weighted based on the workload / annual visit.

Qualitative data

For objective 3, three members of health personnel in three different kinds of groups were interviewed in each CHC; the manager (head nurse), clinical nurse and one member of 'other health personnel'. 'Clinical nurse' was defined as a member of the health personnel who had attended clinical nurse training even if she was employed as a midwife. 'Other health personnel' was defined as a member of staff who was neither manager nor clinical nurse, and was either nurse or midwife²⁸. Nurse assistants were excluded from sampling.

Qualitative research usually uses non-probability sampling, and the sample is not intended to be statistically representative [141]. 'Redundancy', which means no new information from new samples, is recommended as the primary criterion to terminate sampling qualitative data [142]. In this study, however, two-stage sampling was used, in which the first stage was random selection. The sample size was decided in advance. Due to geographical difficulties in accessing the target, quantitative data collection and qualitative data collection were conducted during the same visit, and the sampling strategy designed for this study was the most feasible in the situation. Systematic or random selection can be used in a purposive sampling strategy to increase credibility by avoiding personal, ad hoc selection of cases [143]. Moreover, subgroups in stratified purposive sampling can be compared to display variation in a particular phenomenon [143], and they are 'informationally representative' [144]. Thus, the sampling method used in these circumstances can be justified.

Second stage sampling methods are summarised in Table 5-1:

²⁸ Although midwives are basically involved with maternal health (deliveries and antenatal or postnatal care), some of them are doing consultations, mainly child consultations, if they attended IMCI training.

Table 5-1 Objective, sampling methods and analysis methods

Objective and theme	Sampling methods	Analysis methods
Objective 1 Use of medicine	Retrospective, random	Quantitative
	Prospective, consecutive	
Objective 2 Adherence to STGs	Retrospective, Random*	
	Prospective, Consecutive*	
Objective 3 Knowledge and attitudes	Purposive	Qualitative

* The cases recorded with three target diseases in the same datasets with objective 1 were used.

5.3 Data collection

The following data were collected at each CHC: 1) retrospective data, 2) prospective data, and 3) individual interviews. Furthermore, health personnel data and CHC data were collected to link the main datasets so that data could be analysed by health personnel characteristics or CHC characteristics. Each data collection method is explained in this section.

5.3.1 Retrospective data collection (Quantitative data)

One hundred cases were selected from the cases in the patient registration books in 2005 by systematic random sampling. As patient registration books were not available in the form we needed in two CHCs, and one case collected was invalid, the total sample size was 1,799. The exclusion criteria were as below:

- antenatal care and pregnancy
- parturition and post-parturition
- abortion and post-abortion
- normal neonatal care
- child health program only (immunization, vitamin A, antihelminthics, growth monitoring)
- family planning
- 'control' or 'follow-up' without specific diagnosis
- empty in the diagnosis column
- referral

Data collected were: the date of visit, patient's age (or age group), patient's sex,

diagnosis (or symptom), and prescription. In cases where symptom(s) were recorded instead of diagnosis, the case was categorised according to criteria that had been determined in advance (criteria are given in Appendix 2). The number of medicines was counted²⁹ and whether the prescription included an antibiotic, vitamin or injection was checked³⁰.

Sampled cases were hand-copied into the sampling form (Appendix 3) by data collectors. For the cases of any of the three target diseases, prescribing adherence to STGs was classified by the author based on Timor-Leste's STGs. The data were inputted into Excel spreadsheets by assistants, then checked twice by the researcher.

5.3.2 Prospective data collection (Quantitative data)

Thirty consecutive cases in each CHC were observed. Consent was obtained both from the health personnel and from the patient. In two CHCs, 30 cases were not collected³¹. Therefore, the final sample size was 583. None of the Timorese health personnel refused to be observed or interviewed. However, foreign medical doctors in some CHCs did not consent to being observed, and in such cases only the nurse's consultations were observed.

Exclusion criteria for prospective data collection were the same as those for retrospective data collection. Data collectors were allocated three different points; consultation room(s), dispensing counter and exit. Checklists used are attached (Appendix 4).

In the consultation rooms, the data collector(s) sat away from the health personnel and patient and filled in the checklist, observing the process of consultation: asking chief complaints, taking a history, conducting a physical examination and explaining the

²⁹ Vitamin A for a child under five years old and antihelminthic for a child under 14 years old were not included in the number of medicines as they are given to a healthy child as part of the child health program.

³⁰ Vitamin A given to a child under five years old was not counted as a vitamin prescription for the reason above.

³¹ In one CHC the foreign doctors initially accepted the research team if only nurses' consultations were observed, however, they later began to show their reluctance. The team withdrew from the CHC in the middle of the data collection. In another CHC, the team had to stop data collection halfway due to the country's crisis.

illness / treatment to patients. The date of the visit, patient's age, patient's sex and health personnel's name were also recorded. After finishing the observation, diagnosis (or symptoms) and prescription were copied from the patient's medical chart. As in the retrospective data collection, any case recorded without a diagnosis was categorised based on criteria. The number of medicines was counted, and whether the prescription included an antibiotic, vitamin or injection was checked.

At the dispensing counter, the following issues were checked using a checklist: how many medicines had been dispensed, how many medicines were explained to the patient, how many medicines were taken at the counter under health personnel's supervision, and whether the patient asked the health personnel a question. The dispenser's name was also recorded.

At the exit, the label and the patient knowledge of each medicine were then checked using the checklist. Each label was examined to see if it contained dosage schedule, duration of the treatment, name of the medicine, and the name of the patient. Then the patient was asked if he/she knew the dosage schedule, duration of the treatment, the name of the medicine of each medicine as prescribed. Reason(s) for the prescription was also asked. The label and patient knowledge about the duration of the treatment was not checked for external medicines, oral dehydration salt (ORS) and one dose medicines (mainly Fansidar and antihelminthic). Sometimes prescribed medicines and dispensed medicines were not consistent; however, the medicines that the patient actually took were checked. Questions to patients were usually asked in Tetum. If the patient was not fluent in Tetum, the local language was used. For minor languages that none of data collectors could speak, local help was requested.

Records in checklists were transferred to summary sheets by the data collectors after the observation. Data collectors reviewed each other's summary sheets, which were then checked by the researcher twice. For cases of the three target diseases, adherence to STGs was classified by the researcher based on Timor-Leste's STGs. Assistants inputted data into Excel spreadsheets in two different datasets: by case and by medicine. Data input was checked by the researcher twice.

5.3.3 Interviews (Qualitative data)

Three individual interviews of health personnel in each CHC were conducted using the

semi-structured topic guide. In some CHCs, planned interviewees could not be found³². Therefore, a total of 55 interviews were conducted.

A pair of data collectors conducted the interviews: one interviewer and one note taker. Where possible, the interview took place in a closed room where privacy could be guaranteed. However, for logistical reasons, it was difficult to find a closed space near the CHC in the rural community, so the interview was usually held inside the CHC or the accommodation of the research team, such as a health post.

Based on the research questions listed in 4.2, the topic guide consisted of five topics: 1) standard treatments, especially about treatment of target diseases and indications of vitamins³³, 2) present practice, 3) changes after introduction of STGs and related training, 4) difficulties in using STGs, and 5) requests to improve STGs. Sample questions for each topic are given in Appendix 5. Data collectors were instructed in their training that they did not have to follow the topic guide and sample questions very rigidly, but they needed to cover all the topics.

Interviewing and note taking were conducted in Tetum, occasionally mixed with Indonesian, especially for technical health terms or jargon. Original transcripts were transcribed using Word word-processing software and translated into Indonesian and English by two assistants.

5.3.4 Health personnel and CHC data

Information on health personnel and CHCs were obtained to be linked with the main datasets for the analysis. Details of health personnel's demographical characteristics were recorded in a small questionnaire (Appendix 6), which was put on the back page of the informed consent form. CHC data was gained from secondary data, observation and interviews with the manager. Data were collected on; geographical characteristics,

³² Four managers were absent from CHCs during the data collection period due to their management duties elsewhere. The clinical nurse was not in post in two CHCs. Another member of 'other health personnel' was interviewed in one CHC instead. In another CHC, a replacement could not be interviewed.

³³ In CHCs where quantitative data could be collected before the interview, interviewees were asked for comments on the results of key indicators (mainly average number of medicines per case, percentage of cases when an antibiotic was prescribed, and percentage of cases when a vitamin was prescribed) as a cue for interviewing.

workload, human resources, including staff's previous training, and availability of key essential medicines, the national EML, and STGs. Observation checklists for material resources are given in Appendix 7.

5.4 Analysis methods

This section explains the methods of data analysis and which data were used for each objective.

5.4.1 Use of medicines (Objective 1)

5.4.1.1 Medicine use indicators

Analysis methods

Assessment of the use of medicines in Timor-Leste was based on the INRUD/WHO's medicine use indicators (see 2.3). Of the 13 'core indicators'³⁴, nine indicators were applied in this study: three 'prescribing indicators', three 'patient care indicators' and three 'facility indicators'. One further prescribing indicator was added, specifically for this study.

Data used

Due to the nature of the data, 'prescribing indicators' can be measured by both retrospective and prospective data, which complement each other while 'patient care indicators' use only prospective data [44]. The prospective data consisted of two datasets: encounter data and medicine data. Use of one or the other of these datasets depended on the indicator.

Procedures

Prescribing indicators

³⁴ Although there were 12 original 'core indicators' in the INRUD/WHO manual in 1993, 'the world medicines situation' in 2004 suggests one more facility indicator.

Four indicators were measured. Two indicators in the manual were not included in this study. 'Percentage of medicines prescribed by generic names' and 'percentage of medicines prescribed from EML' which were not measured as they were estimated to be 100 percent in rural CHCs, due to the medicine procurement system in Timor-Leste. 'Percentage of encounters with a vitamin prescribed' was added in 'prescribing indicators' for this study since a high level of vitamin prescriptions was observed in the pilot project. Measurement was as suggested in the manual.

Patient care indicators

Three indicators were measured. 'Average consultation time' and 'average dispensing time' were omitted for practical reasons³⁵.

Regarding 'labelling' and 'patient knowledge', some modification was made on how to present the results. The INRUD/WHO manual indicates that dosage schedule, duration of the treatment, name of the medicine, and name of the patient for 'adequate labelling', and dosage schedule and duration of the treatment for 'patient correct knowledge' should be checked [44]. However, previous studies have sometimes used different criteria for these indicators. [53]. In order to ensure precision of the results, percentage of labelling or knowledge of each element of information was separately measured, in addition to measuring the indicators based on the criteria from the manual. For example, 'percentage of medicines with dosage schedule labelled' or 'percentage of medicines with patient's knowledge of correct duration of the treatment' was also measured and displayed.

As a part of 'patient knowledge', 'reason(s) for the prescription' were also asked. It is counted as a criterion of 'correct patient knowledge' in some previous studies [51, 53]. In this study, 'reason(s) for prescription' was neither included in criteria of 'correct knowledge' nor assessed to ascertain if it was correct or incorrect, but a number of patients' answers about reasons for prescription are presented, focusing only antibiotics and vitamins.

³⁵ The main reason was quality control of measuring time, which was considered difficult with limited data collectors. For example, in the consultation room, observation for adherence to STGs was conducted at the same time. Another reason was that using a stopwatch in the consultation room or dispensing counter was not appropriate in rural CHCs.

Facility indicators

Three indicators were measured as suggested in the manual.

Availability of clinical nurse textbooks was assessed in 18 CHCs where a clinical nurse was in post. Availability of an IMCI chart-book was checked in all the target CHC. Availability of EML and key medicines in stock was assessed in 19 CHCs where they could be checked³⁶.

5.4.1.2 Comparison of prescribing indicators by prescriber's training

Analysis methods

Indicators can be used to compare the performance between prescriber or facility groups [44]. In this study, three 'prescribing indicators' were compared by prescriber's training. As the percentage of encounters with an injection prescribed was very small, it was excluded from this analysis. The Wilcoxon's rank-sum test was used for the statistical analysis.

Data used

As prescriber's name was available only in the prospective data, this analysis relied on the prospective data. The data were then linked to health personnel data.

Procedures

Prescriber's individual results for each indicator were calculated. The median of each indicator was then compared between prescribers who had trained and those who had not. Clinical nurse training and IMCI training were analysed separately.

When including foreign doctors' cases, they were counted in the 'no training' group for both clinical nurse and IMCI training since the foreign doctors were given STGs without the introduction that the local health personnel received. The results excluding and including doctors are presented separately.

³⁶ Data could not be obtained in one CHC as the research team withdrew from data collection before seeing the person in charge of the medicine management.

5.4.2 Adherence to STGs (Objective 2)

5.4.2.1 Adherence to STGs for four healthcare steps

Analysis methods

Adherence to STGs for four healthcare steps was described: taking a history, conducting a physical examination, making / recording the clinical decision, and prescribing medicines.

Data used

The prospective data were used. The datasets were the same as those used for medicine use indicators, but only cases recorded with a target disease were included.

Procedures

Assessment of adherence was based on Timor-Leste's STGs. As described in chapter 3, practice guidelines in Timor-Leste comprised materials developed by patient management programs such as the clinical nurse training program, IMCI program, or malaria management program. For this study, reference was made to clinical nurse textbooks (volumes for ARTIs, malaria and diarrhoea) and the IMCI chart-book. The proportion of cases that adhered to STGs to all target cases was calculated. When a case was recorded with more than two target diseases, the worst result was taken as the case's result for each step³⁷.

Taking a history

Questions that health personnel asked to the patient were checked. Patient's answers were not taken into account. When all recommended questions were asked, it was categorised as 'adhered' to STGs in terms of taking a history.

³⁷ For example, if a patient was diagnosed as malaria and diarrhoea and the treatment adhered to the malaria STGs but a medicine contraindicated in the diarrhoea STGs was prescribed, the cases result was considered as 'not adhered'.

Conducting a physical examination

Examinations of patients that health personnel conducted were checked. Results of the examinations were not taken account. When all recommended examinations were conducted, it was categorised as 'adhered' to STGs in terms of conducting a physical examination.

Recording clinical decision

The way to record clinical decision was checked. Diagnostic accuracy based on a history and a physical examination was not assessed in this study. For example, STGs for adult ARTIs recommend classifying the illness if a patient is suspected of having an upper ARTI, a lower ARTI, or suspected tuberculosis. For child ARTI cases, the IMCI chart-book shows how to differentiate a child with cough or dyspnoea between a case of pneumonia and non-pneumonia. When a case was recorded as explained above, the case was categorised as 'adhered' to STGs in terms of recording clinical decision.

Prescribing medicines

Whether treatment was given in accordance with STGs was checked. When a medicine that is indicated in STGs was not prescribed or a medicine that is contraindicated in STGs was prescribed, the case was categorised as 'did not adhere' to STGs, otherwise it was categorised as 'adhered' to STGs in terms of prescribing medicines. In cases where a proper clinical decision was not recorded as indicated in STGs, its prescription could not be assessed, and the case was counted as 'not adherent' in prescribing adherence.

5.4.2.2 Individual prescribing adherence and prescriber characteristics

Analysis methods

Focusing on prescribing adherence, prescriber's individual adherence was analysed by prescriber characteristics. Two kinds of statistical methods (Wilcoxon's rank-sum test and logistic regression analysis) were used.

Data used

Prospective data were used for the analysis as prescriber's name was available only in the prospective data. Only cases recorded with a target disease were included. The data were then linked to health personnel data.

Procedures

Prescriber's individual prescribing adherence was calculated. The median prescribing adherence, including only local health personnel's data, was compared by prescriber's age, sex, occupational category, civil service level, and work experience, and training. Comparison of the median was also performed by combination of prescriber's training.

Including foreign doctors' data, the median was compared by training. Like the comparison of prescribing indicators, which was explained in 5.4.1.2, doctors were counted in the 'no training' group for both IMCI and clinical nurse training.

To investigate an association between individual prescribing adherence and prescriber's training (clinical nurse training and IMCI training), a logistic regression analysis was conducted. Firstly, the crude odds ratio for each variable was calculated taking account of prescriber clustering. Next, to find possible confounders, the odds ratio for the training adjusted by each of other variables was calculated. Whether there was evidence of the effect of modification by the variable was also checked. Possible confounders found were put in the final model, and the odds ratio for the training adjusted by the possible confounders was calculated, taking account of prescriber clustering. The above mentioned analysis was performed separately for each training (clinical nurse training and IMCI training).

5.4.2.3 CHC's overall adherence and CHC characteristics

Analysis methods

Focusing on prescribing adherence, CHC's overall adherence was analysed by CHC characteristics. The Wilcoxon's rank-sum test was used for the statistical analysis.

Data used

Both prospective data and retrospective data were used for the analysis to complement each other. Each dataset was then linked to the CHC data.

Each of the prospective data and retrospective data contained a weakness to link to the CHC data. The most of the CHC data were obtained during the CHC visit, so linkage of the CHC data to the prospective data, which was obtained at the same time, was appropriate. However, for all practical purposes, prospective data that included newly arrived foreign doctors' cases were considered unlikely to represent the CHC's situation

and remained unreliable for analysis by CHC characteristics. Therefore, retrospective data were also used for this analysis although time discrepancies between the two datasets (the retrospective data and CHC data) were unavoidable.

Procedures

CHC's overall prescribing adherence was calculated. The median was statistically compared by CHC's sub-district population, annual workload, number of health personnel, percentage of members trained, total period of training, and availability of resources.

5.4.3 Knowledge and attitudes (Objective 3)

Analysis method

To describe health personnel's knowledge and attitudes qualitatively, the Framework approach was used. This approach was developed specifically for applied or policy-relevant qualitative research [145-147]. Although inductive analysis is more common in qualitative analysis, the objectives of the study are set in advance in the Framework approach [148]. Qualitative analysis in this study tried to study the 'context', identifying 'the form and nature of what exists', which is one of the four categories of possible research questions to be addressed for the Framework approach research that Ritchie and Spencer suggest [145].

Data used

The interview notes were used for the analysis. Of the three versions of interview notes, original, Indonesian translation, and English translation, the Indonesian versions were mainly used for data analysis supplemented by reference to the original transcripts³⁸.

³⁸ Citations in this thesis were translated by the author from the original transcripts. The italic font inside the parentheses shows the expression in the original transcripts regardless of language. Translation was based on the 'Standard Tetum-English Dictionary' 3rd edition (Hull, 2002) and 'Kamus Indonesia Inggris' 3rd edition (Echols & Shadily, 1989).

Procedures

Key stages of the Framework approach [145] were followed. Firstly, all transcripts were read through to become familiar with the range of diversity and to overview the contents. Key ideas and recurrent themes were listed and the general atmosphere was noted.

After the 'familiarisation' stage, the following thematic indices were identified. Some index categories were identical to the topic, and others emerged from the data, as Ritchie and Spencer indicate [145].

1. Knowledge
 - 1.1 Knowledge of standard treatments of target diseases
 - 1.2 Knowledge of antibiotic use and vitamin use
2. Perceptions of STGs and related training
 - 2.1 Perceptions of their new STGs
 - 2.2 Perceptions of the training
3. Positive perception of changes
 - 4.1 Changes in own practice
 - 4.2 Perceived changes in patient satisfaction
4. Desire for improvement
5. Self-confidence
6. Attitudes to others
 - 6.1 Attitudes to patients
 - 6.2 Attitudes to colleagues
 - 6.3 Attitudes to foreign doctors
7. Attitudes to present difficulties / problems
8. Working conditions

Some themes directly responded to a specific topic. For example, knowledge of standard treatments of target diseases was almost one-to-one correspondence to each sample question in the topic 1 ('standard treatments'). Some other themes were observed across the topics such as comments on antibiotic use, which were found throughout. Issues related to difficulties/problems also arose from various parts of the interview although 'difficulties' were mainly asked in topics 2 ('present practice') and 4 ('difficulties'). Comments on 'changes' were also given outside topic 3, in which questions specifically asked about changes after STGs and related training were implemented.

Moreover, some themes emerged from data gained although they were not directly asked for by questions in the topic guide: attitudes to others, in particular to doctors, were emergent issues raised by the respondents themselves. On the other hand, answers that responded to questions of topic 5 ('requests') showed a wide range of variety, and were considered more meaningful if categorised into other themes rather than being put into one category of 'requests'.

For the next stage, the transcripts of the interview notes were indexed according to the thematic indices identified. Sometimes one passage could be categorised into more than two themes. 'Indexing' was followed by the 'charting' stage, which involves abstraction and synthesis. To build up a picture of the data as a whole, data were rearranged according to the thematic indices.

Indexing, sorting and charting were performed in computer-assisted qualitative data analysis software (NVivo 7). Findings are presented according to the thematic index in chapter 8. The last stage ('interpretation') is presented in the discussion chapter.

5.5 Preparations

This section describes the process before the data collection for the main project to provide information on the research environment.

5.5.1 Pilot project

Prior to the main project, a pilot project was conducted from June 5 to August 9, 2005. The objectives of the pilot project were; 1) to understand local conditions, 2) to establish contact with the local authority including obtaining official approval from the proposal panel in the MoH (Appendix 8), 3) to check the availability of information at several levels in the health system, 4) to establish research logistics, and 5) to develop data collection tools (eg. the sampling form, observation checklists, summary sheets, interview topic guide, and informed consent forms). For the last objective, pilot data collection was carried out using preliminary data collection tools in two purposively selected CHCs. Another purpose of the pilot was on-the-job training for assistants / translators (hereafter assistants).

For the pilot data collection, the researcher and one assistant visited two CHCs for five

days each. One of them was located in a rural sub-district in the most eastern district where the local language is dominant. Another CHC was located relatively near the capital city where the majority of people speak Tetum. In each CHC, retrospective cases were sampled from patient registration books, prospective cases were observed at three observation points using preliminary observation checklists, and finally a focus group discussion among personnel was conducted. Availability of secondary data in each CHC was also checked. During the pilot project some problems were found that needed to be solved.

Firstly, it was necessary to overcome the irregularity of patient registration books. The pilot data collection revealed some variation in recording methods between CHCs. For example, it depended on the CHC if cases for a specific program, such as antenatal care or immunization, were included in the general books or in special books for the program. It also depended on the CHC whether they recorded adult consultations and child consultations separately or together. Therefore, inclusion and exclusion criteria of sampling had to be created. Furthermore, in one of the two CHCs, they recorded chief complaints instead of clinical diagnosis, and this necessitated rules being made to define diseases from chief complaints when records did not show a diagnosis.

Secondly, it was necessary to consider how many days would be needed for the observation in each CHC. Daily patient visits varied according to the weather, local market day or a program implemented on the day, and there were only a few patients on the least busy day. Moreover, it was found that health personnel might be rotating their tasks. In such a case, data collected for one or two days would be influenced by the person in charge of the day and might not represent the general situation of the CHC. At least a one-week (five working days) visit for each CHC was considered ideal for the quality of prospective observation. For practical reasons, however, fixed sample size per CHC, not fixed observation days per CHC, was finally used in the main data collection.

Another problem was with the focus group discussions. It was observed that members with more experience or in higher positions tended to dominate the discussion, and other members hesitated to speak. Senior members, especially the manager, also tended to show viewpoints from their position, not their personal views. This may have happened because they needed to maintain a position in front of the junior staff. Therefore, individual interview techniques were used for the main data collection, taking account of these weaknesses of group interviews.

5.5.2 Data collector training

Multiple data collectors were essential for this research because it required cases to be observed at different points simultaneously. Another reason to employ several members of staff was to prepare for the complexity of the language situation in Timor-Leste. Two different types of staff were recruited: assistants and data collectors. Assistants were expected to speak Tetum, Indonesian and English and to work both in the field and in the office including translation and data input, while data collectors worked in Tetum and Indonesian in the field. The three major local languages besides Tetum were covered by staff members.

Health professionals were not recruited for the research staff. Because of the small size of the country and limited numbers of health professional schools in the area during the previous regime, the majority of existing health professionals knew each other, which was thought to influence the data collection. Younger people were intentionally chosen for the project so that they would make respondents feel at ease when being observed or answering questions.

Eventually, two assistants³⁹ and six data collectors were employed for the main project⁴⁰, and they were trained on the minimum knowledge and skills for the data collection. The process of the data collector training was as below:

- (1) development of training module
- (2) classroom training for basic knowledge, quantitative data collection skills, and qualitative data collection skills
- (3) pre-tests

Training modules were developed by the researcher with two assistants in November and December, 2005 followed by the training which started on January 5, 2006. The list of contents of the training module and training schedule is given in Appendix 9. The classroom training consisted of lectures and role-plays and took 8.5 days in total, including a 2.5-day session for qualitative data collection skills by an invited lecturer from a research institute in Indonesia. Finally pre-tests were conducted in three CHCs for 9.5

³⁹ One of them helped in the pilot project. One more assistant, who was an overseas medical student, temporarily helped for the data collector training.

⁴⁰ Furthermore, two drivers were hired.

days. During the process, data collection tools were revised several times based on staff feedback, and a review session was held before starting data collection.

5.5.3 Arrangement of the field visit

A request letter was distributed to each head of DHSs, asking for collaboration with the research. A copy of the approval letter from MoH's Proposal Review Panel (See Appendix 8) was attached to the letter. The head of DHS was asked to distribute letters to managers of selected CHCs in each district. Since none of the CHCs had a landline and the majority of them were without a mobile phone network, DHSs were always the first contact to communicate issues related with the research to CHCs. Using the organizational structure for the arrangement worked well. The request letter (to DHSs and to CHCs) is given in Appendix 10.

5.6 Unanticipated events during data collection

Two unexpected events, which affected the research project, emerged during the process. One was a fundamental change in the MoH's human resource allocation plan at Level 2 facilities. Another was social unrest in the capital city, which made the government stop functioning for a while and also forced many people to move away from the violence. This section describes these events and explains how they affected the project.

5.6.1 Allocation of foreign medical doctors in Level 2 CHCs

As described in 3.2.4, the scarcity of medical doctors had been one of the major issues in health system rehabilitation and development in Timor-Leste [100, 115, 116]. Policies had been planned and implemented with this presupposition. However, a massive deployment of nearly 300 Cuban medical doctors was announced on December 2005 [149]. It was planned that the Cuban Doctors Brigade would stay until young Timorese medical students who were studying at medical school in Cuba graduated from school and Cuban doctors started to be post in every CHC ⁴¹.

