School of Pharmacy

Evaluation of prescribing practices for treatment of mild/moderate community-acquired pneumonia (CAP) in Mongolia

Gereltuya Dorj

This thesis is presented for the Degree of
Doctor of Philosophy
of
Curtin University

June 2013

Declaration

To the best of my knowledge and belief this thesis contains no material previously published by any other person except where due acknowledgment has been made.

This thesis contains no material which has been accepted for the award of any other degree or diploma in any university.

Signed ……..

Dated …….

Acknowledgement

Completing my PhD degree was the most challenging activity of my 32 years of life. The best and worst moments of my doctoral journey have been shared with many people. My first debt of gratitude must go to my supervisor Emeritus Professor Bruce Sunderland for his continuous support, guidance, patience and encouragement throughout my PhD journey in Australia. I would also like to thank Delia Hendrie for her encouraging and constructive feedback, especially in the writing up the thesis.

I would also like to express my heartfelt gratitude to Professor Jeff Hughes and staff at School of Pharmacy for their friendliness and support at Curtin University, Western Australia. Furthermore, I would like to thank Dr. Richard Parsons for helping me with the statistical analyses.

I wish to thank the Division of Pharmaceuticals and Medical Devices, Ministry of Health Mongolia, staff at School of Pharmacy, Health Sciences University of Mongolia and all participants for helping me to implement this project.

I would not have contemplated this road if not for my parents, Dorj and Tsetsegmaa, who instilled within me a love of creative pursuits, science and language, all of which finds a place in this thesis. Special thanks to my Dad for teaching me to be patient and understanding and to my Mom whose love and encouragement allowed me to finish this journey. I owe you everything and I wish that I could show you just how much I love and appreciate you.

This thesis would not be possible without my best friend and husband Byambatsogt and son Temuun who gave me their endless love and support throughout this wonderful journey.

I dedicate this work to my dad Dorj who left us too soon. I hope I am making you proud.

Abbreviations

ADB- ASIAN DEVELOPMENT BANK

AIDS- ACQUIRED IMMUNE DEFICIENCY SYNDROME

ANOVA- ANALYSIS OF VARIANCE

ANSORP- ASIAN NETWORK FOR SURVEILLANCE OF RESISTANCE PATHOGENS

ARI- ACUTE RESPIRATORY INFECTION

C. PNEUMONIAE- CYTOPLASMA PNEUMONIAE

CAH- CHILD AND ADOLESCENT HEALTH AND DEVELOPMENT

CAP- COMMUNITY-ACQUIRED PNEUMONIA

CSAM- CENTRE FOR STANDARDIZATION AND MEASUREMENT

CURB-65- CONFUSION, ELEVATED UREA NITROGEN, RESPIRATORY RATE ≥30 BREATHS/MIN, AND LOW BLOOD PRESSURE

DALY- DISABILITY ADJUSTED LIFE YEARS

DDD- DEFINED DAILY DOSE

EBM- EVIDENCE- BASED MEDICINE

EPOC- EFFECTIVE PRACTICE AND ORGANISATION OF CARE

FGP- FAMILY GROUP PRACTICE

GDP- GROSS DOMESTIC PRODUCT

HBV- HEPATITIS B VIRUS

HCV- HEPATITIS C VIRUS

HIV- HUMAN IMMUNODEFICIENCY VIRUS

IM- INTRAMUSCULAR

IMCI- INTEGRATED MANAGEMENT OF CHILDHOOD ILLNESS

IOM- INSTITUTE OF MEDICINE

IV- INTRAVENOUS

LRTI- LOWER RESPIRATORY TRACT INFECTION

M. PNEUMONIA- MYCOPLASMAE PNEUMONIAE

MIC- MINIMUM INHIBITORY CONCENTRATION

MOH- MINISTRY OF HEALTH

NDPM- NATIONAL DRUG POLICY OF MONGOLIA

NEDM- NATIONAL ESSENTIAL DRUG LIST OF MONGOLIA

NHMRC- NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL

NPS- NATIONAL PRESCRIBING SERVICE

ORS- ORAL REHYDRATION SALT

OTC- OVER THE COUNTER

PHC- PRIMARY HEALTH CARE

PORT- PATIENT OUTCOMES RESEARCH TEAM

PROTEKT- PROSPECTIVE RESISTANT ORGANISM TRACKING AND EPIDEMIOLOGY FOR THE KETOLIDE TELITHROMYCIN

QUOROM- QUALITY OF REPORTING OF META-ANALYSES

RDF- REVOLVING DRUG FUND

S.PNEUMONIA- STREPTOCOCCUS PNEUMONIAE

SIGN- SCOTTISH INTERCOLLEGIATE GUIDELINES NETWORK

TG- THERAPEUTIC GUIDELINES

UK- UNITED KINGDOM

UN-UNITED NATIONS

UNICEF- UNITED NATIONS CHILDREN'S FUND

USA- UNITED STATED OF AMERICA

WHO- WORLD HEALTH ORGANIZATION

Abstract

This thesis has examined prescribing practices for patients with mild/moderate community-acquired pneumonia (CAP) at outpatient settings in Mongolia. The principal aim was to determine the extent of and factors influencing prescribing practices and to understand reasons for inappropriate prescribing and providing of antibiotic and non-antibiotic medicines, including injections for treatment of mild/moderate CAP. It was envisaged that the results of this research would produce essential data on prescribing for CAP in Mongolia and enlighten policy makers, emphasizing several issues such as appropriate use of antibiotics and patient safety (safe injection practices).

CAP is a significant cause of morbidity and mortality in all age groups worldwide. The mortality rate for children aged less than five was 34.4% in 2011 in Mongolia. It was the second most common reason for all hospitalizations in 2011 (46%). This is the first study that has assessed prescribing practices for the treatment of outpatients diagnosed with mild/moderate CAP in Mongolia.

The thesis consists of three types of studies; first a systematic review on prescribing practices for patients with mild/moderate CAP at outpatient settings in developing countries. The systematic review extracted 29 studies of which nine were classified as of relevance. Of the retrieved studies, 17 assessed the effect of Integrated Management of Childhood Illnesses (IMCI) case management training on the use of antimicrobials among community health workers treating young children at first level health facilities. The overall extent of patients with mild/moderate CAP receiving a correct antibiotic was 59% and a correct treatment was 48%. There was a paucity of studies evaluating prescribing for CAP in developing countries.

The primary study evaluated prescriptions submitted to community pharmacies in Mongolia with a diagnosis of mild/moderate CAP written on each prescription by doctors, with prescriptions collected prospectively and sequentially. All prescribed drugs, including their dosage, duration, route of administration and demographic information of patients were extracted from the prescriptions. Each drug was evaluated for rational prescribing based on

the Standard Treatment Guidelines of Mongolia (2005, 2008), WHO/IMCI guidelines for treatment of mild/moderate pneumonia in children aged two to 59 months and Australian guidelines for the management of non-severe pneumonia.

The site selection was based on the WHO Operational package for assessing, monitoring and evaluating country pharmaceutical situations. The principle for selecting private pharmacies in the urban and provinces was to sample the closest private pharmacy to each public health facility surveyed. A convenience selection method was applied for pharmacies in rural areas based on discussion with local professionals. The selection criteria were based on retail volume, operational activity and close location to hospital or health centres.

In addition, questionnaire studies were completed with community members, medication providers (pharmacists, including pharmacy technicians) and prescribers (doctors), to assess the veracity of the results obtained from the prescription study.

The selection of pharmacists and doctors was based on their location and accessibility. For the study, three public central hospitals, five district hospitals, 20 family group practices (FGPs) and three private hospitals were selected. Thirty community pharmacies were conveniently selected from the chosen five districts that represented a range of pharmacies regarding size, accessibility and distance from clinics, based on discussions with local professionals, ensuring that no particular type of pharmacy was excluded.

Prescriptions were collected from 22 pharmacies and represented the prescribing practices of 118 doctors. The study enrolled 394 (193 adults and 201 children) patients, with a median age for children of 2.0 years (range: 0.033-12) and adults of 33.0 years (range: 13-92). The questionnaire studies enrolled 474 community members, 34 pharmacists, plus 27 pharmacy technicians, 22 general doctors (GP) and 49 specialists.

The study found that a wide range of antibiotics and non-antibiotic medicines were prescribed and provided for the treatment of CAP. The prescription study showed the most commonly prescribed drugs were aminopenicillins (16%), vitamins (13.3%), and mucolytics (5.6%). Similarly, questionnaire results with prescribers and providers confirmed a wide range of antibiotics and non-antibiotics being prescribed. Commonly dispensed antibiotics with prescriptions were oral and injectable penicillins with extended spectrum and oral sulfonamides. Oral macrolides were dispensed more frequently than injetactables whereas in contrast, injectable quinolones and injectable cephalosporins were more frequently dispensed than oral forms. Other medicines dispensed with a prescription for treatment of CAP included mucolytics, vitamins and antihistamines. Additionally, injectable corticosteroids and injectable xanthines were frequently dispensed non-antibiotics. The most commonly dispensed antibiotics without prescription were similar to those with prescription: oral and injectable penicillins with extended spectrum and oral sulfonamides. Additionally, non-prescribed oral and injectable cefalosporins were frequently dispensed. In contrast, tetracyclines and injectable macrolides were less frequently issued.

The prescription study found the overall level of inappropriate prescribing for all patients based upon the standard treatment guidelines was 84.0% (845/1100). A total of 95 were not assessable against the Mongolian guidelines because of lack of information in the current guidelines for children aged between six to 15 years.

Inappropriate drug selection was similar for adults (57.7%) and children (56.6%), and was the major reason for overall frequency of inappropriate prescribing which for adults was 89.0% and for children 78.0%. Doctors in urban areas prescribed more inappropriate drugs than those in rural areas for both children and adults χ^2 [(1, n=575) =10.25, p =.0014].

The assessment of prescriptions for adults with mild/moderate CAP, compared against Australian therapeutic guidelines revealed that a similar extent of inappropriate medicines were prescribed for adults (91.5%) when compared with results of the assessment of prescriptions using Mongolian standards (89.0%). The prescribing practice of inappropriate drugs for children was

higher using Australian therapeutic guidelines (91.2%) than Mongolian standards (78.0%). Similar to the evaluation compared against Mongolian standards, doctors in urban areas tended to select more inappropriate drugs compared with their counterparts in rural areas χ^2 [(1, n=860) =10.77, p = .001].

A higher extent of inappropriateness was found in the evaluation of prescribing practices for treatment of pneumonia in children aged two months to 59 months compared against WHO/IMCI guidelines. The total inappropriateness of assessable drugs prescribed for children was 90.3%.

In investigating reasons for not following prescribing guidelines, of 71 doctors who were surveyed, 42 of these doctors (59.2%) reported they had to change the prescribed antibiotic sometimes/always because the first chosen one showed no effect. Additionally, the questionnaire study with providers (pharmacists and pharmacy technicians) revealed that a majority (70%) had to change the prescription for treatment of CAP sometimes or always because the prescribed treatment was inappropriate.

In addition, the prescription analysis showed that the extent of prescribed injections was 28.4% for adults and 9.0% for children. Prescribing of injectables was significantly higher for adults in urban areas compared with rural areas χ^2[(1, n=556)=21.7, p = <.001], but the difference between urban and rural prescribing of injectables was not significant for children The administration of injections is only legal in hospital settings and only by qualified health personnel.

The discrepancies between the expectations and attitudes towards therapeutic injections between prescribers, providers and the public were evident in this study. Most prescribers (54%) and providers (70%) specified patient's self-diagnosis and wish as an important factor for prescribing/dispensing injections for treatment of CAP. However, this was at variance with community views where only a small percentage (16%) stated this as important, and it was older respondents who preferred having an injection.

The attitude on current treatment guidelines was investigated and a majority of pharmacists plus pharmacy technicians and doctors considered that the current treatment guidelines for CAP were not appropriate (80%, 70%).

Moreover, most dispensers (70%) were in agreement with prescribers (83%) that antibiotics were overused in Mongolia. According to prescribers, the main reason for overusing antibiotics was insufficient government control. In addition pharmacies allowed patients to purchase antibiotics without prescription (35, 59.3%), and a strong public desire was perceived for therapeutic injections including antibiotic injections (36, 61.0%).

The study concluded the currently adopted WHO guidelines need replacement with ones that are locally developed based upon local expertise including considerations of pathogen resistance patterns, the unusual climatic conditions and access of patients to medical care. In addition with respect to CAP, guidelines should include any non-antibiotic medicines considered appropriate for the Mongolian environment especially considering the low winter temperatures. Techniques for successful implementation of guidelines are well-known in the literature, such as those adopted by the National Prescribing Services (NPS) in Australia. In addition, educational programs targeted at improving the public's, prescribers' and providers' knowledge and attitude towards prescribing and provision of antibiotics, including injectable medicines and safe injection practices should be implemented in Mongolia.

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Chapter 1 Introduction

1.1 Aims and context of the study

This thesis investigates the prescribing practices for patients with mild/moderate community-acquired pneumonia (CAP) in Mongolia. The principal aim is to determine the extent of and factors influencing prescribing practices and to understand reasons for inappropriate use of antibiotic and non-antibiotic drugs for treatment of mild/moderate CAP in Mongolia. It is envisaged that the results of this research will produce scientific evidence and enlighten policy makers, emphasizing several issues such as appropriate use of antibiotics and patient safety (safe injection practices).

Community-acquired lower respiratory tract infection (LRTI) is a common cause of acute illness both in developing and developed countries.(1, 2) The spectrum of diseases ranges from a mild mucosal colonisation or infection, acute bronchitis or acute exacerbation of chronic bronchitis/chronic obstructive pulmonary disease, to overwhelming symptoms in the patient presenting with severe community-acquired pneumonia (CAP). Pneumonia is broadly classified into two categories: community-acquired and hospital-acquired. CAP is a significant cause of morbidity and mortality in all age groups, especially the elderly, which is a patient population that continues to grow.(1) In a prospective study of prognostic factors of CAP caused by bacteraemic pneumococcal disease in five countries, death rates ranged from 6% in Canada to 20% in the USA, 13% in the UK and 8% in Sweden.(3) The mortality rate of children aged less than five was the highest due to respiratory infections in Mongolia. The extent of pneumonia was 34.4% in 2011. And it was the second most common reason for all hospitalizations in 2011 (46%) in Mongolia.(4)

Clinical standards and clinical practice guidelines were non-existent until 1992 in Mongolia. During the past 10 years, clinical treatment guidelines have been developed as one of many structures of quality improvement in health care. With technical assistance from World Health Organization (WHO), guidelines on diagnosis and treatment of common diseases have been developed and

disseminated to primary health care facilities as well as Integrated Management of Childhood Illness (IMCI) guidelines that have been widely distributed. Additionally, the Oxford Handbook on Clinical Medicines and a Guideline Book on Maternal and Child Health and Social Welfare were translated and distributed for health professionals in the country.(5)

The Standard Treatment Guidelines of Mongolia for treatment of adults with mild/moderate CAP(6) were developed in 2005 and the Mongolian National Standard for treatment of children with pneumonia has been available since 2001, with the latest update in 2008.(7)

1.2 Specific objectives

The purpose of this research was to assess the prescribing practices for patients with mild/moderate pneumonia at outpatient settings in Mongolia. The following specific objectives were addressed:

1. To complete a systematic review on prescribing practices for mild/moderate CAP at outpatient settings in developing countries.
2. To evaluate the appropriateness of prescribing practices for mild/moderate CAP from supplied prescriptions from community pharmacies based on the prescribing criteria of drug selection, dosage, dosage form, and duration by comparing with the current official guidelines in Mongolia.
3. To establish the level of and determinants that lead to inappropriate injection practices and to understand reasons for injectable antibiotics and other drugs being prescribed provided and preferred for treatment of mild/moderate CAP in Mongolia.

1.3 Thesis approach

This thesis used three types of studies in order to examine the prescribing practices for mild/moderate CAP in Mongolia. First, a systematic review using SIGN guidelines was completed in order to review the literature and assess the evidence. Second, this thesis used prescription data with a diagnosis of mild/moderate CAP at outpatient settings in Mongolia. Third, questionnaire studies were completed with three target groups: (i) community members, (ii)

prescribers (doctors), (iii) providers (pharmacists and pharmacy technicians) in Mongolia. All data were collected, entered and verified by the researcher. Analysis of the data was performed by the researcher and a senior biostatistician. Appropriateness of each criterion was completed by the researcher and confirmed by the supervisors.

Chapter 2 contains background information relating to the study. The chapter starts with geographic and demographic data about Mongolia, illustrating the country specifics including economic diversity and sparse population. In addition, the health care delivery system, including the provision of medicines is introduced. The Chapter continues with information about the key elements in the provision of health care delivery. Additionally, a literature review of the existing treatment guidelines for treatment of CAP is presented in this Chapter.

Chapter 3 presents results of the systematic review on prescribing practices for treatment of mild/ moderate pneumonia at outpatient settings in developing countries.

Methodological aspects used in the study are described in Chapter 4. First, prescriptions submitted to community pharmacies in Mongolia with a diagnosis of mild/moderate CAP were collected prospectively and sequentially. Furthermore, questionnaire studies with three target groups (community members, doctors and pharmacists plus pharmacy technicians) were completed in order to investigate the extent of and factors influencing injection practices in Mongolia.

Chapter 5 contains detailed information regarding the results of the assessment of prescribing practices for treatment of mild/moderate CAP in Mongolia with respect to national prescribing guidelines.

Chapter 6 provides an overview of results of the interviews with community members, doctors and pharmacists including pharmacy technicians.

The discussion of the research findings and their comparison with other findings is provided in Chapter 7. Conclusions using information gained throughout the study about the use and utility of antibiotics including

injectables were made in Chapter 8 and a summary of the recommendations is presented in Chapter 9.

Chapter 2 Background

2.1 Introduction

The purpose of this chapter is to present descriptive information that provides a context for the study. It starts with an overview of the geographic and demographic characteristics of Mongolia. Thereafter, brief introduction of the Mongolian health care system is provided, followed by a discussion of the pharmaceutical sector and drug procurement procedures.

This is followed by an introduction to the appropriate use of medicines and the concept of essential medicines, emphasizing the evidence-based medicine (EBM) and treatment guidelines.

In addition, the issues of inappropriate use of medicines, in particular antibiotic resistance, inappropriate use of injections and its consequences are presented in this chapter. Next is a brief introduction of community-acquired pneumonia (CAP) and discussion of linked health data regarding its management, with an emphasis on treatment guidelines.

Finally, brief information regarding questionnaire studies and issues relating to validity and reliability are provided in this Chapter.

2.2. Study background

Mongolia is a landlocked country in north central Asia, bordered by Russia and China. It is the 19th largest country in the world, with much of the land being desert or semi desert. Administratively, it is divided into 21 aimags (provinces), which are divided into 329 soums (districts), each of which is split into baghs (smaller districts) plus one municipality, the capital city of Ulaanbaatar. The estimated population in 2011 was 2.8 million, with over 40% primarily residing in the capital, Ulaanbaatar.(4) The annual growth rate is 1.1% and about 70% of the population are aged between 15 and 64.(4)

Ulaanbaatar consists of nine districts, i.e. Baganuur, Bagakhangai, Bayangol, Bayanzurkh, Chingeltei, Khan-Uul, Nalaikh, Songinokhairkhan and Sukhbaatar.

Ethnic Mongolians account for 95% of the population, mostly Khalkh and other groups such as Kazakh and Buriyat.

According to the World Bank, Mongolia is classified as a lower-middle income country(8) with 22.4% of the population living on less than US $1.25 a day.(9) The estimated Gross Domestic Product (GDP) per capita in 2011 was $3,100.(8)

Despite some improvements of certain health indicators since the transition into the free market economy, including of life expectancy, infant mortality and child mortality, the country is still facing problems with equitable health care.(10)

According to the health indicator data, respiratory infections accounted for most of the morbidity rates among children aged to five years, with pneumonia being the leading cause (34.4%).(4) In addition, one of the main reasons for hospitalization in 2011 was pneumonia (46.2%), with an increase of 1.4% compared to the previous year.(4)

2.2.1 Health care system in Mongolia

According to the Health Law of Mongolia, the main purpose of health care is to provide qualified care continually, sufficiently, and equally to all Mongolians.(11) Health care is provided primarily through the public sector, including the primary care level: family hospitals in Ulaanbaatar and aimag centres, soum and inter-soum hospitals in aimags; secondary care level: districts hospitals in Ulaanbaatar, aimags and rural general hospitals in aimags and tertiary care level: tertiary level hospitals and centres in Ulaanbaatar, regional diagnosis and treatment centres in aimags. Recent data for 2011 indicated that there were 15 tertiary level hospitals and centres, four regional diagnostic and treatment centres, 17 aimag general hospitals, 12 district general hospitals, 6 rural general hospitals, 37 inter-soum hospitals, 274 soum hospitals, 219 family group practices (FGPs) and 1184 private hospitals.(4)

Family health centres, soum or bagh hospitals are the first official point of contact for patients and from there they can be referred to higher level health facilities. In general, family group practitioners are available for the public; in

contrast specialists are mostly located at higher level facilities. Detailed referral pathways(5) are summarized in Figure 2.1.

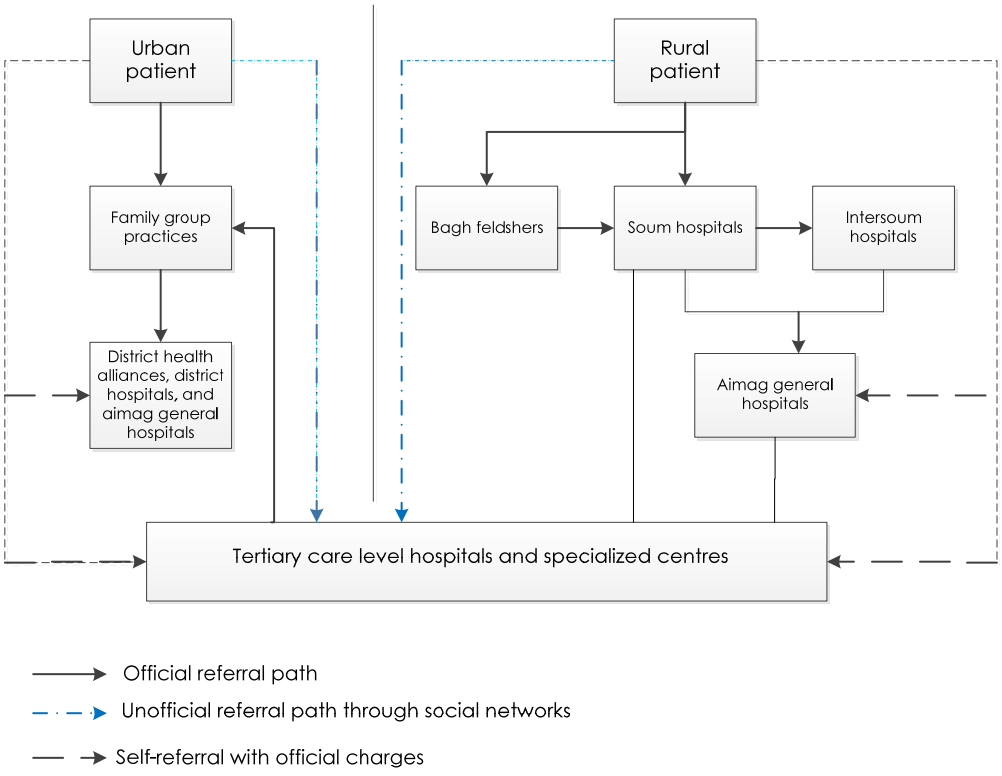


Figure 2.1 Referral pathways for urban and rural areas in Mongolia (adapted from WHO, 2012)

According to the health data, about one-half of all outpatient services were provided at FGPs, soum and inter-soum hospitals, whereas about 35% of outpatient services were provided at higher level hospitals. In contrast, a significant proportion of inpatient service (27%) was provided at primary care level.(4)

2.2.2 Human resource in the health sector

The Ministry of Health of Mongolia (MoH) has prepared a Health Sector Human Resources Development Policy with assistance from the Asian Development Bank (ADB), in order to manage and improve sustainable health care services in Mongolia.(12) As at 2011, 41,124 employees were engaged in the public and private health sector.(4) Most were hospital specialized workers (40.1%), followed by nurses (22.9%), doctors (19.3%) and others (17.7%). A majority of

doctors and nurses worked in public hospitals, while about 80% of pharmacists worked in the private sector(4) (Table 2.1).

Table 2.1 Number of selected health personnel working in the health sector, 2011

Category	Number of employees		Ratio between health personnel [a]
	Ulaanbaatar	Rural	
Doctor	4,907	3,036	1.2
Nurse	4,697	4,749	

[a] Ratio was estimated from the number of doctors versus nurses

There are some deficiencies regarding the distribution of health personnel in Mongolia. Compared with other countries, Mongolia has a large number of health workers but a shortage of nurses.(13) The ratio between doctors and nurses was 1.2, in particular, the ratio of doctors per 10,000 population in Ulaanbaatar city was 1.5 times more than that in rural areas.(5) In addition, the excessive number of medical schools has been pointed out, in particular, the medical doctors are trained for a standard six year curriculum at four state and six private universities and colleges with a graduation pool of more than 2,000 students in Mongolia.(4, 14) However, according to a WHO recommendation, it is optimal to have one medical school per three million population.(15) Legally, medical graduates are required to spend at least three years working at the primary health care (PHC) level before attending training to obtain specialization qualifications. However, the medical schools admit almost everyone for specialist postgraduate training to increase their profit, ignoring the requirement. It has resulted in an overproduction of specialists and shortage of doctors at PHC level and in rural areas.(13)

2.2.3 Pharmaceutical sector in Mongolia

The National Drug Policy of Mongolia (NDPM) is an integrated part of the Comprehensive Policy on the Mongolian National Security and it was approved in 2002. The objective of the NDPM is to provide health organizations, veterinary hospitals and people with highly effective, qualified, registered drugs and medical equipment continually, sufficiently and equally,

and to introduce and promote appropriate use of drugs.(16) The NDPM consists of seven topics, including legislation, drug selection, manufacturing, distributing, drug financing, drug quality assurance and rational use of drugs.(16) In addition, the national policy on Traditional Medicines and Complementary and Alternative Medicines has been publicly available since 1999.(17) The Division of Pharmaceutical and Medical Devices, Ministry of Health (MoH) is responsible for the policy, planning and regulatory affairs in providing pharmaceutical care in Mongolia. Figure 2.2, represents the detailed structures of the regulatory organizations regarding pharmaceuticals in Mongolia.

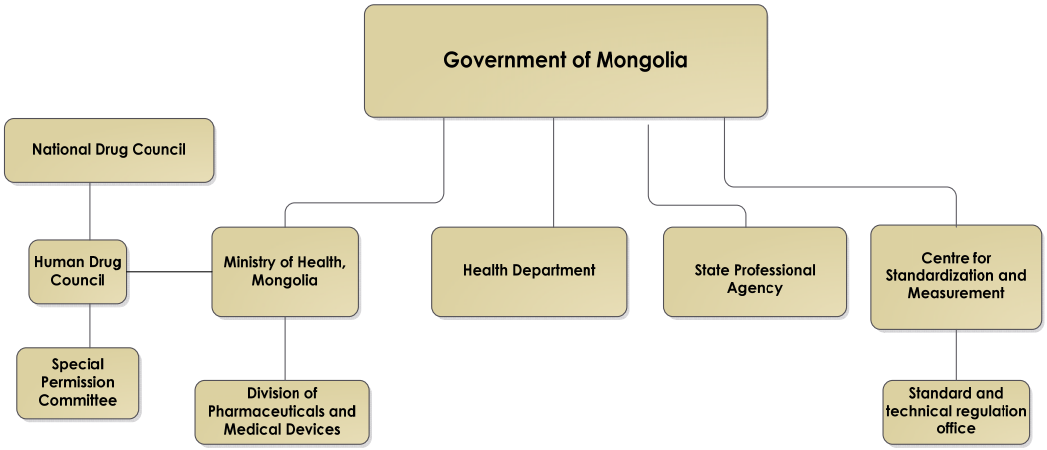


Figure 2.2. Drug regulatory organizations of Mongolia (adapted from Assessment of the pharmaceutical sector of Mongolia, 2009)

Aspects of drug regulation, pharmaceutical and medical devices and their monitoring are divided amongst several government agencies.

The Standardization and Technical Regulatory Office of the Centre for Standardization and Measurement (CSAM) is responsible for the technical standards in local production and its quality control. The special licenses for manufacturing, importing, purchasing pharmaceuticals and medical devices are granted by the Special Permission Committee, MoH.

Registration of doctors, nurses and pharmacists, and pharmaceutical companies occurs through the Health Department. In order to improve the appropriate use of medicines, drugs are regulated through the Special Permission Committee of the Human Drug Council. No drug can be marketed without permission. In addition, drug wholesalers are licensed.(18)

2.2.4 Drug procurement

In Mongolia, the pharmaceutical procurement sector is 100% privatized. Drugs are distributed through organizations such as drug wholesalers and retail drug outlets (community pharmacies and revolving drug funds (RDF)). "National Standard Requirements for Pharmacy" allows a main community pharmacy to have up to two branches, restricting the latter to sale of drugs available without a prescription.(19) The latest statistics show there were 703 community pharmacies, 75% of which had one to two branches.(4, 20) According to the National Guideline for Good Prescribing and Dispensing Practice of Mongolia (Regulations), all physicians must record the diagnosis on the prescription. In addition, the maximum number of retail prescription drugs per patient encounter should be three. At the current time, prescriptions with multiple diagnoses for outpatients are often issued by the doctors, however, there is no guideline to monitor the regulatory compliance.

Wholesalers can import and procure drugs with an approval and special permission from the Mongolian Minister of Health. In 2011, there were 158 registered drug wholesaling companies and 42 local drug manufacturing companies,(4) some of which act as both wholesalers and retailers. These companies were mainly located in the capital city.(4)

In addition, about 85% of all drugs were imported from other countries(20) and 2779 drugs were newly registered in Mongolia in 2011.(4) Most of the registered drugs were imported from Russia or India, followed by Germany, Slovenia and China.

2.3 Appropriate use of medicines

WHO has defined drug use as appropriate (rational) when an appropriate drug is prescribed and administered according to the appropriate dosage

regimen and the drug should be affordable and available and dispensed correctly, that is in correct doses at adequate time periods.(21) The prescriber must follow the standard treatment guidelines to prescribe the appropriate drug. Moreover, rational dispensing correlates with drug supply procedures and also the competency and knowledge of the health care provider.

Significant demand, limited funds and high prices contribute to frequent shortages of drugs in many public health programs, especially in developing countries.(22) Despite the existence of standards for drug regulation for many years, there are still problems with the safety and quality of medicines in both developed and developing countries.(23)

2.3.1 Inappropriate use of medicines

It is essential to monitor and promote appropriate drug use, in order to avoid medical and economic consequences. Medical consequences of inappropriate drug use include unnecessary suffering and death, iatrogenic disease, hospital admissions and increased antimicrobial resistance. Likewise, the public confidence in the health care system will be diminished and curative and preventive services are reduced to cater for the burden subsequent to inappropriate drug use. Economically, inappropriate drug use is followed by waste of resources and unavailability of drugs for those who are in need.(24)

Inappropriate use of medicines has been reported from both developing and developed countries. Observational data from 25 European countries showed that the outpatient antibiotic consumption varied significantly in 2003.(25, 26) The number of defined daily doses (DDDs) per 1000 population was about 30 in Greece and France, whereas a lower number was estimated in the Netherlands (10).(25) On the other hand, overprescribing of antibiotics was found in the Netherlands.(27) According to Vaanane, unnecessary and inappropriate self-medication with antibiotics (28% of respondents had antibiotics for common cold and sore throat) was common among Finnish immigrants in southern Spain.(28) Potentially inappropriate prescribing was also observed for about 12% of community-dwelling older people and 40% of residents in nursing homes in the USA and Europe.(29)

The situation is more serious in developing countries. A systematic review by WHO studied the use of medicines in 97 developing and transitional countries.(30) It found that medicine use was not optimum in all countries, reporting less than 40% was compliant with clinical guidelines. Further findings indicated poor prescribing and dispensing practices, often by unqualified staff with a short encounter of one to two minutes.(30) Other studies have also identified inappropriate self-medication and availability of antibiotics over the counter in developing countries.(31) (32) A comparable situation can be observed in Mongolia.(10, 33, 34) (35)

As summarized by Holloway, determinants of inappropriate medicine use in less developed countries include lack of provider knowledge due to insufficient training and supervision, prescriber habit, lack of clinical guidelines, lack of diagnostic service, poor infrastructure, lack of continuing medical education and supervision with regard to prescribing, excessive pharmaceutical promotion, economic incentives to the prescriber, perceived patient demand by the provider, poor adherence by patients. (36)

In order to combat inappropriate use of medicines, intervention studies have targeted the causes including lack of knowledge.(37) According to the Effective Practice and Organisation of Care (EPOC) Cochrane group review, only a few studies assessing the impact of education could be reported from developing countries.(38) Educational outreach (two intervention studies from Indonesia), reporting a significant decrease in prescribing antimicrobials (24%) and antidiarrhoeals (40%)(39) and mixed group discussions with prescribers and patients (one study from Indonesia reporting a decrease of the proportion of injections from 70% to 40%)(40) were effective in improving prescribing and dispensing practice. Also, one randomized trial in Zambia showed a small positive impact of continuing education meetings on case management, for example the number of drugs per prescription decreased from 2.3 to 1.9.(41) However, more evidence showed contrary results, reporting lack of knowledge may not be a single reason for inappropriate use of medicines.(39) Despite the use of oral rehydration salt for patients with diarrhoea having improved during the 1980s and 1990s, the median percentage of children correctly rehydrated by health workers after 2,000

training courses on management of diarrhoea cases and supervision was only 20%.(39) A study of factors influencing correct performance of health care workers who treat ill children in developing countries found no significant association between correct treatment and in-service training in the treatment of fever or supervision.(42) Results from a study of health workers who treated uncomplicated malaria reported similar findings, suggesting that disease-specific training and supervision were not followed by improved treatment quality.(43)

Along with improving knowledge and education, a better understanding is required as to how and why certain interventions work(44) and also the barriers for successful implementation.(45)

In addition, WHO recommends that countries should implement national policies, including establishment of a multidisciplinary national body to coordinate policies on medicine use and monitor their impact, development of evidence-based clinical guidelines, development of essential drug lists, establishment of drug and therapeutic committees in districts and hospitals, and integrating problem-based training in pharmacology curriculum to promote appropriate use of medicines. Examples of successfully implemented approaches to improve the use of medicines can be seen in a few countries, for example Australia has the National Prescribing Service (NPS) which focuses on the quality use of medicines, by providing information for both community and health professionals. For health professionals this includes professional education activities using access to a range of information resources (new medicines information [NPS RADAR], therapeutic topic review [NPS News], a journal on drug and therapeutic issues [Australian Prescriber]). Similarly, consumers have access to information regarding how to manage the common cold when antibiotics are unnecessary and also about new medicines. NPS also offers an online learning module (National Prescribing Curriculum) for medical and pharmacy students. Also, a 10-year antibiotic program by NPS, involving general doctors, community pharmacists and consumers resulted in a successful decline of antibiotic prescribing for upper respiratory symptoms.(46, 47) On the other hand, little research has been done to identify the impact of such policies implemented in less developed

countries and it is difficult to draw any conclusions, mainly due to lack of sufficient evidence.(48) Among a few studies that assessed the impact of regulatory measures, a decline in antibiotic use among general doctors was reported from Korea(49) and reduced antibiotic sale in the private sector in Chile.(50) An improved health care service at no or low cost for patients mainly in the public sector with appropriate numbers of health professionals was observed from Oman. This followed the Government of Oman undertaking an intervention including the development of an Approved Drug List by selecting medicines on evidence-based medical needs and cost-effectiveness. In addition to feedback from prescribers and other sources regarding appropriate procurement of medicines, the Government conducted mass education campaigns targeted at physicians, pharmacists and patients.(51)

2.3.2 Antibiotic resistance

Inappropriate use of medicines, especially of antibiotics can have unwanted side effects and development of resistance to microorganisms. According to O'Brien and others, the problems related to antibiotic resistance should be considered globally but also each country should monitor and manage these issues locally.(52) Until 1967, *S.pneumoniae* was generally sensitive to penicillin.(53, 54) Nevertheless, the resistance rate has been reported as more than 20% and multi-drug resistance is very common(55) and a literature review indicated that the incidence rate of pneumococci resistance increased from 6% to 44% within 9 years in Spain.(56) Similar findings about penicillin resistance and multi-drug resistant strains of meningococcus can be found elsewhere.(57) In the 1970s, penicillin-resistant pneumococci were most common in Israel, Papa New Guinea, Poland, South Africa and Spain as well as some states in the USA.(58) Furthermore, a few studies documented that there are regional variations in the prevalence of antimicrobial-resistant pneumococci.(59) For instance, carriage of resistance *S. pneumoniae* was significantly more common in urban and rural children in Asia, the Middle East, and Lesotho.(60, 61) A survey of clinical specimens from four Asian countries from 1996 to 1997 found that penicillin non-susceptibility ranged from 80% of isolates in the Republic of Korea to 4% of isolates in India.(62) In Europe, Spain

is a focus of penicillin-resistant pneumococcal strains, with a prevalence of non-susceptibility of over 45% of pneumococcal isolates.(58)

Macrolide resistance is the most prominent example of pneumococcal resistance with regard to the prevalence rate and the level of resistance. Macrolide resistance is a serious concern in many Asian countries compared with the western part of the world. According to the Asian Network for Surveillance of Resistance Pathogens (ANSORP) studies with pneumococcal isolates from some Asian countries between 1998 and 2001, Vietnam (88-92%), Taiwan (86-87%), Korea (80-85%), Hong Kong (76%), and China (74-75%) showed very high prevalence rates of erythromycin resistance.(62) (63) Fluoroquinolone resistance would be a potential issue because fluoroquinolones are frequently used as the first-line agent for the treatment of CAP in many countries. A recent Prospective Resistant Organism Tracking and Epidemiology for the Ketolide Telithromycin (PROTEKT) surveillance study showed that 14.3% of pneumococcal isolates from Hong Kong were resistant to levofloxacin followed by Korea (2.9%) and USA (1.8%). ANSORP surveillance also showed that ciprofloxacin resistance (MIC 4 mg/L) was emerging in Hong Kong (11.8%), Sri Lanka (9.5%), Philippines (9.1%), and Korea (6.5%).(62-64) In the 1970s, Rusinko et al. completed a study on antibiotic sensitivity of Staphylococci isolated from two groups including patients in a children's hospital and health workers in two maternity hospitals in Mongolia.(65) They found that a large number of strains in both groups were resistant to penicillin (93.6% and 95.2%) and streptomycin (66.7% and 87.2%), respectively. Penicillin resistant staphylococci were highly (virtually 100%), sensitive to rare antibiotics (kanamycin, vankomycin, spiromycin, cephaloridin, linkomycin, pristinamycin, fusidic acid and rifamycin) that had never been used in Mongolia.(65) According to the latest report from the State Central Hospital of Mongolia, a total of 101 hospitalized patients received antibiotics in September, 2009 and it has concluded that only 40% of patients (sensitivity analysis confirmed by taking blood, urine, and smear samples) were selected correctly. The antimicrobial resistance was measured and it was found that penicillin resistance was 18%, oxacillin-2%, ampicillin-24%, tetracycline-11%, erythromycin-16%, azithromycin-26%, gentamicin-40%, and cephalosporin-

63%-85%, respectively. These findings indicated these antibiotics should therefore not be prescribed.(66)

2.3.3 Inappropriate use of injections

Medicines are introduced into the body by several routes, including taken orally, sublingually, rectally or vaginally. Medications can also be sprayed into the nose and absorbed through the nasal membranes, inspired into the lungs, usually through the mouth (by inhalation), applied to the skin for a local or systemic effect, delivered through the skin by a patch for a systemic effect and given by injection. Administration by injection (parenteral administration) includes the subcutaneous, intramuscular, intravenous, and intrathecal routes.(67)

Injected medicines are commonly used in healthcare settings for the prevention, diagnosis, and treatment of various illnesses. Unsafe injection practices include re-use of equipment in the absence of sterilization and these practices put patients and healthcare providers at risk of infectious and non-infectious adverse events which have been associated with a wide variety of procedures and settings.(68) In developed countries, the consequences of unsafe injection practices were recognized in the middle of the last century and became more emphasized with the advent of Human Immunodeficiency Virus/ Acquired Immune Deficiency Syndrome (HIV/AIDS) in the 1980s.(69, 70) It is widely accepted that unsafe healthcare injections could transmit HBV,(71) HCV,(72) HIV,(73) viral haemorrhagic fever and other bloodborne pathogens.(74)

Re-usable glass syringes and re-usable needles were replaced by disposable syringes and single-use needles starting from the 1950s and the use of new, disposable, sterile syringes became a standard practice in developed countries.(75) Nowadays, the risk of infection in therapeutic settings due to unsafe injection practices is small in developed countries.(70)

2.3.3.1 Practice of unsafe injections in developing countries

The situation in less developed countries is different since more injections are prescribed many of which are often unnecessary.(70) The global burden of

disease project (WHO) conducted a literature review, and found that the annual ratio of injections per person ranged from 1.7 to 11.3. The highest proportion was reported from the European region (11.3), followed by the Eastern-Mediterranean region (4.3). Overall, the annual number of injections per person was 3.4.(76) The proportion of re-used injection equipment without sterilization ranged from 1.2% to 75%. South-East-Asia accounted for the highest use (75%), followed by the Eastern-Mediterranean region (70%) and the Western Pacific Region (30%).(76) Another systematic review of studies from 13 developing countries regarding injection use and safety reported that for eight of those countries, 25-96% of outpatient visits resulted in at least one injection, and for five countries a majority of administered injections were unnecessary. Commonly administered parenteral injections were vitamins, antibiotics, analgesics and quinines.(77) An assessment of injection practices in Mongolia showed a high injection frequency rate; reporting an average of 13 injections per year among the 65 participants. The estimated needle-stick injuries were 2.6 per year and 28% of providers reported re-using the injection device.(78) A majority of prescribers and about 50% of community members were aware of the potential risks of unsafe injection practice (for example: HIV transmission).(78) A latter reassessment conducted by the MoH indicated an improved practice, reporting eight injections per year, and almost every injection (99%) was administered with new, disinfected and disposable equipment.(79) Both of these studies were on small population numbers limiting their generalisation. However, given the high prevalence of antibody HCV (anti-HCV) in Mongolia (16%-24%),(80) it is essential to monitor and reduce unsafe injection practices in the country.

2.3.3.2 Factors contributing to the popularity of unsafe injections

Reasons for unsafe and unnecessary practices of parenteral medication in developing countries are related to socio-cultural, economic and structural factors. The belief in injection as a strong tool for restoring and maintaining health is mutually supported by health professionals and community members in developing countries.(81) Previous findings have suggested that patient's demand may also force prescribers to administer more injections to satisfy the patient,(82) (83) whereas in contrast others indicated that patients were more

open to alternatives to injections.(84) A study in Uganda and Indonesia questioned the causes for injection prescribing and found that local belief about illness and concepts of efficacy, economic incentives of private or informal providers and lack of patient-provider communication were the main reasons.(85) Previous studies have indicated poor knowledge of associated risks and burden of unsafe and unnecessary injection practice, a lack of available and affordable injection equipment, and easy access to parenteral medication contributes to the popularity of injection in developing countries.(86-88) No more recent data are available since 2000.

2.4 Evidence-based medicine (EBM)

Evidence-based medicine (EBM) is the rigorous and judicious use of existing best evidence in making decisions about the care of individual patients.(89) The practice of EBM can be implemented by integrating personal clinical know-how with best available external evidence from thorough systematic research. Personal clinical expertise is based on proficiency and judgement obtained from clinical experience and clinical practice.(89) The best available external evidence is research findings, particularly from patient centred clinical research into the accuracy and precision of diagnostic tests and the efficacy and safety of therapeutic and preventive programmes.(89) External clinical evidence not only invalidates but also replaces previously accepted diagnostic tests and treatments with new, powerful, accurate, efficacious and safer ones.(90) The practice is a life-long, self-directed learning journey in which practitioners have to be able to critically appraise the evidence for its quality and clinical applicability. Also, they must be able to integrate the appraisal with clinical expertise and apply the results in clinical practice and be able to evaluate their own performance.(90) Each clinical problem is different, and the resources available to solve each problem vary. The need for evidence based general practice has been emphasized,(91, 92) and the role of evidence based guidelines for conditions which commonly occur in general practice has been researched and highlighted.(93) (94) The National Health and Medical Research Council (NHMRC) of Australia have recognized that the fundamentals of an evidence-based approach to clinical or health issues is the evidence itself.(95) This evidence needs to be

collected and organized from systematic literature reviews of the particular issues in question. In addition, interpreting the evidence is still a major challenge for clinical experts compiling clinical practice guidelines. Therefore, the NHMRC has been particularly engaged in developing appropriate guidelines to assist researchers with using, presenting and assessing the evidence. Types of studies such as sy stematic reviews, experimental studies and comparative studies are commonly used to assess clinical and public health issues. Levels of evidence are summarized in Table 2.2.

Table 2.2 Designation of evidence levels (adapted from NHMRC, 1999)

Level of evidence	Study design
I	Evidence obtained from a systematic review of all relevant randomised controlled trials.
II	Evidence obtained from at least one properly-designed randomised controlled trial.
III-1	Evidence obtained from well-designed pseudorandomised controlled trials (alternate allocation or some other method).
III-2	Evidence obtained from comparative studies (including systematic reviews of such studies) with concurrent controls and allocation not randomised, cohort studies, case-control studies, or interrupted time series with a control group.
III-3	Evidence obtained from comparative studies with historical control, two or more single arm studies, or interrupted time series without a parallel control group.
IV	Evidence obtained from case series, either post-test or pretest/post-test.

The quality of evidence considers the methods used by the investigators during the study to minimise bias and control confounding issues within a study type. Quality criteria are suggested for non-randomised controlled studies (including cohort and case-cohort studies).(96)

On the other hand, dependence on EBM may have some disadvantages such as potential lack of applicability of the biomedical perspectives and the role of opinion in tailoring evidence to a patient context and preferences.(97) Despite these arguments, EBM aims to address the persistent problem of clinical practice variations with help of numerous tools, including standardized practice guidelines.

2.4.1 Guidelines and programmes towards improved treatment outcomes

According to the Institute of Medicine (IOM), "*clinical guidelines are systematically developed statements to assist practitioner and patient decisions about appropriate health care for specific clinical circumstances."(98)*Practice guidelines should be applicable to any part of clinical care and should inform about when to order and provide medical services, how these should be performed and how long the patients should receive the medical service.(99) Previous researchers have concluded that the adherence to treatment guidelines is most likely related to an improvement in the prognosis of patients with CAP.(100) It is however important to bear in mind that guidelines integrate some degree of uncertainty arising from heterogeneity of the patient's clinical condition and differences in etiologic microorganisms and the quality of the evidence is difficult to establish.(101-103)

On the other hand, the efficacy of treatment based on guidelines can be assessed by several parameters, such as the influence of change in treatment practices on mortality, morbidity and health-care related costs.(100) As recommended by the Australian Commission on Safety and Quality in Healthcare, antimicrobial use should be optimised by managing through a number of interventions, often referred to as antimicrobial stewardship programs.(104) An essential core to implement the antimicrobial stewardship programs is monitoring of prescribing with respect to the the guidelines on appropriate use of antibiotics.(105) Other interventions include the restriction of selected antibiotics and "stop-orders" after predetermined time periods. The goals of an antimicrobial stewardship include optimization of clinical outcomes while minimizing unintended consequences of antimicrobial use such as toxicity, the selection of pathogenic organisms and the emergence of resistance. Moreover, it is aimed to reduce unnecessary costs associated with health care.(106)

In addition, clinical guidelines are widely available in many countries.(107, 108) These guidelines should consider different risk factors, such as age, comorbidity and initial clinical severity(109) and there should be evidence-based implementation strategies at a local level in each country.

Interventions to improve antibiotic prescribing behaviour were reported in a Cochrane review and indicated that there was insufficient evidence to support the choice of intervention.(110) While single interventions may be as effective as multiple ones due to existing health infrastructure in developed countries, multiple intervention packages were shown to be more beneficial in less developed countries. These intervention packages often include building infrastructure, such as supervisory systems, that are likely to increase their impact.(36) In addition, tailoring interventions to target specific barriers to compliance was reported to be effective in improving professional practice.(98, 111, 112)

2.4.2 Essential Drug Concept

Essential medicines are those that fulfil the priority health care needs of the population. They are selected with due regard to public health relevance, evidence on efficacy and safety and comparative cost effectiveness. Essential medicines are intended to be available within the context of functioning health systems at all times in adequate amounts, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford.(113) The implementation of the concept of essential medicines is intended to be flexible and adaptable to many different situations. Exactly which medicines are regarded as essential remains a national responsibility.(113)

The concept of essential medicines is that a limited number of carefully selected medicines based on agreed clinical guidelines leads to rational prescribing, to an improved supply of drugs and lower costs.(113, 114)

The practical implication of the essential medicines concept is that national essential medicines lists and national drug formularies, together with clinical guidelines, should serve as a basis for formal education and in-service training of health professionals, and of public education about drug use.(115) They should also serve as the main basis for public sector drug procurement and distribution, insurance reimbursement, as well as for drug donations.(114)

The first National Essential Drug List of Mongolia (NEDM) was adopted in 1991 using the WHO Model Essential Drug List as a basis in order to provide health facilities with medicines. The revision of the NEDM is completed every four years on the basis of the recommendations of WHO and country specific data. Currently, the sixth edition of NEDM is available in Mongolian throughout the country. The latest edition includes a total of 328 drugs in 419 drug formulations.(116)

12.5 Management of CAP in developing countries

Although, there are many studies available in relation to CAP, there is relatively little known about the treatment of CAP and its antibiotic use in developing countries. A systematic review on prescribing practices for treatment of CAP in developing countries at outpatient settings delivered 29 studies. Most studies assessed the prescribing practice of antibiotics for the treatment of children aged less than five diagnosed with pneumonia at outpatient setting. Only one intervention study contained information regarding the treatment of adults diagnosed with pneumonia at outpatient setting in developing countries.(117)

The latest observational study on antibiotics used for hospitalized patient treatment of pneumonia in Mongolia was completed by Renbat in 2002 and it showed that most hospitalized patients (85%) received more than one antibiotic including, penicillin, 47.4% received aminoglycosides, 4.2% received macrolides, 2.0% received cefalosporins and 25.3% received sulfonamide preparations.(118) However, that study did not assess the appropriate use of antibiotics and broader issues such as safety, efficacy and cost.(118) To date, no studies have assessed the prescribing practice for treatment of outpatients diagnosed with mild/moderate CAP in Mongolia.