⁴¹ Personal conversation with an MoH officer in March 2006 implied that allocating doctors at Level 2 had not yet become an official policy amendment and would be modified again. However,

The original plan of this research was targeting local health personnel in CHCs where there is no doctor in order to improve rural health services in the resource-limited situation. Deployment of foreign doctors might influence both the aim and data collection of the study. First of all, if the allocation of expatriate and Timorese doctors at Level 2 was permanent, non-physician consultations would be stopped, and the aim of this research would have little meaning. Another concern was whether observation data of local health personnel could be gained as planned. Little information about the change of local health personnel's work after the foreign doctors' deployment was available before the data collection started. Therefore, 'consecutive' samplings were finally planned to observe for prospective data, including the foreign doctors' cases.

After starting the data collection, another issue emerged; many foreign doctors did not consent to participate in the research, which made it difficult to collect planned cases. It was assumed that the doctors were not well informed about the research and did not understand its aim. It was probably because the Doctors Brigade has a different organizational structure in the MoH. To establish collaboration with the Doctors Brigade, the data collection was suspended and an official letter to Cuban doctors in CHCs, as well as the national coordinator of Cuban Doctors Brigade, from a higher official in the MoH (Appendix 11) was requested by the author. The situation improved after that.

5.6.2 Recent crisis in the capital city

During the data collection, Timor-Leste experienced another crisis. Compared with the previous crisis after the Popular Consultation (referendum) in 1999, the scale of the incident this time was much smaller and limited to the capital city and some specific areas. However, the unstable social and political situation made traumatised people frightened again. The incident, which could be traced back to the beginning of 2006, peaked with street fighting late in May, and largely (but not completely) settled down in mid-July [150]⁴².

discussing the background and future possibilities in this change in the human resource allocation is beyond the scope of this study.

⁴² The origin was the discrimination problem in the military alleged by soldiers from the western region. However, the issue was not confined to within the military; rather it was interconnected with politics and spread to the daily life of ordinary people. This led to demonstrations, violence by hooligans, confrontation among people in the community, and finally street fighting between the armed forces and the breakaway group, which started on 23 May, 2006. Members of the national police were involved and some were killed or injured. This new outbreak of violence resulted in

As the serious situation was geographically confined, it did not affect the data directly. Nevertheless, the nationwide emotional conflicts between westerners and easterners made field visits for this research difficult, and civil unrest in the capital required the data collection to be suspended for a while. From the end of April, 2006, members of the research staff originally from the eastern region refused to work in western areas and vice versa. During the street fighting in the capital, rural CHCs functioned normally and data collection could be continued. In reality, however, members hoped to suspend work to escape to their hometown with their families. Finally, field visiting was interrupted for one and a half months from May 27 to July 16, 2006, which meant the data collection took 5.5 months in total. Fortunately, none of the staff and their family members was involved in the violence and field visits could be resumed with the same staff members.

5.7 Ethical considerations

The research was approved by the Proposal Review Panel in the MoH, Timor-Leste and the Ethics Committee at the London School of Hygiene & Tropical Medicine. (The approval letter from the MoH is attached in Appendix 8).

Informed consent was asked of both health personnel and patients. Oral and written information was given to the health personnel, and written consent was obtained from those who consented. For patients, oral information was given, and oral consent was obtained. The informed consent form used for the health personnel and a sample of the oral explanation to the patients is given in Appendix 12.

On the first day of the visit, the purpose of the research, the procedure for confidentiality, and how to respect the respondent's consent were explained to health personnel. Respondents were told that they were free to withdraw if they did not feel comfortable being observed or interviewed. The informed consent form was then distributed to be signed individually.

absence of law and order in the capital city, and communal fighting as well as looting and burning of houses and governmental buildings. The majority of foreigners were evacuated from the country. UNHCR reported that 100,000 people were internally displaced. Deployment of international forces and the police response to the government's official request on 25 May, 2006 led to a reduction in serious fighting. [150]The situation calmed down after the ex-prime minister resigned on 29 June and the new cabinet was formed on 8 July, 2006. However, the situation continued to be unstable for several months.

Oral information was given to patients by data collectors. Gaining written consent from patients was difficult in rural Timor-Leste. The health profile of Timor-Leste indicates 46 percent of the population of 11 years or older have never attended school, and cannot read or write [118]. Even if a person could write his/her name, he/she sometimes hesitated to write it in front of others. This was true especially among females in rural areas. Asking them to sign their names might have made them uncomfortable even they were willing to participate in the study. Therefore, oral consent was considered suitable for patients.

To avoid a patient going home without sufficient information and understanding of the dosing schedule, interviewers were instructed to give feedback to CHC personnel if a patient did not know the dosing schedule. Although no medical emergency for either respondents or staff members happened during data collection, the research team could have responded to a case. The location of the data collection is a primary health care facility, and the researcher is medically qualified with clinical experience and knew the local health system.

5.8 Researcher's position

The researcher visited most of the selected CHCs with staff members to supervise them. It was necessary in the research circumstances, as mentioned in previous sections, in order to control quality of data as well as to manage contingencies including potential risks. However, the researcher did not collect primary data (prospective observations for quantitative data and individual interviews for qualitative data) directly for several reasons. Firstly, although the researcher could communicate with respondents, especially with health personnel, in a common language (Indonesian), it is the third language for both parties. The quality of interviewing might have been impaired if Indonesian was used⁴³. Secondly, having worked together in the past, many members of health personnel knew the researcher, which might have influenced their answers. In particular, the researcher's background as a medical doctor could have made health personnel feel pressured.

⁴³ However, Indonesian is still used as an auxiliary language and is the only foreign language for many people, so the researcher's ability to speak and read Indonesian was an advantage.

CHAPTER 6 Use of medicines

This chapter describes the use of medicines in Timor-Leste, using the INRUD/WHO 'core indicators': prescribing indicators, patient care indicators, and facility indicators. The results of prescribing indicators are then compared by prescriber's training.

6.1 Description of data used

Retrospective data

A total of 1,799 cases were obtained. Among them, 26 percent (468/1,799) of samples were child cases (under five years old). In two CHCs, child consultation books were not found, and all sampled cases were from adult consultation books. Therefore, this might underestimate the proportion of child consultations. Male and female cases were almost equally distributed. Patient's age group and sex in the retrospective data are shown in Table 6-1.

Table 6-1 Number of cases by patient age group and sex – retrospective data

	male	female	Total
under 5 years	248	220	468 (26%)
5 years and above	620	711	1,331 (74%)
Total	868 (48%)	931 (52%)	1,799 (100%)

From 1,779 encounters, 2,175 illnesses were recorded. The number of recorded illness was one to four per encounter. The majority of encounters (1,454/1,799) were recorded with only one illness. Among 2,175 recorded illnesses, 1,231 were target diseases (ARTIs, malaria and diarrhoea). At least one of the three target diseases was recorded in 1,145 encounters, and these cases were further analysed for adherence to STGs in the next chapter. Of the remaining illnesses, 471 were diagnosed with diseases besides the three target diseases counted and 473 'no diagnosis'. The majority of records without clinical diagnosis (336/473) were for four common complaints (headache, musculo-skeletal pains, anorexia and stomach ache).

Prospective cases

The total number of prospective observations was 583, among which 29 percent (168/583) of the cases were child consultations. There were more female cases than male, but the difference was small. Patient's age group and sex for retrospective data are shown in Table 6-2.

Table 6-2 Number of cases by patient age group and sex – prospective data

	male	female	total
under 5 years	92	76	168 (29%)
5 years and above	183	232	415 (71%)
total	275 (47%)	308 (53%)	583 (100%)

For 583 encounters, a total of 759 illnesses were recorded. The number of recorded illnesses per case varied from one to four; however, 74 percent (429/583) of cases were recorded with one illness. Among all 759 recorded illnesses, 444 were the three target diseases. At least one of the three target diseases was recorded in 380 encounters, which were also studied further to investigate adherence to STGs (see chapter 7). Of the remaining recorded illnesses, 180 were other clinical diagnosis besides the three target diseases, 135 were 'no diagnosis' records. Four common complaints (headache, musculo-skeletal pains, anorexia and stomach ache) also accounted for the majority of records without clinical diagnosis (111/135).

Medicines

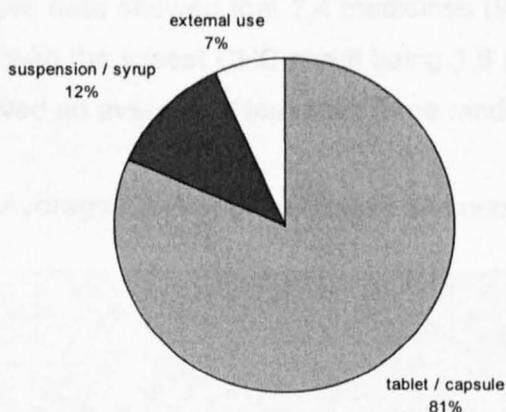
All 583 patients were prescribed at least one medicine. One patient left the CHC before the medicines were dispensed. The remaining 582 patients received medicine(s) in the CHC. In total, 1,461 medicines were dispensed as prescribed, 42 medicines were excessively dispensed without being prescribed. Sometimes single dose medicines were taken at the dispensing counter under the supervision of health personnel. Therefore, 1,482 medicines were taken home by patients, which were assessed in this study at the CHC exit.

Table 6-3 Number of medicines prescribed by health personnel, dispensed at the counter, and taken home by patients

	no of medicines	cumulative no of medicines	
medicines prescribed	1,537	1,537	(prescribed)
medicines not dispensed	- 76	1,461	
medicines excessively dispensed	+ 42	1,503	(dispensed)
medicines taken at the dispensing counter	- 21	1,482	(taken home)

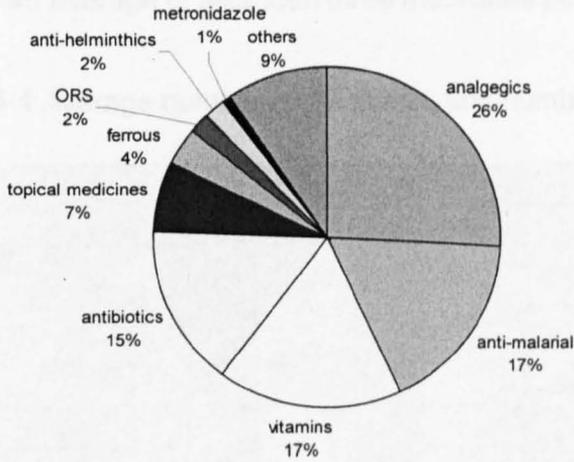
Medicines were given to the patient in three types of dosage form: tablets or capsules (1,205/1,482), suspension / syrup (179/1,482), and external medicines (98/1,482). In terms of medicines classifications, 91 percent (1,344/1,482) of medicines could be categorised into any of nine groups⁴⁴. More than a quarter (383/1,482) were analgesics; 20 percent of which were paracetamol and 6 percent of which were other analgesics. Antimalarials and antibiotics represented 17 percent (257/1,482) and 15 percent (226/1,482) respectively. Vitamins ranked third and represented 17 percent (254/1,482) of the total. Forms and categories of medicines are shown in the following charts.

Figure 6-1 Dosage form of medicines checked



⁴⁴ These groups are analgesics, anti-malarials, vitamins, antibiotics, topical medicines, ferrous, oral rehydration salts (ORS), anti-helminthics, metronidazole. Medicines in Timor-Leste EML categorised in these groups are shown in Appendix 13.

Figure 6-2 Category of medicines checked



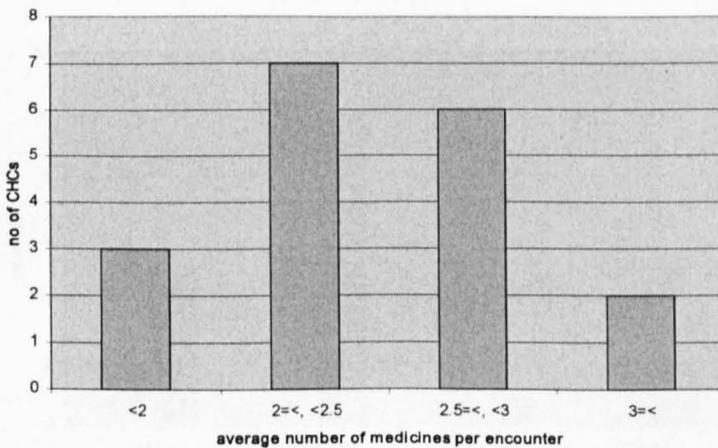
6.2 Medicine use indicators

6.2.1 Prescribing indicators

Average number of medicines

Retrospective data showed that 2.4 medicines (95%CI: 2.4 – 2.5) were prescribed per encounter, with the lowest CHC result being 1.6 and the highest 3.4. Sixteen out of 18 CHCs showed an average of less than three medicines prescribed per encounter.

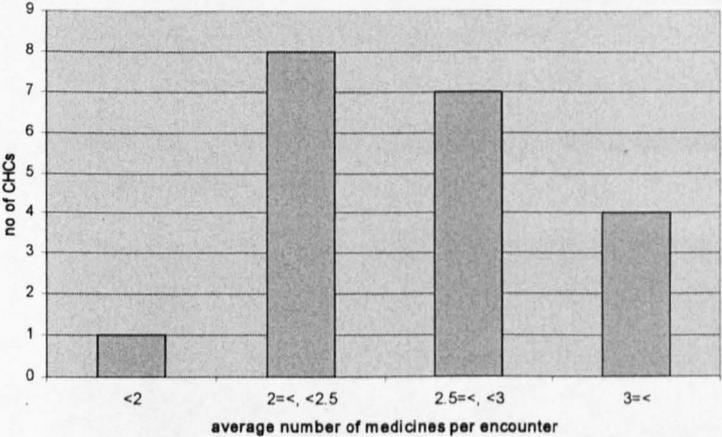
Figure 6-3 Average number of medicines and number of CHCs – retrospective data



Using prospective data, an average of 2.6 medicines (95%CI: 2.5 – 2.7) were prescribed per encounter, which was slightly higher than the result of the retrospective data. The

lowest average in the CHCs was 1.6 and the highest was 4.7. Sixteen out of 20 CHCs showed an average of less than three medicines per encounter.

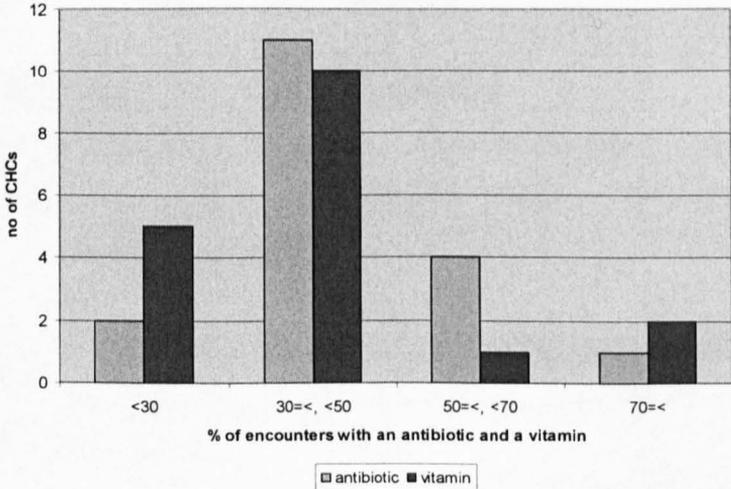
Figure 6-4 Average number of medicines and number of CHCs – prospective data



Percentage of encounters with an antibiotic and a vitamin

Retrospective data showed that an antibiotic was prescribed for a total of 44 percent of the encounters (95%CI: 41 – 46). In five CHCs, more than a half of the cases were prescribed an antibiotic. A vitamin was prescribed for 39 percent of the all encounters (95%CI: 36 – 41). CHC’s antibiotic prescriptions and vitamin prescriptions varied considerably.

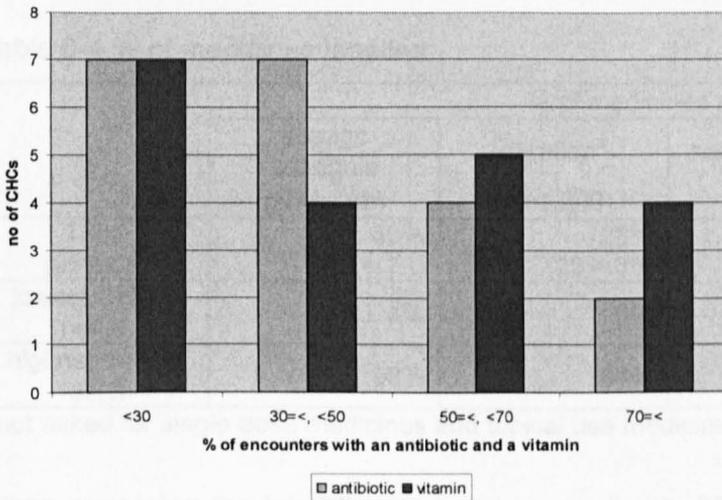
Figure 6-5 Percentage of encounters with an antibiotic and a vitamin and number of CHCs – retrospective data



Prospective data showed that an antibiotic was prescribed for a total of 39 percent of the

encounters (95%CI: 35 – 43), which was slightly lower than the results for the retrospective data. In six CHCs, more than a half of the cases were prescribed an antibiotic. Forty two percent of the all cases observed were prescribed a vitamin (95%CI: 38 – 46). This number was slightly higher than that for retrospective data. Ranges of CHC's antibiotic prescriptions and vitamin prescriptions were wider than those for the retrospective data.

Figure 6-6 Percentage of encounters with an antibiotic and a vitamin and number of CHCs – prospective data



Percentage of encounters with an injection

An injection was prescribed in only eight of 1,799 encounters (0.4 percent) in the retrospective data, and two of 583 (0.3 percent) in the prospective data.

6.2.2 Patient care indicators

Percentage of medicines dispensed

Of 1,537 prescribed medicines, 1,461 medicines, including those that were taken at the counter, were dispensed to patients. Therefore, 95 percent of the medicines prescribed were actually dispensed.

Assessing by case, not by medicine, 86 percent (500/582) of patients were then given exactly the same medicines as the prescription without any shortage or excess, including medicines taken at the counter.

Percentage of medicines labelled

Only six (88/1,482) percent of medicines were adequately labelled if applying the suggested criteria in the INRUD/WHO manual.

The tables below show the percentage of medicines labelled with each element of information (Table 6-4). Although all four elements of information were written on a small proportion of the medicines, 69 percent (1,019/1,482) of medicines were labelled by dosage schedule.

Table 6-4 % of medicines labelled

	% of medicines labelled			
	dosage schedule (N=1,482)	duration* (N=1,200)	name of patient (N=1,482)	name of medicine (N=1,482)
Total (95%CI)	69% (66 – 71)	28% (25 – 30)	15% (14 – 17)	48% (45 – 50)
lowest CHC's result	4%	0%	0%	6%
highest CHC's result	98%	84%	90%	100%

* not asked for single dose medicines and topical use medicines

When assessing the label by case, not by medicine, 63 percent (365/582) of patients received medicines, all of which were labelled with the dosage schedule. However, all four elements of information (dosage schedule, duration of the treatment, name of the patient and name of the medicine) for all medicines were provided on the label for only two percent (14/582) of patients.

Percentage of patients with knowledge of correct dose

A total of 77 percent of the patients (445/582) correctly answered questions on medicine dose (dosage schedule and duration of the treatment) for all the medicines received. Checking dosage schedule only, 85 percent (506/582) of the patients knew when to take the medicines they had received.

Table 6-5 shows patient correct knowledge of each element of information (dosage schedule, duration of the treatment, and name of the medicine) for each medicine. In terms of dosage schedule and duration of the treatment, quite a high percentage of medicines were understood by patients while less than a third of medicines were understood about name of the medicine. Patient knowledge of dosage schedule and

duration of the treatment were higher than the results of labelling of these elements of information.

Table 6-5 Patient correct knowledge

	% of patient correct knowledge		
	dosage schedule (N=1,482)	duration* (N=1,200)	name of medicine (N=1,482)
Total (95%CI)	93% (92 – 95)	88% (86 – 90)	27% (25 – 30)
lowest CHC's result	86%	77%	34%
highest CHC's result	100%	100%	54%

* not asked for single dose medicines and topical use medicines

Reasons for prescription (additional information of patient knowledge)

Antibiotics and vitamins were thought to be effective for a variety of symptoms. Many patients notably misunderstood that vitamins would relieve respiratory symptoms and anorexia.

Figure 6-7 Reasons for antibiotic prescription understood by patients

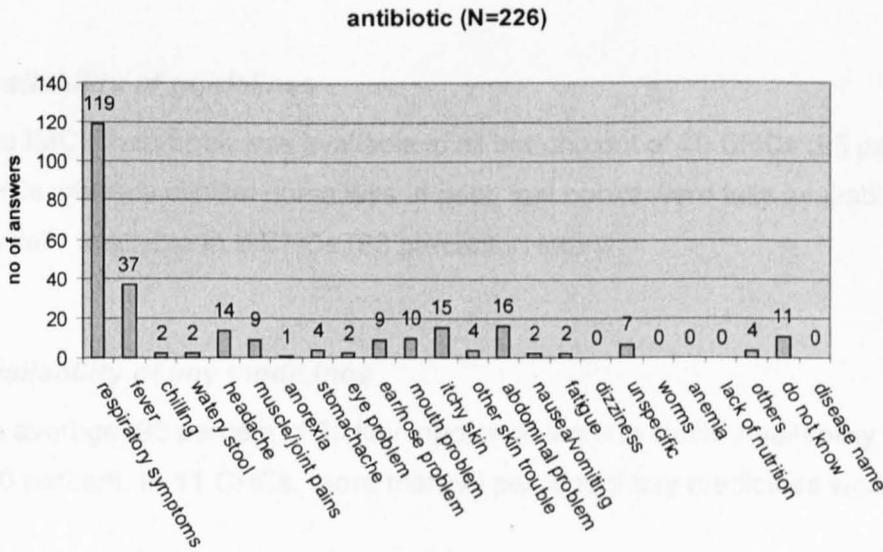
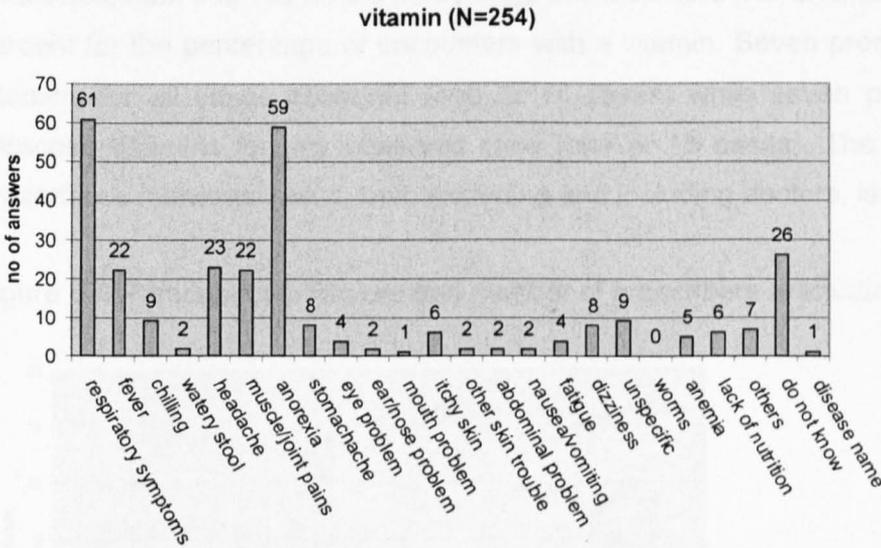


Figure 6-8 Reasons for vitamin prescription understood by patients



6.2.3 Facility indicators

Availability of EML

The national EML was available in 15 out of 19 CHCs (79 percent).

Availability of guidelines

The IMCI chart book was available in all but one out of 20 CHCs (95 percent). Among 18 CHCs where a clinical nurse was in post, text books were fully available in 10 CHCs and partially available in 5 CHCs (83 percent in total).

Availability of key medicines

On average, 86 percent of 30 key medicines were in stock. Availability ranged from 57 to 100 percent. In 11 CHCs, more than 90 percent of key medicines were available.

6.3 Comparison of prescribing indicators by prescriber's training

Fifty three prescribers were included in the observation. Of these 53 people, 32 were local health personnel and 21 were foreign doctors. The total numbers of cases prescribed by local health personnel and by foreign doctors were 350 and 233 respectively. The number of consultations per person varied from one to 30. The range

of the individual result of each indicator was: from 1.6 to 5.9 for the average number of medicines, from 0 to 100 for the percentage of encounters with an antibiotic, and 0 to 100 percent for the percentage of encounters with a vitamin. Seven prescribers prescribed vitamins for all cases observed (one or 14 cases) while seven prescribers did not prescribe vitamins for any observed case (one or 15 cases). The distribution of the prescriber's individual result, both excluding and including doctors, is displayed below.