2.5.1 Management of CAP in adults

Over the past decade or so, professional organisations and societies from many countries have developed guidelines for empiric treatment of adults with CAP, aiming to produce a helpful prescrbing tool. As it is mentioned earlier, the best of guidelines are evidence-based, with recommendations

made only after extensive review and grading of studies in the literature, and supported by expert opinion.(119) At first glance, treatment guidelines share common themes, however there is considerable variation in the way in which they have been developed. Drug recommendations vary reflecting local issues, in addition patient classification schemes are different, for example whether or not nursing home residents or immunocompromised patients.(119)

Although the great majority of LRTIs are of viral origin, CAP is most often a bacterial disease with a substantial annual mortality; ranging from 0.2% for elderly persons in the community(120) to 14% for those hospitalized with CAP(121), and as high as ≥50% in subgroups of patients presenting with septic shock.(122) Thus, pneumonia should in general, be treated with antibiotics. Additionally, the treatment should start promptly because a delay of more than eight hours in treatment is associated with increased mortality.(123)

CAP is often diagnosed based on clinical symptoms, such as cough, sputum production (if adequate specimen obtained but rare for children), laboured breathing, or fever. These symptoms are non-specific and might also be present in patients with upper -respiratory-tract infections, other lower respiratory infections such as acute bronchitis and chronic bronchitis, and non-infectious diseases (reactive airways disease, atelectasis, congestive heart failure, vasculitis, pulmonary embolism, and malignant disease). Laboratory diagnosis is associated with high cost and difficulties and the vast majority of pneumonia cases are treated empirically in developing countries without identifying the etiological agent.(59)

Typical organisms in CAP are Streptococcus pneumonia (*S pneumoniae*),(124) worldwide, however the incidence of less common organisms is variable and dependent upon geography, healthcare setting and the availability of suitable diagnostic tests. In Africa, pneumonia was the most common clinical presentation and the causative agent in 69% of all childhood pneumonia cases was the pneumococcus.(125)

Atypical pneumonia refers to pneumonia caused by organisms such as *Mycoplasma pneumonia*, *Chlamydia pneumonia*, and *Legionela spp*. According to previous findings, *M. pneumoniae* was found to be the etiologic

organism in up to 37% of patients treated out of hospital.(94) A restrospective study found that atypical organisms were involved in 22% of cases of CAP.(126)

Nowadays, the illness severity and site of care plays an important role in the treatment of CAP. The decision about whether or not a patient should be admitted to hospital might have an effect on the extent of diagnostic testing as well as the choice of empirical antibiotic treatment. The general consensus is that most patients can be safely treated as outpatients.(127) The advantages of not admitting patients for CAP are important and include decreased cost, patient preference and avoidance of iatrogenic complications in hospitals. However, selected patients should be admitted if they have special requirements such as the need for close observation, respiratory support, intravenous antibiotics, or other concerns. Many variables attribute to the decision to admit a patient with CAP including severity of illness, associated disease, adequacy of home support, and probability of adherence to treatment. Risk factors for increased mortality of patients with CAP include extremes of age, comorbidity, for example: malignant disease, alcoholism, abnormality of vital signs, and several laboratory and radiographic findings. In addition to the clinician's judgement, prognostic scoring rules have been developed to support the decision.(124, 128, 129)

The Pneumonia Severity Index was developed by the American Thoracic Society and Patient Outcomes Research Team (PORT) and it identifies patients at risk of death with a point system based on several variables. This method was recognized as an effective tool to identify low risk patients who can be treated at home.(130-133) On the other hand, the British guidelines recommend an assessment of severity based on the presence of 'adverse prognostic features'(134) including, age over 50 years, coexisting disease, and four additional specific core features: mental confusion, elevated urea nitrogen, respiratory rate more than 30 breaths/min, and low blood pressure (CURB-65). The scoring method was developed by the British Thoracic Society and assessed by several studies.(135) Antibiotic management adapted from Therapeutic Guidelines were developed and approved by the Western Australian Therapeutic Advisory Group and they recommend the CURB-65

assessment, based on the British Thoracic Society guidelines. Assessment of CAP using the Pneumonia Severity Index(135) is also recommended but requires additional clinical and laboratory information. Only a minority of patients (approximately 10%) will meet the criteria for severe pneumonia. It is important that treatment is matched with disease severity. The clinical status may change following initial assessment and alter the risk category.

2.5.2 Recommendations for empirical therapy for inpatients with CAP

Treatment options are simplified if the pathogen is established or strongly suspected. According to File, the information on the causative agent is of importance when a patient is switched from parenteral to oral therapy.(124)

The guidelines of the British Thoracic Society and the Australian and North American Guidelines on empirical treatment for inpatients are similar: β lactam plus macrolide or monotherapy with a flouroquinolone for inpatients. The length of antibiotic therapy recommended by the British Thoracic Society is usually about seven days for patients treated in the community and ten days for severe patients whereas the American Thoracic Society recommends at least five days for uncomplicated pneumonia. But other studies have shown that short course therapy was as efficacious as the longer courses currently recommended by guidelines.(119, 136) An early switch (after two to three days) from intravenous to oral antibiotics in patients who had responded to therapy has also been shown to reduce the hospital stay without risk for the patient.(137-139) Once a patient is stable, the switch of therapy from intravenous to oral, and discharge from hospital is generally preferred, since it has advantages including economic, care and social benefits.(55, 140) And in some countries, for example Australia and Sweden, injection administration during the whole duration of hospital stay has never been a common practice.(141)

2.5.3 Recommendations for empirical therapy for outpatients with CAP

The key guidelines that have been used in this assessment are summarised in Table 2.3 and comprise the most recent statements from North America

(American Thoracic Society, Infectious Diseases Society of America), Europe (British Thoracic Society), Australia and Mongolia.

The British Thoracic Society guidelines recommend β-lactams (amoxicillin 500-1000mg thrice daily), not macrolides as primary agents.(134) Similarly, because of high-resistance rates to macrolides in Europe, they are not regarded as optimum first line empirical agents to treat *S. pneumonia*.(124) In contrast, the North American guidelines variably recommend macrolides as first line, doxycycline, an antipneumococcal fluoroquinolone (e.g. levofloxacin, gatifloxacin, moxifloxacin) or the combination of β-lactam plus macrolide as treatment options for outpatients (Table 2.3). The rationale is that the macrolides are effective against most pathogens, such as *S. pneumonia*, as well as atypical organisms (*M. pneumonia*, *C. pneumoniae*).

Table 2.3 Empirical therapy of CAP in adults (adapted from File, 2004)

Guideline type	Outpatient treatment*
North American guidelines ATS/evidence-based	No cardiopulmonary disease. No modifying factors: macrolide (eg, azithromycin, clarithromycin) or doxycycline
	Cardiopulmonary disease ± modifying factors: β-lactam (eg, cefuroxime, high-dose amoxicillin, amoxicillin/clavulanate) (macrolide or doxycycline) or antipneumococcal fluoroquinolone
IDSA/evidence-based	Macrolide, doxycycline, or antipneumococcal fluoroquinolone (alternative: β-lactam (eg, amoxycillin/clavulanate, cefuroxime), but these agents not active against atypical pathogens) For older patients with comorbidities, the fluoroquinolone may be a preferred choice
European guidelines British Thoracic Society/ evidence-based	Non-severe disease: β-lactam (eg, amoxicillin) or macrolide (for patients with β-lactam intolerance)

* All drugs given orally, unless otherwise indicated.

2.5.3.1 Management of mild/moderate pneumonia in adults, Australia

The Australian Therapeutic Guidelines (TG)(142) for mild/moderate pneumonia recommends amoxicillin oral OR (if atypical organism suspected) doxycycline oral OR clarithromycin oral to adult outpatients (In rural and remote areas, for patients in whom orally administered antibiotics may be unsuitable procaine penicillin 1.5 g intramuscular daily may be substituted for amoxicillin until substantial improvement has occurred: generally five days is required.)

Table 2.4 Management of adult outpatients with mild/ moderate pneumonia (Australia)

Australian Therapeutic Guidelines: pneumonia, 2010, V14	Amoxicillin 1 g orally, 8 hourly for 5-7 days OR (if Mycoplasma pneumonia, Chlamydophila Chlamydia pneumonia or Legionella is suspected Doxycycline 200mg orally, for the first dose, then 100mg daily for a further 5 days OR Clarithromycin 250 mg orally, 12-hourly for 5 to 7 days
	For patients hypersensitive to penicillin, use doxycycline or clarithromycin.
	If clinical failure is observed, consider switching to to an alternative drug (eg cefuroxime 500mg orally, 12-hourly if the patient is not hypersensitive to penicillin or moxifloxacin 400 mg orally, daily if patient has immediate penicillin hypersensitivity.

2.5.3.2 Management of mild/moderate CAP in adults, Mongolia

The Standard Treatment Guidelines of Mongolia for treatment of adults with mild/moderate pneumonia recommends oral administration of amoxicillin (ampicillin) 500mg every 6 hour or alternatively erythromycin 500mg every 6 hour for adult patients.(6)

Table 2.5 Treatment guidelines for mild/moderate CAP in adults (Mongolia)

Adults	Mild/ moderate CAP
Mongolian Standard Treatment Guidelines for Common Diseases: Pneumonia (2005)	Oral amoxicillin (ampicillin) 500mg every 6 hour, or erythromycin 500mg every 6 hour

2.6 Management of CAP in children

As documented earlier, official recommendations regarding the treatment of pneumonia in adults have been available in countries including Britain, the United States, Canada and Australia.(94, 108, 143) However, in contrast there have been only a few attempts to develop treatment guidelines for children mostly in Europe or North America mainly due to controversies that surround etiologic process of pediatric CAP.(144, 145) In addition, further recommendations on pneumonia in children classified to the cause are available.(146-148)

2.6.1 Treatment for children aged two to 59 months with CAP, recommended by World Health Organization (WHO)

Approximately 10 million children in less developed countries die before they turn five every year and many during their first year of life. Among the causes acute respiratory infections (ARIs) (mostly pneumonia) are the main killers in children, causing a loss of 119 million Disability Adjusted Life Years (DALY) a year, or 10% of the total burden of disease in developing countries.(149)

In order to respond to this challenge, a strategy for Childhood Illness (IMCI) was initiated by the Department of Child and Adolescent Health and Development (CAH) of the WHO and United Nations Children's Fund (UNICEF). The major element of this strategy is improvement in case management skills of health staff by providing locally adapted guidelines on management of

childhood illness and activities to promote their use. The latest technical updates of IMCI have considered and accumulated new evidence and recommendations in six areas, such as antibiotic treatment of severe and non-severe pneumonia, low osmolarity oral rehydration salt (ORS) and antibiotic treatment for bloody diarrhoea, treatment of fever/ malaria, treatment of ear infections, infant feeding and treatment of helminthiasis.(150)

Evidence-based documents regarding treatment of pneumonia in children, inform countries directly about IMCI adaptations(150) and these are summarized in Table 2.6.

Table 2.6 WHO recommendations for the treatment of pneumonia in children aged two to 59 months

Summary of recommendations	For children with non-severe pneumonia, use: Oral amoxicillin (15 mg/ kg of body weight/ dose) thrice daily OR Oral cotrimoxazole (4 mg of trimethoprim/kg/dose) twice daily.
	Oral amoxicillin should be given for three days for non-severe pneumonia in children 2-59 months of age. Oral cotrimoxazole should be given for three days for non-severe pneumonia in children 2-59 months of age in low HIV prevalent countries.
	For children with severe pneumonia, use: Where referral is difficult and injection is not available, oral amoxicillin in 45 mg/kg/ dose twice daily
	For children with very severe pneumonia, use: Injectable ampicillin plus injectable gentamicin is a better choice than injectable chloramphenicol for very severe pneumonia in children 2-59 months of age. A pre-referral dose of 7.5 mg/kg injection gentamicin IM and 50 mg/kg injection ampicillin can be used.

2.6.3 Management of non-severe (mild/moderate) CAP in children, Australia

Oral antibiotics are preferred in non-severe cases and are used to complete the treatment in more serious cases (Table 2.7).(142) In rural and remote areas, where hospitalisation may be difficult, daily IM procaine penicillin may be substituted for benzylpenicillin and administered under close supervision as initial therapy; continue until substantial improvement has occurred, generally 5 days is required.

Table 2.7 Management of CAP in children (Australia)

Birth to 1 week	Benzylpenicillin 60mg/kg IV, 12-hourly for 7 days PLUS Gentamicin (neonate less than 34 weeks postconceptional age: 3mg/kg or more postconceptional age: 3.5mg/kg) IV, daily for 7 days
1 week to less than 4 months	If patient is febrile, is only mildly unwell and has the typical clinical features of pneumonia, use: Azithromycin 10mg/kg orally, daily for 5 days OR (if child more than 1 month old) erythromycin 10mg/kg orally, 6-hourly for 7 to14 days or erythromycin 20mg/kg orally, 6-hourly for 7 to 14 days. If patient is febrile, does not have bronchiolitis, but the typical features of pneumonia, use: Benzylpenicillin 30mg/kg IV, 6-hourly for up to 7 days For severe disease, seek expert advice. Use: Cefotaxime 25 mg/kg IV, 8-hourly
4 months to less than 5 years	For non-severe disease, use: Amoxicillin 25 mg/kg orally, 8-hourly for 3 days If there is not an adequate response after 3 days, review diagnosis and adherence to treatment. If oral therapy is not tolerated, use: Benzylpenicillin 30 mg/kg IV, 6-hourly for up to 7 days. (in rural and remote areas)
5 to 15 years	amoxicllin 25 mg/kg up to 1 g orally, 8-hourly for 5 to 7 days OR (if M. pneumoniae is suspected) clarithromycin 7.5 mg/kg up to 250 mg orally, 12-hourly for 5 to 7 days OR roxithromycin 4 mg/kg up to 150 mg orally, 12-hourly for 5 to 7 days For more serious disease, use:

	Benzylpenicillin 30 mg/kg up to 1.2 gIV, 6-hourly until significant improvement, then amoxicillin 25 mg/kg up to 1 g orally, 8-hourly for a total of 7 days PLUS (if M. pneumoniae is suspected) clarithromycin 12.5 mg/kg up to 500 mg orally, 12-hourly for 7 days OR roxithromycin 4 mg/kg mu pro 150 mg orally, 12-hourly for 7 days.

2.6.4 Treatment guidelines for children with mild/moderate CAP in Mongolia

Mongolian National Standard for treatment of children CAP recommends benzylpenicillin, aminoglycoside (gentamicin) injection for infants and semi-synthetic penicillin (50mg/kg/4 times), plus gentamicin 7.5mg/kg/once)-injection for children aged till five years. It also recommends any of salbutamol, euphyllin, epinephrine or prednisolone, if considered as necessary.(7) Detailed treatment regimen is demonstrated in Table 2.8.

Table 2.8 Treatment guidelines of mild/moderate CAP in children(Mongolia)

Children	Mild /moderate CAP	
Mongolian National Standard: Pneumonia in children MNS 5836:2008	Infants: Benzylpenicillin, aminoglycoside (gentamicin) injection Up to five years old: Semi-synthetic penicillin (50mg/kg/4 times) plus gentamicin 7.5mg/kg/once injection If available chloramphenicol (75mg/kg/3 times a day) Additional option: Cephalosporin II-III	If considered necessary, any of the following could be prescribed: Salbutamol, euphyllin, epinephrine Prednisolone, dexamethasone Vitamin C, A E

It is notable no guidelines are available for children of six years and above.

2.7 Questionnaire studies

Survey research using questionnaires is the most common method employed in pharmacy practice research. Questionnaires are assumed to be a cost-effective tool to collect information from large samples in a relatively short time. Other advantages of questionnaires include the capacity to collect good factual information with short answers and closed questions and collection of relevant information in a systematic way.

Developing a questionnaire to assess attitudes is a difficult task.(151, 152) A researcher has to explore and examine the factors and dimensions that are important underlying determinants of attitude. The questionnaire instruments should have a sound conceptual and theoretical foundation and the statements should be understandable to respondents. As in any questionnaire, all items must be reviewed to avoid potential problems arising from question structure or interpretation.(151) There are three ways to structure a self-administered questionnaire. Firstly, open-ended questionnaire with no answer choice. The other ways are to use as close-ended questions with ordered or unordered response categories.(152) As Dillman reported, there may be differences in the responses obtained from a self-administered questionnaire and an interview questionnaire. The responses obtained from an interview may be influenced by an interaction with another person delivering socially desirable answers for potentially embarrassing behaviour, such as drug use.(152) However, it is practical to tailor the design of surveys mixing interview with self-administered methods to reduce the differences in responses.(152)

2.7.1 Validity and reliability of the questionnaires

Along with the clear and comprehensiveness, the issues of reliability and validity must be addressed. In case of questionnaire design, reliability refers to the extent which the questions produce reproducible responses and are internally consistent. Questions regarding age and details of recent activities are usually reliable, however for other questions that require recall of events the reliability may be of concern. In order to check the reliability, a number of ways can be found from the literature. For example, information provided in

the questionnaire can be checked against another source, such as medication use against prescription data. This sometimes is referred to as 'triangulation'. Combining data from different sources is reported to be effective to assess the accuracy of information. Also, a consistency between responses of individuals to different questions can be checked. Poor reliability in a study can weaken the value of work and the dependability of the study findings, therefore it is crucial to control and improve the reliability of data.(151)

On the other hand, validity is a more complex concept, and it can be defined as the extent to which the questions provide a true measure of what they are designed to measure. Sometimes respondents may be reluctant to report what they really do (for example: unhealthy behaviour) instead of adhering to health advice and it is difficult to conclude the questionnaire reflects an accurate view or behaviour. In observational studies, it is well-known that people change their behaviour intentionally or non-intentionally and data will often not reflect the actual situation. In self-completion questionnaires respondents may tend to under or overestimate on some variables (for example: smoking habits). Moreover, the questionnaire can provide reliable but not valid responses. As suggested by others,(151, 153) four types of validity can be considered to identify and address potential issues:

1. Face validity is the first check to make and it may highlight a poorly worded item or topics that may be important but not included.(151)
2. Criterion validity provides evidence about how well scores on the new measures of the same construct of very similar underlying contructs that theoretically should be related. At the same time, it is very important that the criterion must be valid itself. Predictive validity is one type of criterion-related validty and the criterion measurement is taken at some time after the administration of the questionnaire and the ability of the questionnaire to predict the criterion is assessed. For example: the researcher asks respondents about their prescribed medicines and compares their responses with data from records.(153)
3. Construct validity applies to complex variables and the evaluation of construct validity requires examining the relationship of the measure

being evaluated with variables known to be related or theoretically related to the construct measured by the instrument. It is important that in establishing construct validity, scores on an instrument are associated with scores on another (criterion) measure of the same construct that is measured concurrently in the same subjects. The criterion measure would be considered to be the gold standard measure of the construct. An example is a researcher developing a self-administered version of an instrument that had been validated for person-to-person interviewer administration.(153)

4. Content validity is the extent to which the data collected cover all the issues relevant to the study objectives. Because of non-availability of statistical tests determining whether a measure adequately covers a content area or adequately represents a construct, content validity usually depends of on the judgement of experts in the field.(153)

One of the biggest threats to external validity (generalisation) is non-response. According to previous studies, non-responders are likely to differ from responders in ways that would result in biased study results.(151) To increase the response rate, the development and design(152) and details of the questionnaire are of importance. Also, a pre- testing on a similar group is recommended to obtain the content validity.(154) Moreover, improving the recruitment process (clear purpose of the study, remuneration for participation or issues with confidentiality) and to assess the impact of the response bias on the study results can be useful to increase the response rate.(151)

Apart from validity and reliability, the questionnaire organization and layout is important. In contrast to interview, respondents may look at the questionnaire and make an assessment of its value, complexity and required time. These factors may contribute to the decision whether they complete it or not.(151)

2.7.2 Data collection: prospective method

Prospective collection of data is a powerful method that can be time consuming. The information relates to real-life scenarios and it can be more accurate than relying on recall. In some studies data can be collected by a researcher who is physically present at a study site and observes and records

details of events. In non-participant observation, the researcher aims to be discrete and not interfere with the normal activity. Participant observation is where the researcher acts as a study or group member. The biggest challenge in observation studies is known as "Hawthorne effect" where the presence of researcher can have effect on the validity of the data. Therefore, it is beneficial when the purpose of the study is clearly explained; assurance of the confidentiality of data is provided to the respondents and the researcher is unobtrusive when collecting data.(151)

2.8 Summary

The study was conducted in Mongolia which is located in north central Asia. The estimated population in 2011 was 2.8 million, with over 40% primarily residing in the capital, Ulaanbaatar. Mongolia is a low-income country with 22.4% of the population living on less than US $1.25 a day. Health indicator data showed that there are problems with equitable health care. Respiratory infections accounted for most of the morbidity rates among children aged to five years, with pneumonia being the leading cause (34.4%). More reports suggested that inappropriate use of medicines; including injections are common in Mongolia.

Drug use is appropriate/ rational when an appropriate drug is prescribed and administered according to the appropriate dosage regimen. In addition, the drug should be affordable and available and dispensed correctly, that is in correct doses at adequate time periods (WHO).

Consequences of inappropriate drug use include unnecessary suffering and death, iatrogenic disease, hospital admissions and increased antimicrobial resistance. The reports from developing countries indicated that less than 40% was compliant with clinical guidelines. Also, inappropriate self-medication and availability of OTC antibiotics are common in developing countries, including in Mongolia.

In order to combat with inappropriate use of medicines and improve the quality of health care, WHO recommends that countries should implement national policies. NPS of Australia is one of the few successful examples which

focus on the quality use of medicines, by providing information for both community and health professionals.

Development of resistance to microorganisms and unwanted side effects are consequences that inappropriate use of medicines, especially of antibiotics can have. As the literature review indicated, the incidence rate of pneumococci resistance increased from 6% to 44% within 9 years. Similar findings about penicillin resistance and multi-drug resistant strains of meningococcus can be found elsewhere.(57) Macrolide resistance is a serious concern in many Asian countries compared with the western part of the world.

Further examples of inappropriate use of medicines include unnecessary and overusing of injections which are common in less developed countries. Possible explanation for injection overuse in developing countries is related to socio-cultural, economic and structural factors. Data from 13 developing countries regarding injection use and safety reported that for eight of those countries, 25-96% of outpatient visits resulted in at least one injection, and for five countries a majority of administered injections were unnecessary. Mongolia showed a high injection frequency rate; reporting an average of 13 injections per year among the 65 participants. A latter assessment of injection practice was conducted by MoH and it observed an improved practice, reporting eight injections per year, and almost every injection (99%) was administered with new, disinfected and disposable equipment. However, the generalisation of these studies is limited due to a small population numbers.

Although, there are many studies available in relation to CAP, there is relatively little known about the treatment of CAP and its antibiotic use in developing countries. A systematic review on prescribing practices for treatment of CAP in developing countries at outpatient settings delivered 29 studies. Most studies assessed the prescribing practice of antibiotics for the treatment of children aged less than five years diagnosed with pneumonia at outpatient setting. Only one study contained information regarding the treatment of adults diagnosed with pneumonia at outpatient setting in developing countries. To date, no studies have assessed the prescribing practice for treatment of outpatients diagnosed with mild/moderate CAP in Mongolia.

Evidence obtained from research studies are an essential part of EBM. This evidence needs to be collected and organized from systematic literature reviews, experimental studies or comparative studies of the particular issues in question. The NHMRC of Australia have recognized that the fundamentals of an evidence-based approach to clinical or a health issues is the evidence itself. In addition, interpreting the evidence is still a major challenge for clinical experts compiling clinical practice guidelines.

While therapeutic guidelines with detailed antibiotic regimen are available in most developed countries, it is notable that no guidelines are available in Mongolia for children of six years and above.

Chapter 3 Systematic review on appropriate prescribing of antibiotics for the treatment of mild/moderate CAP at outpatient settings in developing countries

This Chapter presents data obtained from a systematic review conducted for the period from January 1990 to March, 2013. A systematic appraisal and a comparison of the research data assessing the prescribing practices of antibiotics for the treatment of mild/moderate CAP at outpatient settings in developing countries was conducted.

3.1 Introduction

A systematic review is the application of scientific strategies that limit bias by the systematic assembly, clinical assessment, and synthesis of all relevant studies on a specific topic.(155)

Systematic reviews and meta-analyses require expertise in both the subject matter and review methodology. The rules of Evidence-Based Medicine (EBM) that must be followed, suggest that a formal set of rules must be accompanied by medical training and clinical experience of clinicians to integrate the results of clinical research effectively. Along with expertise in review methods, expertise in the subject matter and technical competence is very important for a systematic review.(155)

It is well-known that high quality studies can be identified by searching standard electronic databases and the more explicit and careful the search strategy is, the more likely a systematic review will include all of the significant papers. Moreover, "snowballing" methods or tracking references of references and electronic citations are reported to be particularly powerful for identifying high quality sources. The final step in a systematic review is usually a meta-analysis.(155) This review conducted a meta-analysis of results where possible from the studies of higher relevance, in order to establish overall significant findings from the selected studies.

CAP accounts for 95% of all pneumonia cases in the world among children aged less than five years of age.(2) Unfortunately, only limited research has

been reported in relation to appropriateness of prescribing of antibiotics for patients with mild/moderate pneumonia in developing countries. This research covers issues relating to poor access to medication and limited budgets for medicines, poor health care and high risk of death.(2) Appropriate and prompt administration of antibiotic therapy is essential especially in resource-poor settings.(156)

Studies inverstigating effective antibiotics for the treatment of CAP in children under 18 years of age were analysed by Kabra(157) and 27 studies enrolling 11, 928 children were extracted. The review compared ambulatory treatment of non-severe pneumonia with various antibiotics and concluded that amoxicillin and cotrimoxazole were associated with similar failure rates. Considering the limited data on other antibiotics, co-amoxiclavulanic acid can be a second-line antibiotic for treatment of non-severe pneumonia in children. Furthermore, it was evident that side effects occurred to a lesser extent when treatment protocols used azithromycin compared to co-amoxiclavulanic acid, and a better resolution of radiologic pneumonia was achieved with clarithromycin when compared with erythromycin. In hospitalized patients, treatment with oral amoxicillin was comparable to injectable ampicillin or penicillin. A higher mortality rate was recorded in hospitalized children with severe pneumonia treated with chloramphenicol compared to those treated with penicillin/ampicillin plus gentamicin. Also, oral and injectable amoxicillin were equally effective when compared with benzylpenicillin/ampicillin, and cotrimoxazole versus procaine penicillin for the treatment of pneumonia.(157)

Evidence from six randomized controlled trials (RCT) concerning the efficacy of different antibiotic treatments for CAP in outpatients older than 12 years of age was summarized in a systematic review.(158) Of these six RCTs, two studied the same antibiotic pair (clarithromycin and erythromycin(159, 160)) and the other four trials studied different antibiotic pairs (clarithromycin versus azithromycin microspheres,(161) clarithromycin versus telithromycin,(162) azithromycin microspheres versus levofloxacin,(163) and telithromycin versus levofloxacin(164)). Therefore, the systematic review was not able to carry out a formal meta-analysis of the data. In addition, individual studies did not

reveal any significant differences in efficacy between various antibiotics and antibiotic groups. However, there were some significant differences regarding the extent of side effects. Consequently, the review concluded that a recommendation regarding the choice of antibiotic to be used for the treatment of CAP in ambulatory outpatients cannot be made owing to a lack of evidence. (158)

RCTs evaluating the efficacy of short-course versus long-course antibiotic therapy for non-severe CAP in children aged two months to 59 months have been reported previously. The review extracted four studies involving 6177 children under five. As the evidence from this review suggested, there were non-significant differences between a short course (three days) of the same antibiotic therapy and a longer treatment (five days) for non-severe CAP. In addition, it suggested that a short-course (three days) could be equally effective when compared with a long-course (five days) of either oral amocixillin or cotrimoxazole for children aged between 2 to 59 months diagnosed with non-severe CAP. However, due to a small number of available studies (four) further research is needed.(136)

WHO completed a systematic review of studies published between 1990 and 2007 about the use of medicines in developing and transitional countries, and it found that less than 80% of children less than five years of age who were diagnosed with pneumonia were treated with an appropriate antibiotic.(30) As the study reported, no improvement was observed during the study period and the proportion of pneumonia cases treated appropriately with antibiotics ranged from 49% to 67%. Only about 40% of prescribers were reported to treat acute respiratory infections (ARI)s in compliance with the guidelines, with medical doctors and paramedical health workers having similarly poor prescribing practices.(30)

United Nations Children's Fund (UNICEF) global databases summarized information from different countries regarding the proportion of children aged zero to 59 months with suspected pneumonia receiving antibiotics. The information was collected from different sources such as Demographic and Health Surveys, Multiple Indicator Cluster Surveys and National Family Health Surveys.(165) The extent of children aged less than five years with suspected

pneumonia receiving antibiotics was as low as 3% in Haiti and as high as 88% in the Democratic People's Republic of Korea (DPRK).(165) The primary study data are summarised the in Table 3.1.

Table 3.1 Proportion of children aged less than five with pneumonia receiving antibiotics (adapted from UNICEF global survey, 2012)

Country or territory	Time Period	Total (%)	Source
Afghanistan	2010-2011	64	MICS 2010-2011
Albania	2008-2009	60	DHS 2008-09
Algeria	2006	59	MICS 2006
Armenia	2010	36	DHS 2010
Bangladesh	2011	71	DHS 2011 (Prelim)
Belarus	2005	67	MICS 2005
Belize	2006	44	MICS 2006
Bhutan	2010	49	MICS 2010
Bolivia (Plurinational State of) [a]	2008	64	DHS 2008
Bosnia and Herzegovina	2005-2006	73	MICS 2005-2006
Burkina Faso	2006	15	MICS 2006
Burundi	2010	43	DHS 2010
Cambodia	2010	39	DHS 2010
Cameroon	2006	38	MICS 2006
Central African Republic	2010	31	MICS 2010 (Prelim)
Chad	2010	31	MICSp 2010
Côte d'Ivoire	2006	19	MICS 2006
Cuba	2010-2011	70	MICS 2010-2011
Democratic People's Republic of Korea	2009	88	MICS 2009
Democratic Republic of the Congo	2010	42	MICS 2010
Djibouti	2006	43	MICS 2006
Dominican Republic	2007	57	DHS 2007
Egypt	2008	58	DHS 2008
El Salvador	2003-2008	51	Other 2008
Ethiopia	2011	7	DHS 2011
Gambia	2006	61	MICS 2006
Georgia	2005	56	MICS 2005
Ghana	2011	56	MICS 2011
Guinea-Bissau	2010	35	MICS 2010
Guyana	2009	18	DHS 2009
Haiti [a]	2005-2006	3	DHS 2005-2006
Honduras [a]	2005-2006	54	DHS 2005-2006
India	2005-2006	13	DHS 2005-2006
Iraq	2006	82	MICS 2006

Jamaica	2005	52	MICS 2005
Jordan	2007	79	DHS 2007
Kazakhstan	2006	32	MICS 2006
Kenya	2008-2009	50	DHS 2008-2009
Kiribati	2009	51	DHS 2009
Kyrgyzstan	2006	45	MICS 2006
Lao People's Democratic Republic	2006	52	MICS 2006
Malawi	2006	30	MICS 2006
Mauritania	2007	24	MICS 2007
Mongolia	2010	72	MICS 2010 (Prelim)
Montenegro	2005	57	MICS 2005
Mozambique	2008	22	MICS 2008
Myanmar	2009-2010	34	MICS 2009-2010
Nauru	2007	47	DHS 2007
Nepal	2011	7	DHS 2011
Nigeria	2008	23	DHS 2008
Pakistan	2006-2007	50	DHS 2006-2007
Peru	2010	51	DHS 2010
Philippines	2008	42	DHS 2008
Rwanda	2007-2008	13	DHS 2007-2008
Serbia	2010	82	MICS 2010
Sierra Leone	2010	58	MICS 2010
Solomon Islands	2007	23	DHS 2007
Somalia	2006	32	MICS 2006
South Sudan	2010	33	MICS 2010
Sudan	2010	66	MICS 2010
Suriname	2006	37	MICS 2006
Swaziland	2010	61	MICS 2010
Syrian Arab Republic	2006	71	MICS 2006
Tajikistan	2005	41	MICS 2005
Thailand	2005-2006	65	MICS 2005-2006
The former Yugoslav Republic of Macedonia	2005	74	MICS 2005
Timor-Leste [a]	2009-2010	45	DHS 2009-2010
Togo	2010	41	MICS 2010 (Prelim)
Trinidad and Tobago	2006	34	MICS 2006
Turkmenistan	2006	50	MICS 2006
Uganda [a]	2006	47	DHS 2006
Uzbekistan	2006	56	MICS 2006
Viet Nam	2011	68	MICS 2010-2011
Yemen	2006	38	MICS 2006
Zambia	2007	47	DHS 2007
Zimbabwe	2010-2011	31	DHS 2010-2011

[a] ARI definition does not specify chest-related problem

DHS- Demographic and Health Survey

MICS- Multiple Cluster Survey

As reported by WHO, the pharmaceutical sector is complex but a vital component of the health care system.(166) The assessment and monitoring of strategies, in particular pharmaceutical system components, provides information regarding the issues and gaps, and inputs in the development of health policies. Consequently, relevant authorities, including policy-makers, managers, international agencies and donor organizations will then be able to prioritise areas where the best impact can be achieved.(166) Therefore, a systematic approach to assess the access, quality and rational use of medicines has been proposed by WHO.(166) The latter includes adherence to standard treatment protocols for tracer conditions such as the use of first-line (recommended) antibiotics for mild/moderate pneumonia at outpatient settings, use of Oral Rehydration Salt (ORS) for watery diarrhoea and non-use of antibiotics for simple ARIs.(166) As reported, at least 20 countries have used the operational package and this experience was beneficial to allocate country budgets and project grants for monitoring and assessment of the pharmaceutical sector.(166) However, the small number of samples (ten prescriptions for children diagnosed with pneumonia) make it impossible to generalise from these findings.

WHO has designed interventions to improve the case-management skills of health workers in order to reduce child mortality and improve child health and development.(167) These interventions are aimed to improve family and community practices related to child health in developing countries and skill assessment of health workers has been assessed in other studies.(168) However, there are only limited studies evaluating the prescribing practice of antibiotics for treatment of CAP at outpatient settings in developing countries.

3.2 Objectives

The objective of this review was to investigate and summarize published studies evaluating inappropriate prescribing practices of antibiotics for the

treatment of mild/moderate CAP at outpatient community health settings in developing countries and evaluate the existing data. In addition, the study aimed to complete meta-analyses of relevant studies with similar methodologies.

3.3 Methods

A systematic review was completed by using the terms "community-acquired pneumonia", "pneumonia", "antibiotic", "antimicrobial", "developing country", "low-middle income country", "transitional country", "appropriate", "rational", "inappropriate", "irrational", "prescribing", "prescription", "community" and "outpatient". Consequently, a meta-analysis using a random effects model of relevant studies was completed in order to locate the power of the findings.

The term 'antibiotic' and 'antimicrobial' were used interchangeably, as they are used interchangeably in the literature.

3.3.1 Search strategy

Electronic databases searched were Medline, Science Direct, Embase, Web of Science, Cochrane Library and Pro Quest and additional searches were also conducted using Google Scholar. The full electronic databases of WHO Library Information System (WHOLIS), WHO Eastern Mediterranean Region (WHO/EMR), WHO Western Pacific Region (WHO/WPR) and WHO Pan American Health Organization (PAHO)/Latin American and Caribbean Health Sciences Literature (Lilacs), as well as the drug use bibliography composed and updated by International Network for Rational Use of Drugs (INRUD), and the database of the International Conference on Improving Medicines (ICIUM) were also searched.

Potential studies were identified by using inclusion and exclusion criteria. A "snowballing" method was employed and references of all relevant articles were retrieved. The final search included publications up until March, 2013.

According to the World Bank, "low-income or middle-income countries" are defined as "developing countries" that had low income of gross national

income (GNI) per capita of US$1,026 or less, in addition lower middle income countries with GNI per capita between US$1,026 and US$4,036.(169)

3.3.2 Inclusion and exclusion criteria

Inclusion:

- Articles published in English
- Published between January 1990 and March, 2013.
- Containing relevant data on appropriate use of antibiotics for CAP at outpatient community health settings in developing countries

Exclusion criteria:

- Opinions about appropriate prescribing for CAP
- Not assessing the appropriateness of antibiotic use for CAP
- Studies completed at inpatient hospital settings
- Pneumonia cases were not directly indicated or to less than 70% of all Acute Respiratory Infections (ARI)/Lower Respiratory Infections (LRI) cases reported as aggregated data
- Assessing viral Upper Respiratory Inspections (URI) where antibiotic is not required

3.3.3 Data extraction and analysis

Relevant papers from the selected electronic databases were reviewed at the abstract level and prospective applicable papers were obtained in full-text. The analysis of the papers was completed by using the Scottish Intercollegiate Guidelines Network (SIGN).(170)

To collect information on retrieved articles, a data extraction sheet was developed that was consistent with the Quality of Reporting of Meta-analyses (QUOROM).(171) The data sheet included information about the country, demographic characteristics of the participants, study design, conclusions and findings summarized by the original authors (Appendix B). The decisions whether to include or exclude the paper and the SIGN rankings were completed by consensus by the researcher and supervisors.

Full articles were reviewed independently for quality and the review extracted the following outcome data:

1. Study design
2. Description of participants
3. Study location
4. Prescribed antibiotic
5. Prescribed dose of an antibiotic
6. Prescribed dosage form of an antibiotic
7. Prescribed duration of an antibiotic
8. Prescribed frequency of an antibiotic
9. Providing information on how to use antibiotic for patients
10. Prescribed a correct treatment
11. Intervention
12. Intervention outcomes

In addition, key parameters for the assessment of appropriate/rational prescribing were included if (i) the correct antibiotic, (ii) correct dose, (iii) correct dosage form, (iv) correct frequency, (v) correct duration, (vi) explaining how to administer the antibiotic and (vii) correct treatment was prescribed (Table 3.2).

Table 3.2 Key parameters of the prescribing practices for mild/moderate CAP

Parameters [a]	Definitions
Prescribing an antibiotic	After a correct classification/diagnosis, an antibiotic should be prescribed.
Prescribing appropriate antibiotic	Appropriate antibiotic was if it was recommended in the national, IMCI or other guidelines used widely in each country.
Prescribing appropriate dose of an antibiotic	Appropriate dose complying with guidelines
Prescribing appropriate dosage form	Appropriate dosage form complying with guidelines
Prescribing appropriate frequency	Appropriate frequency complying with guidelines
Prescribing appropriate duration	Appropriate treatment duration complying with guidelines
Explaining how to administer the antibiotic	Caregiver knows to explain to the patient how to take the medicine
Prescribing an appropriate treatment	A treatment was considered appropriate if a recommended medicine, dose, frequency[b] and duration[b] were prescribed. In addition, explaining how to administer the antibiotic

[a] Adopted from WHO/IMCI guidelines for treatment of CAP in children aged two to 59 months.

[b] Some of the studies did not assess the frequency or duration

Where publications included additional diagnoses along with CAP, it was decided where only aggregated data were provided at least 70% of the diagnoses would be for CAP (studies with limited relevance) unless data for CAP were isolated (relevant studies).

All analyses were done using STATA version 10. The outcome measure was the odds ratio (OR) of the extent of prescription with a correct treatment performed by relevant health workers (HW). The ORs and associated 95% confidence intervals (CI) were tabulated by key parameters for appropriate drug use (Table 3.2), for example: a correct antibiotic prescribed and the HWs' status of training. Heterogeneity was measured using the I^2 statistic and the

null hypothesis of no heterogeneity was tested using the Q statistic generated from the χ^2 test. A random effects model(172) was used to estimate the pooled OR.

3.4 Results

The database search yielded initially 36(37, 44, 78, 173-205) individual papers (Figure 3.1 and Table 3.3). After eliminating one duplicate study(197) and following a snowballing technique of those articles delivered another 78 studies and 10 reports(30, 82, 85, 117, 167, 198, 206-286)

Of 123 papers retrieved, 71(36, 37, 44, 76, 78, 85, 167, 173, 174, 177, 179, 181, 184-190, 192-196, 198-202, 204, 205, 209, 214, 220-222, 224-227, 229, 231-233, 237, 238, 240-251, 255, 258, 261, 264-266, 269-272, 278, 284, 285) were excluded because the information regarding the prescribing of antibiotics for CAP was not specific enough. Furthermore, 23 (175, 191, 197, 223, 228, 230, 234-236, 239, 243, 252-254, 256, 257, 259, 260, 262, 263, 273, 282) articles were excluded because of the setting of the studies (hospital inpatient)(Figure 3.1).

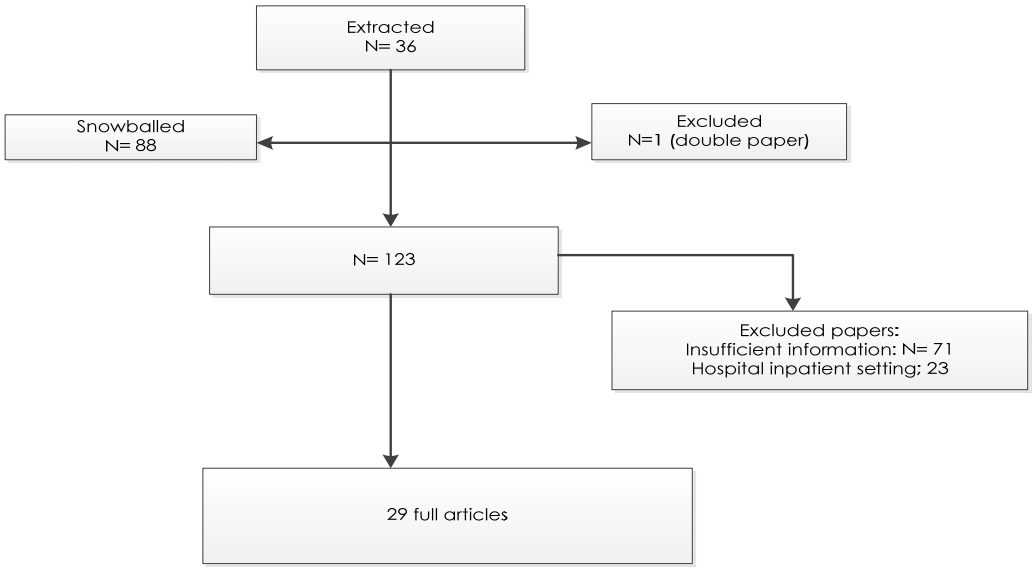


Figure 3.1 Data extraction

Table 3.3. Search results from databases

Search terms	Science Direct	Web of Knowledge	Pro Quest	Embase (Ovid)	Cochrane	Medline (Ovid)
Pneumonia	119, 470	156, 436	603, 042	118, 897	7604	54, 679
AND (antibiotic OR antimicrobial)	48, 505	26, 845	101, 686	25, 188	11	6, 692
AND ("developing countries" OR "low-income countries" OR "transitional countries")	3, 743	298	4, 652	286	-	132
AND (appropriate OR rational OR inappropriate OR irrational)	2, 513	55 (14)	2, 652	34	-	26
AND (prescribing OR prescription)	658	10	1, 182	7	-	4
AND community	1, 192	4	1062	2		1
AND outpatient	619	1	659	2	-	1
Total (36)	7(37, 44, 78, 173-175, 179)	1(181)	25(36, 37, 176-178, 180, 182-196, 200-202, 204)	2(197, 199)	-	1(197)

3.5 Summary of the findings from relevant studies

Studies were categorized into relevant if they included specific treatment criteria and patient treatment outcome. Consequently, nine studies were assessed as relevant. The SIGN levels were assigned for the assessment of the nine relevant studies, of which two belonged to SIGN level 2+(206, 218) and the remaining seven were assigned SIGN level 2- (Table 3.4).

Table 3.4 Relevant studies for the systematic review

#	Paper	Methodology	Sample	Period or year	Country	SIGN level
1.	Bryce, 2005(207)	Comparative non-controlled study	62(post) versus 52 (comparison)	Aug, 2000	Tanzania	2-
2.	Kalyango, 2012(212)	Comparative controlled study	134 (post) versus 102 (control)	Jan-Feb, 2011	Uganda	2-
			61 (CMD users) versus 174 (non-CMD users)			
3.	Rwanda, 2009(215)	Observational non-controlled study	14 (post)	11-16 May, 2009	Rwanda	2-
			73 (post)			
			83 (post)			
			30 (post)			
4.	Kafle, 2009 (211)	Comparative non-controlled study	177 (pre) versus 100 (post)	Mar-Jun, 2004	Nepal	2-
5.	Uzochukwu, 2007(219)	Comparative non-controlled study	9 (pre) versus 7 (post)	Three months, 2005	Nigeria	2-
6.	Osterholt, 2009(217)	Comparative non-controlled study	34 (pre) versus 31 (post)	2001	Benin	2-
			55 (pre) versus 33 (post)	2002		
			98 (pre) versus 50 (post)	2004		
7.	Pariyo, 2005(218)	Comparative non-controlled study	154 (pre) versus 328 (post)	2000	Uganda	2+
			148 (pre) versus 96 (post)	2001		
			352 (pre) versus 100 (post)	2002		
8.	Odhacha, 1998(216)	Comparative non-controlled study	115 (pre) versus 27 (post)	1998	Kenya	2-
9.	Bang, 1994(206)	Comparative non-controlled study	709 (post)	1988-1991	India	2+

The reported studies were mainly from African(180, 182, 183, 207, 208, 212, 215, 217, 218, 267, 274, 275, 277) and Asian countries.(178, 193, 206, 210, 211, 213, 281) All studies, except one evaluating prescribing practice of antibiotics for adults,(117) assessed the prescribing practices of antibiotics used for the treatment of children aged less than five years diagnosed with pneumonia in developing countries.

A majority of the extracted studies (85%) assessed the effect of IMCI case management training on the use of antimicrobials among community health workers (CHW) treating young children at first level health facilities. Only one study in the extracted nine relevant studies reported a control group of 102 children with pneumonia (n=236, intervention=134).(212) Therefore, despite the possible confounding effects, the results from uncontrolled studies were pooled due to limited evidence.

From the data provided in the relevant studies, the studies enrolled 3177 patients. In addition the average extent of prescribing a correct antibiotic was 56.7% and a correct treatment was 47%, respectively (Table 3.5).

Table 3.5 Summary of prescribing practices for treatment of CAP in the relevant studies

Prescribe AB		Correct AB		Correct dose		Correct dosage form		Correct frequency		Correct duration		Explain how to administer		Correct treatment	
Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)
46.9 (0.5)	92.2 (0.1)	54 (0.2)	59.7 (0.2)	19 (0.01)	58 (0.3)	-	-	24 (0.1)	29 (0.01)	16 (0.1)	47.8 (0.4)	36.3 (0.4)	74.4 (0.04)	26 (0.12)	59 (0.3)
74.1(0.36)		56.7 (0.17)		50 (0.34)		-		26 (0.07)		35 (0.34)		55.4(0.3)		47(0.31)	

- Data were not provided

3.5.1 Meta- analysis of the relevant studies

As outlined in Table 3.6, correct dose was assessed in four of the selected studies(206, 212, 215, 217) and the frequency was evaluated in one study.(212)

The duration of prescribed antibiotic was measured in two studies.(206, 212) The assessment of appropriate advice regarding how to take the antibiotic was reported in two of the studies.(207, 219) The outcome of the antibiotic treatment was reported in five of the extracted studies.(207, 212) (11, 215) Dosage form of the prescribed antibiotic was not assessed in any of the reported studies.

The meta- analysis with random effects model(172) of the relevant studies including post IMCI training data with pre as the comparative group was completed. The aim of the meta-analysis was to establish whether health workers' training influenced an appropriate antibiotic selection. It indicated that overall IMCI training was associated with significantly better performance in regards to prescribing of correct antibiotic (OR= 1.91, CI= .82- 3.34, $p < .001$, Q= 22.8) and correct treatment (OR= 2.13, CI=1.21- 3.21, $p < .01$, Q= 15.3). The correct treatment was defined inconsistently in the studies. A study in Uganda considered it as correct if the child used the recommended drug, dose, frequency and duration.(212) In addition to these parameters, the study in Tanzania considered whether the antibiotics administration was explained to children.(207) In contrast, a second study conducted in Uganda reported that correct treatment was defined as the child being prescribed the correct drug in the correct formulation and dosage.(218) A study in Rwanda reported only post IMCI training data(215); therefore it was not included in the meta-analysis.