Figure 6-9 Prescribing indicators and number of prescribers (excluding doctors)

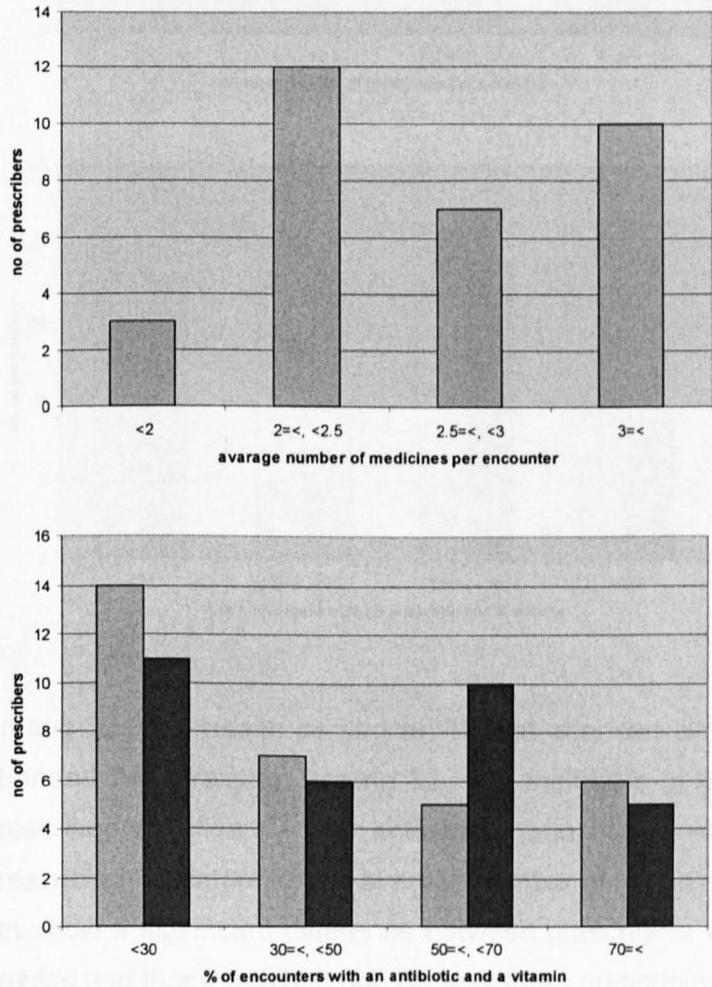
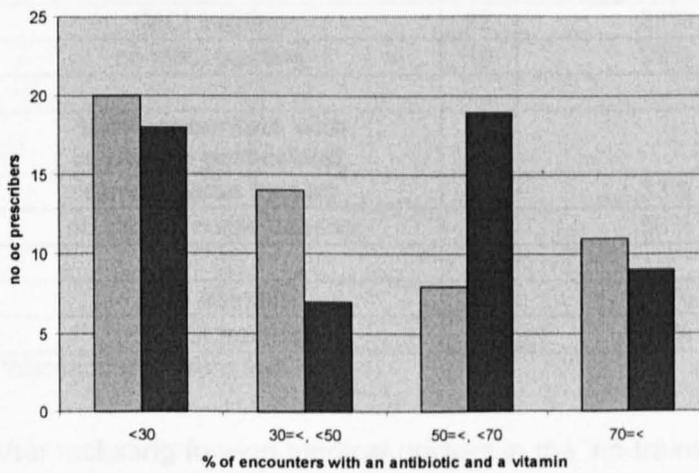
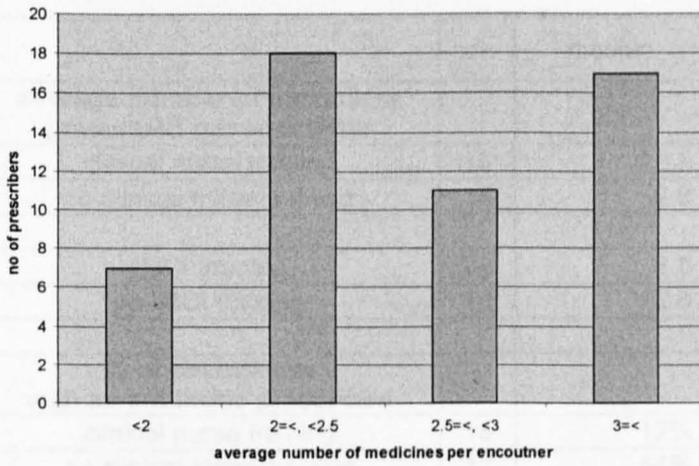


Figure 6-10 Prescribing indicators and number of prescribers (including doctors)



Among 32 local health personnel, 15 had attended clinical nurse training, and 22 had attended IMCI training. Among 32 local members of health personnel, clinical nurses prescribed significantly less antibiotics than non-clinical-nurses. However, two other prescribing indicators for the average number of medicines and vitamin prescriptions did not show a significant difference between prescribers who had attended clinical nurse training and those who had not. None of three prescribing indicators showed a significant difference between prescribers who had attended IMCI training and those who had not.

Table 6-6 Comparison of prescribing indicators by prescriber's training (excluding doctors)

	n	median	Inter-quartile range	p-value*
average number of medicines prescribed per encounter				
clinical nurse training	15	2.3	2.0 – 2.8	0.15
no clinical nurse training	17	2.8	2.2 – 3.2	
IMCI training	22	2.5	2.2 – 3.0	0.78
no IMCI training	10	2.6	2.2 – 3.2	
% of encounters with an antibiotic prescribed				
clinical nurse training	15	17%	0 – 27%	<0.01
no clinical nurse training	17	54%	36 – 89%	
IMCI training	22	33%	20 – 54%	0.71
no IMCI training	10	39%	17 – 83%	
% of encounters with a vitamin prescribed				
clinical nurse training	15	33%	20 – 50%	0.15
no clinical nurse training	17	56%	27 – 70%	
IMCI training	22	33%	23 – 60%	0.56
no IMCI training	10	45%	27 – 67%	

* Wilcoxon rank-sum test

After including foreign medical doctors in the 'no training' group, the same results were obtained: among three prescribing indicators tested, only the percentage of antibiotics was significantly different between clinical nurses and non-clinical-nurses.

Table 6-7 Comparison of prescribing indicators by prescriber's training (including doctors)

	n	median	Inter-quartile range	p-value*
average number of medicines prescribed per encounter				
clinical nurse training	15	2.3	2.0 – 2.8	0.19
no clinical nurse training	38	2.7	2.2 – 3.2	
IMCI training	22	2.5	2.2 – 3.0	0.83
no IMCI training	31	2.5	2.2 – 3.2	
% of encounters with an antibiotic prescribed				
clinical nurse training	15	17%	0 – 27%	0.01
no clinical nurse training	38	45%	33 – 76%	
IMCI training	22	33%	20 – 54%	0.39
no IMCI training	31	36%	22 – 75%	

(continued)

% of encounters with a vitamin prescribed				
clinical nurse training	15	33%	17 – 62%	0.17
no clinical nurse training	38	51%	23 – 69%	
IMCI training	22	33%	23 – 60%	0.51
no IMCI training	31	50%	17 – 67%	

* Wilcoxon rank-sum test

6.4 Summary of the chapter

Using retrospective data, an average of 2.4 medicines were prescribed per encounter and 2.6 medicines per encounter using prospective data. An antibiotic was prescribed to 44 percent (retrospective data) or 39 percent (prospective data) of the patients, and a vitamin was prescribed to 39 percent (retrospective data) or 42 percent (prospective data) of the patients. Prescription of an injection was extremely rare (0.4 percent of retrospective cases and 0.3 percent of prospective cases). Ninety five prescribed medicines were actually dispensed. Recommended information was labelled on only six percent of the all dispensed medicines. However, among four elements of recommended information, a dosage schedule was labelled on nearly 70 percent of the medicines. In spite of poor labelling, 77 percent of patients knew how to take the medicines that they received correctly.

Comparing prescribing indicators by prescriber's previous training, health personnel who had attended clinical nurse training prescribed significantly less antibiotics. When the foreign doctors were included in the 'no training' group, the same result were obtained.

CHAPTER 7 Adherence to STGs

This chapter assesses adherence to STGs for three major diseases (ARTIs, malaria, and diarrhoea). Adherence to STGs for four healthcare steps (taking a history, conducting a physical examination, recording clinical decision, and prescribing medicines) is described. The remaining sub-sections focus on the prescribing step, and adherence to STGs is then analysed by prescriber characteristics and CHC characteristics.

7.1 Description of data used

Retrospective data

Of 1,799 retrospective cases sampled, 1,145 cases were recorded with at least one of the conditions: ARTIs, malaria and diarrhoea, which were selectively used. The proportion of child consultations (under five years) and adult consultations (five years and above) was nearly 1:2 and female and male consultations were approximately equally distributed, as shown in Table 7-1. Among these target cases, 93 percent of cases (1,060/1,145) were recorded with only one target disease, and seven percent of cases (85/1,145) were diagnosed with more than two target diseases. Counting each disease separately (if a case was recorded with more than two target diseases, each of them was counted separately), the numbers of ARTIs, malaria and diarrhoea were 793, 351 and 87 respectively.

Table 7-1 Patient age group and sex among target cases – retrospective data

	male	female	total
under 5 years	205	173	378 (33%)
5 years and above	358	409	767 (67%)
total	563 (49%)	582 (51%)	1145 (100%)

Prospective data

From all 583 prospective cases, the 380 cases that were recorded with at least one of ARTIs, malaria and diarrhoea were selectively used. The proportion of child consultations and adult consultations was approximately 1:2, and there were more female consultations than male consultations, as shown in Table 7-2. Among them, 84 percent of cases (320/380) were recorded with only one target disease, and 16 percent of the cases (60/380) were diagnosed with more than two target diseases. Counting each disease separately, the numbers of ARTIs, malaria and diarrhoea were 275, 142 and 27 respectively.

Table 7-2 Patient age group and sex among target cases – prospective data

	male	female	total
under 5 years	73	66	139 (37%)
5 years and above	103	138	241 (63%)
total	176 (46%)	204 (54%)	380 (100%)

7.2 Adherence to STGs for four healthcare steps

Using the 380 prospectively observed cases that were diagnosed with at least one of the three target diseases, adherence to STGs for four healthcare steps was assessed as follows:

Taking a history

Thirty seven percent of patients (141/380) were asked questions about the history of their present illness during their consultation, as recommended in STGs. The highest CHC result was 61 percent (11/18) and the lowest was 15 percent (2/13). Assessing each disease separately, adherence to STGs about taking a history of ARTIs, malaria and diarrhoea was 50 percent (138/275), 31 percent (44/142) and seven percent (2/27) respectively.

Conducting a physical examination

Twenty four percent of patients (93/380) were given a physical examination based on STGs, with the highest CHC result of 64 percent (7/11), and the lowest of zero percent (0/20). Assessing each disease separately, adherence to STGs conducting a physical

examination of ARTIs, malaria and diarrhoea was 46 percent (127/275), 0.7 percent (1/142) and zero percent (0/27) respectively.

Recording clinical decision

Seventy seven percent of the total cases (292/380) were recorded as recommended in STGs, with the highest result of 100 percent in four CHCs (11/11, 16/16, 19/19 and 20/20) and the lowest of 25 percent (4/16). Of the three diseases, ARTIs showed the lowest result with 70 percent (192/275). Many inappropriate records of ARTIs were merely written as 'ARTI' but did not differentiate upper ARTIs and lower ARTIs or pneumonia and non pneumonia. Most malaria and diarrhoea cases were recorded with clinical diagnosis; however, six out of 142 malaria cases and one out of 27 diarrhoea cases were recorded with only symptoms.

Prescribing medicines

The overall prescribing adherence was 56 percent (213/380), with the highest CHC result being 96 percent (24/25) and the lowest being 19 percent (3/16). Among patients in which the decision was recorded properly (292 cases), 73 percent (213/292) of prescriptions adhered to STGs. Nearly 80 percent (110/142) of malaria patients received medicines in accordance with STGs while less than half (134/275) of ARTI cases received recommended medicines.

7.3 Prescribing adherence using retrospective data

Among 1,145 retrospective samples with at least one of the target conditions, 83 percent of the cases (949/1,145) were recorded in the recommended manner. Other cases were recorded with symptoms only or with clinical diagnosis but no further classification. Among the appropriately recorded cases, 641 cases were recorded with recommended medicines. Therefore, prescribing adherence to STGs was 56 percent of the all target cases (641/1,145) and 68 percent (641/949) of the cases that were appropriately recorded.

Assessing each disease separately, prescribing adherence to STGs for ARTIs, malaria and diarrhoea was 51 percent (406/793), 72 percent (252/351) and 34 percent (30/87) respectively.

7.4 Prescribing adherence and prescriber characteristics

In this section, prescriber's individual prescribing adherence is analysed by prescriber characteristics using prospective data.

7.4.1 Prescriber characteristics

Fifty two prescribers were responsible for the management of 380 target cases. Thirty two members of local health personnel were observed in 240 consultations and 20 foreign doctors in 140 consultations.

Detailed prescriber information was obtained from 32 local members of health personnel. Male members were observed more than female members of health personnel. The majority of local prescribers had graduated from basic education, and resided near the CHC. Fifteen of 32 personnel were clinical nurses. More than two thirds of the observed prescribers had been trained by the IMCI program. A summary of the results is shown in Table 7-3.

Table 7-3 Summary of prescriber characteristics

prescriber characteristic		n
age (years)	35>	16
	>=35	16
sex	male	22
	female	10
residence*	inside	29
	outside	3
occupational category	manager	3
	nurse	22
	midwife	7
civil service level	junior	18
	senior	14
work experience (years)	15>	19
	>=15	13
pre-service education	basic**	29
	higher	3
IMCI training	no	10
	yes	22
clinical nurse training	no	17
	yes	15

* whether respondent resided inside or outside the sub-district where the CHC was located.

** nursing high school +/- one year diploma for midwifery

7.4.2 Comparison of individual prescribing adherence by prescriber characteristic

Of 52 prescribers, including foreign doctors, an average of 7.3 (max 25; min 1) target cases was observed. The highest individual result was 100 percent for 11 prescribers and the lowest was 0 percent for seven prescribers. Individual prescriber's adherence and the number of prescribers are presented in Figure 7-1.

Figure 7-1 Prescriber's individual prescribing adherence and number of prescribers

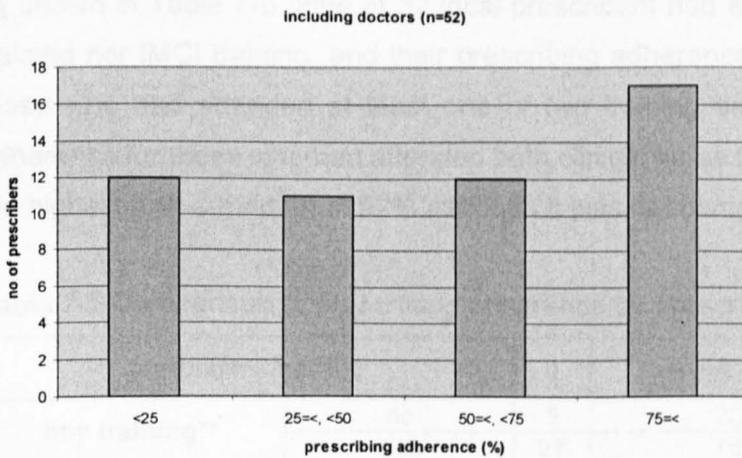
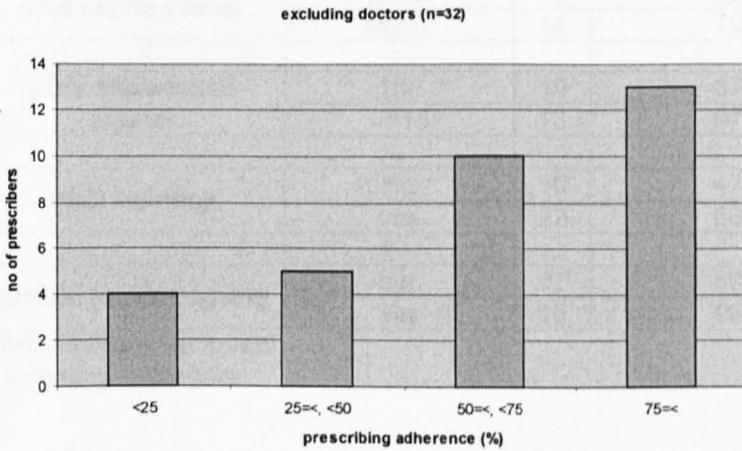


Table 7-4 shows a comparison of the median and inter-quartile range of individual prescribing adherence by prescriber characteristic and p-value of the Wilcoxon rank-sum test. Of 32 local members of health personnel, whose 240 consultations were observed, prescribers who had attended clinical nurse training showed significantly higher prescribing adherence to STGs than those who had not attended the training (<0.01). Prescribers who had attended IMCI training showed a slightly higher prescribing adherence than those who had not attended the training; however, it was not significant.

Table 7-4 Comparison of prescribing adherence by prescriber characteristic

prescriber characteristic		n	median	inter-quartile range	p-value*
age (years)	35>	16	65%	46 – 85%	0.62
	>=35	16	68%	42 – 100%	
sex	male	22	68%	43 – 100%	0.36
	female	10	62%	44 – 80%	
occupational category	nurse*	25	67%	43 – 96%	0.71
	midwife	7	67%	44 – 80%	
civil service level	junior	18	62%	50 – 80%	0.21
	senior	14	79%	43 – 100%	
work experience (years)	15>	19	67%	50 – 92%	0.94
	>=15	13	67%	40 – 100%	
IMCI training	no	10	47%	20 – 90%	0.13
	yes	22	68%	57 – 96%	
clinical nurse training	no	17	50%	33 – 67%	<0.01
	yes	15	90%	64 – 100%	

* Wilcoxon rank-sum test

** including managers

Prescribing adherence in relation to prescriber's previous training was examined further, as shown in Table 7-5. Five of 32 local prescribers had attended neither clinical nurse training nor IMCI training, and their prescribing adherence was significantly lower than those who had attended at least one of two training sessions ($p < 0.01$). Prescribing adherence for those who had attended both clinical nurse training and IMCI training was the highest with a median of 92% although it was not compared statistically.

Table 7-5 Comparison of prescribing adherence by prescriber's training

prescriber's training		n	median	Inter-quartile range	p-value*
any training**	no	5	20%	20 – 40%	<0.01
	yes	27	70%	57 – 100%	
type of training	none	5	20%	20 – 40%	NA***
	IMCI only	12	62%	42 – 80%	
	clinical nurse only	5	90%	60 – 100%	
	both	10	92%	67 – 100%	

* Wilcoxon rank-sum test

** any of IMCI or clinical nurse training

*** Wilcoxon rank-sum test is not applicable for binominal variable.

Including foreign doctor consultations and counting them in the 'no training' group for both IMCI and clinical nurse training for the purpose of the analysis, clinical nurse prescribers still showed a significantly higher prescribing adherence than the others ($p < 0.01$). IMCI trained prescribers also showed significantly higher prescribing

adherence than the others ($p < 0.01$). Prescribers who had not attended either training, including 20 foreign doctors, showed significantly lower prescribing adherence than those who attended at least one of the two kinds of training ($p < 0.01$).

Table 7-6 Comparison of prescribing adherence by prescriber's training (including doctors)

prescriber's training		n	median	inter-quartile range	p-value*
IMCI training	no	30	38%	20 – 60%	<0.01
	yes	22	68%	57 – 96%	
clinical nurse training	no	37	40%	20 – 67%	<0.01
	yes	15	90%	64 – 100%	
any training	no	25	25%	14 – 50%	<0.01
	yes	27	70%	57 – 100%	

* Wilcoxon rank-sum test

7.4.3 Logistic regression analysis of prescribing adherence

Analysing 240 target cases that were managed by local health personnel, the crude odds ratio of prescribing adherence for each prescriber characteristic suggested there was a strong association between prescribing adherence and prescriber's clinical nurse training. A weak association between prescribing adherence and prescriber's IMCI training was also indicated.

Table 7-7 Crude odds ratio of prescribing adherence for each prescriber characteristic after taking into account prescriber clustering

prescriber characteristic		n	crude OR	95%CI	p-value*
age (years)	35>	136	1		
	=>35	104	1.3	0.4 – 4.0	0.61
sex	male	168	1		
	female	72	0.5	0.1 – 1.4	0.17
occupational category	nurse**	197	1		
	midwife	43	0.5	0.1 – 1.9	0.34
civil service level	junior	149	1		
	senior	91	1.5	0.5 – 4.8	0.47
work experience (years)	15>	159	1		
	=>15	81	0.9	0.3 – 2.8	0.89
IMCI training	no	79	1		
	yes	161	2.8	0.9 – 8.0	0.06
clinical nurse training	no	111	1		
	yes	129	5.4	2.1 – 13.8	<0.01

* Wald test

** including manager

The odds ratio of prescribing adherence for prescriber's clinical training was investigated after adjusting for another factor. Prescriber's work experience, civil service level and sex were found as possible confounders for the association between prescribing adherence and prescriber's clinical nurse training. There was no evidence of effect modification between clinical training and each of these three variables.

Table 7-8 Adjusted odds ratio of prescribing adherence for prescriber's clinical nurse training after taking into account prescriber clustering

adjusted for	adjusted OR	95%CI
age	5.6	2.2 – 14.7
sex	5.0	1.9 – 13.0
occupational category	5.3	2.0 – 13.9
civil service level	5.9	2.3 – 15.2
work experience	7.1	2.7 – 18.5
IMCI training	5.4	2.3 – 12.6

The final logistic regression model demonstrated that there was an association between prescribing adherence and prescriber's clinical nurse training at a significant level (<0.01) after taking into account confounders (prescriber's work experience, civil service level and sex) as well as prescriber clustering. The adjusted odds ratio for prescribing adherence in the final model was 6.6 (95%CI: 2.5 – 17.6).

Investigating the adjusted odds ratios for prescribing adherence for prescriber's IMCI training, only adjusting for prescriber's clinical nurse training made a change from the crude odds ratio. The odds ratio for prescriber's IMCI training adjusted for clinical nurse training was 2.9 (95%CI: 1.2 – 6.8) at a significant level (p=0.02).

7.5 Prescribing adherence and CHC characteristics

CHC's overall prescribing adherence was compared by CHC characteristics using both retrospective and prospective data.

7.5.1 CHC characteristics

Complete information was obtained at 16 CHCs, but four CHCs had some missing data. A summary of CHC characteristics is shown below.

Table 7-9 Summary of CHC characteristics

CHC characteristic		
region	east	5
	south	8
	south-central	2
	west	3
sub-district population (people)	10000>	10
	>=10000	10
annual workload * ** (case/person)	1000>	8
	>=1000	10
no of health personnel** (people)	6>	10
	>=6	10
total members trained** (%)	70>	11
	>=70	9
total period of training ** *** (weeks/person)	3>	9
	>=3	11
availability of key medicines**** (%)	90>	8
	>=90	11
availability of EML****	yes	15
	no	4
availability of IMCI chart book	yes	19
	no	1
availability of clinical nurse textbooks*****	complete	10
	partial	5
	no	3

* Data was obtained in 18 CHCs where retrospective data was collected⁴⁵.

** excluding nurse assistants⁴⁶

⁴⁵ In CHCs where information was missing in patient registration books, the count was adjusted according to missing days.

⁴⁶ Although nurse assistants are counted as health personnel in official documents in the MoH, they were not included in the number of health personnel here. They are mainly working for

*** The IMCI training and clinical nurse training were counted for two weeks and twelve weeks respectively.

**** Data was obtained in 19 CHC.

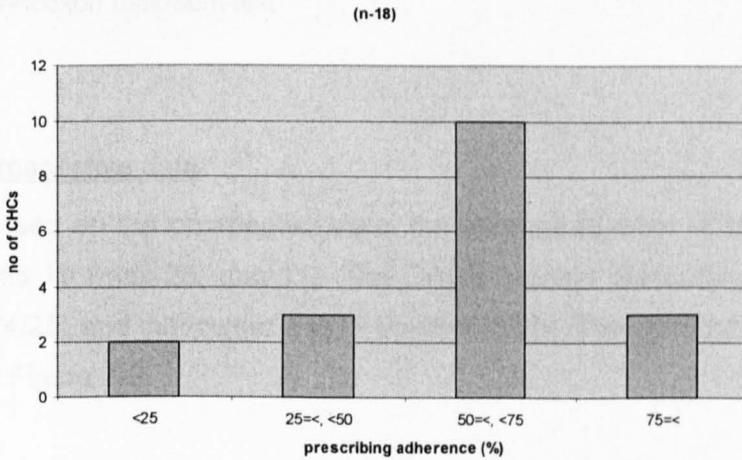
***** Data was obtained in 18 CHCs where a clinical nurse in post.

7.5.2 Comparison of CHC's overall prescribing adherence by CHC characteristic

Retrospective data

Based on the retrospective data, the average number of target cases per CHC among 18 CHCs was 64 (max 78, min 51). The CHC's highest prescribing adherence was 88 percent (64/73) and the lowest was 12 percent (8/67). The distribution of the results is presented in Figure 7-2.

Figure 7-2 CHC's overall prescribing adherence and number of CHCs – retrospective data



There was no significant difference in CHC's overall prescribing adherence compared by each CHC characteristic, as presented in Table 7-10. CHCs with more members of health personnel showed a higher prescribing adherence than other CHCs, but it was not significant. The total number of members trained and total period of training did not show a difference in prescribing adherence.

registering patients or dispensing medicines and are unlikely to be involved in consultations and prescriptions. Moreover, they usually do not attend clinical training.

Table 7-10 Comparison of CHC's overall prescribing adherence by CHC characteristic – retrospective data

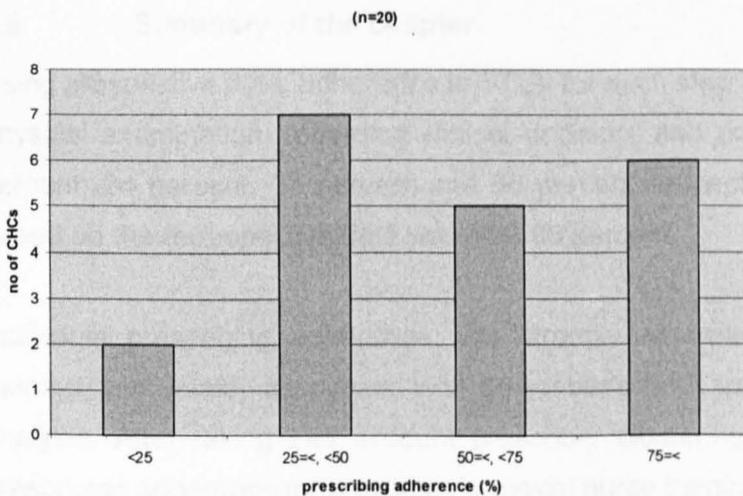
CHC characteristics		n	median	Inter-quartile range	p-value*
sub-district population (people)	10000>	9	56%	35 – 64%	0.16
	>=10000	9	63%	59 – 70%	
annual workload (case/person)	1000>	8	62%	48 – 77%	0.45
	>=1000	10	60%	40 – 65%	
no of health personnel (people)	6>	10	58%	35 – 64%	0.08
	>=6	8	66%	57 – 77%	
total members trained (%)	70>	10	60%	54 – 63%	0.53
	>=70	8	64%	38 – 75%	
total period of training (weeks/person)	3>	8	58%	40 – 67%	0.56
	>=3	10	62%	54 – 70%	

* Wilcoxon rank-sum test

Prospective data

Based on the prospective data, the average number of target cases among 20 CHCs was 19 (max 25, min 11). The CHC's highest prescribing adherence was 96 percent (24/25) and the lowest was 19 percent (3/16). The distribution of the results is presented in Figure 7-3.