Table 3.6. Analysis of the relevant studies

#	Study	N/n (pneumonia patients)		Prescribed AB n(%)		Correct AB n(%)		Correct dose n(%)		Correct dosage form n(%)		Correct frequency n(%)		Correct duration n(%)		Explain how to administer AB n(%)		Outcome (appropriate treatment) n(%)	
		Before[b]	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1	Bryce Tanzania [a]	52 [a]	62	43 (82.69%)	49 (79.03%)	21 (40.38%)	45 (72.58%)	-	-	-	-	-	-	-	-	32 (61.54%)	48 (77.41%)	19 (37%)	45 (73%)
2	Kalyango, Uganda	102	134	-	-	38 (37%)	60 (45%)	20 (20%)	20 (15%)	-	-	16 (16%)	40 (30%)	11 (11%)	29 (22%)	-	-	7 (7%)	16 (12%)
	Kalyango, Uganda CMD/nonCMD	174	61	-	-	78 (45%)	26 (42%)	31 (18%)	5 (9%)	-	-	54 (31%)	17 (28%)	35 (20%)	16 (26%)	-	-	23 (13%)	4 (7%)
3	Kafle, Nepal	177	100	-	-	103 (58.2%)	72 (72%)	-	-	-	-	-	-	-	-	-	-	-	-
4	Osterholt, Benin	-	41	-	40/41 (97.6%)	-	-		31/41 (75.6%)	-	-	-	-	-	-	-	-	-	28/41 (68.3%)
5	Uzochukwu, Nigeria	9	7	1 (11.1%)	7 (100%)	-	-	-	-	-	-	-	-	-	-	1 (11.1%)	5 (71.4%)	-	-
6	Pariyo, Uganda	328	154	-	-	-	-	-	-	-	-	-	-	-	-	-	-	81 (24.7%)	62 (40.3%)
		96	148	-	-	-	-	-	-	-	-	-	-	-	-	-	-	24 (25.0%)	53 (35.8%)
		100	352	-	-	-	-	-	-	-	-	-	-	-	-	-	-	48 (47.9%)	181 (51.4%)
7	Odhacha, Kenya	131	40	-	-	115/131 (88%)	27/40 (67%)			-	-	-	-	-	-	-	-	-	-
8	Rwanda [c] Ruhango	-	14	-	-	-	-		11 (75%)	-	-	-	-	-	-	-	-	-	12 (84%)
	Rwanda Gisagara		73	-	-	-	-		62 (85%)	-	-	-	-	-	-	-	-	-	62 (85%)
	Rwanda Nyamagabe		83	-	-	-	-		73 (88%)	-	-	-	-	-	-	-	-	-	73 (88%)
	Rwanda Kirehe		30	-	-	-	-		9 (30%)	-	-	-	-	-	-	-	-	-	30 (99%)
9	Bang, India		709	-	-	-	-		609 (85.9%)	-	-	-	-	-	677 (95.5%)	-	-	-	-

[a] The number of defined CAP patients out of the total ARIs
[b] All studies located were intervention studies
[c] No comparison (pre IMCI training) data were provided
- No data were provided

3.5.2 Practice of prescribing an antibiotic for patients with pneumonia

Data extracted from the studies were incorporated into each of the identified criteria for appropriate prescribing. Prescribing an antibiotic for patients diagnosed with pneumonia is an essential step towards appropriate case-management of the disease and three of the studies included information regarding whether an antibiotic was prescribed.(207, 217, 219) Furthermore, information regarding the appropriate selection of antibiotic for treatment of CAP was assessed in four of the selected papers. (207, 211, 212, 216)

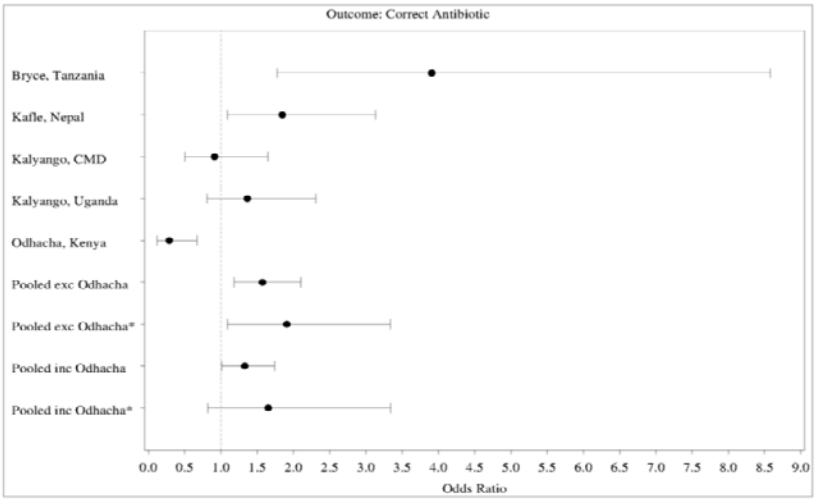
Bryce et al. completed a comparative study of 114 children under five years of age in Tanzania who were treated by CHWs in intervention and comparison districts. The practice of prescribing an antibiotic was slightly lower in the intervention district (79%) compared to those in control district (82%).(207) Findings from Benin suggested that after complete assessment and correct diagnosis, almost all children were prescribed an antibiotic (97.5%).(217) Short-term training of health workers in Nigeria was observed as helpful as the practice of prescribing or administering antibiotics for children was improved (100% versus 11%).(219)

3.5.3 Prescribing a correct antibiotic for patients with pneumonia

The pre and post intervention results with regards to appropriate selection of antibiotic was compared by Bryce,(207) Kalyango,(212) Kafle(211), Odhacha.(216) Overall, CHWs showed an improved practice of prescribing a correct antibiotic after the IMCI training. Bryce assessed the impact of IMCI with regards to quality of care received by children diagnosed with pneumonia in IMCI and non-IMCI districts of Tanzania and an improved prescribing practice of correct antibiotic, including correct amount, frequency, and duration was reported.(207) Approximately 42% of children with self-reported pneumonia symptoms received a correct antibiotic in a study reported from Uganda.(212) Kafle reported a statistically significant improved prescribing practice of cotrimoxazole or amoxicillin alone or with paracetamol as recommended in the STGs of Nepal ($p < .001$).(211) However, another assessment of CHWs' prescribing practices after the training was

completed in Kenya and a slightly declined performance level of CHWs was reported after the first three months training for the treatment of pneumonia in children aged two to 59 months.(216) This study was included in the meta-analysis despite the different intervention time line.

Of the studies reporting the prescribing practice of correct antibiotic, four studies(207, 211, 212, 216) with one containing two separate analyses were of sufficient quality to be included in the meta-analysis. Estimates from these studies were grouped according to the pre and post intervention results and represented in a forest plot (Figure 3.2).



* Pooled' line means that the pooled estimate was obtained using the Random effects model.

Figure 3.2 Meta-analysis of prescribing practice of selection of correct antibiotic for patients with mild/ moderate CAP in developing countries after IMCI intervention training

This plot shows that IMCI trained CHWs performed significantly better when compared to no training group with regards to selection of correct antibiotic for patients with mild/moderate CAP. (OR= 1.91, CI= 1.09- 3.34, $p < .001$, Q= 22.8). There was some heterogeneity between groups (Q=22.8, $p = .01$).

3.5.4 Prescribing a correct dose, frequency and duration for patients with pneumonia

A correct dose of prescribed antibiotic for patients with pneumonia given by birth attendants in India reported that 86% of children were prescribed a correct dose of sulfamethoxazole-trimethoprim. The correctness between age and treatment dose according to data from a patient record review was 70% for children in Rwanda.(215) A study from Uganda suggested that the extent of recommended drug and dose was higher in the control arm compared to the intervention group (20% versus 15%).(212) However, meta-analysis of these two studies comparing the extent of pneumonia patients using trained CHWs and non-trained CHWs suggested that the difference was not significant (OR= .62, CI= .35- 1.09, p = .36, Q= .83). The heterogeneity was tested and indicated that the studies were homogenous.

In contrast, the extent of recommended drug and frequency was two-fold higher in an intervention group than in the control group (30% versus 16%).(212) However, this was not significant (OR= 1.57, CI= .57- 4.37, p = .39, Q= 4.4). Again, the I^2 test showed they were homogenous.

Information regarding the duration of prescribed antibiotics was reported in two studies.(206, 212) A meta-analysis comparing CHWs prescribing practices in two areas (intervention and control), indicated that training was associated with a significantly better practice for both districts (OR= 1.81, CI=1.09- 2.99, p = .02, Q= .87). Birth attendants in India observed that most of the prescribed duration periods were correct (95.5%).(206)

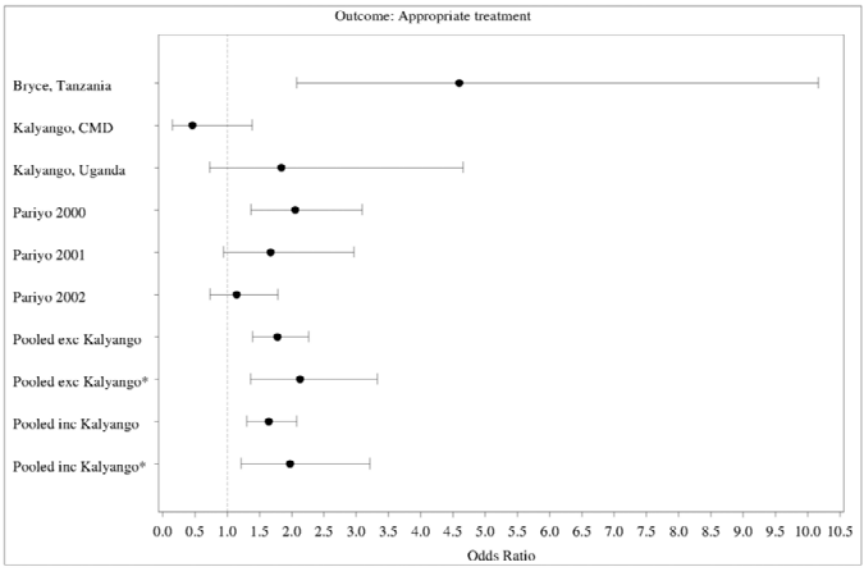
3.5.5 Advising how to administer antibiotics for patients with pneumonia

The practice of providing explanations on how to administer antibiotics for children with pneumonia was reported in two studies and improved practice of providing information about how to administer antibiotics correctly after the training was observed by Bryce(207) (61.5% versus 77.4%), and Uzochukwu(219) (11.1% versus 71.4%).

3.5.6 Correct treatment/management of patients with pneumonia

Of nine selected studies, five reported the correct management/ treatment of patients with pneumonia. These studies compared and presented results of the treatment outcomes before and after IMCI training(207, 212, 215, 217, 218) and CHWs demonstrated an improved management of pneumonia patients in three studies.(207, 212, 218) Outcome of appropriate treatment by CHWs was assessed in Tanzania and they observed an improved practice between IMCI trained CHWs and non-IMCI trained CHWs (70% versus 40%).(207) A study from Uganda reported that overall appropriate drug use tended to be slightly higher in the intervention arm (11%) when compared with the control arm (7%), however the difference was not statistically significant.(212)

A meta-analysis with a random effects model using three studies(207, 212, 218) indicated a statistically significantly better antibiotic management of pneumonia patients by IMCI trained CHWs (OR= 2.13, CI=1.21- 3.21, $p < .01$, Q= 15.3)(Figure 3.3).



* Pooled' line means that the pooled estimate was obtained using the Random effects model.

Figure 3.3 Comparison of administration of appropriate treatment outcome (relevant studies)

A study from Rwanda indicated that a majority of children with pneumonia received appropriate treatment by CHWs after IMCI training.(215) However, no data regarding the pre-intervention status of the patients were provided. Also, about 70% of patients received appropriate treatment in a study reported by Benin.(217)

Findings from Kenya however indicated contrary results. Odhacha evaluated CHWs performance after the end of IMCI training and three months later. The results suggested that the level of performance had decreased after a three-month period (67%) as compared to that at the end of training (88%).(216) Similarly, an evaluation of the management of sick children by CHWs in Kenya between 1997 and 2001 also reported a reduced level of recommended and adequate treatment at the third evaluation.(182) However, all these comparison studies, except one(212) had no control groups.

3.6 Summary analysis of studies with limited relevance

Studies with limited relevance included diagnosis of ARIs, including pneumonia. The criterion adopted was if pneumonia was the diagnosis for more than 70% of total ARIs related cases, the study would be included in the systematic review. All studies except one(180) were assigned SIGN level 2- (Table 3.7).

Table 3.7 Selected studies with limited relevance

#	Paper	Methodology	Sample	Period or year	Country	SIGN level
1.	Iqbal, 1997(210)	Observational study	28	Jan-Mar, 1993	Pakistan	2-
2.	Fagbule, 1994(208)	Observational study	63	1988-1999	Nigeria	2-
3.	Shrestha, 2006(117)	Comparative study	8 versus 60	Jul/Aug, 2002	Nepal	2-
4.	IMCI Tanzania, 2004(176)	Comparative study	59 versus 52	Aug, 2000	Tanzania	2-
5.	Rowe, 2001(183)	Comparative study	117	Jul.28, 1999/11-12.Oct.1999	Benin	2-
6.	Kelly, 2001(182)	Comparative study	48	Feb. 1998	Kenya	2-
			66	Nov. 1999		
			92	Feb/Mar.2001		
7	Arifeen, 2005(178)	Comparative study	70	Aug-Sep, 2000	Bangladesh	2-
8	Gouws, 2004(180)	Comparative study	419	2000	Tanzania	2+
			516	2000	Uganda	
			653	2002	Brazil	
9	Keohavong, 2006(213)	Observational study	223	Apr-Jun, 2004	Lao	2-
10	Ministry of Health, Ethiopia, 2003(275)	Observational study	106	Oct, 2003	Ethiopia	2-
11	Ministry of Health, Kenya, 2008(277)	Observational study	10	Dec, 2008	Kenya, public	2-
			10		Kenya, FGHS	
12	Ministry of Health, Uganda, 2008(276)	Observational study	10	Jul-Aug, 2008	Uganda	2-
13	Ministry of Health, Jamaica, 2012(280)	Observational study	114	Sep, 2012	Jamaica	2-
14	Ministry of Health, Mongolia, 2009(281)	Observational study	10	Aug-Dec, 2009	Mongolia	2-
15	Ministry of Health, Barbados, 2011(279)	Observational study	40	Feb, 2011	Barbados	2-
16	Ministry of Health, Ghana, 2008(267)	Observational study	10	May-Jun, 2008	Ghana	2-
17	Ministry of Health, Syrian Republic, 2009(283)	Observational study	10	Jun, 2009	Syrian Republic	2-
18	Ministry of Health, Zambia, 2001(274)	Observational study	489	2001	Zambia	2-
19	Ministry of Health, Brazil, 2009(268)	Observational study	123	Sep, 2009	Brazil	2-
20	WHO, 2009(30)	Review		1990-2006	Developing countries	2-

A total of 20 studies were extracted of which six compared pre and post intervention results and only one study had a control group of eight.(117) The remaining 14 observed prescribing practices for treatment of patients diagnosed with mild/moderate CAP (Table 3.8). Of those 14 studies observing prescribing practices, eleven studies reported an assessment of quality of care (adherence to standard treatment protocols) with regards to treatment of CAP by using the WHO Operational package.(287) These studies reported the level of prescribing of the first-line antibiotic for patients with mild/ moderate CAP at outpatient settings.

The practice of whether an antibiotic was prescribed for patients with pneumonia was only reported in one study,(208) 14 studies reported the prescribing practice of correct antibiotic(30, 180, 210, 213, 267, 268, 274-277, 279-281, 283) and five studies evaluated the management of children with pneumonia (117, 178, 182, 183, 189) (Table 3.8).

Table 3.8 Analysis of studies with limited relevance

#	Study	N/n (pneumonia patients)		Prescribed AB n(%)		Correct AB n(%)		Correct dose n(%)		Correct dosage form n(%)		Correct frequency n(%)		Correct duration n(%)		Explain how to administer n(%)		Correct treatment n(%)	
		Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After	Before	After
1	Iqbal, Pakistan(210)	28	-	-		11 (39%)[a]	19 (68%)[b]	-	-	25 (89%) [a]	23 (82%) [b]	-	-	-	-	-	-	-	-
2	Fagbule, Nigeria(208)	86/63 (73.3%)	-	73 (84.9%)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
3	Shrestha, Nepal (117)	2	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1.2 [c]	
		9	51	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
4	IMCI Tanzania(176)	52	59	-	-	-	-	-	-	-	-	-	-	-	-	-	-	40% (28-52)	75% (58-92)
5	Rowe, Benin(183)	550/117	-	-	-	-	-	-	-	-	-	-	-	-	-	33 (28.2%)	-	67 (57.3%)	
6	Kelly, Kenya(182) [f]	-	48	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28/48 (58.3%)	28/48 (58.3%),
		-	66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	43/66 (65.1%)	38/66 (57.6%)
		-	92	-	-	-	-	-	-	-	-	-	-	-	-	-	-	92 (50%)	92 (39.4%)
7	Arifeen, Bangladesh(178)	70 (25%)		-	-	-	-	-	-	-	-	-	-	-	-	-	-	8 (12.5%)	-
8	Gouws Tanzania(180)	-	134/117 (87%)	-	-	58 (43%)	69 (77%)	-	-	-	-	-	-	-	-	77 (18%)	73 (98%)	-	-
	Gouws Uganda(180)	-	181/161 (89%)	-	-	83 (25%)	68 (41%)	-	-	-	-	-	-	-	-	144 (29%)	80 (31%)	-	-
	Gouws Brazil(180)	-	68/19 (28%)	-	-	35 (51%)	33 (67%)	-	-	-	-	-	-	-	-	70 (9%)	41 (54%)	-	-
9	Keohavong, Lao(213)	262	-	-	-	91% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
10	Ministry of Health, Ethiopia,(275)	106	-	-	-	54% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
11	Ministry of Health, Kenya, public(277)	10	-	-	-	95% [e]	-	-	-	-	-	-	-	-	-	-	-	-	
	Ministry of Health Kenya, FGHS 268	10	-	-	-	61% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
12	Ministry of Health, Uganda(276)	10	-	-	-	70.0% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
13	Ministry of Health, Jamaica(280)	114 (50%)	-	-	-	30.2% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-

14	Ministry of Health, Mongolia(281)	10	-	-	-	80.8% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
15	Ministry of Health, Barbados(279)	40	-	-	-	32% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
16	Ministry of Health, Ghana(267)	10	-	-	-	100% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
17.	Ministry of Health, Syrian Republic(283)	10	-	-	-	100% [e]	-	-	-	-	-	-	-	-	-	-	-	-	-
18	Ministry of Health, Zambia(274)	489	-	-	-	13% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
19	Ministry of Health, Brazil(268)	123	-	-	-	63.3% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
20	WHO - Africa (30)	50	-	-	-	58,5% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
	WHO- Sub-Saharan Africa(30)	50	-	-	-	58.5% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
	WHO- Latin American and Caribbean(30) [c]	21	-	-	-	70% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
	WHO - Middle East and Central Asia (30)	17	-	-	-	66.7% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
	WHO- East Asia and Pacific 30	16	-	-	-	74.3% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-
	WHO - South Asia(30)	12	-	-	-	33.8% [d]	-	-	-	-	-	-	-	-	-	-	-	-	-

[a] The study results were obtained from the questionnaire
[b] The data were obtained from the prescribing practice
[c] OR was obtained from a logistic regression model
[d] Mean value was provided
[e] Median was provided
[f] Only post training data were provided
- No data were provided

Studies with limited relevance enrolled 2272 patients and the proportion of the patients receiving a correct antibiotic was reported to be 60% and a correct treatment was received by 51% of patients (Table 3.9).

Table 3.9 Summary of prescribing practices in studies with relevance

Prescribe AB		Correct AB		Correct dose		Correct dosage form		Correct frequency		Correct duration		Explain how to administer		Correct treatment	
Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)	Before Mean % (SD)	After Mean % (SD)
84.9	-	60 (0.3)	63 (0.2)	-	-	-	-	-	-	-	-	21 (0.1)	61 (0.3)	36.5 (0.2)	58 (0.3)
84.9		60 (0.2)		-		-		-		-		38.2 (0.3)		51(0.2)	

- Data were not provided

3.6.1 Practice of prescribing an antibiotic for patients with pneumonia

The practice of prescribing an antibiotic for patients with pneumonia was reported in only one of the studies classified as of limited relevance.(208) Fagbule et al. observed a cohort of 63 children aged less than five years diagnosed with pneumonia in Nigeria and 85% of those children were prescribed an antibiotic.(208)

3.6.2 Prescribing a correct antibiotic for patients with pneumonia

The prescribing practice of a correct antibiotic for patients with pneumonia was reported in two studies and 12 reports.(30, 180, 210, 213, 267, 268, 274-277, 279-281, 283) Iqbal compared the prescribing practice and interviewed the general doctors and fewer of doctors reported prescribing an oral antibiotic for patients with pneumonia (39%). However, this was lower when compared with observed prescribing practice (68%).(210) A study that assessed treatment of pneumonia in developing and transitional countries reported that about 80% of pneumonia cases were treated with appropriate antibiotics during 1990 and 2009.(30, 286) In a previous study completed by WHO, the extent of prescribing a correct antibiotic was 34% in South East Asia, 58.5% in African region and 74.3% in East Asia Pacific (Table 3.8).

3.6.3 Prescribing a correct dosage form

Oral antibiotics are generally recommended for patients with mild/ moderate CAP. The prescribing of the correct dosage form was reported in only one study that observed the prescribing practice and interviewed doctors. The extent of prescribed injectable antibiotics was similar (82%) with reporting in the interview (89%).(210)

3.6.4 Providing information on how to use antibiotic appropriately

Data from multiple countries indicated that the practice of explaining how to use antibiotics appropriately to patients was statistically better achieved by IMCI trained CHWs when compared with those who did not receive any training.(180)

3.6.5. Correct treatment/management of patients with pneumonia

Of the extracted 22 studies five assessed the correct overall management of patients with CAP.(117, 178, 182, 183, 189) Practical Approach to Lung Health (PAL) is a WHO initiated generic clinical practice guideline that was designed to improve the management of respiratory diseases in adults. Impact of the PAL- intervention program was assessed in Nepal and it was a statistically significant improved adherence to treatment guidelines by the CHWs was observed (OR =1.2, $p < .05$).(117) However, the number of prescriptions in the control group was lower (8) compared to those in the intervention group (60) potentially biasing the result.(117) Data from Tanzania reported an improved management of pneumonia after the training, whereas a little over half of patients diagnosed with mild/ moderate CAP received an adequate treatment.(176) An assessment of the impact of IMCI training in three consecutive years indicated a declining performance of CHWs with relation to adequate treatment of pneumonia in children aged two to 59 months in one district of Kenya. The study observed a decline in both groups' results ranging from 58% to 39.4% after the training. The management of pneumonia was considered to be adequate if the drug was selected correctly but the study did not assess the drug dosing.(182) A study from Bangladesh reported

that only 13% of children diagnosed with pneumonia were treated correctly.(178)

3.7 Discussion

Primary findings

To the best knowledge of the candidate, this is the first systematic review that has investigated and evaluated data on the prescribing practice of antibiotics for outpatients with mild/moderate CAP in developing countries since January 1990. No random controlled trials were identified and for the comparative evaluation only two studies had control groups. Despite the WHO/IMCI developed guidelines for appropriate treatment of children diagnosed with CAP which includes information about the antibiotic selection, correct antibiotic, dose, dosage form, frequency, duration of an antibiotic in addition to explaining how to use the medicine appropriately, treatment outcome;(288) no study has provided data that has assessed all six key parameters when evaluating appropriate/ rational prescribing for patients with mild/moderate CAP separately. Notably, Bryce specified six of these parameters regarding the correct antibiotic.(207) A study from Uganda reported five key parameters including correct antibiotic, dose, frequency and duration(212) whereas Pariyo included correct drug, dose, frequency and duration.(218) In contrast, Odhacha specified correct treatment as only if antibiotic prescribed without providing any information about dosage of the antibiotic whereas a report from Rwanda compared only the dose of the prescribed antibiotic.(215) Furthermore, a study from Nepal assessed the pre and post intervention results using one key parameter (prescribing an antibiotic).(211) The remaining three studies assessed two parameters to assess the quality of care for treatment of CAP in children aged less than five.(206, 217, 219)

The assessment of studies with limited relevance provided similar findings. Only one study assessed whether an antibiotic was prescribed for treatment of ARIs, including pneumonia(208) and one study reported prescribing practice of correct prescription (in terms of dose, frequency and formulation).(180) Studies from nine countries completed an assessment of the pharmaceutical

sector, including the assessment of quality of care for tracer conditions, such as pneumonia. The extent of prescribing practice of the recommended first-line antibiotics for treatment of pneumonia in children was evaluated using outpatient records. However, the small number of samples (10) in each group should be considered when interpreting results.

The results from the review indicated that the overall extent of patients with mild/moderate CAP receiving a correct antibiotic was 59% and a correct treatment was 48%, respectively. This is lower than a previous finding from developing and transitional countries, reporting about 80% of pneumonia cases were treated with appropriate antibiotics during 1990 and 2006.(30) More literature indicated that the treatment of pneumonia cases with appropriate antibiotics did not improve from 1992 to 2009 (varying over time in the range from 49% to 67%).(286, 289)

Overall completeness and applicability of evidence

The systematic review found important issues related with assessment of appropriate prescribing practices for treatment of mild/ moderate CAP in developing countries. But caution must be exercised when interpreting the results due to limited number of studies. Nine studies with relevance and 20 studies with limited relevance were indentified including a good number of participants contributing to the results (5,449). In addition, the inclusion criteria for studies with limited relevance specified that the diagnosis of pneumonia specifically within the ARI group was more than 70%.

Quality of evidence

Despite WHO initiated health facility drug-use indicators being widely accepted as a 'gold standard',(290) inappropriate prescribing practice is not a rare issue in developing countries.(291) In the era of significantly increasing resistance of respiratory bacteria, for example *S. Pneumoniae* and *H. Influenzae* to antibiotics recommended for the treatment of mild/ moderate CAP,(232, 255, 285) the findings provide evidence to support the need for improvement of prescribing practices for treatment of mild/moderate CAP in developing countries. In addition, the results of the meta-analyses support the

effectiveness of IMCI training for CHWs with regards to prescribing practice of correct antibiotic, correct duration and overall management of patients with CAP. Therefore, due to limited number of studies more research is required to support this finding.

Potential biases in the review process

A systematic and thorough search of the literature identifying all studies meeting inclusion criteria was undertaken. The candidate and supervisor independently selected the studies and assigned the SIGN levels. Discrepancies were resolved by consensus.

Agreements and disagreements with other studies or reviews

Statistically significant differences were found in relation to the prescribing practice of the correct drug and correct treatment among IMCI trained and non-IMCI trained CHWs. In general, this was in line with systematic reviews that confirmed the effectiveness of case management with antibiotic treatment in reducing mortality from childhood pneumonia in developing countries.(232, 255, 285) A review of prescribed antibiotics for treatment of pneumonia summarized findings from developing countries and it reported that the extent of practice of prescribing a correct antibiotic for children under five was under 70%. In addition, the review concluded that the practice of prescribing a correct antibiotic did not improve over a period of more than 15 years.(36) However, there has been no previous attempt to assess the prescribing practice (including all parameters of appropriateness) for treatment of mild/moderate pneumonia in developing countries.

3.8 Limitations

There are limitations to be considered when interpreting and synthesizing results from the systematic review. First, the systematic review excluded any articles that were published in non-English languages. Moreover, the SIGN grading of the extracted papers is open to some interpretation because the SIGN grading system lacks precision in allocating the grading. Throughout the systematic review, it was notable there was a lack of high SIGN level quality

papers. This is of great concern with respect to the quality of studies over the past 23 years.

Furthermore, there were some issues regarding reporting the IMCI studies, due to the different definition of the indicator "pneumonia cases managed correctly". In WHO/CHD studies it includes all aspects of case management whereas in WHO/IMCI studies it is interpreted as "% pneumonia cases with appropriate antibiotics" because this indicator does not generally include other aspects of case management (such as dosing, referral and advice).(30)

Additional issues include the quality of extracted studies. In particular, a majority of studies were uncontrolled (28/29), making it difficult to attribute observed changes to the intervention due to any secular trend or sudden change.(292) Also, interventions in uncontrolled before and after studies are often confounded by the Hawthorne effect which potentially could lead to an overestimate of the effectiveness of an intervention.(293)

Heterogeneity between studies

The observed differences between studies may reflect the difficulties of overlapping time periods and confounding, but could also reflect the differences in population studies, the definition of prescribing a correct antibiotic and correct management of pneumonia.

3.9 Conclusion

Considering the number and nature of studies that assessed the prescribing practices of antibiotics for patients diagnosed with mild/moderate pneumonia at outpatient settings in developing countries, the review concludes that a considerable amount of research needs to be completed into assessing the prescribing practice of antibiotics for mild/moderate pneumonia in developing countries. Moreover, the current WHO/IMCI guidelines consider only children aged two to 59 months. WHO/IMCI initiated studies should include evaluation of other recommended criteria of appropriateness of drug prescribing, for example dose, dosage form, duration of and explaining how to administer the prescribed antibiotic. The lack of reported studies in children over five years and adults in developing countries

is of great concern considering the prevalence of mild/moderate CAP in developing counties. Appropriate prescribing is poor and the patient adherence with prescribed medication adds an additional layer potentially resulting in poor patient outcomes.

Chapter 4 Methodology

In addressing the overall aim of the project, two major studies were conducted. The first of these was a prescription study to evaluate the appropriateness of prescribing practices for mild/moderate CAP. Prescription data were collected from community pharmacies prospectively and sequentially. Secondly, questionnaire studies with community members, prescribers (doctors) and providers (pharmacists and pharmacy technicians) were completed in order to establish the level of and determinants that lead to inappropriate injection practices and to understand reasons for injectable antibiotics and other drugs being prescribed provided and preferred for treatment of mild/moderate CAP in Mongolia.

4.1 Assurance of readability, validity of the studies

A data collection form for the prescription study and questionnaire forms were developed and translated from English to Mongolian and back-translated into English, in order to assure the validity of data collection and minimise linguistic and cultural biases, known as decentering(294) (Appendix E and Appendix F). These were carried out by experts as detailed in the relevant parts of the methodology.

4.2 Evaluation of prescribing practices for CAP in Mongolia

4.2.1 Data collection

Prescriptions submitted to community pharmacies in Mongolia with a diagnosis of mild/moderate CAP written on a prescription by doctors were collected prospectively and sequentially. According to the standard for prescriptions,(295) all physicians must record the diagnosis on the prescription. Prescriptions with multiple diagnoses were not included due to the different assessment. All prescribed drugs, including their dosage, duration, route of administration and demographic information of patients were extracted from the prescriptions on to a data collection form that was developed for the study. The validity of data collection was assured by translating from English to Mongolian and back-translated into English as requested for ethics approval. The prescriptions were evaluated as received and prior to any amendments

made as a result of pharmacist intervention. Each drug was evaluated for rational prescribing based on the Standard Treatment Guidelines of Mongolia (2005, 2008),(6, 7) Australian Therapeutic Guidelines for Treatment of non-severe pneumonia,(142) WHO/IMCI guidelines for pneumonia in children.(150) Appropriateness was assessed for each of the following indicators: drug selection, dosage form, prescribed dose, frequency of administration and prescribed duration. A drug was classified as "inappropriate" if one or more indicators were inappropriate for each prescribed item. The assessment was based on a cascading effect, for example. If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator, etc.

4.2.2 Site selection

The site selection was based on the WHO Operational Package for assessing, monitoring and evaluating country pharmaceutical situations.(166) The principle of selecting private pharmacies in the urban areas and provinces was to select the closest private pharmacy to each public health facility surveyed where doctors were surveyed by questionnaire. However, branches and Revolving Drug Funds (RDF) were excluded in this study because branches of the pharmacies are legally restricted to only providing Over the Counter (OTC) drugs. RDFs have variable management structures, such as soum governor, nurse or pharmacy technician can be managers of RDFs. In addition, RDFs were not included in the study because of remote location and due to limited budget.

A convenience selection method was applied for pharmacies in rural areas based on discussion with local professionals. The selection criteria were based on retail volume, operational activity and close location to hospital or health centres.

Thirty pharmacies consisting of 20 in the Ulaanbaatar area and 10 in eight of the provinces were selected for inclusion in the study, of which 22 consented. This represented a response rate of 73%. All pharmacies that did not consent were in the urban area. The sites selected were privately owned community

pharmacies in towns in eight provinces (Bayankhongor, Bulgan, Govi-Altai, Khovsgol, Ovorkhangai, Sukhbaatar, Tuv, Uvs) and the remainder 12 pharmacies in the capital city (Ulaanbaatar).

4.3 Study definitions

- An overdose was defined as a dose prescribed greater than 10% above that specified in the guidelines and an under dose greater than 10% below that specified in the guidelines. The decision was based on the limits of dosage content of pharmaceutical products. (296)
- Injections were determined as any medications, including contraceptives and vaccination that were injected either intravenously, intramuscularly or subcutaneously. Intravenous fluid medications with or without drug addition were defined as a continuous drip.
- Prescriber of injections was defined as those who prescribed or recommended drugs, including injectables, irrespective of their position or qualification. These included doctors, specialists and traditional practitioners operating within their scope of practice.
- Dispensers of injections are defined as those who provided injectables on a prescription irrespective of their position or qualification. These are pharmacists and pharmacy technicians.
- Administrator of injections was defined as a person who administers injectables to community members, irrespective of their position or qualification. These included doctors, specialists, traditional practitioners and nurses.
- It is noted that injections are often supplied outside of the law from various outlets in Mongolia.

4.4. Questionnaire issued to community members

4.4.1 Development of questionnaires issued to community members

The development of a questionnaire relating to injection use among community members and to investigate knowledge, attitudes and other relevant factors was based on the WHO developed guide: Injection Practices:

Rapid Assessment and Response Guide(297) and other research findings.(70, 76, 84, 85, 298, 299)

A structured questionnaire included community members' characteristics such as socio-demographics, experiences and views about their recent consultation and previous ones, self-diagnosis and self-request for injections, expectations for the consultation, satisfaction; compliance with oral medication; expectations of injections; attitude towards and knowledge about antibiotics.

4.4.2 Validation of the questionnaires for community members

Two actively working professional translators with more than 15 years of working experience and whose native language was Mongolian completed the English to Mongolian, and back translations to assure accuracy and minimize any possible bias. These translators were unknown to each other.(300)

For readability and comprehensiveness of the questions, a pilot study was completed. Of forty distributed questionnaires, 15 were returned yielding a response rate of 37.5%. Modifications regarding some wording terms were made after the pilot study, in order to improve the completeness and clarity of questions (Appendix F). No major omissions were identified. These responses were not used further in the study.

4.4.3 Selection of community members

As recommended in the guide,(298) a sample of community members, who appeared and were confirmed to be 18 years of age was selected by collecting at pre-determined locations to obtain a representative sample from different socio-economic groups. Questionnaires were administered at 55 different locations. These included three public central hospitals in large district and five district hospitals in semi-rural districts; five FGPs located in large and 15 semi-rural and rural districts; three private hospitals in large and semi-rural districts; one university in large and two in semi-rural districts; three supermarkets in the city centre and 19 small shops in the semi-rural and rural areas.

The researcher approached respondents and outlined the objectives of the study to them and asked for their permission to participate.

4.4.4 Questionnaire administration to community members

Patient information sheets, written in Mongolian, were distributed to the respondents and explained by the researcher. Prior to administering the questionnaire, a verbal consent was obtained.

Most of the questionnaires were completed by participants. In some cases, however, the researcher administered the questionnaire to the participant and completed the questionnaire based on their responses. Questionnaires took between 10 to 20 minutes to complete, including the introduction, explanation and obtaining a verbal consent.

The survey took place in a public quiet area, for example hallway of the hospitals, university or waiting area in supermarkets, whenever possible.

The researcher made a clear statement that there were no right or wrong answers and explained the research objectives thoroughly.

All questionnaires were administered during the winter period, January-March, 2010 in Ulaanbaatar, Mongolia which is a period with a high prevalence of acute respiratory tract infections.

4.5. Questionnaire issued to pharmacists and pharmacy technicians

4.5.1 Development of questionnaires issued to pharmacists and pharmacy technicians

A literature review was undertaken to establish previous findings related to the pharmacists' role in dispensing, prescribing and administering injections in developing countries. Several studies were identified and used to inform this research.(85, 86) One previous study focusing on the role of doctors and nurses regarding therapeutic injections in Mongolia was also used.(301)

A questionnaire was developed using a WHO/SIGN guide.(297, 298) This guide included information relevant to investigation of injection practices, their

determinants and their consequences. In addition, the questionnaire was developed after a range of discussions with pharmacy academics and practitioners from Australia and Mongolia, in order to explore pharmacists' practice of dispensing and prescribing antibiotics for the treatment of CAP in Mongolia and to investigate the underlying factors that impact on dispensing, and prescribing practices and administering of therapeutic injections in Mongolia (Appendix F).

4.5.2 Validation of the questionnaire for pharmacists and pharmacy technicians

Readability and validity of the preliminary questionnaires were evaluated by a team of local professionals, including an academic from the School of Pharmacy, Health Sciences University of Mongolia with more than twenty years work experience, one epidemiologist with more than seven years of working experience, one pharmacist who is registered and a community pharmacist who has worked for more than twenty years in Mongolia. Based on the comments of local professionals, another two antibiotics were added to the number of medicines prescribed for mild/moderate CAP.

The questionnaire was piloted to ensure that the questions were clear, and considering the average pharmacists and pharmacy technicians' busy workload, that the instrument could be completed in a reasonable amount of time. The pilot study included two pharmacists and two pharmacy technicians and the response rate was 100%. After the pilot study, a few further modifications in wording and order of the questions were made (Appendix F).

4.5.3 Selection of pharmacists and pharmacy technicians

For the selection of community pharmacies and health facilities, three large districts in urban areas and one semi-rural were chosen to represent the average conditions in the country. In addition, one rural district of Ulaanbaatar was chosen based on population size that were thought to be representative of all socioeconomic areas in Mongolia.(287) Forty community pharmacies were conveniently selected from these chosen five districts that

represented a range of pharmacies regarding size, accessibility and distance from clinics, based on discussions with local professionals, ensuring that no particular type of pharmacies was excluded. These included pharmacies selected for the prescription study (12) and another 28 pharmacies. In respect to their location, 25 community pharmacies were located in three large districts, twelve were in semi-rural districts and the remaining three were located in rural districts.

Pharmacists and pharmacy technicians who did not consent (19) were working in pharmacies located in the large districts. The refusal was due to busy workload and unwillingness to participate.

The study aimed to involve at least one pharmacist, and/or pharmacy technician from each pharmacy and accordingly they were contacted in their working area. Where the two were at the same pharmacy, they completed the questionnaire separately.

4.5.4 Questionnaire administration to pharmacists and pharmacy technicians

After obtaining verbal consent, a self-administered questionnaire with 33 items was distributed to qualified pharmacists, pharmacy technicians working in community pharmacies in urban and rural districts of Ulaanbaatar, Mongolia.

In order to improve the response rate, the survey was completed in the early mornings or when the participants were able to focus on the survey. No more than two respondents were selected from the same pharmacy and where there were two, they were a pharmacist and a pharmacy technician. The respondents filled out the questionnaire independently from each other if there were more than one respondent at the same pharmacy.

4.6 Questionnaire issued to doctors

4.6.1. Development of the questionnaires issued to doctors

Development of the 24-item questionnaire was also informed by the WHO/SIGN guide(297, 298) and additional relevant questions were included. As recommended, self-administered questionnaires were used to elicit prescribing practice for tracer conditions (mild/moderate CAP), including

prescribing reported antibiotics and non-antibiotic medicines and administering injections. Also, the questions were focused on doctors' views on current treatment guidelines for CAP, their experience with prescribing treatment with injectable medicines, attitudes and knowledge about injectables, patients' expectations and demands, and the prevalence of counterfeit and substandard medicines in Mongolia.

Literature that related to factors influencing injection prescribing was evaluated.(84, 85, 302) Those studies highlighted the importance of investigating the underlying factors. Published data on prescriber's perceptions about injections from other countries were conducted and a small study regarding doctors' attitude toward prescribing of injections in Mongolia were reviewed.(301)

4.6.2 Validation of the questionnaires for doctors

Preliminary questionnaires were assessed in terms of readability and validity, by an epidemiologist with more than seven years of working experience and two medical experts of more than 15 years working experience. They all practised in Mongolia.

Final questionnaires were piloted with three family group practitioners and two specialists. Following their feedback and discussion with local professionals, the wording and order of some the questions were modified (Appendix F).

4.6.3 Selection of doctors

As recommended in the WHO guide,(298) three large districts (based on population size), one semi-rural district to represent the average conditions in the country and one rural district of Ulaanbaatar thought to be representative of all socioeconomic areas in Mongolia were selected.

There are three public central hospitals, eight specialized centres, nine district hospitals, six private hospitals and 126 FGPs located in Ulaanbaatar.(303)

Selection of health facilities was based on their location and accessibility. For the study, three public central hospitals in large districts, five district hospitals

in semi-rural districts, three private hospitals in semi-rural districts and 20 FGPs located in both large and semi-rural districts were selected.

The study aimed to select at least two doctors; one general doctor and one specialist form each setting. Similar to the questionnaire study with pharmacists and pharmacy technicians, where there were two at the same hospital, they completed the questionnaire independently from each other.

4.6.4 Questionnaire administration to doctors

Doctors were randomly selected from the list of actively working employees, provided by human resource offices in the selected sites.

4.7 Data analysis

The statistical analysis was completed using the Statistical Package for Social Sciences (SPSS Version 21.0). Standard descriptive statistics were used to summarize demographic data and responses to the questionnaires (frequencies for categorical variables, means and standard deviations for variables measured on a continuous scale).

The drugs prescribed for the diagnosis of mild/moderate CAP were analysed against requirements in the Standard Treatment Guidelines for mild/ moderate CAP (2005, 2008), the National Guidelines for Good Prescribing Practice of Mongolia, Australian therapeutic guidelines and WHO/IMCI recommendations for treatment of pneumonia in children aged less than five. Decisions regarding appropriateness were made separately by the candidate and validated by one supervisor. Differences were resolved by consensus. Differences in prescribing practices between adults and children and urban and rural areas were tested for statistical significance using the Chi-square statistic and Fisher's Exact's test.

Questions regarding the frequency of dispensed/prescribed medicines for treatment of CAP were identified using a five-point Likert scale ranging from never to always. The responses were condensed into three categories (never/rarely, sometimes, and often/always). Those responses gauged using Likert scales ranged from strongly agree to strongly disagree were formed into

two groups, strongly agree/agree, and disagree/strongly disagree. The Likert scale responses were coded from one to five. For the Likert scales, the mean values were used to compare the differences between the groups. Other questions were coded as 1- Yes, 2- Sometimes, 3 – No.

The mean values of responses measured on a Likert scale can be assumed as normally distributed, as the number of samples were large (>30) in each group (community members-474, pharmacy and pharmacy technicians-61, doctors-71) (Central Limit Theorem).(304) In addition, appropriate frequencies were provided for each category on the response forms.

Logistic regression analysis was applied in order to perform comparisons of binary dependent variables (for example: yes/no) across different groups, whereas dependant variables with more than two categories were compared by one-way analysis of variance, ANOVA or Kruskal-Wallis test for independence. The differences between individual groups were identified performing a Tukey's HSD (honestly significant difference) Post Hoc Test or Pairwise comparisons. A p value of $< .05$ was considered to be statistically significant.

Cronbach's coefficient alpha was used for internal consistency of the questions regarding community members' reasons to refuse injections, influencing factors of injections issued to doctors and pharmacists.

4.8 Ethical considerations and confidentiality

The study protocol was approved by the Human Research Ethics Committee, Curtin University, Western Australia (PH-11-2010). As advised by the Human Ethics Committee, MoH of Mongolia, a local ethical approval was not required in addition to the Curtin approval.

All participants were informed on the nature of the study, its length and their right to withdraw (Appendix D). Informed consent was sought for participation (Appendix D). Personal details were removed from the data collection forms upon the completion of the data collection and were replaced with an appropriate numeric code. In accordance with NHMRC (National Health & Medical Research Committee) requirements on "data

storage and retention", only de-identified data were stored in a locked cupboard in the School of Pharmacy; the electronic version of data was stored in a password protected computer where only the researcher had access to. No individual patient data were published. At the completion of the study all data will be archived for a minimum of five years.

No monetary incentives or prizes were offered or distributed throughout the study.

Chapter 5 Results of an evaluation of prescribing practices for mild/moderate CAP in Mongolia

This section provides results from the prescription study. Prescriptions submitted to community pharmacies in Mongolia with a diagnosis of mild/moderate CAP written on the prescription by doctors were collected prospectively and sequentially.

Firstly, the chapter describes the selection and characteristics of participants and continues with the prescribing pattern of doctors. Thereafter, the frequency analysis of inappropriate prescribing using the Mongolian Standard Treatment Guidelines (STG) for mild/moderate CAP and the results from analysis of prescribing level of injections are presented. In addition, a comparative analysis using the Australian therapeutic guidelines and WHO/IMCI guidelines for treatment of non-severe pneumonia is presented. Finally, the overall results from the prescription study are summarized.

5.1. Selection and characteristics of participants

The study enrolled 394 (193 adults and 201 children) participants who were diagnosed with mild/moderate CAP. The prescriptions represented the prescribing practices of 118 doctors.

Table 5.1 shows the demographic characteristics of participants. Adults (48.9%) and children (51.0%) were almost equally represented, with a median age for children of 2.0 years (range: 0.03-12) and adults of 33.0 years (range: 13-92). The proportions of adults (48.9%) and children (51.0%) were almost equally represented.

Table 5.1 Demographic characteristics of participants

Characteristics	Number n (%)	Gender (male) n (%)	Median age (years)	Median weight (kg)	Location n (%)
Adults	193 (48.9)	97 (50.3)	33.0	-	Urban=124 (64.2) Rural=69 (35.8)
Children	201 (51.))	98 (48.8)	2.0	13.7	Urban=111 (55.2) Rural=90 (44.8)
Total					394 (100)

5.2 Prescribing pattern of doctors

A total of 1100 drugs were prescribed for the 394 participants, with the most commonly prescribed being aminopenicillins (10.4% for adults and 18.3% for children), followed by vitamins, mucolytics (bromhexine), ciprofloxacin and paracetamol (Table 5.2).

Table 5.2 Most commonly prescribed drugs for patients with mild/moderate CAP

Drug name	Prescribed frequency (N=1100)	Percentage (%)	ATC Code
Aminopenicillins	163	16.0	J01CA
Vitamin C	67	8.8	A11GA01
Bromhexine (Mucolyitic)	62	5.6	R05CB02
Paracetamol	57	3.5	N02BE01
Ciprofloxacin	52	4.7	J01MA02
Salbutamol	37	3.4	R03CC02
Erythromycin	36	3.3	J01FA01
Cotrimoxazole	34	2.7	J01EE01
Ketotifen (Antihistamine)	33	3.0	R06AX17
Calcium gluconate	32	2.9	A12AA03
Cefazoline	31	2.8	J01DB04
Sodium chloride	31	2.8	A12CA01
Chlorpheniramine	29	2.6	R06AB04
Chitamon[a]	23	2.1	Herbal
Vitamin B Complex	17	1.6	A11EA

[a] Local product containing *Glycyrrhiza uralensis Fisch, Thermopsis dahurica Czefr.*

There was a low level of poly-pharmacy with the median number of drugs being three per prescription. There was no significant difference in the number of drugs prescribed for adults and children $\chi^2[(1, n=749) = 0.24\ p = .63]$ or in urban and rural locations, $\chi^2[(1, n=745) = 0.001, p = .98]$ (Table 5.3).

Table 5.3 Number of drugs prescribed per prescription

Category	Adults		Children	
	Urban	Rural	Urban	Rural
No. of patients	124	69	111	90
No. of prescribed drugs	368	188	301	243
Min	1.00	1.00	1.00	1.00
Median	3.00	3.00	3.00	3.00
Max	7.00	6.00	7.00	6.00
Mean	2.99	2.72	2.71	2.73
Std Dev	1.20	0.87	1.12	0.91
p value[a]	= .63		= .98	

[a] *p*-value was calculated based on number of adults and children and number of drugs in urban or rural.

The number of antibiotics prescribed per prescription ranged from zero to three and most prescriptions included at least one antibiotic (93.4%). Doctors tended to prescribe more than one antibiotic for adults in urban areas. More detailed results by urban and rural areas are presented in Table 5.4.

Table 5.4 Number of antibiotics prescribed for children and adults

Number of antibiotics per prescription	Adults		Children	
	Urban n (%)	Rural n (%)	Urban n (%)	Rural n (%)
0	3 (6.5)	3 (4.3)	15 (13.5)	5 (5.6)
1	24 (52.2)	57 (82.6)	92 (82.9)	73 (82.0)
2	16 (34.8)	8 (11.6)	4 (3.6)	10 (11.2)
3	3 (6.5)	1 (1.5)	-	1 (1.2)

5.3 Frequency of inappropriate prescribing, using Mongolian standard treatment guidelines for mild/moderate CAP

The overall level of inappropriate prescribing for all patients based upon the Mongolian STGs was 845 (84.0%) (Figure 5.1). A total of 95 were not assessable because of a lack of information about drug selection, dosage form, dose,

frequency and duration in the current guidelines for children aged between 6 to 15 years.

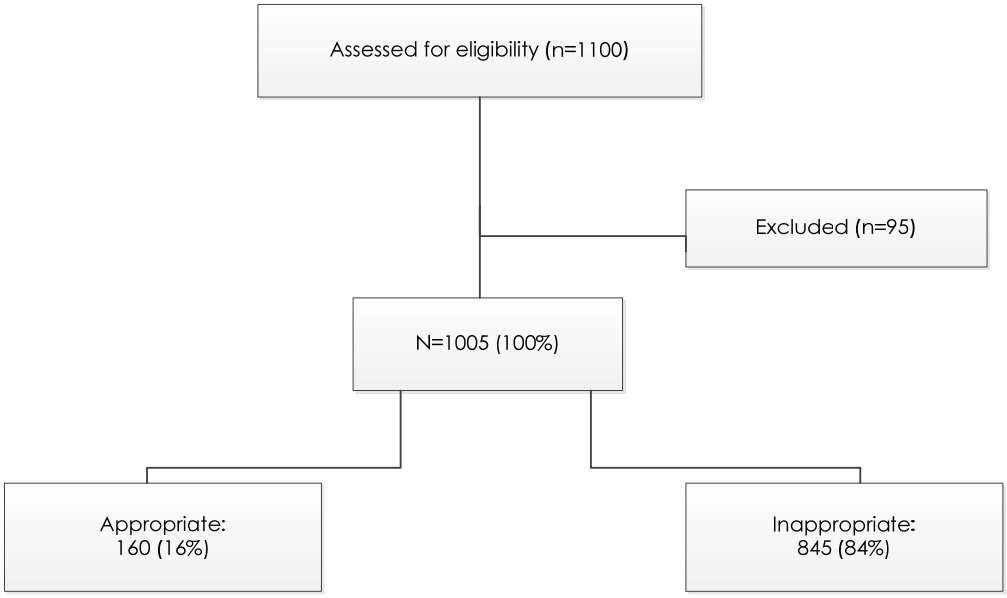


Figure 5.1 Appropriateness level of prescribing for patients with mild/moderate CAP

The evaluation of prescribing practices of antibiotics and non-antibiotics for children and adults with mild/ moderate CAP indicated that 54.7% of all prescribed antibiotics were appropriately prescribed for children under five years (86/157) and 53.1% for adults (35/66).

Table 5.5 Appropriateness of antibiotic use prescribed for children and adults

Variables	Children, n (%)	Adults, n (%)
Appropriate	86 (54.5)	35 (53.1)
Not appropriate	71 (45.5)	31 (46.9)

The assessment of non-antibiotics revealed similar findings, with only 33.2% of prescribed items for children and 47.1% for adults being appropriate. (Table 5.6).

Table 5.6 Appropriateness of non-antibiotic medicines prescribed for children and adults

Variables	Children, n(%)	Adults, n(%)
Appropriate	97 (33.2)	231(47.1)
Not appropriate	195 (66.8)	259(52.9)

The assessment was carried out by sequential elimination of selection dosage form, dose and frequency of administration in the order shown in Table 5.7 and Table 5.8. The duration of an antibiotic course could not be included due to lacking information in the Mongolian guidelines. A drug was classified as "inappropriate" if one or more indicators were inappropriate for each prescribed item. The assessment was based on a cascading effect, for example. If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator.