Figure 7-3 CHC's overall prescribing adherence and number of CHCs – prospective data



There was no significant difference in CHC's overall prescribing adherence when compared with each CHC characteristic, including total inputs of training (total members trained and total period of training).

Table 7-11 Comparison of CHC's overall prescribing adherence by CHC characteristic – prospective data

CHC characteristic		n	median	inter-quartile range	p-value*
sub-district population (people)	10000>	10	48%	41 – 63%	0.88
	>=10000	10	59%	36 – 82%	
annual workload (case/person)	1000>	8	48%	33 – 77%	0.93
	>=1000	10	51%	40 – 63%	
no of health personnel (people)	6>	10	53%	41 – 63%	0.85
	>=6	10	54%	36 – 83%	
total members trained (%)	70>	11	50%	36 – 79%	0.54
	>=70	9	55%	45 – 82%	
total period of training (weeks/person)	3>	9	40%	29 – 63%	0.16
	>=3	11	62%	45 – 82%	
availability of key medicines (%)	90>	8	57%	43 – 80%	1.00
	>=90	11	55%	40 – 83%	

* Wilcoxon rank-sum test

7.6 Summary of the chapter

Using prospective data, adherence to STGs for each step: taking a history, conducting a physical examination, recording clinical decision, and prescribing medicines, was 37 percent, 24 percent, 77 percent and 56 percent respectively. Prescribing adherence based on the retrospective data was also 56 percent.

Individual prescribing adherence was strongly associated with prescriber's clinical training, and weakly associated with prescriber's IMCI training assessed by univariate analysis. After taking into account prescriber clustering, the adjusted odds ratio of prescribing adherence for prescriber's clinical nurse training was 6.6 (95%CI: 2.5 – 17.6), and for IMCI training was 2.9 (95%CI: 1.2 – 6.8). None of the CHC characteristics was associated with CHC's overall prescribing adherence.

CHAPTER 8 Knowledge and attitudes

This chapter describes health personnel's knowledge and attitudes regarding the use of medicines, especially prescribing adherence to STGs. It looks at individual interview data obtained from health personnel. In this chapter, the results are displayed according to thematic indices identified (See 5.4.3)

8.1 Respondents

As explained in 5.2.2, stratified purposive sampling was employed to target three groups of local health personnel: managers, clinical nurses, and other health personnel. The final sample size was 16 managers, 18 clinical nurses and 21 members of 'other health personnel'. Younger and less experienced people were purposively selected for 'other health personnel' in order to collect wider views as well as to compare them with managers and clinical nurses. However, the youngest or least experienced member was not always chosen. Selection of the members of 'other health personnel' was sometimes influenced by availability of members on the interview day or manager's recommendation.

Table 8-1 summarises respondent attributes. Of all 55 respondents, 36 had attended IMCI training. Twelve respondents had both clinical nurse and IMCI training. Thirteen respondents had neither. Although it was expected in the original plan to choose interviewees from those who were observed, eighteen respondents (10 managers, three clinical nurses and five other members) were involved in neither prescribing nor dispensing medicines during data collection⁴⁷.

⁴⁷ In some CHCs, after the arrival of the foreign doctors only a few cases (or even no cases) were managed by local members of health personnel and it was difficult to interview exclusively local health personnel who had done consultations.

Table 8-1 Interviewee characteristics and sampling group

characteristics		sampling group			total (n=55)
		manager (n=16)	clinical nurse (n=18)	other health personnel (n=21)	
age	35>	2	5	11	18
	>=35	14	13	10	37
sex	male	16	16	10	42
	female	0	2	11	13
occupational category	nurse	16	17	16	49
	midwife	0	1	5	6
civil service level	senior	16	13	3	32
	junior	0	5	18	23
work experience	15>	4	6	15	25
	>=15	12	12	6	30
pre-service education	basic	14	17	21	51
	higher	2	1	1	4
clinical nurse training	yes	0	18	0	18
	no	16	0	21	37
IMCI training	yes	13	12	11	36
	no	3	6	10	19

8.2 Knowledge of standard treatment

This section describes respondent knowledge of standard treatment. The first sub-section (8.2.1) considers the use of medicines for three target diseases (ARTIs, malaria and diarrhoea), and answers questions of the topic 1 ('standard treatments'). In the last sub-section (8.2.2) collected interviewee comments in relation to antibiotic use and vitamin use, which were found more widely across the questions, are analysed.

8.2.1 Knowledge of standard treatments for ARTIs, malaria and diarrhoea

ARTIs

All the three key points of ARTI management (see 3.4) were referred to by more than a third of interviewees. Half of the clinical nurse interviewees suggested that certain types of upper ARTIs also required antibiotic therapy, which the clinical nurse textbook indicates.

Apart from a few exceptions, statements given in clinical nurses' answers did not contradict recommendations in STGs. The exceptions were: one clinical nurse said that

all ARTIs required an antibiotic and another clinical nurse suggested that the seriousness of the illness determined antibiotic indication.

On the other hand, several non-clinical-nurse interviews indicated antibiotic therapy for all ARTIs or upper ARTIs. Their criteria for antibiotic indication are seriousness of the illness, duration of the illness, type of sputum, and presence of a high fever. None of these criteria are recommended in STGs. One nurse indicated chloramphenicol, which is not listed as a daily use oral antibiotic in Timor-Leste's EML for Level 1-2 facilities.

Malaria

Treatment for clinically suspected malaria without a blood smear test was well known among respondents. Some people, who worked for the CHCs with a laboratory, indicated procedures based on a blood smear test. Only one respondent suggested that treatment for clinically suspected malaria was chloroquine, which is not recommended in STGs because chloroquine resistant *P. falciparum* had been reported in Timor-Leste.

Although the majority of respondents specified recommended malaria management, some suggested treatments that STGs do not recommend. For example, using two kinds of medicine (Fansidar and chloroquine) for a specific type of malaria diagnosed by a blood smear test was suggested. However, it is unnecessary to combine them if the malaria type is known. One respondent gave the recommended medicines for *P. falciparum* and *P. vivax* the wrong way round. Misunderstandings of primaquine use were also detected. Some respondents stated that primaquine was the second line medicine after the first line treatment failure, and others believed that quinine could be used as an alternative to primaquine.

Diarrhoea

While nearly all clinical nurses knew that oral rehydration was the principal treatment for simple acute diarrhoea and that an antibiotic was not necessary, less than half of the non-clinical-nurses indicated these points. Treatment of dysentery was shown by nearly half of the respondents. However, nobody clearly explained treatment of persistent diarrhoea as recommended in STGs.

Some of the respondents seemed to be confused with how to use an antibiotic or metronidazole for diarrhoeal patients. Some indicated an antibiotic or metronidazole without mentioning blood in the stool. Others indicated only metronidazole for treatment

of dysentery although STGs recommend the use of an antibiotic (cotrimoxazole or nalidixic acid) first for suspected shigellosis, and then metronidazole for suspected amebiasis. Quite a few interviewees specified incorrect criteria for antibiotic indication such as seriousness of diarrhoea and duration of the illness. Apart from one exception, all respondents who answered in this way were non-clinical-nurses. Antibiotics that were not recommended in the diarrhoea STGs were occasionally listed by interviewees. Several members indicated chloramphenicol, which is registered as an emergency injection for Level 2 CHCs.

8.2.2 Knowledge of antibiotic use and vitamin use

Antibiotic use

As described in 8.2.1, respondents, in general, understood well when to use antibiotics for patients. More accurate knowledge was shown by clinical nurses than others.

Some interviewees suggested that 'serious (*berat*)' illness or a long history of illness (sometimes specifying a period which was different from that in STGs⁴⁸) were criteria for antibiotic use for ARTIs and diarrhoea. Nobody indicated an antibiotic as treatment for suspected malaria⁴⁹. Aside from a small number of exceptions, the antibiotics that interviewees indicated in their answers were those in the EML for Level 1-2 facilities.

In many comments, respondents did not merely cite the indications of the antibiotic use but also specified when they did not use antibiotics; eg. common colds, no pneumonia, and acute simple diarrhoea. Some suggested their antibiotic use had been improved after STGs were introduced.

'Before training, antibiotic use was too high, but now we do a comprehensive examination [and] we do not give antibiotics randomly....for example, we give antibiotics for pneumonia but we give only paracetamol for a common cold.'
(clinical nurse)

⁴⁸ The clinical nurse textbook for tuberculosis, which is based on the National Tuberculosis Program, only indicates a trial antibiotic to the patients with more than 3-week cough and negative sputum smear.

⁴⁹ In the transcript of one respondent, who was 'other health personnel', the phrase 'malaria antibiotics (*antibiotika malaria*)' was used, but considering her context, she intended to say 'anti-malarials'.

'I feel there are differences, for example, we only gave antibiotics for only one day for severe diseases, but after training, we give antibiotics for five days to patients with ARTIs.' (clinical nurse)

Although interviewees demonstrated their knowledge of inappropriate overuse of antibiotics, they rarely gave the reasons. Only one respondent pointed out antibiotic resistance as below.

'...overuse of antibiotics is not very good for health. If antibiotics are used too much, resistance can emerge. For example, [suppose] I have an ampicillin injection everyday, if I get gonorrhoea, ampicillin cannot cure [it].' (other health personnel)

Vitamin use

A few respondents said that vitamins did not cure diseases. A few indicated that vitamins were contained in food, especially in vegetables, and usually vitamin tablets were not necessary. A couple of respondents acknowledged that they prescribed vitamins to satisfy patients or to avoid being criticised for doing nothing when the patients actually did not need medication. However, the majority believed vitamins were effective for certain types of patient condition. Some interviewees said they prescribed a vitamin for all cases.

The most frequently cited answer was that vitamins worked for appetite loss. Some of them indicated more specifically that vitamins could improve or restore the appetite after recovery from a certain disease, eg. ARTIs or malaria.

The second most frequent comment was that vitamins could improve anaemia, sometimes mentioning 'vitamin iron' or 'vitamin SF (sulphate ferrous)'. One possibility for this answer was that they mistook iron for a vitamin. 'Vitamins for pregnancy' might lead to the same misunderstanding.

Malnutrition as a reason for a vitamin prescription was also evident in many answers: 'malnutrition (*malnutrisi*)', or 'shortage of nutrition (*kurang gizi*)'. Some believed vitamins were effective for general conditions, such as regaining 'energy (*forca*)', 'stamina (*stamina*)', or 'spirit (*semangat*)', and so on.

Quite a few respondents thought that vitamins were needed for ARTI patients or were effective against respiratory symptoms such as a cough. Many of these answers specifically indicated vitamins for upper ARTIs or common colds, for example, 'there is no indication of an antibiotic for a common cold but it needs vitamins'. Early recovery or relief from respiratory symptoms were believed to be reasons for vitamin use. Vitamins for malaria were also referred to. As mentioned before, the context of many of the answers suggests that respondents mistook iron for a vitamin. Some interviewees said vitamins could stimulate appetite lost by malaria infections. Vitamins for diarrhoea were indicated although it was less frequent than vitamins for ARTIs or malaria. One respondent said that a vitamin could function as fluid replacement, and another suggested it should be given to a patient with recurrent diarrhoea.

Unlike knowledge of antibiotic use that showed a clear contrast between clinical nurses and others, misunderstandings of vitamin use were given by respondents regardless of their previous training.

8.3 Perceptions of STGs and related training

In this section, respondent perceptions of STGs and the training that introduced standard treatments are described. They were mainly made in responses to topic 3 ('changes'). However, comments on what they thought of their new STGs were found across the questions.

8.3.1 Perceptions of their new STGs

All of the respondents were aware of the existence of their new STGs⁵⁰ such as the IMCI chart-book, clinical nurse training textbooks and National Protocol of Malaria Management. Health personnel perceived STGs positively. None of the respondents expressed negative perceptions although a few of them, who had not yet attended training, answered that they had not yet read them because they were busy. The most

⁵⁰ Respondents used several terms to describe their STGs: protocol (*protokol*), manual (*pedoman* or *manual*) or guidelines (*petunjuk*) in Indonesian. They used Indonesian terms probably because they had been familiar with these Indonesian vocabularies since the Indonesian occupation period and did not have the equivalent terms in their own language, yet. In this chapter, 'STG' was used to translate these terms whatever their original expression.

commonly used word to describe STGs was 'advantage (*manfaat*)' or 'useful (*bermanfaat*)'⁵¹. They said that STGs could 'help (*ajuda*)', 'support (*melindungi*)' or 'facilitate (*facilita*)' them, and also could 'increase capacity (*umenta kapasidade*)' or 'add concepts (*umenta wawasan*)'.

'STGs are useful, they help us to give treatment and [they] support nurses.'
(clinical nurse)

'All STGs here can facilitate us to carry out treatment.' (manager)

The role of STGs was described as a 'teacher (*mistrø,gu ru*)' or 'path (*dalan*)' to follow.

'STGs have a great advantage because they resemble a teacher if we have difficulties.' (clinical nurse)

'These STGs are very good because they can give a good path for us and our staff [so that] they can give treatment for patients.' (manager)

The fact that they could open STGs repeatedly appeared beneficial for respondents. They found their new STGs useful because they could look at them again when they forgot something or faced a problem.

'STGs are useful because when we forget [something] or have difficulties in giving treatment, we can open STGs that we have again.' (clinical nurse)

Interviewees positively perceived standardisation of treatments after the introduction of STGs. No one disagreed with or refused to accept the concept of STGs in general or a specific STG.

'Treatment in this CHC is the same although the nurse is different because all [nurses] use STGs, and because STGs form criteria for treatments.' (other health personnel)

⁵¹ These two Indonesian words have the same stem. All of them were found in Indonesian in the original transcripts, a total of 58 times from 39 respondents.

They seemed to believe that they needed to comply with the instructions in STGs, and used the word 'should (*tenki*)' quite often. Two directions of thinking were identified in their answers to support this attitude that they 'should' follow STGs. Firstly, they were aware of themselves as frontline workers in the community. They realised that nobody else could treat people and felt the need to improve the quality of their services.

'Sick people should come to [see] the nurse because there is nowhere else they do (=receive) treatment. Importantly, we, as the nurses, are ready and can do something for the Timorese.' (clinical nurse)

Secondly, it was found that they were obedient to the authorities as peripheral civil servants. Some respondents believed STGs were reliable because they were developed by experts in the MoH and WHO so then health personnel should 'just follow (*halo tuir deit*)' any decision indicated by STGs. Several interviewees, all of them categorised in 'other health personnel', used 'big people (*boot sira*)' or 'superiors (*atasan*)'⁵² to describe the authorities or a 'small person (*ema kiik*)' for themselves.

'These STGs are something good because, as I know, intelligent people made them.' (manager)

'This is the Ministry policy, they worked together with WHO when making STGs. So, there have never been negative effects for us so far.' (manager)

'...we have STGs from international [organisations] that we just follow.' (other health personnel)

'We follow what big people give.' (other health personnel)

8.3.2 Perceptions of training

Respondents also positively perceived the training that introduced STGs. They said training had been 'useful (*bermanfaat*)' and 'helpful (*ajuda*)' to make them understand the contents of STGs and to be able to give treatment according to STGs. Training could increase their capacity, and health personnel could acquire knowledge they had not had before they attended the training.

'Good. The training that we got (=attended) was very good because [it] can help our services as well as increase our capacity.... what we did not know, we could find out through training.' (other health personnel)

'The advantage of the training [is that we] are able to give treatment according to STGs.' (clinical nurse)

They valued getting actual 'experiences (*esperiencia, pengalaman*)' during training, for example, how to use a stethoscope, following instructions in STGs. They could share experiences with other participants during training.

'Attending training is the same as giving (=getting) more experience for us.'
(other health personnel)

'...and with training, we could also share our experience with colleagues.'
(clinical nurse)

Some of them had doubts. Respondents who had been trained hoped that they could feedback the results of training to their colleagues but their comments implied it did not work well. One clinical nurse had wished to share his new knowledge but he implicitly stated it had been difficult. On the other hand, a junior nurse who had not yet attended training accused her senior colleague of not feeding back the results of the training to co-workers in the CHC. Both sides, however, did not specifically indicate what kind of feedback they expected to offer or receive, and exact expectations of training feedback in the CHC were not known. One manager complained that supervision was not adequate after the training. A few respondents raised the question of whether training really matched the situation in CHCs.

'Regarding the training, [although] the training uses a lot of money, sometimes they do not do anything, so [I] just hope there is more supervision about (=after) the training, for example, 6 or 7 times.' (manager)

⁵² These words are sometimes used to indicate a person in an upper position in the workplace.

'Here, only Mana⁵³ IMCI attended [training], but [after] she came [back], she did not tell us [what she had learnt].' (other health personnel)

8.4 Positive perception of changes

'Changes after STGs and related training' was the main issue of topic 3. However, a contrast between 'before (*uluk, sebelum*)' and 'now (*agora, sekarang*)' or 'after (*depois, setelah*)' was observed quite often beyond the answers in topic 3⁵⁴. Some respondents compared their present practice with before, and others showed what patient changes they perceived as a consequence of their change.

8.4.1 Changes in own practice

Having standard treatments seemed to bring differences to their daily work. Some interviewees viewed the change as being connected to the restored sovereignty (independence) of the nation.

'Before, we gave treatment based on experience, but [now, after] Timor-Leste independence, we are using STGs.' (clinical nurse)

'There are differences. Before we had the training, we used experiences during the Indonesian time. Now is better. There are good results, and after attending the training, better.' (clinical nurse)

'From 2001 to 2003, we did (practices) according to [what we had learned during the time of] Indonesia, from 2004 to the present, we are doing according to STGs - STGs gave a big change to us.' (manager)

After the international NGOs left, local health personnel needed to do consultations by themselves (See 3.1 and 3.2). However, before the introduction of STGs and related training, they lacked confidence in their own practice because they had been relying only

⁵³ A courtesy title to call an elder woman

⁵⁴ Forty seven passages (including some equivalent expressions) described this contrast from a total of 29 observed respondents.

on their own experience. They had perceived their previous practices were 'random (*arbiru*)', 'perfunctory (*asal-asal*)', 'uncertain (*ragu-ragu*)', or 'disordered (*naran deit*)'.

'Before IMCI training, we were following what we learnt in school, after IMCI, we follow the IMCI chart-book that [we] have already had.' (manager)

'Before, [we] worked perfunctorily, but now, with adequate STGs, [we] satisfy patients.' (clinical nurse)

'Before, [I] gave antibiotic randomly, but there is a big improvement for me because after [I] have STGs, I give treatment with confidence.' (clinical nurse)

Respondents expressed their changes not only in general concepts but also in actual and concrete examples from their daily practice: they began to give a detailed physical examination; not to use injections very much; not to use antibiotics for patients with common colds or simple diarrhoea; to use chloroquine and Fansidar at the same time for suspected malaria patients; to use age and weight to decide a dose of medicine for child cases; and to give advice to patients.

One interviewee said they could not rely only on their own experience because knowledge was updated year by year, and using STGs had advantages. Another respondent raised a similar issue but in a different way. He commented that they could not follow the present STGs forever because knowledge was always changing. Some hoped to have prompt information from the MoH in the case of any update to STGs.

'When there is a change in health issues, it should not arrive in the CHC too late.' (clinical nurse)

8.4.2 Perceived changes in patient satisfaction

Patient satisfaction was considered to depend on 'only each patient's idea (*idak-idak hanoin deit*). However, respondents believed patients were more satisfied with their practice than before. They thought that they could satisfy patients if patients got well, especially in cases when they recovered early. They also believed that a careful examination, which they had learnt as 'comprehensive patient management' in training, made patients contented. It was said that patients were glad if they were given concrete explanations or if they were told they did not have a serious condition.

'Patients feel contented with our care because after they take the medicines that we give, they feel a difference. Concerning [if they are] satisfied or not, it depends on each patient.' (manager)

'Patients are contented with our care now because we give an examination from head to feet.' (clinical nurse)

They listed the reasons why they thought that patients were satisfied: the number of visits had increased; patients expressed their appreciation; patients did not get angry or complain; patients were supportive; and there was no trouble between the CHC and the community.

A few respondents felt that patients could not understand what they had newly learnt. Their new practice might have disappointed patients because it did not meet patient specific preference, eg. injection, capsule, or polipharmacy.

'A majority of patients understand how to take medicines. They are contented, but some of them are not very contented because they hoped to get an injection following their own experience.' (clinical nurse)

'About patients who are not contented, they do not yet understand what counselling is.' (other health)

8.5 Desire for improvement

Respondents' desire 'to increase capacity (*augmenta kapasidade*)' was frequently observed⁵⁵ in answers to topic 3 ('changes'), 4 ('difficulties') and 5 ('requests'). Some of the interviewees said they felt their capacity had increased after having STGs or attending the training, and others said they wished to increase their own or colleagues' capacity 'more (*tan*)'.

⁵⁵ Seventeen passages including 'to increase / improve capacity (*augmenta / hadia kapasidade*)' and 5 more similar expressions were found.

'If possible, [I would like] more training for other colleagues and for us, clinical nurses, in order to increase our capacities.' (clinical nurse)

These answers expressed their feeling that their capacity had increased as a result of the training as well as their hope that they would increase their capacity more in the future. It was difficult to find directly from the interviews whether they had wished to 'increase capacity' before the introduction of the new STGs. Since respondents had felt a lack of confidence in their practice before, it was assumed that their hope for increasing capacity might have developed since they became responsible for consultations.

In terms of future STGs, some suggested general, non-specific requests such as 'what was not included in the current STGs', but others specified certain diseases. Hypertension, asthma, sexually transmitted diseases, gastritis, cancer and AIDS were referred to by more than two respondents. It was not clear from the interviews why they hoped these diseases would be included in future STGs. In particular, cancers and AIDS were unlikely to be urgent issues in the rural community based on the morbidity rates, and their real intentions of the answers were undetermined.

Some clinical nurses hoped other members of the health personnel would have clinical nurse training. Several of them suggested that clinical nurse training was necessary for all nurses. One clinical nurse asked for more clinical nurses so that they could help each other. There was a real need for clinical nurses in health posts that were located in remote areas.

'Present training will be better if two or three nurses in a CHC attend it in order to help each other.' (clinical nurse)

'I hope [the MoH] will increase [the number of] clinical nurses in CHC 6 because [we] have only one clinical nurse, and hope to have clinical nurses in the health posts, too.' (manager)

'If possible, [I hope the MoH] will increase [the number of] clinical nurses in this CHC because in this CHC [area] many people live far from CHC.' (other health personnel)

8.6 Self-confidence

Although 'self-confidence' was not directly asked about in the interview topics, many comments were obtained in this connection. Remarks were mainly found in responses to topic 2 ('present practice'). However, relevant comments were given across the topics.

Respondents in general were confident in their present practice, and described this using expressions such as 'good (*diak*)', 'correct (*loos*)', 'sure (*ho fir an, yakin*)', and so on.

'The treatment that they (=my staff) give is good, there is no bad thing (=none of them is bad).' (manager)

'[!] don't say [treatments are] 100 percent correct, according to my opinion, 80 percent of treatments are correct.' (clinical nurse)

'... we also feel patients are contented because we treat them well.' (other health personnel)

As mentioned in 8.3.1, they were aware that they were only the people who could treat sick people. Self-awareness of their responsibilities could be found in the attitudes towards prescribing practice. They said that patients sometimes expected or demanded unnecessary medicines. Health personnel believed that they were responsible for giving medicines to the patient and should not submit to patient expectations if inappropriate. Moreover, they should explain what the patient actually needed and should not prescribe medicines inappropriately. Related comments were dominant among clinical nurse answers.

'In reality, patients come to the CHC [as they] hope to receive medicines. Sometimes a patient comes [and] says (=complains) that there are not enough medicines [prescribed]. However, we always tell them that the medicine is poison (=medicine can be poisonous if they take inappropriately).' (clinical nurse)

'... some [patients with a symptom like a] runny nose hope to get medicines, too. [They] become angry if [they] do not have (=receive) medicines; however, we explain [that it is unnecessary).' (clinical nurse)

'There are some patients who like only one kind of (=a specific) medicine. However, we cannot give medicines according to patients' wishes, but we give [it] based on the present STGs.' (clinical nurse)

Overall, clinical nurses were proud of their clinical nurse status. They said it was a new position⁵⁶, and they were different from other nurses. They were ready to share the knowledge they had gained in the training with their colleagues and hoped other members would have a chance to attend the training.

'... about colleagues, [they] always ask me [about STGs] when they have problem.' (clinical nurse)

8.7 Attitudes to others

Comments on and explanations of daily work sometimes revealed attitudes to others in their working environment. These kinds of remarks were heard across the questions and occasionally appeared as a complaint about a situation, a request for solutions, or a justification or excuse for what they did or did not do. Although each of topic 2 ('present practice'), 3 ('changes') and 4 ('difficulties') was asked not only in relation to personal problems but also environmental matters as well as patient side issues (see sample questions), 'attitude to others', was not put as an *a priori* theme. In particular, questions about doctors were not asked in the topic guide. Nevertheless, related comments were obtained far more than expected. This theme was mainly observed in topics 2, 3 and 4, but also found even in answers to topic 1 ('standard treatments') and 5 ('requests'). In this section, attitudes to others in the work like patients, colleagues, and foreign doctors are separately cited and then analysed.