A chi-squared analysis showed a statistically significant difference between inappropriate prescribing for adults and children, $\chi^2[(1, n=1100) = 22.8, p = <.001]$. Relatively more adults were prescribed inappropriate drugs, largely as a result of the dosage frequency prescribed.

Table 5.7 Assessment of prescriptions for children with mild/moderate CAP*

Category	Drug selection n (%)	Dosage form n (%)	Dose n (%)	Frequency n (%)	Final result n (%)
A	195 (43.4)	171 (87.7)	102 (59.6)	99 (97.1)	99 (22.1)
IA	254 (56.6)	24 (12.3)[a]	(see below)	3 (2.9)	350 (78.0)
OPD	-	-	1 (0.6)	-	-
UPD	-	-	68 (39.8)	-	-
NAI	95	95	95	95	95
Total assessable	449	195	171	102	449
Total	544	290	266	197	544

A- Appropriate, IA- Inappropriate, NAI- No assessable guideline information, OPD- Overprescribed dose, UPD- Under prescribed dose

[a] Includes the number of appropriately selected drugs from the previous column.

* If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator.

Table 5.8 Assessment of the prescriptions for adults with mild/moderate CAP

Category	Drug selection n (%)	Dosage form n (%)	Dose n (%)	Frequency n (%)	Final result n (%)
A	235 (42.3)	192 (81.7)	120 (62.5)	61 (50.8)	61 (11.0)
IA	321 (57.7)	43 (18.3)[a]	(see below)	59 (49.2)	495 (89.0)
OPD	-	-	18 (9.4)	-	-
UPD	-	-	54 (28.1)	-	-
Total	556	235	192	120	556

A- *Appropriate, IA- Inappropriate, OPD- Overprescribed dose, UPD- Under prescribed dose*

[a] Includes the number of appropriately selected drugs in inappropriate dosage forms only.

Inappropriate drug selection was the major reason for inappropriate prescribing for patients with CAP, with the extent of inappropriate drug selection similar for children (56.6%) and adults (57.7%). Doctors in urban areas prescribed a higher frequency of inappropriate drugs than those in rural areas for the population studied, χ^2 [(1, n=575) =10.25, p =.0014] (Figure 5.2).

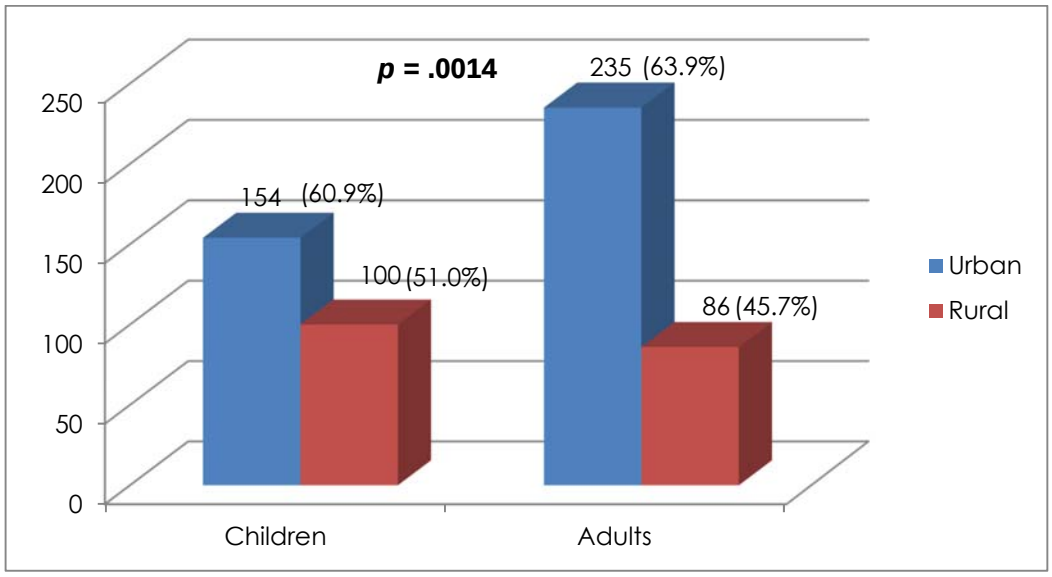


Figure 5.2 Inappropriate levels of drug selection for adults and children with mild/moderate CAP in urban and rural areas

5.4 Prescribing level of injectables

The proportion of drugs prescribed as injections was 28.4% for adults (n=556) and 9.0% for children (n=544). The proportion of encounters with at least one injection prescribed was 29.3%, and it was greater for adults (42.7%) than for children (16.5%).

Prescribing of injectables was significantly higher for adults in urban areas compared with rural areas χ^2[(1, n=556)=21.7, p = <.001], but the difference between urban and rural prescribing of injectables was not significant for children (Table 5.9). In the case of antibiotics, the proportion of injectables prescribed was 34.7% in the urban (83/239) and 18.5% in rural areas (31/168). Since the guideline for ambulatory care does not allow any use of injectables for outpatients with moderate/mild CAP,(305) this finding for injectables is non-compliant with the prescribing standards in Mongolia.(295) Moreover, it is noted that gentamicin is recommended for the treatment of mild/moderate CAP for children and it was prescribed for outpatients with mild/moderate CAP. However, this is available only as injectable, so the guideline of ambulatory care is non-compliant with the Mongolian prescribing standard.

Table 5.9 Proportion of prescribed injectables for participants with mild/moderate CAP

Category	No. of injectables n (%)	No. of non-injectables n (%)	Total	*p* Value
Urban adults	128 (23.0)	240 (43.2)	368	< .001
Rural adults	30 (5.4)	158 (28.4)	188	
Urban children	32 (5.9)	269 (49.4)	301	.141
Rural children	17 (3.1)	226 (41.5)	243	

5.5 Frequency of inappropriate prescribing based upon Australian therapeutic guidelines for treatment of mild/moderate CAP

The results of the assessment of prescription categories for patients with mild/moderate CAP based on an application of Australian therapeutic guidelines(142) are shown for children and adults, respectively (Table 5.9 and Table 5.11).

Table 5.10 Assessment of the prescriptions for children with mild/moderate CAP, compared against Australian therapeutic guidelines*

Category	Drug selection n (%)	Dosage form n (%)	Dose n (%)	Frequency n (%)	Prescribed duration n(%)	Final result n (%)
A	141 (25.9)	125 (88.7)	64 (51.2)	49 (76.6)	48 (98.0)	48 (8.82)
IA	403 (74.1)	16 (11.3)[a]	-	15 (23.4)	1 (2.0)	496 (91.2)
OPD	-	-	24 (19.2)	-	-	-
UPD	-	-	37 (29.6)	-	-	-
Total	544	141	125	64	49	544

A- Appropriate, IA- Inappropriate, OPD- Overprescribed dose, UPD- Under prescribed dose

[a] Includes the number of appropriately selected drugs with inappropriate dosage form

* If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator.

A chi-squared analysis showed a statistically non-significant difference between inappropriate prescribing for adults and children, χ^2[(1, n=1100,) =0.012, p = .91] (with Yates correction). Similar scores were obtained for inappropriate prescribing for both adults and children.

Inappropriate drug selection was the major reason for inappropriate prescribing for patients with CAP, with the extent of inappropriate drug selection being lower for children (74.1%) compared to adults (82.2%).

Table 5.11 Assessment of the prescriptions for adults with mild/moderate CAP, compared against Australian guidelines*

Category	Drug selection n (%)	Dosage form n (%)	Dose n (%)	Frequency n (%)	Prescribed duration n (%)	Final result n (%)
A	99 (17.8)	75 (75.8)	65 (86.7)	55 (84.6)	47 (85.5)	47 (8.5)
IA	457 (82.2)	24 (24.2)	-	10 (15.4)	8 (14.5)	509 (91.5)
OPD	-	-	5 (6.7)	-	-	-
UPD	-	-	5 (6.7)	-	-	-
Total	556	99	75	66	56	556

A- Appropriate, IA- Inappropriate, OPD- Overprescribed dose, UPD- Under prescribed dose

*If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator.

Doctors in urban areas prescribed more inappropriate drugs than those in rural areas for the population studied, χ^2 [(1, n=860) =10.77, p = .001] (Figure 5.3).

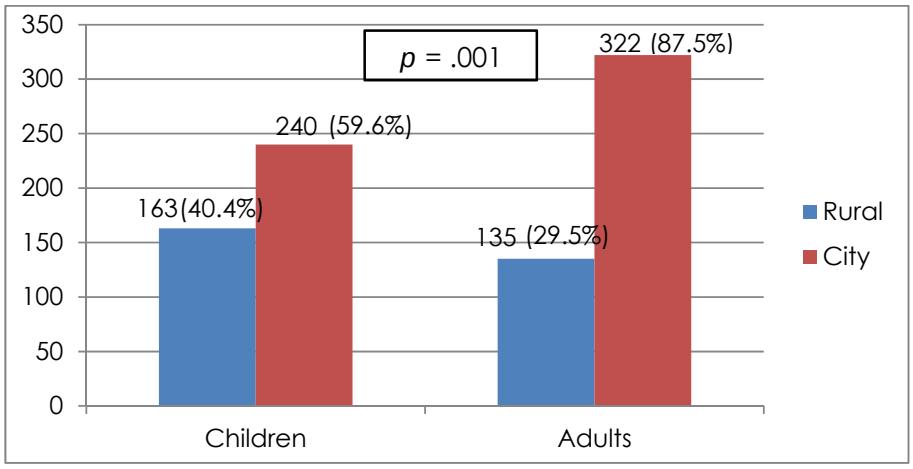


Figure 5.3 Inappropriateness level of drug selection for patients with CAP in urban and rural areas compared against Australian guidelines

5.6. Frequency of inappropriate prescribing by comparing against Integrated Management of Childhood Illness (IMCI) guidelines for pneumonia in children

The assessment using IMCI guidelines(150) included a total of 544 drugs, prescribed for children. Of all of these, one hundred were not assessable due to a lack of information in the guideline regarding the children aged 6 to 15 years. Therefore, these drugs were excluded from the final analysis. The overall inappropriateness level of assessable drugs prescribed for children was 90.3% (Figure 5.4).

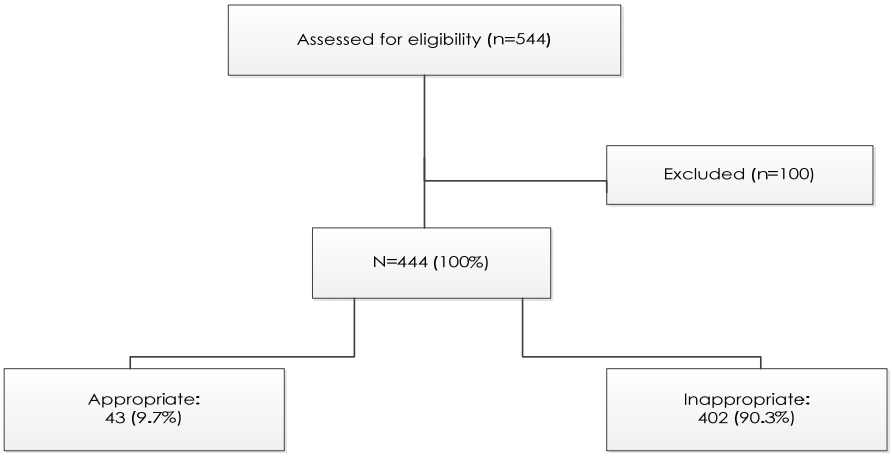


Figure 5.4 Appropriateness level of prescribing for children with mild/moderate CAP, compared against IMCI guidelines

Inappropriate drug selection was the major reason (77.9%) for inappropriate prescribing for children with CAP compared against IMCI guidelines (Table 5.12).

Table 5.12 Assessment of the prescriptions for children with mild/moderate CAP, compared against IMCI guidelines

Category	Drug selection n (%)	Dosage form n (%)	Dose n (%)	Frequency n (%)	Prescribed duration n (%)	Final result n (%)
A	98 (22.1)	97 (21.8)	56 (12.6)	46 (10.4)	43 (9.7)	43 (9.7)
IA	346 (77.9)	1 (0.2)	-	10 (2.3)	3 (0.7)	401 (90.3)
OPD	-	-	13 (2.9)	-	-	-
UPD	-	-	28 (6.3)	-	-	-
NAI	100					100 (18.4)
Total assessable	444	98	97	56	46	444
Total	544	98	97	56	46	544

A- Appropriate, IA- Inappropriate, NAI- No assessable guideline information, OPD- Overprescribed dose, UPD- Under prescribed dose

* If the first indicator was "inappropriate", then the prescription item classification was "inappropriate" and this drug was excluded from further analysis and would not appear in the second indicator.

In terms of the extent of inappropriate drug selection, it was greater for patients (85.7%) in urban areas compared to rural areas (67.7%). Doctors in urban areas prescribed more inappropriate drugs than those in rural areas studied applying IMCI guidelines, χ^2 [(1, n=444) =19.51, $p < .001$] (Figure 5.5).

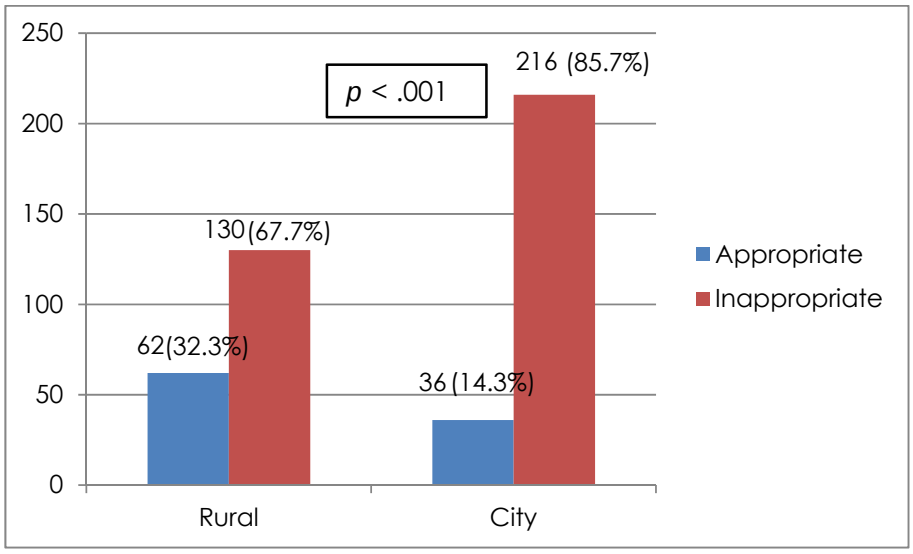


Figure 5.5 Inappropriateness levels of drug selection for children with mild/moderate CAP in urban and rural areas, compared against IMCI guidelines

5.7 Summary of the results of the evaluation of prescribing practices for mild/moderate CAP in Mongolia

The prescription analysis indicated that a wide range of antibiotics and non-antibiotic medicines were prescribed for the treatment of mild/moderate pneumonia in Mongolia. The most commonly prescribed drugs were aminopenicillins, vitamins, and mucolytics, with the median number of drugs being three per prescription. When the evaluation was compared against Mongolian standards the level of inappropriate drug selection was similar for adults (57.7%) and children (56.6%), and was the major reason for the overall frequency of inappropriate prescribing for adults (89.0%) and children (78.0%). Doctors in urban areas prescribed more inappropriate drugs than those in rural areas for both children and adults χ^2 [(1, n=575) =10.25, p =.0014].

Moreover, a non-compliance with Mongolian guidelines was found in relation to the prescribing practice of injections for non-hospitalized patients. The proportion of prescribed injections was 28.4% for adults and 9.0% for children, and for adults, it was significantly higher in urban areas. The prescribing standard for non-hospitalized patients in Mongolia states that injections should not be prescribed. This is at variance with current guidelines.

The assessment of prescriptions for adults with mild/moderate CAP, compared against Australian guidelines revealed that a similar extent of inappropriate medicines was prescribed for adults (91.5%) when compared with results of the assessment of prescriptions using Mongolian standards (89.0%). Also, the prescribing practice of inappropriate drugs for children was higher using Australian guidelines (91.2%) than Mongolian standards (78.0%). Similar to the results using the Mongolian standards, doctors in urban areas selected more inappropriate drugs compared to their counterparts in rural areas χ^2 [(1, n=860) =10.77, p = .001].

A higher extent of inappropriateness was found in the evaluation of prescribing practices for treatment of CAP in children aged two months to 59 months using the WHO/IMCI guidelines. The total inappropriateness level of assessable drugs prescribed for children was 90.3%.

Overall, the main reason for inappropriate prescribing was inappropriate drug selection when a comparison made against three guidelines.

Again a similar result was obtained from the evaluation using the Mongolian standards in relation to different prescribing practices between doctors in urban and rural areas of Mongolia. Doctors in urban areas prescribed more inappropriate drugs when compared to their counterparts in rural areas when WHO/IMCI guidelines were applied χ^2 [(1, n=444) =19.51, p < .001].

Chapter 6 Results of the questionnaire studies with community members, doctors, pharmacists, including pharmacy technicians

An important finding from the prescription study was the high level of prescribing of injectable medicines for the treatment of CAP. The prescribing of injections for ambulatory outpatients at family group practices is not allowed under the Mongolian regulation. This chapter investigates this question of prescribing injectables further by reporting the results of questionnaires administered to community members, pharmacists, including pharmacy technicians and doctors that investigated treatment practices and experiences and the extent of and factors influencing injection practices in Mongolia.

6.1 Results of a questionnaire issued to community members

Section 6.1 provides information about community members' characteristics, their experiences and views about their recent consultation and previous ones; self-care practices; for example self-diagnosis and self-request for medications, expectations for the consultation, satisfaction, injections, attitude towards and knowledge about antibiotics in Mongolia.

6.1.1 Demographic characteristics of respondents

Six hundred community members aged over 18 years were contacted at various locations (pharmacies, shopping centres, hospitals and universities) in Ulaanbaatar, Mongolia. The response rate of usable questionnaires was 79%. Non-respondents included people who refused to participate when asked and those who agreed but were unable to complete the questionnaire. Almost half of respondents were aged between 31 and 50 (n=228, 48.1%), 40.9% of respondents were male (n=194), and the average income was US$154-230 (range: 201,000-300,000 MNT) per month (n=99, 20.9%). The details of the respondents are provided in Table 6.1. In addition, for comparison purposes, census data are provided for Mongolia.

Table 6.1 Demographic characteristics of respondents

Variables	Study N=474, n (%)	Census data of Mongolia, 2011	*p* Value
Age (years)			
20-30	198 (41.8)	586,302 (35.6)	< .0001
31-50	228 (48.1)	746,834 (45.3)	
≥51	48 (10.1%)	315,188 (19.1)	
Gender:			
Male	194 (40.9)	937,271 (49.2)	.0003
Female	280 (59.1)	968,698 (50.8)	
Marital status:			
Single	148 (31.2)	344,679 (20.9)	< .0001
Married	250 (52.7)	1,140,111(69.2)	
Divorced	30 (6.3)	35,329 (2.1)	
Separated	25 (5.3)	23,576 (1.4)	
Widowed	21 (4.4)	104,629 (6.3)	
Education:			
Higher	116 (24.5)	392,572 (20.6)	.0004
Secondary	238 (50.2)	869,240 (45.6)	
Primary	98 (20.7)	562,485 (29.5)	
Other	22 (4.6)	81,672 (4.3)	
Occupation:			
Employed	247 (52.1)	911,664 (84.7)	.0994
Unemployed	58 (12.2)	164,116 (15.3)	
Civil servant	66 (13.9)	-	
Student [a]	74 (15.6)	300,494 (36.2)	
Military servant	29 (6.1)	-	
Income (MNT) [c]:			-
<90,000	83 (17.5)	379.400 [b]	
91,000-200,000	77 (16.2)		
201,000-300,000	99 (20.9)		
301,000-400,000	90 (19.0)		
401,000-500,000	68 (14.3)		
>501,000	57 (12.0)		

[a] Economically non active population

[b] Average income in 2011 in Mongolia 2

[c] MNT- Mongolian National Tugrug

- No data were available

A comparison of the sample of community members with population data indicated statistically significant differences with respondents being younger

and the sample comprising more females, more singles and separated people and having higher education levels than the Mongolian population.

6.1.2 Demographic characteristics of respondents by location

The distribution of respondents according to location is outlined in Table 6.2. Most respondents were from the Ulaanbaatar city region (n=407, 85.7%) where the survey was administered, Respondents from Ulaanbaatar city region, when compared with those from rural areas, tended to be older, more were female, fewer were employed, more were students, and incomes were higher.

A comparison with the Mongolian population showed statistically significant differences in the demographic characteristics of respondents for both Ulaanbaatar city region and rural areas. Respondents from Ulaanbaatar city region tended to be younger than their counterparts in the general population, relatively more were female, and more were divorced or separated. Respondents from rural areas also tended to be younger than their counterparts but relatively more were male, had higher education levels, and were single, separated or divorced.

Table 6.2 Demographic characteristics of respondents, by location

Variable	Ulaanbaatar			Rural		
	Study n (%)	Census^ n (%)	*p*-value	Study n (%)	Census n (%)	*p*-value
Age (years)						
20-30	156 (38.3)	424,856 (37.2)	< .0001	42 (62.7)	161,446 (31.9)	< .0001
31-50	209 (51.4)	503,368 (44.0)		19 (28.4)	243,433 (48.2)	
≥51	42 (10.3)	215.121 (18.8)		6 (10.0)	100.067 (19.8)	
Gender						
Male	152 (37.3)	636,955 (47.8)	< .0001	42 (62.7)	300,316 (52.3)	.0885
Female	255 (62.7)	694,724 (52.2)		25 (37.3)	273,974 (47.7)	
Marital status						
Single	124 (30.5)	436,974 (33.0)	< .0001	24 (35.8)	156,111 (27.2)	< .0001
Married	216 (53.1)	774,705(58.2)		34 (50.7)	371,533 (64.7)	
Divorced	28 (6.9)	18,517 (1.4)		2 (3.0)	5,143 (0.9)	
Separated	20 (4.9)	28, 896 (2.2)		5 (7.5)	6,451 (1.1)	
Widowed	19 (4.7)	69,587 (5.2)		2 (3.0)	35,052 (6.1)	
Education						
Higher	104 (25.6)	345,655 (25.9)	.0006	13 (19.4)	46,917 (8.2)	< .0001
Secondary	196 (48.6)	687,547 (51.6)		40 (49.7)	181,693(31.6)	
Primary	85 (20.9)	271,231 (20.4)		12 (17.9)	291,254 (50.7)	
Other	20 (4.9)	27,246 (2.0)		2 (3.0)	54,426 (9.5)	
Occupation						
Employed	205 (50.4)	556,602 (61.0)	.034	42 (62.7)	355,062 (76.4)	0.4251
Unemployed	49 (12.0)	108,171 (11.9)		9 (13.4)	55,945 (12.0)	
Civil servant	59 (14.5)	-		7 (10.4)	-	
Student*	70 (17.2)	247,017 (27.1)		4 (6.0)	53,477 (11.5)	
Military servant	24 (5.9)	-		5 (7.5)	-	
Income (MNT):						
<90,000	74 (18.2)			9 (13.4)		
91,000-200,000	60 (14.7)			17 (25.5)		
201,000-300,000	78 (19.2)	379,400 ¤	-	21 (31.3)	379,400 ¤	-
301,000-400,000	80 (19.7)			10 (14.9)		
401,000-500,000	64 (15.7)			4 (6.0)		
>501,000	51 (12.5)			6 (9.0)		

¤ Average income in 2011

- No data were available

6.1.3 Injection exposure

Data on the nature and prevalence of injection use were collected from community members as a part of the questionnaire. Questions regarding the extent of injection use revealed that all respondents had received at least one injection in the past and 56.6% had received an injection in the past twelve months (Table 6.3).

Table 6.3 Time since respondents had received an injection

Period	Number of respondents, n (%)
<1 month	97 (20.5)
1-6 months	91 (19.2)
6-12 months	80 (16.9)
>1 year	206 (43.5)
Total	474 (100)

The most common reason for having an injection was reported to be for treatment of a disease (n=358, 61%), for administration of vitamins (n=166, 26%), and some had injections for vaccinations and contraception (Figure 6.1).

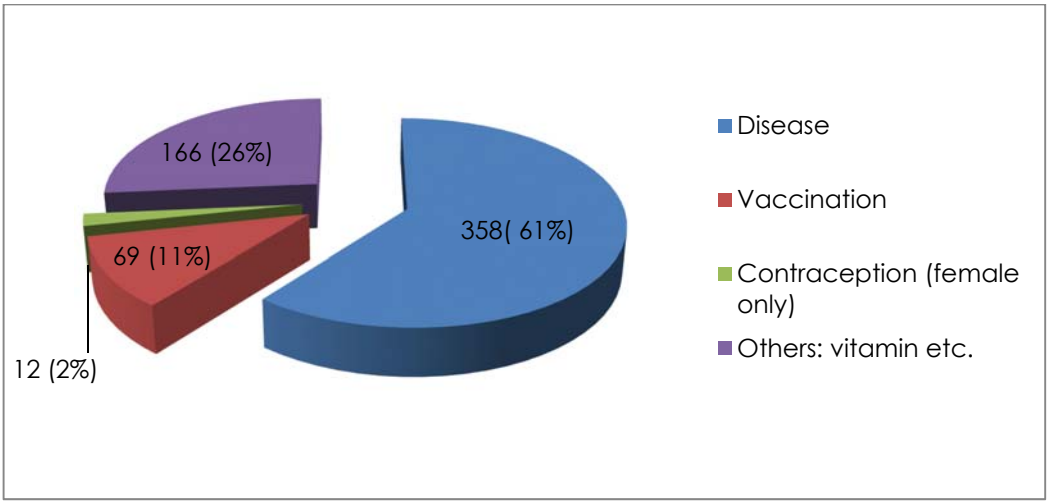


Figure 6.1 Patients' stated reasons for being given an injection

To further explore the extent of received injections, the respondents were asked to indicate the number of injections they had for their last treatment. Of the 358 participants, who had injections for treatment of a disease, almost 80% had between one and four injections and almost 14% reported more than five injections. A single injection was usually given for immunization and always for contraception (Table 6.4).