8.7.1 Attitudes to patients

Two different types of view on patient comprehension were found. One was that health personnel were responsible for patient comprehension about how to take medicines, and good services would enable patients to take medicines.

⁵⁶ It is not yet an official job title in the MoH, but a member of health personnel who attended training in the clinical nurse training program is called 'clinical nurse'.

'When an explanation is clear, patients comprehend. Especially about antibiotics, the explanation should be correct. This completely depends on staff at the dispensing counter.' (clinical nurse)

'Patients feel satisfied when there are good services and a careful examination, and when the services are good, [it] helps them (=patients) be glad to take medicines.' (clinical nurse).

Many interviewees said health personnel 'explained repeatedly (*əsplika fila fail*⁵⁷)' how to take medicines and checked it by 'asking again (*husu faili*)' so that patients could comprehend it. They thought patients in general understood their explanation. They also said patients could 'ask again (*husu faili*)' health personnel until they understood it.

'[After] we have explained [how to take medicines], [we] ask (=check it) once again to the patient. When [the patient] does not comprehend it, [we] explain it once again.' (clinical nurse)

On the other hand, other respondents also said that patient comprehension depended on each individual, especially on their educational level. Some thought if a patient did not get well, it was caused by poor patient compliance. Some respondents complained that patient awareness about health in general, not only about how to take medicines, was inadequate.

'We sometimes find patients do not take medicines, because (=as a result) they come back with the same sickness.' (manager)

'About medicines, we give [them], they (=patients) take [or] do not take [them]. Sometimes we give [them] for 5 days, patients take it for 3 days (=patients stop taking them on the third day) when they feel well.' (other health personnel)

⁵⁷ '*Fila fail*' literally means 'to go back' or '*filafali*' in one word means 'once again' as an adverb. '*Fila fail (filafali)*' or '*fali*' in connection with to explain or to ask how to take medicines was observed 19 times in total.

'Patient awareness is inadequate. Because (=therefore) patients here sometimes [just] use timing of market [day] and come for a consultation at the same time.' (clinical nurse)

As mentioned in 8.6, we were given examples of patient preference that respondents believed inappropriate; some patients hoped for a specific medicine like an antibiotic or a specific form like a capsule or an injection. They complained about patients who preferred receiving medicines to having health education, even if their condition was not serious. Therefore, health personnel occasionally needed to give patients unnecessary vitamins to satisfy them.

'In fact, a common cold does not require medicines, but considering our situation, [if] patients come [and we] give only counselling, they say the nurse is wrong.' (clinical nurse)

Respondents were afraid that a patient would be disappointed when the medicine given in the CHC did not make them well at home, especially in a case where the patient lived in a remote area.

'Some are not very contented because sometimes, for people who [live] remotely, [we] give medicines that is not suitable to their sickness and they [do] not [get] well. They are not very contented. (other health personnel)

Some interviewees said patients would forget how to take medicines if they received too many different kinds, and appropriate services should be based on real patient needs.

'Sometimes [if] there are too many [kinds of] medicine, patients get confused and take them incorrectly. Therefore, [we] should do consultations properly and give medicines properly based on their needs, probably only two or three kinds of medicine.' (clinical nurse)

8.7.2 Attitudes to colleagues

'To help each other (*ajuda malu*)' or to do something 'to each other (*ba malu*)' in relation to CHC work was observed in many comments⁵⁸.

'If a colleague gives wrong medicine or sometimes an unnecessary antibiotic, we always remind each other to follow STGs.' (clinical nurse)

According to some respondents, colleagues who had not attended training seemed unfamiliar with standard treatments. Interviewees said if they faced difficulties in practice, they could ask a colleague who had attended training and knew more. However, as mentioned in 8.3.2, contradictory views on feedback of training in the CHC were found. While one side said they were not able to attend training despite their wish to do so, the other side complained they did not have enough feedback from trained colleagues. Some clinical nurses said colleagues could ask the clinical nurse.

'When [somebody] has not attended training, it is better to ask other colleagues who have already attended the training.' (clinical nurse)

'[If] other members, who have not attended clinical nurse training, face a difficulty in treatment, they can check STGs. And when they can not understand, they can ask the clinical nurse.' (clinical nurse)

Several clinical nurses expressed their wish to share the knowledge they had gained in training, and others expected (an)other member(s) to have a chance to attend the training. Respondents besides clinical nurses, including managers, thought clinical nurses knew more about STGs.

'About STGs, only clinical nurse handles with (=answers) the issues.' (manager)

'About patients, I think only clinical nurse master this (=clinical nurse masters patient care more than others) because they attended [training] for six months' (manager)

⁵⁸ Other expressions were; to ask, to teach, or to share work with each other. '*Malu*' or '*ba malu*' was found 11 times in total.

Although 'helping each other' was suggested by many interviewees, one member of 'other health personnel' mentioned that there was insufficient 'solidarity (*kekompakan*)' among staff. As only one interview was conducted in this CHC (see footnote on page 48), other people's views in the same CHC could not be obtained. This minority view should not be ignored. He also talked about colleagues' inadequate practice with patients.

'Some colleagues get angry [at patients] and do not give good services because of anger. Sometimes they only shout to patients.' (other health personnel)

8.7.3 Attitudes to foreign doctors

The word 'doctor (*doutour(a), dokter*)' was very frequently used although it was not put in the topic guide. The majority of comments were based on their actual experience of working with doctors in the CHC⁵⁹, mainly the recently deployed Cuban doctors. Most of the comments concerning doctors could be organised into four categories.

In the first category, they explained on several occasions the past and present situation at the CHC in terms of availability of doctors. When they had not had Cuban doctors after international NGOs' withdrawal, they had done consultations by themselves. Even after the deployment, if the doctors were absent from the CHC, local staff had needed to do the consultations. Some of them added that STGs were of great help when the doctor was not available. One manager mentioned, however, even though they had STGs they always needed to ask the doctor for help.

'Before, [during the Indonesian time and UNTAET time], we only helped doctors to give medicines.' (clinical nurse)

'Before the [Cuban] doctors came, I did consultations, sometimes other members of staff did.' (clinical nurse)

'[When] we did not yet have doctors, we followed our duty, but now we have doctors [who are] always going ahead [together].' (other health personnel)

⁵⁹ Seventy four passages from thirty four respondents were found, among which three were about specialists who developed their STGs. The others indicated specific doctors or doctors in general who had worked or worked together: Indonesian doctors, NGO doctors, UN expatriate doctors, and Cuban doctors.

'Although doctors are not available, we give treatment as we learnt [in training].' (other health personnel)

The second category consisted of their collaboration with Cuban doctors. They appreciated that they could consult the doctor on difficult cases although language might be an obstacle in the communication with doctors as a few respondent pointed out.

'When we have a problem, [we] consult with doctors.' (clinical nurse)

'Because we attended the training, we can give [prescriptions], but when we have a problem, [we] consult with doctors. The consultation is good, but the language becomes a barrier.' (manager)

In the third category, some respondents implicitly or explicitly complained that doctors did not follow recommendations in STGs. However, they recognised the doctor have more knowledge than the nurse. Although one clinical nurse blamed doctors for not adhering to STGs, he mentioned that they could not change the doctor's prescriptions due to his position. Instead of making a complaint, some of them raised this issue as a request to the MoH that they would make doctors use STGs or develop the doctors' version of STGs. This was probably also caused by the respondents believing their positions to be low.

'[We] hope the Cuban doctors will follow the treatment in STGs.' (clinical nurse)

'Doctors do not follow STGs, but we cannot change the medicine they prescribe because when (=if) we change the medicine and the patient has a problem, I will be sent to jail. Because (=For) knowledge that doctors have learnt is more than nurses.' (clinical nurse)

'If possible, [we hope the MoH] make uniform STGs for us and the doctors.' (clinical nurse)

'We ask [the MoH], if possible, to provide STGs in Spanish so that our doctors can use them.' (manager)

The fourth category comprised comments on local health personnel's obedience to foreign doctors' prescriptions.

'We only follow the doctor's prescriptions, [if we can] not understand a prescription, we ask the doctor again.' (other health personnel)

The type of comments clearly differed among respondent groups. The majority of complaints or requests concerning doctors not using STGs were identified in clinical nurse answers. More than two thirds of clinical nurses brought this point up. On the other hand, all of the comments that indicated their obedience to the doctor were observed in the 'other health personnel' group. More active and concrete suggestions about good collaboration with doctors were raised by clinical nurses than others. For example, one clinical nurse said that they could show doctors the standard management of malaria because the disease is rare in their home country.

In addition to the four above-mentioned issues, some respondents said that local members of health personnel were more intimate with patients than the foreign doctors. One clinical nurse added that he got confused about his position as a clinical nurse after the foreign doctors came because he did not do consultations any more.

8.8 Attitudes to present problems / difficulties

Words such as 'problem (*problema, masalah*)', 'difficulty (*difikuldade, kesulitan*)', 'obstacles (*hambatan*)', and 'lack (*kekurangan*)' were widely found all over the interviews. They often appeared in the phrase of 'no problem / difficulty'⁶⁰. However, 'no problem' was sometimes followed by 'but / however (*maibe*)' and actually indicated 'a problem'. Less frequently, expressions were the other way around (there is a problem, but/however...) or 'if there is a problem ...', which suggested a way to solve it. Related comments mainly responded to questions which had been asked about existing problems or obstacles in topic 2 ('present practice') and 5 ('difficulties'), but they were also found across the topics. What they perceived to be existing problems and what they thought could be done to solve them are given in this section.

Nobody mentioned there was a problem with STGs. As described before, one of the reasons that STGs were understandable might be that health personnel were familiar

⁶⁰ All respondents used one of these words (or other vocabularies with similar meaning) at least once. There were 185 passages that included these words were found.

with the language used for STGs. Among respondents who mentioned the use of STGs, all but one did not think them difficult. The person who said 'difficult' was a young midwife, and she specifically pointed to the particular difficulty of an STG for family planning due to the complexity of options available.

Problems or difficulties in applying STGs in real practice were established as an *a priori* issue and related questions were set in the topic guide. Nevertheless few comments with this answer were found. Instead of mentioning a problem/difficulty in STGs, respondents said that they opened STGs to solve a problem. Collecting comments on 'there is no problem' and 'if there is a problem', other possible problem solving measures besides consulting STGs also emerged. They suggested they could consult with the doctor or ask each other for help when they faced a problem. Some believed they could feedback⁶¹ problems to the central level. A few said they needed to have a meeting among members of staff to solve the problems.

'So far, there is no difficulty in applying STGs, if there is [a difficulty], we consult each other.' (other health personnel)

'There is no difficulty in [giving] treatments because here we have STGs as well as Cuban doctors to ask for help.' (clinical nurse)

'No difficulty because, with a seriously ill patient, we give an injection and refer [the patient] to the regional hospital.' (clinical nurse)

'So far, we just follow [what have been given]. If there is any problem, we will inform [it] to the MoH.' (manager)

However, it was unknown from the answers we received if the abovementioned problem-solving measures were actually functioning well.

⁶¹ Words for 'to offer (*hato*)', to request (*husu*), 'to inform (*fo-hatene*), and 'to consult (*konsultasi*)' were used in original transcripts.

8.9 Working conditions

Some of the comments on working conditions, which were found across the interviews, are considered in this section.

'Referral (*rujuk*)' seemed to support practice in rural CHCs. The term was frequently cited. However, nearly two thirds of the passages containing 'referral' just appeared as their knowledge of the timing of the referral as indicated in STGs⁶². It was not very clear from the answers if the referral system was functioning well. Some respondents indicated they were allowed to give injections as pre-referral treatment after STGs were introduced. One clinical nurse pointed out that transportation was a problem for the referral. Several respondents touched on transportation difficulties but not specifically in relation to patient referral. Another clinical nurse requested the referral system be improved.

Many respondents mentioned shortage of medicine, including one answer which mentioned the lack of plastic bags for medicine⁶³. A few answers revealed difficulties in the procurement system: calculation for the quarterly request form was difficult; sometimes the medicine provided by the district was not the same as had been requested; and delivery of medicine to the CHC was delayed. Other majority responses just mentioned it as a problem, for example, available medicine was 'little (*uitoan*)' or 'limited (*terbatas*)', 'not in stock (*la iha*)', 'finished quickly (*hotu lalais*). It was difficult to tell from these responses how the shortage of medicine influenced their prescribing practice.

Some interviewees referred to language issues⁶⁴. The language used in STGs did not seem difficult for users. Regarding daily communication with patients, while some interviewees said a specific local language⁶⁵ was a problem in their practice, others thought speaking in a local language was an advantage for them. This seemed to depend on the region. Language barriers with foreign doctors were also pointed out.

⁶² Thirty five passages mentioning 'referral (*rujuk*)' from 24 respondents were found, of which 23 passages showed their knowledge about the timing of referral.

⁶³ Twenty passages in relation to the shortage of medicine or supplies (plastic bags) were found from 18 respondents.

⁶⁴ In total 13 observations about language issues were found; four about the language in their STGs, five about communication with patients in local language, two about communication with foreign doctors, and two non-specific.

⁶⁵ Local languages here mean languages besides Tetum.

Deficiencies in staff in terms of both quantity and quality were also raised. A shortage in staff numbers⁶⁶ was sometimes used as an excuse for not doing what they actually felt was necessary, for example, labelling dosage schedule and patient name on a medicine bag. Two managers admitted they needed to assign unqualified members to certain work, for example, nurse assistants to prescribe medicines in mobile clinics or cleaners or security guards to dispense medicines at the counter.

Working conditions might not yet have been well established, however, one manager stated as below;

'Because our nation just became independent, we are going slowly according to our wish.' (manager)

8.10 Summary of the chapter

Responding five topics, eight indexes were identified. Overall, standard treatments were well known by respondents. Clinical nurses showed more precise and detailed knowledge, especially for antibiotic use.

Respondents well agreed with STGs and accepted them. They believed they 'should' follow them. This feeling of obedience was caused through their self-awareness as frontline health workers as well as peripheral civil servants. STGs brought them many changes. Three components of the change found were: the concept, daily practice and perceived patient satisfaction. They had felt a lack of confidence and hoped to improve their capacity, and became confident in their practice using STGs. Self-confidence was identified more evidently in clinical nurse interviews, in particular, their answers of attitudes to patients, colleagues and foreign doctors.

Although 'difficulties' in applying STGs were established as *a priori* issue in the interview, few responses were obtained. Instead, respondents suggested how to deal with difficulties; opening STGs was one of their problem-solving ways. Needed supports in workplace such as mutual help, doctor consultation, referral, and feed-back to the MoH were also suggested to solve difficulties.

⁶⁶ A shortage in staff numbers was raised by seven interviewees.

CHAPTER 9 Discussion

This chapter integrates the results and discusses the findings. Key findings are discussed according to the objective and research questions followed by the strengths and limitations of the research and the generalisability of the study.

9.1 Principal findings

The principal findings are discussed in sections 9.1.1, 9.1.2, and 9.1.3 which correspond to the results in chapter 6, 7 and 8 respectively. In section 9.1.4, all the results are gathered to identify factors that influence the use of their new STGs.

9.1.1 Use of medicines in Timor-Leste (Objective 1)

Medicine use situation in Timor-Leste (Research question 1)

The table below shows a comparison between the situation in Timor-Leste and 'the world medicines situation' published by WHO in 2004 [53], which collects studies using the same INRUD/WHO indicators.

Table 9-1 Comparison between Timor-Leste and previous studies collected in WHO report

indicator	result in Timor-Leste	WHO report in 2004	
		average	no of studies in the report
no of medicines per encounter	2.4* / 2.6**	2.4	35
% of encounters with an antibiotic	44* / 39**	45	35
% of encounters with an injection	0.4* / 0.3**	23	34
% of medicines actually dispensed	95	89	12
% of medicines adequately labelled	6	54	8
% of patients with knowledge of correct dosage	77	71	16
availability of EML (%)	79	78	9
% of key medicines in stock	86	67	6

* result from retrospective data

** result from prospective data

The number of medicines per encounter and percentage of encounters with an antibiotic prescribed in Timor-Leste was similar to the average for the 35 studies reported by the WHO.

The use of injections in Timor-Leste was extremely low. As unsafe and unnecessary injections is reported widely [151] this result in Timor-Leste was encouraging. Timor-Leste's EML for Level 2 lists injections as 'E-medicines' (mainly antibiotics and anti-malarials), which can be used as an initial treatment for severely ill patients while referring them to a higher level facility [128]. Thus, only limited kinds and numbers of injections were procured at Level 2 facilities. Moreover, the second version of the national EML specifies that the initial treatment and referral of severe patients should be guided by the clinical nurse program and IMCI [128]. It was thought that the low percentage of injection use in Timor-Leste was realised by combining EML development with the medicine procurement system as well as with the referral system and STGs with related training.

A high percentage of actual dispensing of prescribed medicines was understandable, taking into account the fact that medicines are dispensed in the CHC free of charge. Only one patient left the CHC before receiving medicines (two medicines). Seventy four medicines were not dispensed even though the patients received other medicines. Reasons for not dispensing were not investigated in this study. Availability might have been a reason.

The percentage of medicines adequately labelled was low. Essential elements of information on the label include: dosage schedule, duration of the treatment, name of the medicine, and name of the patient. Investigating each of these four elements of information separately, nearly 70 percent of medicines were labelled with the dosage schedule while the name of the patient was written on only 15 percent of medicine bags. Duration of the treatment was written on fewer medicine bags than dosage schedule (28%). Considering that many patients answered that they would take medicines 'until finishing'⁶⁷, there was a possibility that the duration of the treatment was unnecessary information on the label for both patients and health personnel. Because previous studies suggest that labelling is considered one of the measures to improve patient knowledge and compliance [51, 152], a low percentage of adequate labels might have influenced patient compliance. Considering the low literacy rate in rural Timor-Leste, labelling might not have had an influence. Investigating patient compliance, however, was beyond the scope of this study.

⁶⁷ STGs usually limit the number of days of initial medication (eg. five-day antibiotics for pneumonia) and instruct health personnel to tell the patient to 're-visit' the CHC for follow-up during or after the initial medication.

The percentage of patients with knowledge of correct dosage was higher than the average for previous studies⁶⁸. Patient knowledge of the correct dosage schedule and duration of the treatment is higher than labelling of each element of information. Some patients answered them without labelling, which implied they did not always rely on the label to recall how to take their medicines. Patient knowledge is considered as an essential prerequisite for patient compliance [51, 153, 154], but it does not always guarantee patient compliance to the prescription [155]. It was difficult to tell from the research results whether a high percentage of short-term patient knowledge in Timor-Leste resulted in patient compliance at home.

Many patients understood that antibiotics were given for their respiratory symptoms and/or a fever. It was reasonable if it meant pneumonia. On the other hand, a considerable number of patients misunderstood that vitamins could treat various symptoms. For example, many patients who received a vitamin answered that it was prescribed for respiratory symptoms or anorexia.

Prescribing indicators and prescriber's training (Research question 2)

Comparison of prescribing indicators by prescriber's training suggested that clinical nurse training influenced antibiotic prescription. There were no differences found between clinical nurses and non-clinical-nurses in the other two prescribing indicators: the number of medicines per encounter and the percentage of encounters with a vitamin. There were no differences detected in three prescribing indicators by prescriber's IMCI training. These results were compatible with the results from the interviews on health personnel's knowledge of standard treatments (see 9.1.3).

9.1.2 Adherence to STGs (Objective 2)

Adherence to STGs for healthcare steps (Research question 3)

Adherence to STGs can be measured by looking for four steps: taking a history; conducting a physical examination; recording the clinical decision; and prescribing medicines. In this study, the results were 37 percent, 24 percent, 77 percent and 56 percent for each step respectively. These were 'unconditional' proportions that Krause et

⁶⁸ Criteria of 'correct knowledge' in the report were not always consistent with 'the world medicines situation'.

al. suggest, in which adherence to the previous steps was not taken into account [34]. Krause et al. also suggested an 'accumulated proportion' to assess adherence for all steps of the process, and only three percent of the accumulated proportion of adherence were achieved in their study in Burkina Faso study. If applying this in the present study, the proportion of patients who received procedures that adhered to STGs for all four steps was 11% (42 out of 380 patients who were diagnosed with at least one target disease). Among them, 38 patients were dispensed the same medicines as prescribed, and all medicines were explained. Therefore, the equivalent accumulated proportion to Krause's study was 10 percent^{69 70}.

Adherence to STGs about taking a history and conducting a physical examination for suspected malaria patients and diarrhoea patients was very low. Almost no patients with malaria and diarrhoea were given a complete physical examination. A possible explanation of this is STG-related factors, which will discuss in 9.1.3. For prescribing adherence, malaria was better than diarrhoea, and ARTIs was the worst. These results were then compared with the results gained from interviews asking about knowledge of standard treatments (8.2). It was found in general that a point better known was better practiced by health personnel.

Prescribing adherence and prescriber characteristics and CHC characteristics (Research question 4)

A critical issue of this analysis was that doctors' cases were unexpectedly included. As a result, the number of cases that were managed by local health personnel alone decreased. Among the 380 cases with a target disease recorded, only 240 were handled by local personnel cases.

The univariate analysis using Wilcoxon's rank-sum test showed strong evidence that individual prescribing adherence was different between clinical nurses and non-clinical-nurses ($p < 0.01$). In addition, there was weak evidence that individual prescribing between IMCI trained personnel and non-IMCI-trained personnel was

⁶⁹ In Krause's study, health personnel steps are; medical history, clinical examination, drug choice and explaining about dose. Dispensing in this study was considered equivalent to 'drug buying' in Krause's study, which is regarded as a patient step.

⁷⁰ The accuracy of diagnosis, whether it was based on a history and/or a physical examination, was not assessed in this study.

different ($p=0.06$). For other prescriber characteristics, such as prescriber's age group, sex, occupational category, civil service level, work experience, there was no significant difference in individual prescribing adherence. Using logistic regression analysis, taking into account prescriber clustering and possible confounders, the adjusted odds ratio for individual prescribing adherence of clinical nurses compared to non-clinical-nurses was 6.6 (95%CI: 2.5 – 17.6). The adjusted odds ratio for individual prescribing adherence of IMCI trained personnel to non-IMCI-trained personnel was 2.9 (95%CI: 1.2 – 6.8). It appeared as if clinical nurse training had more effect on individual prescribing adherence than IMCI training. However, simply comparing these two kinds of training was not very meaningful since the training aims, type of training input, and target patients were different (see 3.2.5).

When including foreign doctors, only a univariate analysis by prescriber's training could be performed. If doctors were classified into the 'no training' group, each variable: prescriber's clinical nurse training, IMCI training, and 'at least one training' was significantly associated with individual prescribing adherence.

Analysis for CHC's overall prescribing adherence was complicated. Neither the retrospective nor the prospective data was ideal for linkage to the CHC data. (see 9.2.3.) However, based on available data, none of the CHC characteristics, including the total training input such as the total members trained and total period of training, influenced a CHC's overall prescribing adherence.

9.1.3 Knowledge and attitudes (Objective 3)

Knowledge of STGs (Research question 5)

Overall, the key issues in Timor-Leste STGs for the three target diseases were well known among the respondents. All interviewees refer to their new STGs in Indonesian terms such as *pedoman*, *petunjuk* or *protocol*, which suggested that these terms had already been known from the previous regime. Existence of their new STGs was recognised regardless of whether the interviewee knew the contents. Everyone knew what their new STGs were, which suggested that STGs were well disseminated nation-wide. Health personnel were well aware of their new STGs. Although everybody was aware of STGs, some differences in STG knowledge among respondent groups and target diseases were found.

In general, clinical nurses referred to STGs more accurately than others. This contrast was particularly evident in knowledge of antibiotic use for ARTIs and diarrhoea. Clinical nurses far less frequently indicated treatments that contradicted STGs than other interviewees. In chapter 6 and 7, clinical nurses showed a difference in prescribing practice: a lower percentage of antibiotic prescription and higher percentage of prescribing adherence to STGs than others. It was considered that clinical nurse training influenced both knowledge and practice and that there was an association between knowledge and practice. Even so, some clinical nurses showed their misunderstandings, for example, suggesting an antibiotic for all ARTIs or acute simple diarrhoea and indicating inappropriate anti-malarials for *P. vivax* and *P. falciparum*. This implied that follow-up was needed to monitor and correct individual misunderstandings after completion of training. IMCI trainees and non-trainees did not show very explicit differences in accurate knowledge of STGs, compared with the contrast between clinical nurses and non-clinical nurses.

Among the three target diseases, standard treatments of malaria were especially well understood. Only one interviewee indicated treatment that contradicted STGs; he suggested that the treatment for clinically suspected malaria patients was chloroquine alone, which is not recommended in STGs. The majority knew the standard treatment for clinically suspected malaria patients without a blood smear test. This result was also compatible with the results in chapter 7 that showed a high percentage of prescribing adherence to malaria STGs compared with adherence to ARTI and diarrhoea STGs.

Training for the National Protocol for Malaria Management had been conducted in the country in addition to clinical nurse training and IMCI training. It was likely that this program had affected the knowledge and practice of malaria treatment. However, since this training was not targeted in this study⁷¹, its influence on the current CHC practice was difficult to ascertain. Another assumption to support the high level knowledge of malaria treatments was the simplicity of the instructions. Previous studies have suggested that specific characteristics of the guidelines themselves are linked to adherence [82, 86, 90, 91]. In comparison, adherence to STGs with reference to taking a history and conducting a physical examination for suspected malaria patients was very

⁷¹ This training was initiated by an international NGO at a very early stage of the rehabilitation, just after the crisis before the MoH was established. Detailed information could not be gained. For example, the number of trainees is not listed in MoH documents. It was also difficult to define who was a trainee.

low (see 7.2), and this may be due to the complicated instructions provided for these activities.

In spite of good knowledge of STGs in general, many members of health personnel misunderstood the functions and clinical indications of vitamins. This was observed regardless of respondent group. This health personnel misunderstanding might have been linked to the high proportion of vitamin prescriptions regardless of prescriber's training and patient misunderstanding of vitamins, which were found in chapter 6.

Attitudes of present practice (Research question 6)

The health personnel interviewed were willing to use STGs. No one refused to accept or disagreed with the concept of standardising treatments or a specific STG. They stated that STGs were 'advantageous' and 'useful'. It was believed that the acceptance of or agreement with STGs promoted the use of STGs.

Respondents thought that they 'should' follow STGs. Two different stances emerged to explain this feeling of obedience. They were aware of themselves as frontline workers and knew that they were the only people who could treat sick patients and believed standard treatments helped them in this situation. At the same time, the health personnel thought they had to be obedient to STGs as they were developed and implemented by the MoH in collaboration with 'intelligent' people. Extrapolating from some comments which used the word 'big people (=seniors)' or 'small people', it was considered that their position in the civil service hierarchy influenced their feeling of obedience.

Respondents in general were confident of their present practice. They demonstrated their responsibilities to patients when prescribing medicines. Although previous studies have shown that patient expectations and 'perceived expectations' are one of the factors for inappropriate prescribing practice [27-32], interviewees in this study indicated that they would not submit to patient expectations if this was inappropriate. A few commented that they sometimes needed to prescribe vitamins to satisfy the patient or to avoid complaints by the patient. Some thought patient comprehension of and compliance with the prescription depended on health personnel work while some believed it depended on each patient's ability to comprehend and comply with medical explanations.

When a patient expected an inappropriate medicine or could not understand how to take medicines properly, the health personnel said that they tried to give further explanations to the patient. In their STGs, they learned 'counselling (*konseling*)'⁷². According to instructions of '*konseling*', the health personnel should tell patients what to do at home, how to take medicines, when to revisit the CHC, how to prevent the disease, and so on. '*Konseling*' is emphasised both in the clinical nurse textbooks and IMCI chart-books. Previous studies suggest that health information affects patient comprehension and patient satisfaction [27, 156-158]. The perceived patient satisfaction found in this study (8.4.2) has a possible association with their '*konseling*' to patients.

Some clinical nurses directly expressed their pride in being a clinical nurse. Overall, clinical nurses showed their self-confidence more explicitly than others. In particular, their attitudes to patients, colleagues and foreign doctors showed the difference. For example, answers that indicated their attitudes to patient's inappropriate expectations were found more in clinical nurse interviews. The majority of complaints in relation to doctors not using STGs were also stated by clinical nurses. Meanwhile, merely showing obedience to the doctor was found in the answers provided by 'other health personnel'. Quantitative data showed that clinical nurse training was associated with prescribing practice, and interview data suggested clinical nurses were equipped with more precise understanding of STGs than others. In addition, clinical nurse training was considered to affect their self-confidence.

Changes brought about by the introduction of STGs (Research question 7)

Health professionals are known to resist change in their daily practice [78-81] and this can be a barrier to adherence to STGs [82] In this study, however, changes were positively perceived by respondents.

Three components of the change were observed: the policy concept of using STGs, daily practice, and perceived patient satisfaction. First, standardising treatments brought a change in their work. Although the term 'standard treatment guidelines' had been known since Indonesian times, their answers suggested that practicing with their new STGs made an epoch. As they had felt a lack of confidence in their previous practice and hoped to increase their capacity, their new STGs were of help. Second, they realised

⁷² This has a similar meaning to 'patient education' or 'information to the patient' in their STGs, not the meaning of psychotherapy as often used (see 3.2.5).

actual changes in daily practice. They gave exact examples, in detail, showing a contrast between 'before and after' they had received STGs: for example, they prescribed antibiotics for a common cold before but are not prescribing them now; they did not use a stethoscope before but can use the one now, etc. Third, they perceived changes in patient satisfaction after they had started to use STGs. Although actual patient satisfaction was not assessed in this study, other studies suggest a positive association between patient satisfaction with care and the degree to which physicians implement clinical guidelines [62].

Changes lead to improved self-confidence, and as a consequence, promoted further use of STGs. Many interviewees expected more training and prompt information on any change in STGs. It was pointed out that the present STGs could not be used forever since knowledge was always changing. This implied that in order to promote use of STGs they should not be allowed to become outdated.

Difficulties in application and implementation of STGs (Research question 8)

Previous studies have shown that there are barriers to implementing clinical guidelines in practice [82, 85, 86, 88, 89]. In this study, responses unexpectedly showed that using STGs was not very difficult. Many answers indicated 'no difficulty/problem' or suggested possible actions 'if there is a 'difficulty/problem'. Respondents said that they simply 'open [STGs] again' to solve the difficulties.

Besides turning to STGs, health personnel indicated other measures to solve a difficulty/problem: helping each other, referring a difficult case to a higher level facility or to the doctor, and giving feedback about the problems to the MoH. However, it was unclear from the interviews whether these supportive factors functioned in actual practice.

Although 'helping each other' was found to be one of the problem solving measures when they used STGs, it was not easy to put into practice. A few people complained that colleagues who had been trained did not feedback the results in the workplace very well, while members who had been trained implied that it was difficult to give feedback to colleagues. Some respondents hoped to have more trainees per CHC so that they could help each other. However, as shown in chapter 7, total training input in a facility, such as the total members trained and total period of training, did not make a difference to the CHC's overall prescribing practice.

Some difficulties in their work were suggested. They could be categorised in the 'external barriers' Cabana et al. identify [82] or 'social context' and organisational context' found in other studies [85, 86, 88, 89]. Some of them were patient factors: poor comprehension and compliance with taking medicines, insufficient awareness of health issues in general, and inappropriate expectations for medicines. Others were environmental factors such as difficult transportation for the referral, language barriers between the health personnel and patients or foreign doctors, shortage of medicines, and limited staff. Barriers caused by 'lack of solidarity' in the CHC were implied. However, further information could not be gained from the interviews.

Although interviewees suggested that a shortage of medicines was a problem, this was not supported by the quantitative data (chapter 6). One possibility of this contradiction was the assumption that medicine stock was investigated after medicines arrived in many CHCs, and they would be short later in the end of every quarter. Another assumption was that shortage of medicines was not as serious as they thought, but they just believed 'medicines were always short' based on their previous experience. The interviews did not suggest what kind of medicine was likely to be out of stock and how shortage of medicine influenced their prescribing practice.

9.1.4 Factors that influence the use of STGs (Objective 4)

Factors that influence the use of STGs (Research question 9)

Training

The results from the quantitative data analysis identified that prescriber's training, especially clinical nurse training, was associated with less use of antibiotics and greater adherence to STGs. Furthermore, the qualitative data analysis found that clinical nurse training influenced knowledge of STGs, as well as their prescribing attitudes.

According to the conceptual framework created by Cabana et al., 'awareness' and 'familiarity' are factors that influence knowledge [82]. In this study, there was no doubt that all health personnel in Timor-Leste were well aware of the existence of their new STGs. However, previous studies suggest that awareness does not ensure familiarity with the contents [159, 160] and a lack of familiarity was more common than lack of awareness [82]. This study showed that health personnel who had not attended training less frequently referred to treatments indicated in STGs and were more likely to indicate treatments that contradicted STGs. Training made participants familiar with the contents.

These results are compatible with previous studies that indicate that distribution of STGs through a training course is more likely to be implemented [65-71].

Using all the available quantitative data, the total input of training in a CHC was not considered to affect CHC's overall prescribing adherence. From the qualitative data, little information on facility factors could be obtained. In terms of sharing training results in the CHC, contradictory opinions were gained from both trainee side and non-trainee side. In sum, how individual training influenced overall performance in their facility was not clearly demonstrated in this study.

Agreement with STGs

None of the study participants disagreed with a policy to standardise basic treatments or a specific guideline. In Cabana's study, 'lack of agreement' is identified as one of the barriers to prescriber's attitude to STG adherence [82]. In this study, 'a lack of disagreement', in other words, agreement with STGs promoted their use of the STGs.

It was found that health personnel thought that they 'should' follow their new STGs. This expression was broadly found across the topics. The background to this feeling of obedience emerged in the study: health personnel were conscious of themselves as frontline workers in the community who could only treat patients; and they also thought that they should follow the STGs as civil servants since they were developed and implemented by the MoH.

Health personnel's positive perception of the changes

One of the most prominent findings was that health personnel positively perceived changes after STGs had been introduced. Since previous studies have suggested that people resist change in the workplace [77-81], it was a unique result in this study. Health personnel listed a variety of changes, which can be summarised in three components: health personnel understood that treatments for basic illnesses had been standardised nationwide based on the new policy (the policy concept of standardisation); they were putting new standards into their work, indicating actual examples of change (daily practice); and they believed that their new practice guided by their new STGs made many patients more satisfied than before (perceived patient satisfaction). Moreover, health personnel hoped for constant changes in the future, if necessary. They especially expected prompt information on any change in the present STGs and further training to increase their capacity even 'more'.

Health personnel had felt a lack of confidence in their previous practice and thought it 'random'. They hoped to increase their 'capacity'. Their positive perception of the changes, therefore, brought self-confidence to their work. This increased self-confidence further promoted the use of STGs. Previous studies have indicated different results concerning self-assessments and patient perspectives [157, 161, 162], which suggest that high self-perceived effectiveness is not always preferable for patients. This research found health personnel's self-confidence and perceived patient satisfaction separately. However, an association between these two themes was not assessed and is still undetermined.

Development of STGs in a health policy framework

Development of Timor-Leste's STGs did not rely on a single policy or a single vertical program. All of the six policy areas that were established in the Health Policy Framework [112] are linked to the development of STGs. In particular, 'health service configuration' and 'basic package of services' (these are part of organization and management policy), human resource development policy, and drug policy are the basis of Timor-Leste's STGs. Furthermore, STGs exist across various programs, and STGs, training, the national EML and health service delivery system were interconnected with each other. Training was planned based on the 'basic package of services' policy [113]. This is explained in a training module [122]. All medicines taught in training and written in training materials (=STGs) are listed in the national EML. Timor-Leste's EML emphasises the relation between the EML and training and STGs, and medicines in the list are categorised according to the facility level. [128].

In the interviews, health personnel answered that they gave an injection before sending a severely ill patient to the upper level facility showing their knowledge of referral indications. Health personnel understood that only a few injections were really needed. Nevertheless, it was difficult to conclude that the extremely low percentage of injection prescriptions could be realised only by introducing STGs through training. In the EML, majority of injectable medicines were marked as 'emergency medicine' for Level 2 facility [128], and procurement for these facilities is minimal. It was considered that the result was caused by a combination of STGs, training, the national EML, referral system and procurement system.

STG-related factors

Previous studies have suggested that STG related factors influence adherence to STGs [82, 86, 90-92]. Although questions on this theme were not directly asked in this study, STG characteristics were suggested by the interviews: their STGs were easy to use; and they could be opened repeatedly. The quantitative data showed a considerable difference in adherence to STGs between specific instructions. It implied that there might have been a difference in features among specific STGs; e.g. simplicity of the contents and display of flowcharts or tables. However, the interviews did not suggest which STGs were specifically easier than others or which were more difficult than others. Few actual suggestions were made in the interviews as to ways of making the present STGs more user-friendly.

Supports

Some support was expected by health personnel for the use of STGs. These were found mainly in responses to the questions about problems/difficulties. Instead of indicating a difficulty, health personnel suggested possible measures for solving it such as helping each other, referring a serious case to a higher level facility including consultation with the doctor, and giving feedback about the problem to the MoH. However, it was unknown from the interviews whether this expected support was practically functioning, as discussed in 9.1.3.

9.2 Strengths and limitations of the study

9.2.1 Situation in Timor-Leste

One of the strengths of this study was the provision of information for a very new country. A study on the use of medicines using internationally used indicators has not yet been reported from Timor-Leste, and other public health research is also limited. Nevertheless, conducting research in a newly established country meant that unavoidable difficulties were encountered during the project.

Firstly, the health policy and planning for the country was in flux. The most critical issue for this study was a change in the human resource allocation plan for rural CHCs. That occurred in the middle of the research project (See 5.6.1). This made data collection

difficult and data analysis complicated. As the research aim was established based on the fact that doctors were extremely scarce, the aim might have been undermined.

Secondly, the health information system had not been well established, and documentation was not yet uniform. This resulted in missing retrospective data, and also necessitated developing criteria to prepare for variations in the patient registration books among CHCs. This decreased the quality of the data. As the quality of secondary information gathered in the MoH from CHCs was considered questionable, this research principally relied on primary data.

Thirdly, 'limited capacity' has been an issue since the early stage of reconstruction of the country [111]. This lack of skills had been found in the government, international agencies, as well as in NGOs. For an individual researcher, therefore, to find very qualified and experienced research staff was difficult. As explained in 5.4.2, one of the reasons for choosing young people as research staff for this project was to make respondents feel easy about being observed or interviewed. In reality, however, another reason was that only a limited choice was available. In these unique circumstances, this research project tried to contribute to the 'capacity building' of the nation.

Fourthly, communication and transportation were still difficult. None of the CHCs selected for the research had a landline, and the majority of them were located out of the mobile phone network. This meant getting information on the CHC in advance or confirming data afterwards was almost impossible. Furthermore, the road conditions in rural areas were extremely hard. The research team needed to withdraw from one CHC that was originally selected since the vehicles could not get through, and the schedule was rearranged for some CHCs to wait for the dry season, which could have biased the data collected.

Finally, the language situation in Timor-Leste was complicated. Tetum, the East Timorese lingua franca, has become a national language [110], 86 percent of the population above six years old are reported to speak it [94], and the National Institute of Linguistics, founded in 2001, has been establishing the structure of the language and an official orthography [163]. However, a number of spelling systems are still in use and there are substantial grammatical and lexical variations [164]. A previous study on traumatic stress among Timorese indicates the language barriers in undertaking research in Tetum [165]. In practice, its vocabulary was still limited and sentences were contextual. This might have influenced the research, especially the qualitative data analysis.

9.2.2 Data collection

Quantitative data collection

The INRUD/WHO manual suggests that both the retrospective and prospective data have advantages and disadvantages but can be used to complement one another. Retrospective data are easy to collect if the source is complete and reliable, and they can be randomly sampled to minimize bias. However, only information on the prescribing step can be found. On the other hand, prospective observation is usually complete, providing information on all of the health care steps, but biases due to seasonality, peculiarities in staffing and inconsistencies in the supply cycle are unavoidable [44]. The presence of observers may stimulate modifications in health personnel practice as in the 'Hawthorne effect' [166].

For the retrospective data collection, missing registration books and irregularity of the documentation were often a concern. Moreover, sources of the retrospective data provided only basic information. Including doctors' consultations in the prospective observation made data collection difficult as described in 5.6.1. As only the doctors who consented to participate in the study were included, doctors' data could have been biased. Although the majority of languages were covered by staff and local help, some patients were excluded because of their languages.

Since the INRUD/WHO manual was published, other more detailed indicator-based tools have come out [167-170]. In this study, only simple indicators were measured. Nevertheless results were important where no objective data on this issue were available, yet. Further more, the method was feasible to apply in Timor-Leste's situation. Because INRUD/WHO indicators were developed as first-line measures to stimulate further questioning and to guide subsequent action [44], it was meaningful to use them in this study.

Qualitative data collection

Data collectors provided both advantages and disadvantages for the qualitative data collection. All of them were fluent in Tetum and Indonesian. They were originally from rural areas and knew the situation well. At the same time, they were relatively highly educated when compared with the average in the country. Their younger age was considered to make respondents more relaxed. However, as already discussed, their lack of experience might have influenced the quality of the data. Interviewing and note

taking was not always very thorough. Since data analysis relied on their interview notes, the quality of note taking had to be taken into account.

The respondents were informed of the aim of the research in advance. Many respondents knew the researcher. Although interviews were not carried out with respondents by the researcher directly, she stayed in most of the target CHCs with data collection staff. These facts might have resulted in respondents answering in the way they believed the researcher was expecting, which would skew the data.

Finding a location in which to hold the interviews was problematic. Although the ideal would have been to interview health personnel away from the health facility, it was difficult to find a closed space in the rural community. For example, local restaurants or private houses usually offered little privacy. Therefore, many interviews were performed inside the CHC or the research team's accommodation such as a health post. Being interviewed in the health facility might have affected health personnel emotionally even though privacy issues were always deliberately considered.

9.2.3 Analytical methods

Use of medicines (Objective 1)

For practical reasons, the sample size of each CHC was fixed, although the number of patient visits varied among CHCs. Moreover, the extent of missing registration books also differed; from 100 percent missing in two CHCs to completely available in 11 CHCs. These facts might have biased the results in both chapter 6 and 7.

Indicators can be used to compare the performance between prescriber or facility groups [44]. Three prescribing indicators in this study were compared by prescriber's training, using the prospective data. If possible, the retrospective data would be preferable for this analysis for several reasons; they had a larger sample size, were randomly sampled, and comprised, almost exclusively, local health personnel cases. However, information in the registration books was limited. As prescriber's name was not available in the books, further analysis with the retrospective data was impossible.

Adherence to STGs (Objective 2)

Including doctors' consultations in the prospective data made the quantitative analysis complicated. Considering the original purpose, the inclusion of doctors in the analysis was questionable, but excluding doctor cases made the sample size smaller than

expected. The smaller sample size led to less power. In addition, analysis by CHC characteristics was complicated. On the one hand, prospective data that included doctors' cases were not considered to represent the CHC's overall situation. On the other hand, a time discrepancy could not be avoided between the retrospective data sampled from records in 2005 and CHC data obtained in the middle of 2006. Both the retrospective data and prospective data were not ideal to be linked to CHC data and analysed by CHC characteristics. Finally, this analysis used both data. Although the actual composition of the staff in 2005 was unknown, the linkage of the datasets (the retrospective data and the CHC data) was based on the assumption that the composition of health staff in the CHC was static.

As information from the retrospective data collection was minimal and none of the CHCs recorded individual prescriber's name in patient registration books, analysis of retrospective data by prescriber was impossible.

'Prescribing adherence', which was the main focus for the analysis described in chapter 7, was assessed based only on recorded diagnosis. Accuracy of diagnosis was not taken into account in prescribing adherence, which was not enough to assess 'community efficacy' [33, 34].

Analysis for prescribing adherence was separately carried out by prescriber characteristics and by CHC characteristics, using a Willcoxon rank-sum test. If the collected data were more suitable, for example prescriber's name was available in the retrospective data and precise CHC data in 2005 could be gained, a more sophisticated statistical analysis model that took account into prescriber's factors and CHC factors could be developed.

Knowledge and attitudes (Objective 3)

Living and working in Timor-Leste for several years, the researcher had shared experience with respondents. Knowledge of the local context in terms of rural conditions as well as the public health system was an advantage for analysing the interviews. The ability to speak Tetum and Indonesian, especially the vocabularies used in CHCs, was of help, too. Although these issues may have caused a potential risk of subjectivity, value-free is not considered valuable in qualitative research [171], and a researcher can be a research instrument [166]. A researcher's personal experience should not impair but strengthen the study.

As discussed in 5.4.3, the qualitative analysis in this study used the 'Framework approach'. This approach is particularly appropriate for policy-oriented research that has clear aims at the outset [145-147, 172], and thus suitable for this research. The relatively limited time-scale of the approach was also appropriate. The visibility of qualitative methods is another feature of the Framework approach [145], and computer software can help this visibility [173].

The quality of interviewing and note taking might have been a limitation of the qualitative analysis. In addition to the quality of interviewers and note takers, the nature and present immaturity of Tetum could also have been a problem. Moreover, although interviewing the respondents in their own language was an advantage, it necessitated interview notes being translated. Birbili indicates that translation-related problems can result from difficulties in gaining conceptual equivalence or comparability of meaning, difference of grammatical and syntactical structures in two languages, and a way to access and understand participants' words [174]. It was considered that all of these issues occurred in the translation in this research. Birbili further notes that there are two techniques known to deal with translation-related problems: piloting or pre-test and back translation [174]. Due to time constraints, back translation was not done in this study. Instead, the researcher translated directly from the original notes, and relied much more on the Indonesian translation than the English translation⁷³.

9.2.4 Mixed methods research

The rationale for and advantages of mixed methods research were discussed in 5.1. Mixed methods fitted the aim of the study as well as the situation in the research area. It could quantify a phenomenon while explaining its context, which was one of the most important strengths of this research. However, mixed methods cannot supplement deficiencies in research design [175]. In this study, limitations of data, some of which were unavoidably caused during data collection, meant that the study was unable to carry out deeper integration. For example, interviews were originally planned with health personnel who were observed for quantitative data so that quantified observational data

⁷³ Although the grammar and structure of Tetum and Indonesian are different from each other, Tetum still borrows conceptual and abstract words as well as technical jargon from the Indonesian vocabulary. Two translators had been educated in Indonesian from compulsory to higher education, and were nearly native speakers. Therefore, the Indonesian translation was considered more reliable than the English translation.

and qualitatively analysed interview data could be integrated. However, a third of the interview respondents were not involved in consultations or dispensing.

9.3 Generalisability

This study randomly sampled facilities from the whole country although there were some excluded CHCs. The quantitative data sampled were considered to represent the situation for rural Timor-Leste even both the retrospective and prospective data could not escape from some defects, as discussed in section 9.2.2. The qualitative data used the same random samples at the first stage and then 'purposive sampling was applied in the second stage sampling so that selected cases were 'informationally representative [144]'. Thus, results of this mixed methods research could be generalised to rural CHCs in Timor-Leste.

Transferability, whether the findings could be transferred outside Timor-Leste, is also important to consider. Previous studies discuss 'naturalistic generalisation' or 'inferential generalisation' regarding the relevance of findings to other settings and contexts beyond the sampled one [176-178]. Timor-Leste experienced a chain of unusual events; serious violence, transitional administration by the UN and restoration of sovereignty. In this aspect, the context was unique. When the research was conducted, however, a 'post-crisis' situation was no longer emphasised, at least in the health sector. Rather, the country should be viewed as one of the poorest countries in the world [179]. The country faced limitations of resources as seen in many other developing countries. In this study, the resource-limited situation in Timor-Leste and how the new health system has been trying to deal with such a situation were described. The country has been struggling with establishing a sustainable system to provide health services equally to the people. The findings can be inferentially generalized, and are transferable to other resource-limited areas.

CHAPTER 10 Summary and recommendations

In this chapter, key findings are summarised and then recommendations are presented for Timor-Leste, other resource-limited areas, and future research.

10.1 Summary

This research can be summarised as below, corresponding to the objectives and research questions established in chapter 4:

10.1.1 Use of medicines (Objective 1)

Medicine use situation in Timor-Leste (Research question 1)

Timor-Leste's characteristics regarding the use of medicines in public health facilities were favourable when compared with previous studies from other developing countries. The number of medicines per encounter and percentage of encounters with an antibiotic prescribed were similar to the average for 35 previous studies. An extremely low percentage of encounters in which an injection was prescribed in Timor-Leste was notable. It was believed this low percentage of injection prescriptions could be achieved because of a combination of the new policy combining the national EML, STGs and related health systems. A high percentage of medicines actually dispensed and a high percentage of patients' knowledge of correct dosage were found. However, the percentage of encounters with a vitamin prescribed was measured in this study, and shown to be high.

Prescribing indicators and prescriber's training (Research question 2)

Three prescribing indicators were statistically compared by prescriber's training. The percentage of encounters with an antibiotic prescribed was lower for health personnel with clinical nurse training than for those without the training. Two other indicators (the average number of medicines per encounter and percentage of encounters with a vitamin prescribed) did not show a significant difference by clinical nurse training. IMCI training did not make a statistical difference in the three prescribing indicators. The same

conclusion was reached when including foreign doctors in the 'no training' group for both clinical nurse and IMCI training.

10.1.2 Adherence to STGs (Objective 2)

Adherence to STGs for healthcare steps (Research question 3)

In total, adherence to STGs for the three major diseases studied (ARTIs, malaria and diarrhoea) for each step (taking a history, conducting a physical examination, recording clinical decision, and prescribing medicines) was 37 percent, 24 percent, 77 percent and 56 percent respectively. The result was remarkable in malaria treatment; nearly 80 percent of prescriptions for clinically suspected malaria patients adhered to malaria STGs. However, the history taking and physical examinations were only performed in accordance with STGs in a few consultations. Although reasons for this could not be determined directly from the data, one possible explanation was the complexity of the instructions in STGs for taking a history and conducting a physical examination.

Prescribing adherence and prescriber characteristics and CHC characteristics (Research question 4)

Prescriber's clinical nurse training was strongly associated with prescribing adherence to STGs for the three target diseases, and prescriber's IMCI training was weakly associated with prescribing adherence to STGs. A higher level of prescribing adherence was observed among prescribers who attended both kinds of training. Other prescriber characteristics, such as age, sex, occupational category, civil service level, and work experience, were not associated with prescribing adherence. Adjusted OR for prescribing adherence of clinical nurse was 6.6 (95%CI: 2.5 - 17.6) and adjusted OR for prescribing adherence of IMCI trainees was 2.9 (95%CI: 1.2 - 6.8). When foreign doctors were categorised into the 'no training' group, prescriber's clinical nurse training, IMCI training and 'any training (one of two kinds of training)' also showed a statistical difference in prescribing adherence. Analysis by CHC characteristics was difficult because of limitations of the data. Based on the available data, however, facility characteristics investigated in the study, including the total input of training such as total members trained and total period of training, were not associated with the CHC's overall prescribing adherence to STGs for the three target diseases.

10.1.3 Knowledge and attitudes (Objective 3)

Knowledge of STGs (Research question 5)

Overall, newly introduced STGs were well known to local health personnel in Timor-Leste. Clinical nurses referred to STGs more accurately and minutely than others. A contrast between IMCI trainees and non-trainees among non-clinical-nurses was not very clear. Among the three target diseases, treatment recommendations in malaria STGs were understood the most. These results support a higher level of prescribing adherence among clinical nurses and a higher level of prescribing adherence to malaria STGs, which were found in the quantitative analysis. Despite an overall good knowledge of prescribing, health personnel often misunderstood the indications for vitamin prescription. This study revealed three facts related to knowledge and prescription of vitamins. Firstly health personnel over-prescribed vitamins. Secondly health personnel lack knowledge of vitamins. Thirdly patients lack knowledge of vitamins. These three facts are probably related, but this can not be inferred directly from the data.

Attitudes of present practice (Research question 6)

Health personnel accepted the new policy to standardise basic treatments, and did not show any disagreement with STGs in general or specific STGs. They believed that they 'should' follow STGs. Two stances emerged to explain this feeling of obedience; they were frontline workers in the community, at the same time, governmental employees under the MoH. Respondents were confident in their present practice in terms of the use of medicines. They would not submit to patient expectation for medicine if they considered it inappropriate or unnecessary. Self-confidence was more evident in clinical nurse interviews, in particular their answers about attitudes to patients, colleagues and foreign doctors. These results implied that clinical nurse training could also influence attitudes.

Changes brought about by the introduction of STGs (Research question 7)

It was a unique finding that changes after the introduction of new STGs were positively perceived by health personnel in Timor-Leste. Changes suggested by respondents consisted of three different components: the policy concept, daily practice, and perceived patient satisfaction. As a background, a lack of confidence and hope to improve their capacity had previously existed. Health personnel's positive perception of the changes led to self-confidence and the gained self-confidence further promoted the

use of STGs. Moreover, they hoped for prompt information in case of any change to STGs as well as for more training for themselves and for colleagues.

Difficulties in application and implementation of STGs (Research question 8)

Unexpectedly, health personnel did not feel that STGs were difficult to apply. They thought that they could open STGs repeatedly to solve difficulties. Other problem solving strategies respondents suggested were; to help each other, to refer a severely ill patient to a higher level facility or to the doctor, and to give feedback to the MoH. Shortage of medicines and other social and organizational issues were indicated as a difficulty/problem. However, little information was obtained on how these external barriers influenced the use of medicines and adherence to STGs.

10.1.4 Factors that influence the use of STGs (objective 4)

Factors that influence the use of STGs (Research question 9)

Training was associated with health personnel's adherence to STGs. In particular, clinical nurses showed clear differences in their knowledge, attitudes and prescribing practice. However, the total effect of individual training on overall CHC performance was still questionable. Health personnel's agreement with STGs was considered to facilitate the use of STGs. They thought they 'should' follow STGs because they were frontline workers in the community as well as government employees under the MoH. Health personnel's positive perception of the changes brought about by the introduction of STGs led to increased self-confidence, and this further promoted the use of STGs. A pre-existing lack of confidence and hope for increasing capacity underlay this factor. Development of STGs in a health policy framework was important so that related policies and programs were interconnected. In Timor-Leste, STGs, training, the national EML, and health service delivery system were interrelated and consistency between them was maintained, which resulted in favourable practice. STG-related factors were suggested by health personnel: their STGs were easy to use and could be opened repeatedly. Expected supports for the use of STGs were identified such as: mutual help, referral and consultation, and a feedback system.

10.2 Implications in Timor-Leste

The findings in this study suggest strategies that will improve the use of medicines in rural CHCs through the use of STGs.

10.2.1 Policy implications

STGs

Efforts should be made to keep health personnel's ownership of their new STGs. This requires maintaining their agreement with the STGs as well as their positive perception of the changes after they started using the STGs. It is vital that health personnel continuously and clearly understand the need of standard treatment and policy on their new STGs. Constant socialisation of new STGs to the all people concerned is important, including foreign doctors.

Interrelation and consistency between related policies and programs should be maintained. The development of Timor-Leste's STGs is linked to all policy areas, and the STGs, training, the national EML and health service delivery system are interconnected. It was considered this caused the favourable results, as seen in the low percentage of injections being described. STGs should not be isolated from any related policies and programs.

Favourable features of the present STGs should be taken into account and strengthened in future revisions. As health personnel thought that they could easily use their STGs repeatedly, revised STGs should be produced based on local need. Prompt information is expected to arrive at CHCs when any change in the present STGs is made.

Training

A clear strategy should be stated by the MoH so that health personnel who have been trained can maximize their gained ability under the ever-changing circumstances. Research results showed that the plan for in-service training of local health personnel was successful, but clinical nurses are now in a delicate position because of a new human resource allocation plan. The position of training should be understood by the all people concerned with health policy and planning.

Support system

Health system support for the use of STGs should be well functioning. This includes further strengthening of a referral and consultation structure and feedback path. Based on observation, availability of medicines is quite good but many health personnel complained of shortages of medicines. Investigation into the real meaning of these complaints will inform improvements in the medicine procurement system.

10.2.2 Practice implications

Follow-up supervision and update sessions are necessary to encourage health personnel to practice what they have learnt. Follow-up and updates are also needed to monitor trainees' performance, which will address their weakness and correct their misunderstandings after completing training.

It is also necessary for health personnel to know how to share knowledge and skills related to the newly introduced STGs among trainees and non-trainees in a facility. In this study, the total training input was not associated with CHC's overall adherence to STGs. Training should include a module that instructs trainees on how to transfer the new knowledge and skills to colleagues. Follow-up supervision at the facility is also important for this purpose. As already planned in Timor-Leste, CHC management training for managers may be one strategy to solve this issue.

Encouraging an organizational culture of mutual support in the CHC and providing realistic techniques to support that culture are important because many Level 2 CHCs are geographically isolated. In such a circumstance, their mutual help will be crucial. In the interviews, health personnel suggested that helping each other would be of help when they faced a problem; this, therefore, should work well.

10.3 Applications in other areas

What was notable in Timor-Leste was the appropriate use of medicines and good adherence to their new STGs in an under-resourced setting with limited facilities and health personnel with minimal educational background. Introducing new STGs through in-service training showed the potential to empower local health personnel and to contribute to a sustainable system of providing health services equally to the people. It is important to recognise that, in Timor-Leste, STGs existed across various programs. It is

required that STGs, training, the national EML and health service delivery system be interconnected. Consistency between related policies and programs should be kept. This study indicates that these strategies would be usefully tried in other under-resourced- settings.

10.4 Further research

Many issues were beyond the scope of this study, and more and more issues emerged from the findings of the study. The following research topics were identified as important in helping to understand more about the use of medicines and adherence to STGs in rural communities.

Training-related research

Training evaluation: This study investigated the effect of training on the use of medicines and adherence to STGs, but did not evaluate the content and process of the training. Evaluating each training program would provide more information.

Training effect on facility's performance: In this study, training did not prove effective on CHC's overall performance. To determine what works in a facility will require qualitative organisational research. An intervention study to investigate the total input of training in a facility and the facility's overall outcome could be usefully conducted.

Middle- and long-term training effects: In this study, only short-term performance after training was assessed. The middle- and long-term effect of training on adherence to STGs, taking into account the influence of known and other possible maintenance strategies, will be required.

Different outcome measurements

Impact on community health: The impact of introducing STGs (with training) on community health was not assessed. Where the health information system is reliable, the mortality rate of the target diseases can be measured as an outcome. Health facility utilisation for the target diseases; medicine consumption; and antimicrobial (antibiotic or anti-malarial) resistance are also possible outcome measurements.

Patient satisfaction: In this study, health personnel perceived changes in patient satisfaction after their new STGs had been introduced. To know real patient satisfaction as a consequence of introducing the STGs, more research will be needed.

Costs: The economic aspects of the introduction of STGs were not assessed. When training to introduce STGs is planned, both implementation and maintenance costs of training need to be considered. A cost-effectiveness study to compare different training programs should be conducted.

Different settings

Use of medicines in remote areas: This study targeted primary care facilities, which are located at sub-district centres and called Level 2. As 85 percent of the population of Timor-Leste live in rural areas [112], many people cannot easily access Level 2 facilities. The MoH is currently offering some strategies for people in very remote areas, such as health posts or mobile clinics (Level 1) and community activities by family health promoters. A study on the situation in remote areas is important.

Use of medicines in the private sector, including retailers: This study was limited to the public health system. However, Timor-Leste MoH estimates a regular clientele of around 125,000 in the private sector with 190 health workers [113]. Although many private clinics are located in urban areas, some of them are run by the church and a coffee producer cooperative which is located in the same town as the Level 2 CHCs. Moreover, although the Pharmaceutical Activities law has been enacted, local grocery stores are still selling medicines. Little is known about the use of medicines in the private sector.

Others

Why and how factors found worked: 'How much' and 'what' questions were asked in this research, but questions as to 'why' the factor worked and 'how' the factor worked were not much investigated. Answering 'why' and 'how' questions will help to develop further strategies.

Common misunderstandings shared by health personnel and patients: This research showed a high proportion of vitamin prescription and common misunderstandings of vitamins were shared by health personnel and patients. Investigating the relationship between health personnel knowledge and patient understanding will help to inform on strategies to improve the use of medicines in the community.

10.5 Conclusions

This is the first time research on health personnel's use of medicines and adherence to their new STGs in Timor-Leste has been reported. Overall, Timor-Leste's characteristics of the use of medicines in the CHC were favourable. Clinical nurse training strongly influenced knowledge of, attitudes to, and practice of the use of medicines and prescribing adherence to STGs. IMCI training also showed an association with prescribing adherence to STGs.

Agreement with the policy concept and contents of STGs facilitated the use of STGs. Health personnel's positive perception of the changes brought about by the introduction of STGs led to increased self-confidence, which further promoted the use of STGs. Development of STGs in a policy framework was important to maintain interrelation and consistency across related policies and programs. Health personnel thought that their new STGs were easy to use and could be opened repeatedly. A supportive environment and good support systems are important for health personnel to adhere to STGs.

Efforts are required to maintain health personnel's agreement with and positive perception of their STGs. Constant socialisation and timely updates are necessary. STGs should not be isolated from related policies and programs. Revised STGs should be more user-friendly based on the local need, and should arrive at CHC promptly. All the people concerned need to understand the position of training within the health policy framework. Follow-up supervision and update sessions are necessary to encourage and monitor their individual practice as well as the CHC's overall performance. It will be necessary to ensure that expected support systems are functioning.

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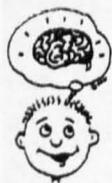
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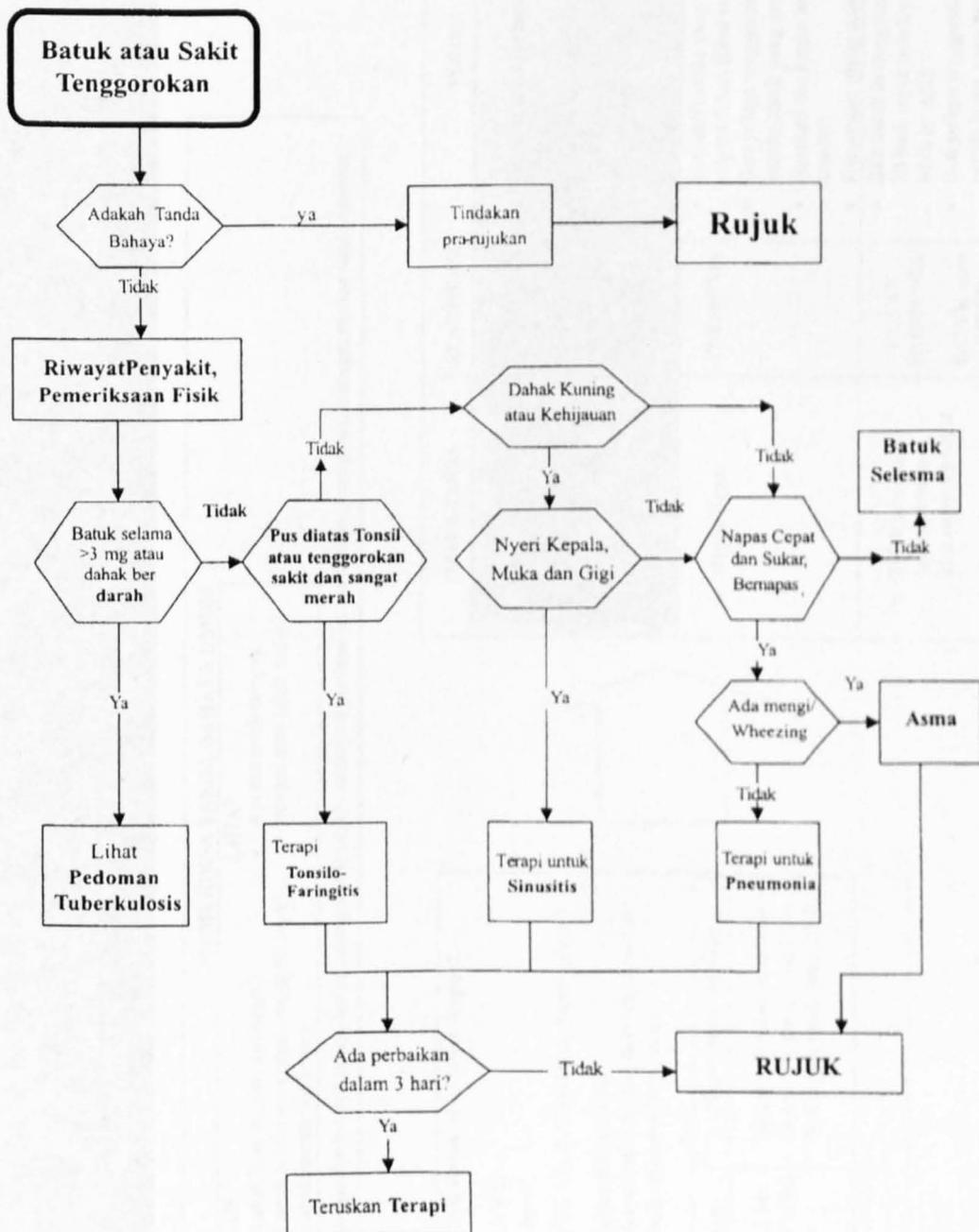
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APPENDIX



Pengambilan Keputusan Klinis



Lampiran 1

Pedoman IMCI

Anak umur 1 minggu hingga 5 tahun

Indikator klinik yang terpenting dalam membuat diagnosis pnemonia adalah: **Pernapasan Cepat**. **Tanda-tanda lain** dapat membantu untuk menentukan **beratnya** pnemonia

MEMERIKSA TANDA BAHAYA UMUM

TANYAKAN

- Apakah anak bias minum aau netek?
- Apakah anak selalu memuntahkan semuanya?
- Apakah anak menderita kejang

LIHAT

- Apakah anak tampak letargis atau tidak sadar?

Semua anak dengan tanda-tanda bahaya umum penanganan **SEGERA**, selesaikan penilaian ini dan lakukan penanganan, sehingga rujukan tidak terlambat.

Apakah Anak Batuk atau Sesak Napas?

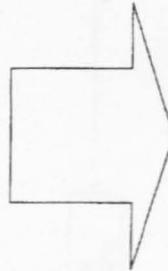
Bila Ya, **TANYA**

- Berapa lama?

LIHAT, DENGAR, RABA: (anak harus tenang)

- Hitung napas dalam 1 menit
- Lihat adanya tarikan dinding dada bagian bawah
- Lihat dan Dengarkan adanya Stridor

Bila Anak	Napas cepat apabila
1 minggu-2 bln 2 bulan-12 bulan 12-5 tahun	60 kali per menit atau lebih 50 kali per menit atau lebih 40 kali per menit atau lebih



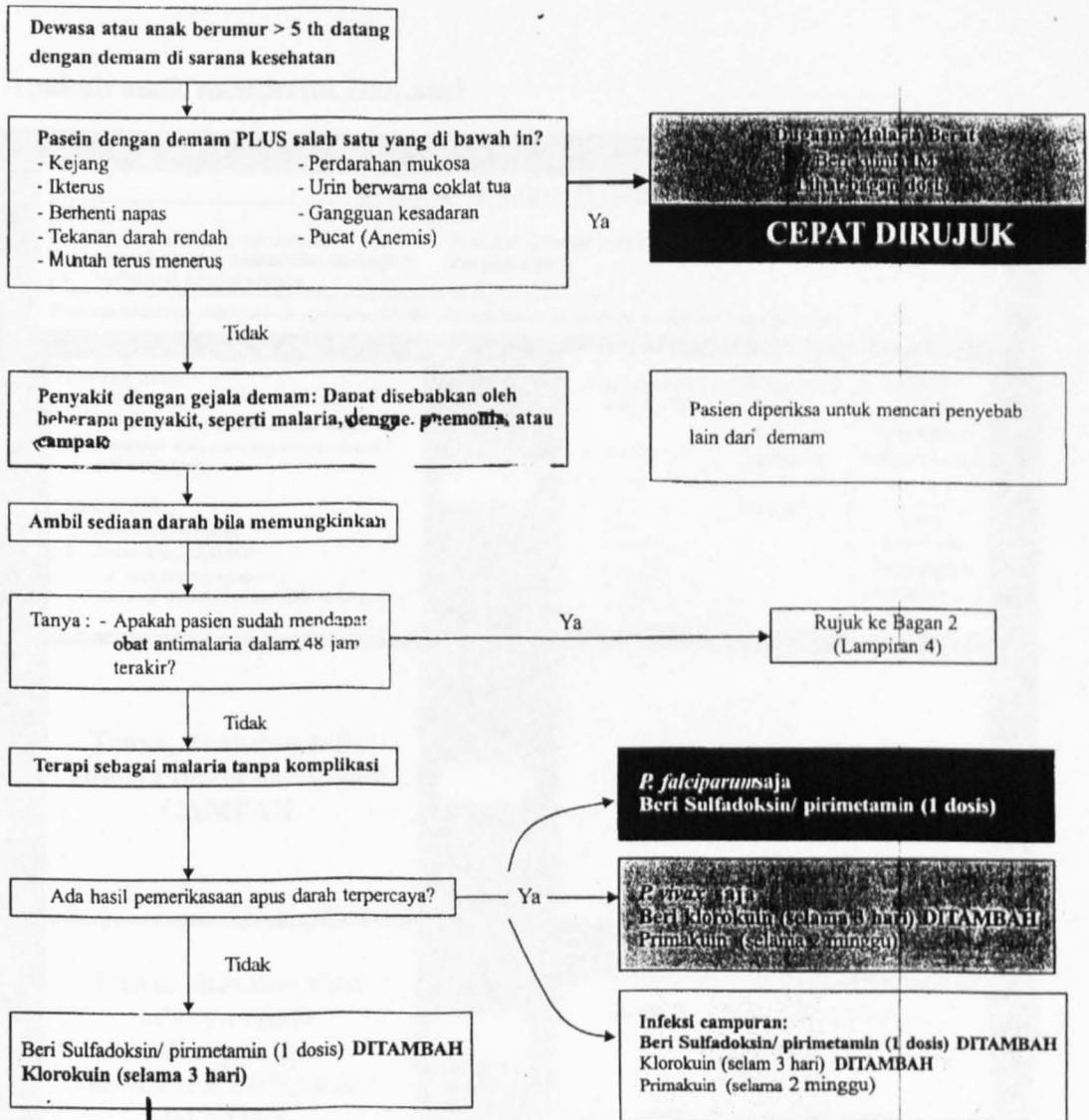
TANDA-TANDA	KLASIFIKASI	TERAPI
<ul style="list-style-type: none"> • Adakah tanda bahaya atau • Tarikan dinding dada bagian bawah atau • Stridor pada anak tenang 	PNEMONIA BERAT atau SANGAT BERAT	<ul style="list-style-type: none"> • Berikan dosis pertama antibiotik yang sesuai • Rujuk SEGERA ke sarana kesehatan dengan tingkat yang lebih tinggi
<ul style="list-style-type: none"> • Napas Cepat 	PNEMONIA	<ul style="list-style-type: none"> • Beri antibiotika yang sesuai selama 5 hari (lihat terapi) • Beri pelega tenggorokan & pereda batuk yang aman • Nasehati ibu kapan harus segera kembali • Kunjungan ulang setelah 2 hari
<ul style="list-style-type: none"> • Tidak ada tanda tanda pnemonia atau penyakit berat 	BUKAN PNEMONIA: BATUK atau PILEK	<ul style="list-style-type: none"> • Bila batuk berlangsung lebih dari 30 hari, rujuk untuk pemeriksaan lebih lanjut. • Beri pelega tenggorokan & pereda batuk yang aman • Nasehati ibu kapan harus kembali • Kunjungan ulang setelah 2 hari

Malaria

Bagan Tatalaksana Malaria

Pada Anak umur > 5th dan Dewasa

(Dipetik dari Protokol Nasional Tatalaksana Malaria MoH TL, Bagan 1b)



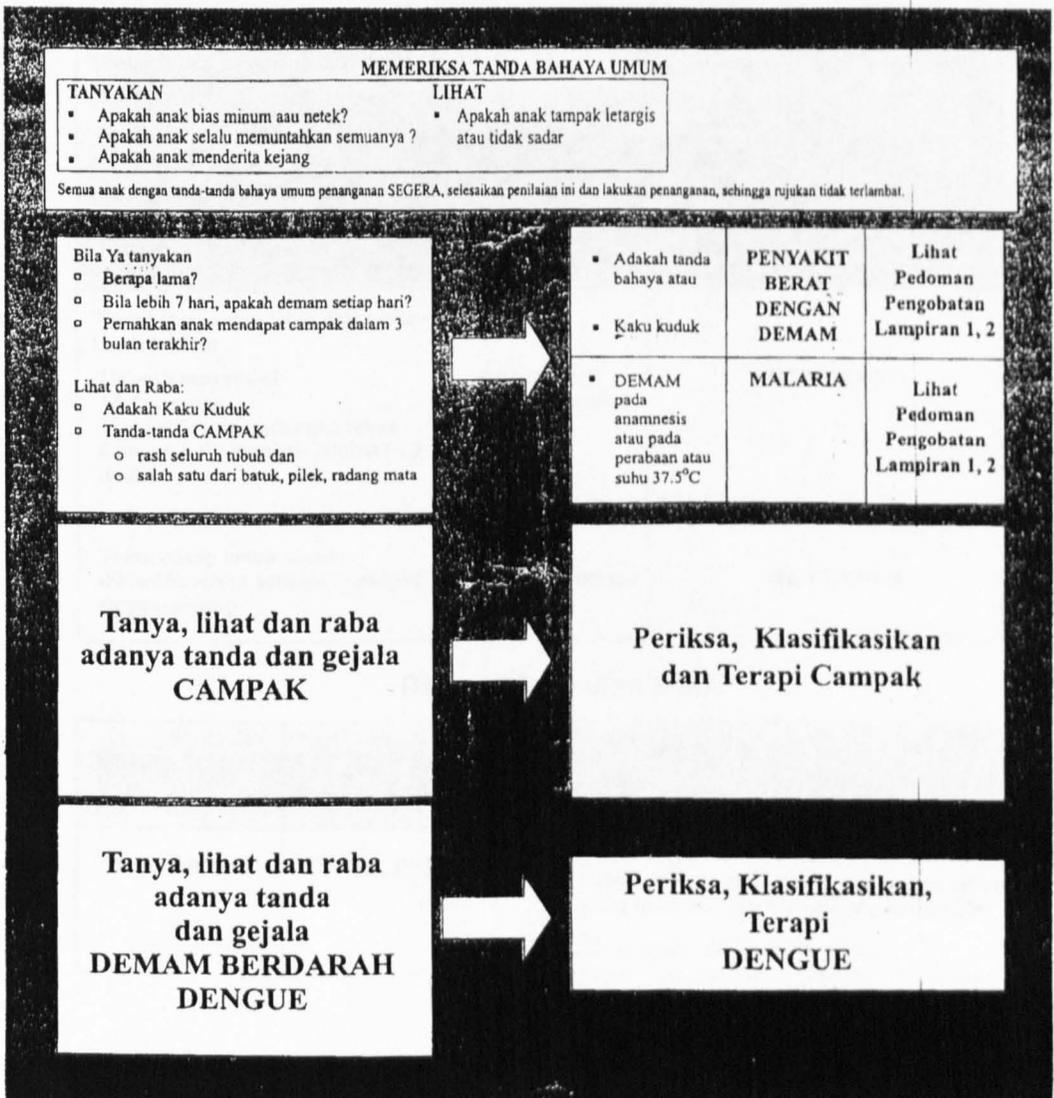
Malaria

IMCI

Lampiran A

Pedoman IMCI Anak berumur 2 bulan hingga 5 tahun
Bagan Alur Demam (IMCI)

Apakah anak menderita Demam?





Pengambilan Keputusan Klinis dan Klasifikasi

Derajat Dehidrasi

Yang paling penting adalah menilai derajat Dehidrasi (lihat tabel). Jika ada dua tanda atau lebih maka golongankan pasien pada lajur yang sama. Jika tidak ada dua tanda atau lebih maka lanjutkan ke lajur berikutnya.

Penilaian Dehidrasi

TANDA	KLASIFIKASI	TERAPI
Terdapat dua atau lebih dari tanda-tanda berikut Lunglai atau tidak sadar Mata cekung Tidak dapat minum atau minum sedikit Cubitan kulit kembali sangat lambat (≥ 2 detik)	DEHIDRASI BERAT	RENCANA C
Terdapat dua atau lebih dari tanda-tanda berikut Gelisah atau rewel Mata cekung Haus atau minum dengan rakus Cubitan kulit kembali lambat (≤ 2 detik)	DEHIDRASI RINGAN-SEDANG	RENCANA B
Tidak cukup tanda untuk diklasifikasikan sebagai dehidrasi ringan-sedang	TIDAK DEHIDRASI	RENCANA A

Diare 14 hari atau lebih

Ada dehidrasi	DIARE PERSISTEN BERAT	Atasi dehidrasi sebelum dirujuk bila juga mempunyai klasifikasi berat Rujuk
Tanpa dehidrasi	DIARE PERSISTEN	Lihat Terapi untuk Diare Persisten Nasehati ibu tentang cara pemberian makan pada anak dengan DIARE PERSISTEN Kunjungan ulang setelah 5 hari

Darah Dalam Tinja

Darah dalam tinja	DISENTERI	Beri antibiotika yang sesuai untuk Diare Berdarah selama 5 hari (Lihat Terapi Diare Berdarah) Kunjungan ulang setelah 2 hari
-------------------	------------------	---

MEMERIKSA TANDA BAHAYA UMUM	
TANYAKAN	LIHAT
<ul style="list-style-type: none"> Apakah anak bias minum aau netek? Apakah anak selalu memuntahkan semuanya? Apakah anak menderita kejang 	<ul style="list-style-type: none"> Apakah anak tampak letargis atau tidak sadar?

Semua anak dengan tanda-tanda bahaya umum penanganan SEGERA, selesaikan penilaian ini dan lakukan penanganan, sehingga rujukan tidak tertambat.

Gejala Klasifikasi Tindakan

Apakah anak menderita diare?

JIKA YA, TANYA:

- Sudah berapa lama?
- Adakah darah dalam tinja?

LIHAT dan RABA:

- Lihat keadaan umum anak, apakah: Letargis atau tidak sadar? Gelisah atau rewel/mudah marah?
- Lihat apakah mata cekung?
- Beni anak minum, apakah: Tidak bisa minum atau malas minum? Haus, minum dengan lahap?
- Cubit kulit perut, untuk mengetahui turgor. Apakah kembalinya: Sangat lambat (lebih dari 2 detik)? Lambat?

Klasifikasikan DIARE

<p>↳ Untuk DEHIDRASI</p>	<p>↳ Terdapat dua atau lebih tanda-tanda berikut ini:</p> <ul style="list-style-type: none"> Letargis atau tidak sadar Mata cekung Tidak bisa minum atau malas minum Cubitan kulit perut kembali sangat lambat 	<p>DEHIDRASI BERAT</p>	<ul style="list-style-type: none"> Jika tidak ada klasifikasi berat lainnya: Beri cairan untuk dehidrasi berat (Rencana Terapi C). Jika ada klasifikasi berat lainnya: <ul style="list-style-type: none"> Rujuk SEGERA dan selama dalam perjalanan ibu diminta terus memberi larutan oralit sedikit demi sedikit. Anjurkan ibu agar tetap memberi ASI. Jika ada kolera di daerah tersebut, beri obat antibiotik untuk kolera.
<p>↳ dan jika DIARE 14 HARI ATAU LEBIH</p>	<p>↳ Terdapat dua atau lebih tanda-tanda berikut ini:</p> <ul style="list-style-type: none"> Gelisah, rewel/mudah marah Mata cekung Haus, minum dengan lahap Cubitan kulit perut kembali lambat. 	<p>DEHIDRASI RINGAN/ SEDANG</p>	<ul style="list-style-type: none"> Beri cairan & makanan sesuai Rencana Terapi B Jika ada klasifikasi berat lainnya: <ul style="list-style-type: none"> Rujuk SEGERA dan selama dalam perjalanan ibu diminta terus memberi larutan oralit sedikit demi sedikit. Anjurkan ibu agar tetap memberi ASI. Nasihatilah ibu kapan harus kembali segera. Kunjungan ulang setelah 5 hari bila tidak ada perbaikan
<p>↳ dan jika ada DARAH DALAM TINJA</p>	<p>↳ Tidak cukup tanda-tanda untuk diklasifikasikan sebagai dehidrasi berat atau ringan/ sedang</p>	<p>TANPA DEHIDRASI</p>	<ul style="list-style-type: none"> Beri cairan & makanan sesuai Rencana Terapi A. Nasihatilah ibu tentang kapan harus kembali segera. Kunjungan ulang setelah 5 hari bila tidak ada perbaikan.
	<p>↳ Ada dehidrasi.</p>	<p>DIARE PERSISTEN BERAT</p>	<ul style="list-style-type: none"> Atasi dehidrasi sebelum dirujuk bila anak juga mempunyai klasifikasi berat lain. Rujuk.
	<p>↳ Tanpa dehidrasi.</p>	<p>DIARE PERSISTEN</p>	<ul style="list-style-type: none"> Nasihatilah ibu tentang cara pemberian makan pada anak dengan DIARE PERSISTEN. Kunjungan ulang setelah 5 hari.
	<p>↳ Darah dalam tinja</p>	<p>DISENTRI</p>	<ul style="list-style-type: none"> Beri antibiotik yang sesuai untuk Shigella selama 5 hari. Kunjungan ulang setelah 2 hari.

Criteria for the targeted diseases

	diagnosis	others
ARTIs	ISPA, ISPA A, ISPA B, ARI, URTI, LRTI, salesma (common cold), flu / influenza, faringitis (pharyngitis), tonsillitis, sinusitis, pneumonia, BBP (batuk bukan pneumonia),	There is no diagnosis and the chief complaint includes at least one of: mear (cough) inus metin (nasal congestion) inus been (running nose) kakorak moras (sore throat) iis boot (difficult breathing)
Malaria	malaria or malaria test positive	Prescription includes at least one of: Fansidar Chloroquine Quinine Primaquine
Diarrhoea	diare dysentery	There is no diagnosis and the chief complaint includes at least one of: tee been (watery stool) kabun moras (abdominal pain / diarrhoea)

Criteria for classification and prescription

ARTI

classification	category of medicine		
	1 essential	2 if necessary	3 unnecessary
URTI common cold flue / influenza cough not pneumonia	-----	paracetamol or another antipyretic	anti-cough antibiotic
LRTI pneumonia	antibiotic	paracetamol or another antipyretic	anti-cough
pharyngitis tonsillitis sinusitis	antibiotic	paracetamol or another antipyretic	anti-cough
suspected tuberculosis	antibiotic	paracetamol or another antipyretic	anti-cough

Malaria

classification	category of medicine		
	1 essential	2 if necessary	3 unnecessary
malaria (in a facility without laboratory) suspected malaria clinical malaria	fancidar chloroquine	paracetamol or another antipyretic SF	antibiotic
Falciparum (+)	fansidar	paracetamol or another antipyretic SF	antibiotic
Vivax (+)	chloroquine primaquine	paracetamol or another antipyretic SF	antibiotic
mixed malaria Falciparum (+), Vivax (+)	fansidar chloroquine primaquine	paracetamol or another antipyretic SF	antibiotic
malaria with first line treatment failure	quinine	paracetamol or another antipyretic SF	antibiotic

Diarrhoea

classification	category of medicine		
	1 essential	2 if necessary	3 unnecessary
diarrhoea simple diarrhoea acute diarrhoea diarrhoea without dehydration	ORS	paracetamol or another antipyretic	anti-diarrhoea antibiotic
bloody diarrhoea dysentery	ORS antibiotic	paracetamol or another antipyretic	anti-diarrhoea
persistent diarrhoea	ORS antihelminthic or metronidazole	paracetamol or another antipyretic	anti-diarrhoea

Criteria for adherence

	medicine(s) in category 1	medicine(s) in category 3	medicine(s) in category 3
adherent	prescribed	prescribed or not prescribed	not prescribed
not adherent	not prescribed		prescribed

remarks

- Priority is the 1st diagnosis
- If the 2nd diagnosis is also one of 3 targeted diseases,
 - o It is acceptable if there is no essential medicine for the 2nd diagnosis (to ignore it).
 - o It is unacceptable if there is an unnecessary medicine for the 2nd diagnosis (to consider it unnecessary).
- Duplicate of antipyretic is considered to be unnecessary.
- Duplicate of antibiotic is considered to be unnecessary.
- Duplicate of vitamin is considered to be acceptable.
- Vitamin A for children <5yo is not counted for the number of medicines or a vitamin prescription.
- An antihelminthic for children 2 – 14yo is counted for the number of medicines. It is considered to be acceptable even if it is prescribed without diagnosis.

Form 1

Sample dari buku registrasi pasien

Fasilitas:

Tanggal pencatatan:

Data kolektor:

No	serial No	tanggal	umur	VD	jen kel	diagnosa / klasifikasi	group	obat-obatan	jumlah obat	anti biotik	vit	inj	klas	resep
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)
1														
2														
3														
4														
5														
6														
7														
8														
9														
0														
SUBTOTAL														
TOTAL														

ISPA = _____ Malaria = _____ Diare = _____ Group A = _____ Others = _____ missing= _____

Form 2

Checklist untuk ruang konsultasi

Fasilitas:

Tanggal:

Data kolektor:

Persetujuan lisan: (Ya / Tidak)

Nama:

(No. ID:)

(1) No Kartu:			
(2) Umur:			
(3) Jenis kelamin: (M / F)			
(4) Keluhan utama			
(5) Anamnesis		(6) Pemeriksaan fisik	
1	Lamananya / durasi		(Tanda vital)
		1	Temperatur / suhu
2	Demam	2	Tekanan darah
3	Sakit kepala	3	Nadi
4	Mual / muntah	4	Frekuensi napas
5	Kemampuan minum / makan	5	Berat badan
6	Rasa haus		
			(Pemeriksaan fisik lainnya)
7	Batuk / sakit tenggorokan / pilek / hidung tersumbat	6	Kepala
8	Sesak napas	7	Mata
9	Batuk lebih dari 3 minggu	8	Muka
10	Dahak dan warnanya	9	Telinga
11	Dahak berdarah	10	Mulut/Tenggorokan
12	Sakit menelan	11	Leher
13	Sakit gigi / sakit di muka	12	Dada/Paru --- inspeksi
		13	Dada/paru --- auskultasi
		14	Perut
14	Mengigil / gemetar / keringkat	15	Kulit
		16	Turgor
15	Banyaknya diare perhari		
16	Tinja berdarah / tinja dengan lendir	17	Lainnya
17	Nyeri otot / sendi / punggung		
			(7) Konseling
18	Nyeri bagian belakang bola mata	1	Pengambilan keputusan / diagnosis
19	Bercak-bercak kulit	2	Pengobatan
		3	Kunjungan ulang
20	Volume urin	4	Pencegahan
21	Warna urin		
22	Gejala-gejala lainnya		
23	Pengobatan untuk penyakit sekarang		
24	Kehamilan		

Diperiksa oleh:

Form 2

<p>(1) Prescriber</p> <p>(2) Language Tetun Bahasa daerah → Bahasa asing →</p> <p>(3) Translator tidak ada ada → (petugas kesehatan, anggota keluarga/teman)</p>	
<p>(4) Diagnosa dan klasifikasi</p> <p>Malaria test (Ya / Tidak) Jika Ya, → (PF (+), PV (+), (-))</p> <p>(5) Group A (sakit kepala, myalgia/sakit sendi/sakit punggung, kurang nafsu makan, sakit mag) B (ISPA, malaria, diare) C Lain-lain</p>	
<p>(6) Resep:</p> <p>(7) (antibiotic, vitamin, injeksi)</p>	
<p>(8) Kepatuhan terhadap STG</p> <p>anamnesis cukup?</p> <p>pemeriksaan fisik cukup?</p> <p>dicatat diagnosa dengan kasifikasi?</p> <p>pereseapan yang patuh terhadap STG?</p>	<p>ya tidak</p> <p>ya tidak</p> <p>diagnosa dengan klasifikasi diagnosa tanpa klasifikasi gejala-gejala saja</p> <p>patuh cukup patuh tidak</p>

Interview topic guide

(1) About treatment

We hope to ask you about treatment according to your knowledge and experience.

- For what kind of ARTI (ISPA) do you prescribe antibiotics?
- How about for diarrhoea?
- What are diagnostic and therapeutic principles of malaria for you?
- What do you think is the indication of vitamin?

(2) About present practice

We hope to ask you about your work, especially about medicine issues. (If quantitative collection is already completed, show the brief results and ask them comments first.)

- Do you think patients are satisfied with your treatment? Please give us specific reasons why you think so.
- Do you think patients understand how to take medicines that you prescribe or dispense? Please give us specific reasons why you think so.
- Do you have any problems in prescribing or dispensing medicines? Please think about the working condition, your personal issues, and patients' side issues.

(3) About changes after STGs and related training

So far, some kinds of national protocols and guidelines have been developed and introduced in CHC work: for example, National Malaria Management Protocol (Protocol Tatalaksana Malaria Nasional), National Tuberculosis Program Manual (Manual Program Tuberculosis Nasional), IMCI, etc. Clinical Nurse Training (Pelatihan Perawat Klinik) textbooks also guide decision-making and treatment.

- What do you think has been changed after the introduction of these guidelines or protocols? In the workplace, in your personal work, or patients' reaction?
- For example, 'comprehensive patient management' is introduced as you know in IMCI training or clinical nurse training. What do you think about this? What in 'comprehensive patient management' do you think is the most important difference from the previous management? What kind of changed do you feel? In the workplace, in your personal work, or patients' reaction?
- Many of you have participated in training for these protocols and guidelines. What was the most impressive or influential point for you? What has been changed by the training that you participated in? What was the most negative point for you? What can not be changed regardless of the training?

(4) About difficulties in using STGs

- Why do you think these protocols and guidelines are introduced?
- You may face something in the protocols or guidelines that are not suitable to your daily work or the local situation. Can you give us actual examples?
- When or in what kind of situation do you feel difficulties to use a protocol or guideline? You can indicate general issues or give us examples in a specific protocol or guideline.
- Is there any obstacle for you to use a protocol or guideline? Please think about the working condition including your colleagues, your personal issues, patients' side issues, or the content itself.

(5) Requests

You may continue to use protocols and guidelines although they will be updated or revised.

- Do you have any suggestion for the future use? What do you expect to add in the protocols or guidelines? You can indicate general issues or suggestions of a specific protocol and guideline.
- How do you want to apply the contents of these protocols or guidelines in your daily work?

Questionnaire

Name of district	
Name of CHC	
Birth date / / 19..... (dd) (mm) (yy)
Sex	1) Male 2) Female
Position	1) Manager 2) Senior nurse 3) Junior nurse 4) Senior midwife 5) Junior midwife 6) Assistant nurse 7) Other health personnel 8) Other personnel (cleaner, security)
Civil service level	1) Level 1 2) Level 2 3) Level 3 4) Level 4 5) Level 5 6) Level 6
Educational background	1) Not completed primary school 2) Primary school 3) Secondary school 4) General high school 5) Basic nursing high school 6) Other vocational high school 7) Diploma (less than 1 year) 8) Diploma /D1 9) Diploma /D2 10) Diploma /D3 11) University 12) Postgraduate
How many years have you been working for CHC? (including other CHCs and Puskesmas during Indonesian time)	
What language do you use the most oftenly at home?	
What language do you use the most oftenly in CHC (with patiens)?	
What sub-district are you currently living?	
How do you commute?	1) Walk 2) Bicycle 3) Minibus 4) Bus 5) Office motorbike 6) Private motorbike 7) Other

CHC checklist

(1) Facility:

(2) Date:

(3) Investigator:

(4) Key medicines		
chloroquine	Tablet	
	Syrup	
Fansidar	Tablet	
quinine	Tablet	
primaquine	Tablet	
paracetamol	Tablet	
	Paediatric tablet	
	Syrup	
ferrous	Tablet	
	Syrup	
cotrimoxazol	Tablet	
	Paediatric tablet	
	Suspension	
amoxicillin	Tablet	
	Suspension	
erithromicin	Tablet	
	Suspension	
penicillin	Tablet	
nalidixic acid	Tablet	
oralit	Powder	
albendazole	Tablet	
pyrantel	Tablet	
	Suspension	
metronidazole	Tablet	
	Suspension	
quinine	Injection	
chloramphenicol	Injection	
procaine penicillin	Injection	
ampicillin	Injection	
gentamicin	Injection	
(5) EML		
(6) STGs		
Malaria		
IMCI		
Clinical Nurse Training*		

* ARTIs, Tuberculosis, Malaria, Dengue, Intestinal parasitosis, Diarrhoea, Skin infection, Malnutrition, Anaemia, Injury



REPÚBLICA DEMOCRÁTICA DE TIMOR-LESTE
MINISTÉRIO DA SAÚDE
Gabinete do Vice-Ministro

Ref: MS-VM/Prop. Org./05/ 34f

Dili, 13 July 2005

Ms. Michiyo Higuchi
DrPH student
Public Health & Policy Department
London School of Hygiene & Tropical Medicine

Dear Ms Michiyo Higuchi,

Thank you for your continuing interest in Timor-Leste and in particular the quality and further development of health services. Your proposal to support further efficient development of the health service was considered by the proposal review panel on 28th June, 2005.

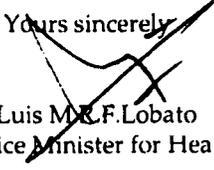
The piece of research that you propose on use of medicines in rural community health centres covers a new and important area of study for Timor-Leste and as such the Ministry of Health has approved your research project proposal with the following conditions.

We must note however that while supporting your research in principle, the Government of Democratic Republic of Timor-Leste cannot provide any financial support for the study.

The proposed area of study is on the topic of use of medicines with health staff, many whom are newly trained. In order that the findings of your study are fully understood, considered and recommendations implemented where appropriate the Research Committee requests that your findings are presented to the Ministry of Health prior to any publication. It will also be necessary for you to provide the Ministry of Health with two copies of the full research document including findings.

The Ministry of Health wishes you every success in your study.

Yours sincerely,


Luis M.F. Lobato
Vice Minister for Health

Cc:

1. Dr. Rui Maria de Araújo, Minister for Health
2. Dr. John Porter, Reader in International Health Department of Infectious and Tropical Diseases and Public Health and Policy, University of London

*Edifício dos Serviços Centrais do Ministério da Saúde, Rua de Caicoli, Caixa Postal 374, Dili, Timor-Leste
Telefone: 670 (390) 3313645; Fax: 670 (390) 3325189*

Part I (quantitative data collection)

Chapter 1.	Introduction
1) knowing each other	- Name list
2) about the research	- What is the research that data collectors will work for? o Title of the research o Objectives of the research o Target of the research o Data collection methods o Research team o Schedule of the project
3) roles of data collectors	- What will data collectors do? o Preparation o Arrangement of the field o Data collection o Data entry into summary forms
4) important things to know for data collectors (research ethics)	- What is the meaning of 'confidentiality'? - How should we be careful for respondents? - What is the meaning of 'informed consent'?
Chapter 2.	Basic background for medicine use research
1) about medicines in general	- What are medicines? - Why / how are they important for us?
2) about 'essential medicines'	- What are 'essential medicines'? - Why this idea emerged?
3) about rational / appropriate use of medicines	- What are conditionals to use medicines appropriately? - What kind of information is needed for the use of medicines? - What will happen if a medicine is used inappropriately? - What is the meaning of 'rational drug use'?
4) about 'standard treatment guidelines'	- What is the meaning of 'standard treatment guideline'? - What kinds of STGs are there in Timor-Leste? - Why are they important?
5) how to calculate indicators	- How to calculate <u>the average number</u> of medicines per encounter? - How to calculate <u>%</u> of encounters with an antibiotic prescribed?
Chapter 3.	Essentials knowledge for data collection
1) commonly-used terms at CHC work	- What kinds of offices have responsibilities for health system in Timor-Leste? - What kinds of health facilities are available at national, district, sub-district and village level? - Who are working at CHC or HP?
2) steps of work at CHC	- What do health personnel do when a sick patient visits CHC?
3) work at CHC (1) --- registration	- What are contents of the medical chat?
4) work at CHC (2) --- consultation	- What are done at the consultation room? o Checking general risk symptoms & signs o History taking o Physical examination o Decision making / classification (diagnosis) o Treatment including prescription o Counseling - What is difference among 'symptom', 'sign' and 'diagnosis'?
5) work at CHC (3) --- labeling / dispensing	- What kinds of information are needed on the label? - What kinds of explanation are needed at the dispensing counter?
6) work at CHC (4) --- recording	- What kind of information is recorded in the patient registration book?
7) name of body parts	
8) name of common illness / diseases	

(continued)

Chapter 4.	Basic knowledge for target diseases
1) acute respiratory tract infections	<ul style="list-style-type: none"> - General information - Important symptoms (from history taking) - Important signs (from physical examination) - Classification - Essential medicines for the treatment - Counseling
2) malaria	<ul style="list-style-type: none"> - General information - Important symptoms (from history taking) - Important signs (from physical examination) - Classification - Essential medicines for the treatment - Counseling
3) diarrhoea	<ul style="list-style-type: none"> - General information - Important symptoms (from history taking) - Important signs (from physical examination) - Classification - Essential medicines for the treatment - Counseling
Chapter 5.	Data collection
1) sampling and recording cases from patient registration books	
2) observation at the consultation room	
3) observation at the dispensing counter	
4) interview to patients	
5) data entry into summary forms	

Part II (qualitative data collection)

(by dr. Sri Suryawati from Gadjah Mada University)

1. Introduction
2. To be an interviewer / FGD facilitator
3. To be a note-taker
4. Guideline for in-depth interview / FGD
5. In-depth interview
6. Practice for in-depth interview
7. Transcription
8. Practice for transcription
9. FGD
10. Practice for FGD
11. Closing

Data: February, 2006

To:, Manager CHC

Cc:, Head of District Health Services,
Sra. Isabel M. Gomes, District Health Liaison, the Ministry of Health

From: Michiyo Higuchi, DrPH candidate, London School of Hygiene & Tropical Medicine

Subject: Data collection at CHC

I would like to ask for your collaboration for my research.

I am planning to conduct a research on the use of medicines in Community Health Centers, which has been approved by the proposal review panel in the Ministry of Health (Ref MS-VM/Prop.Org./05/247, attached). In this connection, my research team hopes to visit CHC for the data collection.

I would be very glad if you could collaborate with this data collection on someday from/..... to/...../2006, probably for one or four days. Our data collection methods are observation with checklists at consultation rooms and dispensing counter and short interview to selected patients. We also hope to interview to 3 nurses individually (manager, clinical nurse and one of nurses) on the last day of the visit when you are not busy with patients.

Because our target is 30 patients per one CHC, the duration of the visit at each CHC will depend on the total number of patients of the CHC. Therefore, we can only make a rough schedule at the moment. We will contact with each CHC about the exact date of our visit at least one week before going there. We prepare for accommodation and meals by ourselves.

I attached informed consent sheets for members of the CHC about this data collection. I also put small questionnaire on the back page of the consent sheet. I hope to have them back before the data collection on the first day.

Any question from you directly to the chief researcher would be much appreciated. Thank you very much in advance for your collaboration.

Sincerely,

Michiyo Higuchi
Chief researcher
DrPH candidate
London School of Hygiene & Tropical Medicine

Contact numbers: 7252115 (personal HP), 7292732 (office HP), 3322338 (office landline)



**REPÚBLICA DEMOCRÁTICA DE TIMOR LESTE
MINISTÉRIO DA SAÚDE
Gabinete do Secretario Permanente**

Ref.MS-SP/V/06/.....

Dili, 11 de Maio de 2006.

Dear all Cuban doctors assigned at the CHC's facilities

I would like to inform all of you that Ms Michiyo Higuchi is a DrPH student where now conducting a research on the use of medicines in Community Health Centers.

As stated in her letter to the Ministry of Health, that she is interesting in nurses work and standard Treatment Guidelines in resource limited situation, however, taking into consideration a level 2 facility now has doctors. she is interest to include the doctors consultation in the research.

The Ministry of Health, kindly request doctors at the facility level to collaborate and provide necessary information and contribute to the research.

Best regards,

A handwritten signature in black ink, appearing to read 'Feliciano da C. A. Pinto'.

Feliciano da C. A. Pinto, SKp.
Permanent Secretary for Ministry of Health,
Timor-Leste

cc.: Dr Francisco Medina, Cuban Doctors Brigade Coordinator

For health personnel (written consent)

Dear colleagues,

We would like to ask for your cooperation for the research conducted under the supervision of the Ministry of Health, Timor-Leste.

The purpose of this research is to study the present services of the CHC by observing activities and interviewing to patients. We will stay in this CHC for 1 or 4 days.

Individual performance will be kept confidential. The research does not influence your personal evaluation. We do not indicate any name in a report or publication from the results of the research.

If you do not want to be observed, you can refuse. Moreover, if you change your mind after you agreed, you can withdraw from the observation at anytime.

Please check the statements below after you have understood the information on this sheet. I would also be glad if you could kindly answer questionnaire on the back page. Any question through CHC Manager or directly to the chief researcher would be appreciated.

Sincerely,

Michiyo Higuchi
Chief researcher
DrPH candidate
London School of Hygiene & Tropical Medicine

.....

- I agree to be observed in the CHC. (yes / no)

Date _____

Your signature _____

Your name (in print) _____

For patients (oral consent)

Sample explanation for oral consent form a patient

(about the researcher)

1) I am a student from London. I am planning to conduct public health research in collaboration with the Ministry of Health, Timor-Leste.

(the purpose of the research)

2) The main purpose of this research is to know the work of CHC.

(what will be done)

3) For this purpose, I hope to ask some questions and to see your patient record, especially about medicines that you received right now.

(about confidentiality)

4) Nobody except us will ever know your personal answers and the contents of your patient record. Your name will never appear in the report.

(about informed consent)

5) If you do not want to answer our questions or you don't like we see your patient record, you can refuse. We do not ask questions and do not see your patient record anymore.

(additional information)

6) It is not a test for you. Even if you misunderstand, nobody criticise you and you can go back to the nurse to ask again how to take them. You do not have to feel tension.

Can you answer our questions?

Can you agree that we will see your patient record?

Medicines and categories

	category	essential medicines in Timor-Leste
1	other analgesics (antipyretics or pain killer)	- paracetamol - aspirin (ASA) - ibuprofen
2	antibiotics	- amoxicillin - chloramphenicol - cloxacillin - cotrimoxazole (sulfamethoxazole+trimethoprim) - erythromycin - nalidixic acid - penicillin V (phenoxymethyl-penicillin)
3	anti-malarials	- chloroquine - primaquine - quinine - fansidar (sulfadoxine+pyrithamine)
4	anti-helminthics	- albendazole - mebendazole - pyrantel
5	vitamin	- multivitamin - vitamin B1 (thiamin) - vitamin B6 (pyridoxine) - vitamin B12 (cobalamin) - vitamin C (ascorbic acid) - folic acid
6	ferrous	- SF - SF + folic acid
7	ORS	
8	topical medicines	
9	metronidazole	