Table 6.4 Reason and number of injections received for that treatment

Reason of injection/ Number of injections[a]	One (%)	2-4 n (%)	5-8 n (%)	>8 n (%)
Disease (N=358)	36.3	47.7	9.2	6.7
Vaccination (N=69)	86.9	11.6	0	1.4
Contraception (N=12)	12	-	-	-
Others: vitamins, etc. (N=165)	32.1	54.5	9.7	3.6

[a] Respondents could select more than one option

6.1.4 Quality of care

Questions concerning the reasons for receiving an injection were proffered and results are summarized with regards to major illnesses and the type of parenteral administration. The frequency analysis of injections indicated that the administration of contraception and vaccinations were appropriately administered with a single injection (Table 6.5).

Table 6.5 Reasons and type of injections received

Reason for injection [a]	Single injection(s) n (%)	Continuous drip n (%)
Disease	301 (59.4)	206 (40.6)
Vaccination	67 (95.7)	3 (4.3)
Contraception (females only)	12 (100)	-
Others: vitamins, etc.	113 (50.2)	112 (49.8)

[a] Respondents could choose more than one option

Injections were commonly reported for management of symptoms of weakness, respiratory symptoms, which included cough, sore throat or pneumonia. A little less than half of respondents (46%) had multiple single injections for their last treatment. Of these 196 (41.4%) were continued on oral medicines that were similar to the injection medication.

In terms of using new clean needles and syringes, a majority was aware of these requirements and only 39 respondents (8.2%) said they did not know.

Questions regarding unwanted effects of injections were presented and about 20% had one of the proffered side effects after previous injections. Similar proportions experienced a swollen or hard lump under the skin (n=26, 28.6%) and a warm feeling under the skin (n=23, 25.2%). Less common were extravasation and an experience of fainting after having an injection (Table 6.6).

Table 6.6 Distribution of side effects experienced after getting an injection

Description	Proportion of respondents, N=91(%)
Swollen or hard lump under skin	26 (28.6)
Warm feeling under the skin	23 (25.2)
Persistent pain under injected area	12 (13.2)
Weak feeling after the injection	11 (12.1)
Fever caused by injection	9 (9.9)
Persistent redness	4 (4.4)
Extravasation	3 (3.3)
Fainted	3 (3.3)

When presented with reasons regarding side effects, several possible explanations were put forward in the questionnaire. About one-third (34.1%) did not know that these effects could occur whereas others attributed them to the injection or the injection techniques employed (Figure 6.2).

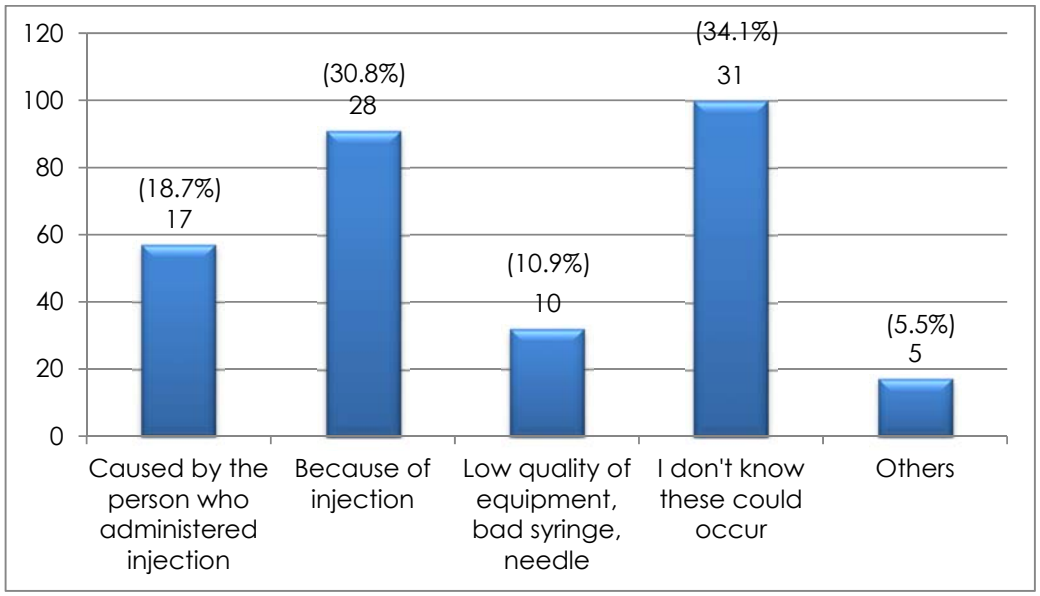


Figure 6.2 Possible reasons for side effects occurring after getting an injection

Regarding the actions undertaken after experiencing side effects (Figure 6.3), some respondents consulted a doctor (n=30, 32.9%) and others went to hospital (n=15, 16.7%) or consulted a pharmacist (n=6, 6.3%). However, almost one-half respondents did not do anything (n=40, 44.0%), which may be due to respondents not recognizing that those symptoms were side effects related to an injection or considering them minor.

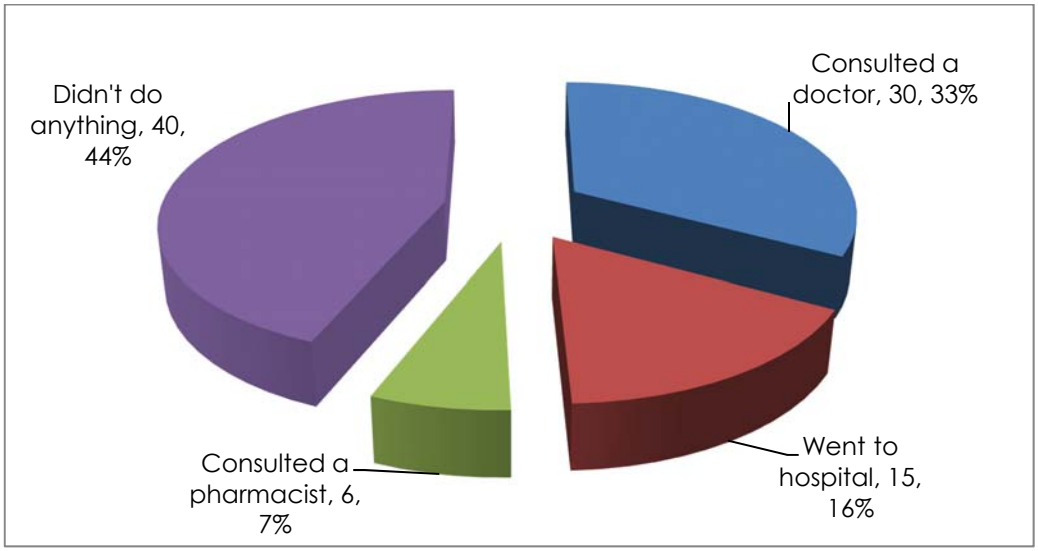


Figure 6.3 Actions undertaken after experiencing a side effect to an injection

6.1.5 Characteristics of prescribers, providers and administrators of injectables

6.1.5.1 Injection prescribers

Participants were asked about prescribers and providers of therapeutic injections to gain an insight to this practice. The main prescribers were doctors (75%), who are formal prescribers which was compliant with the current guidelines(305) (Table 6.7). Other practitioners were less frequently sought for prescribing of injections.

Table 6.7 Prescribers of injections

Category [a]	Yes n (%)	Sometimes n(%)
Doctor	353 (74.9)	75 (15.9)
Pharmacist	24 (5.1)	79 (16.7)
Nurse	30 (6.4)	66 (14.0)
Traditional practitioner	35 (7.4)	64 (13.6)

[a] Some responses were missing for each category

6.1.5.2 Injection providers

Of the 474 respondents, most obtained their injections on prescription or received over-the-counter injectables from pharmacists (60%). Detailed results are summarized in Table 6.8.

Table 6.8 Practitioners who supplied or dispensed injections for community respondents

Category [a]	Yes n (%)	Sometimes n (%)
Doctor	118 (25.0)	69 (14.6)
Pharmacist	283 (59.7)	71 (15.0)
Nurse	21 (4.4)	54 (11.4)
Traditional practitioner	31 (6.5)	50 (10.6)

[a] Some responses were missing for each category

Demographic differences were found among the respondents agreeing with pharmacists dispensing or providing injections. There was a significant difference between respondents with different educational level, [Kruskal-Wallis test, H = 9.51, df=3, p =.023]. In particular respondents with tertiary education (Group 3: M =1.53, SD = 0.82) were more likely to respond that injections were dispensed or provided with or without a prescription by pharmacists than those respondents with primary education (Group 1: [M = 1.86, SD = 0.93], p = .006).

Additionally, about 25% of respondents indicated doctors as dispensers or suppliers of injections (this includes people who were severely ill and received an injection from a doctor at inpatient settings). Respondents from urban compared with those from rural areas did not support doctors providing injections [Kruskal-Wallis test, H=14.4, df=1, p < .001]. Pairwise comparisons indicated a significant difference between doctors providing injections across respondents with different marital status [H=10.3, df=4, p = .036] and pairwise comparisons indicated single respondents (Group 1: [M = 2.16, SD = .93] were more likely to accept injections provided from doctors than married people (Group 2: [M = 2.46, SD = .79]), p = .002.

As shown in Table 6.8, seventy-five respondents stated that injections were provided by nurses. In this case, widowed people (Group 5: [M = 2.47, SD = .75] were more likely to accept injectables from nurses than single (Group 1: [M = 2.82, SD = .46], p = .004, or married people (Group 2: [M = 2.83, SD = .45]) p = .003.

6.1.5.3 Administration of therapeutic injections

In compliance with guidelines,(305) most respondents chose nurses as the main health professional for the administration of injections, followed by doctors. When comparing responses across different groups, administration of injections by nurses were more likely to have been to the older age group (more than 51 years) (Group 3: [M = 1.35, SD = .67]) than younger ones (range: 20-30 years) (Group 1: [M = 1.8, SD = 0.9]) and Tukey's HSD demonstrated a significant result (p = .003).

Of all respondents, about seventeen people stated traditional practitioners as the administrators of injections and one-way ANOVA showed significant difference across respondents with different marital status [F (4, 467) = 3.6, p = .006]. Similar to injection providers, widowed people (Group 5: [M = 2.47, SD = 0.6]) tended to agree with traditional practitioners being an administrator of injections compared with single (Group 1: [M = 2.88, SD = .42]) or married respondents (Group 2: [M = 2.79, SD = 0.49]) (p = .003, p = .028).

About 15% of respondents reported that injections were administered by friends or relatives (Figure 6.4).

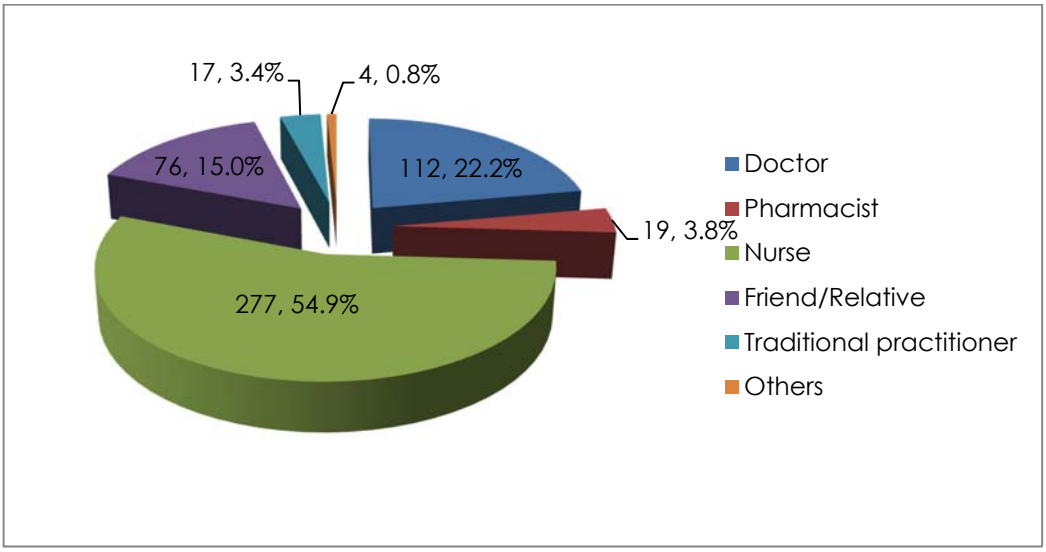


Figure 6.4 Distribution of individuals who administer injections

6.1.6 Respondents' attitude towards therapeutic injectable medicines

When presented with questions regarding their attitude towards injections, only seventy-seven respondents had the likelihood of receiving injections in their mind when they visited a doctor (16.2%). A significant difference was found using Kruskal-Wallis test of expecting an injection across respondents in different age groups [H=6.1, df=2, p = .048], with respondents aged over 51 (Group 3; [M = 2.08, SD = 0.85]) being more supportive of the statement than younger ones (range: 20-30 years) (Group 1: [M = 2.39, SD = 0.69]), p =0.018

Respondents indicated their perception that doctors prescribed (n=137, 29.0%) injections. However, about 9% of respondents desired an injection being prescribed (n=41, 8.7%). Statistically significant differences were found between desiring an injection across respondents' age groups, with younger respondents being more likely to reject the statement (Table 6.9).

Table 6.9 Relationship between desiring an injection from a doctor across different age groups

Category	Age level with significant difference			Kruskal-Wallis Sig.
	Pairwise comparison between groups	M (SD) [a]	M (SD)	
Desire for an injection	≥51 years versus 20-30 years	2.4 (0.8)	2.7 (0.6)	.008
	≥51 years versus 31-50 years		2.7 (0.6)	.02

[a] Answers were coded from 1 to 3, with 'Yes' being 1 and 'No' being 3.

When asked their opinion about therapeutic injectables, 40% of all respondents agreed that injections were a better medicine (n=190) than oral medications, with significantly more older respondents tending to agree with this [F (2, 471) = 9.13, p < .001].

Moreover, when participants were asked for their opinions regarding treatment with injectable medicines, a number of aspects were proffered and detailed results are summarized in Table 6.10.

An important perception regarding injections was that they hasten the recovery process (n=269, 56.8%). Older respondents (over 51 years) agreed with this statement relatively more when compared with respondents aged less than 51 years [F (2, 471) = 7.87, p < .001]. Similarly, widowed respondents agreed more with this statement [F (4, 471) = 6.93, p < .001] (Group 5: [M =

1.09, *SD* = 0.3]) when compared to single (Group 1: [*M*= 1.76, *SD* = .74]) or separated respondents (Group 4: [*M* = 1.72, *SD* = .84]).

Table 6.10 Reasons to prefer injection

Explanations [a]	Yes n (%)	Sometimes n (%)	No n (%)
An injection helps to recover faster	269 (56.8)	143 (30.2)	62 (13.1)
An injection costs less	72 (15.2)	111 (23.4)	291 (61.4)
I prefer having an injection, because I forget to take medicine	126 (26.6)	108 (22.8)	240 (50.6)
When doctor prescribes tablets/ capsules, the treatment is more effective	79 (16.7)	201 (42.4)	194 (40.9)
My friends, relatives recommend me to have an injection	106 (22.4)	129 (27.2)	239 (50.4)
Medical companies advertise injections	103 (21.7)	118 (24.9)	253 (53.4)
Having an injection is a personal preference	22 (4.6)	60 (12.7)	392 (82.7)

[a] Some responses were missing for each category

However, less than half of respondents disagreed that the treatment with oral medication was more effective than injectables (n=194, 40.9%). In general, most respondents did not support the statement that treatment cost was less with injections (61.4%) with younger respondents significantly stronger in their disagreement than respondents older than 51 years [*F* (2, 471) = 7.43, *p* = .001].

Having an injection was not a personal preference for most respondents (82.7%). When comparing responses, respondents with other or no formal education were more likely to agree with having an injection as a personal preference when compared with respondents with primary or secondary education, however this was not statistically significant [Kruskal-Wallis test, *H*=6.1, df=3, *p* = .107] (Table 6.11).

Table 6.11 Relationship between likelihood of having an injection as a personal preference across respondents with different education levels

Variable	Yes/Sometimes n (%)	*p* value [a]
Primary	3 (13.6)/10 (16.7)	.107
Secondary	6 (27.3)/33 (55.0)	
Tertiary	9 (40.9)/14 (23.3)	
Other	4 (18.2)/3 (5.0)	

[a] *p* value is estimated by performing Kruskal-Wallis test

Purchasing injections

When purchasing injections several key matters were identified. The price of the injection and whether it was imported or a local product was of a less importance when getting an injection. On the other hand, people were more concerned about the importance of complete package (61.9%) and the expiry date of the injection (85.2%) (Figure 6.5).

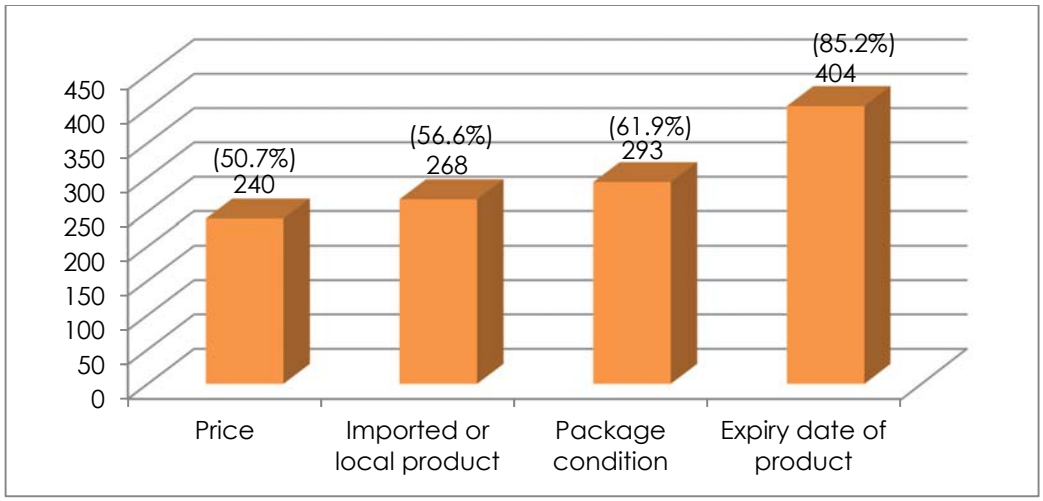


Figure 6.5 Important matters identified by a majority of respondents when purchasing an injection

If an injection was not prescribed, only 69 respondents (14.6%) said they would be disappointed and statistical differences were found using Kruskal-Wallis test across different groups (Table 6.12).

Table 6.12 Relationship between being disappointed if injection was not prescribed by age and income group

Variable	Yes/Sometimes n (%)	*p* [a]
Age		< .001
20-30	20 (10.1)/37 (18.7)	
31-50	35 (15.4)/38 (16.7)	
≥51	14 (29.2)/16 (33.3)	
Income (MNT)		
≤90,000	13 (15.7)/13(15.7)	.071
91,000-200,000	21 (27.3)/15 (19.5)	
201,000-300,000	13 (13.1)/19 (19.2)	
301,000-400,000	12 (13.3)/17 (18.9)	
401,000-500,000	7 (10.3)/14 (20.6)	
≥501,000	3 (5.3)/13 (22.8)	

[a] *p* values are estimated by performing Kruskal-Wallis test

Pairwise comparisons showed older respondents (Group 3: [*M* = 2.08, *SD* = .82]) were more likely to be disappointed if an injection was not received (Kruskal-Wallis test, *H*=20.8, df=2, *p* < .001).

The questionnaire also asked about respondents' practice of refusing therapeutic injections and 39.4% respondents answered they would refuse an injection. Several reasons were proffered for refusing or rejecting injectable medicines (Table 6.13). A reliability analysis showed that all items for refusing an injectable appeared to have good internal consistency, Cronbach's α=0.78.

Table 6.13 Reasons for refusal if injection was prescribed/ supplied

Reasons [a]	Yes n (%)	Sometimes n (%)	No n (%)
I am scared of pain	138 (29.2)	82 (17.4)	252 (53.4)
I am scared of needle and injection	180 (38.1)	86 (18.2)	206 (43.6)
I do not trust the doctors and pharmacists	46 (9.7)	141 (29.9)	285 (60.4)
It is possible to recover without any kind of injection	119 (25.2)	151 (32.0)	202 (42.8)
There are lots of dosage forms, e.g. tablets, capsules are available for many diseases	129 (27.3)	126 (26.7)	217 (46.0)
After sometime disease cures by itself	48 (10.2)	124 (26.3)	300 (63.6)
There was no clean needle and syringe	21 (4.4)	29 (6.1)	422 (89.4)
Others	126 (26.8)	52 (11.0)	293 (62.2)

[a] Some responses were missing for each category

Of the participants, 22 men (11.3% of male cohort) and 19 women (6.8% of female cohort) had refused injections in the past. As data in Table 6.13 demonstrate, the main reason for refusal was being scared of needles and injections (n=180, 38.1%) and acknowledging the availability of other dosage forms than injections.

In particular, respondents aged between 20 and 30 years stated being scared (Group 1: [M = 2.14, SD= .89], p = .013) compared with those aged ≥51 (Group 3: [M = 2.54, SD = .74]). Similarly, younger respondents were likely to accept that other dosage forms, including tablets, capsules etc. were available [Kruskal-Wallis test, H=12.1, df=2, p = .002].

In general, most respondents did not have trust issues with their doctors and pharmacists. In addition, most did not support that after a period of time a disease would be cured by itself (63.6%).

6.1.7 Cost of injections

The cost of injections was estimated from the payment during their last visit at the doctor and whether they paid any fees for the purchase and administration of an injection. The respondents paid approximately US$14.3(median US$13.8) for visiting a doctor, US$12.6(median US$11.5) for purchasing an injection, and US$4.6 (median US$3.3) for the administration of injection. Comparing these fees with the average income in Mongolia at that time (US$291 per month), these are high prices to pay, however, most respondents reported the fees paid for visiting the doctor, for purchasing medicine from pharmacy and for the administration of injections was affordable.

6.1.8 Counterfeit medicines in Mongolia

When asked about knowledge about counterfeit medicines in Mongolia, the majority of respondents reported that they were aware about its existence (66.5%). Comparing the type of counterfeit medicines, counterfeit/ substandard antibiotics were slightly more prevalent (59.4%), than non-antibiotic medicines (49.2%).

6.1.9 Summary of findings of the questionnaire study with community members

The questionnaire study with community members in Mongolia investigated their experiences, views and attitudes towards injection practices relevant to the treatment of CAP.

The results showed that all respondents had received at least one injection in past years and 56.6% had received an injection in the past twelve months. The most common reason for having an injection was reported to be for treatment of a disease (61%) or for administration of vitamins (26%).

In terms of injection prescribers and providers, participants indicated that the main prescribers were doctors (75%), who are formal prescribers which was compliant with the current guidelines. Other practitioners were rarely sought for prescribing of injections. Of the 474 respondents, most obtained on

prescription or received OTC injectables from pharmacists (60%). In compliance with guidelines, most respondents chose nurses as the main health professional for the administration of injections, followed by doctors. A small number of respondents chose informal injection administers, such as friends or relatives for administration of injections (15%).

Attitude towards injections was assessed and a minority respondents had the likelihood of receiving injections in their mind when they visited a doctor (16.2%), in particular a statistically significant difference was observed for older respondents when compared with those aged less than 51 years. Respondents indicated their perception that doctors prescribed injections (29.0%). At the same time, about 9% of respondents did not desire an injection being prescribed. Also, statistically significant differences were found between desiring an injection across respondents' age groups, with younger respondents being more likely to reject the statement. Similarly, of those who would be disappointed if an injection was not prescribed or provided, older respondents were more likely to be disappointed if an injection was not received. When asked about their opinion about therapeutic injectables, 40% of all respondents agreed that injections were a better medicine than oral medications. And significantly, older respondents tended to agree with this. Moreover, when participants were asked for their opinions regarding the effect and quality of injectable medicines and the main belief in injections was explained by the reason that it hastens the recovery process (56.8%). Older respondents tended to agree more with a faster recovery from injections. However, less than one-half disagreed that the treatment with oral medication was more effective than injectables (n=194, 40.9%). Having an injection was not a personal preference to most respondents (82.7%). The study indicated that most respondents did not have trust issues with their doctors and pharmacists.

Assessment of safe injection practice indicated positive findings: a majority was aware of using new syringe and needles for every injection administration.

The majority was aware about the existence of counterfeit and substandard medicines (66.5%) and respondents indicated that the prevalence of

counterfeit/substandard antibiotics was slightly more (59.4%) than non-antibiotic medicines (49.2%) in Mongolia.

6. 2 Results of a questionnaire issued to pharmacists and pharmacy technicians

This section provides results of the questionnaire study with pharmacists and pharmacy technicians with regards to their practice of dispensing and prescribing antibiotics for the treatment of CAP in Mongolia and to investigate the underlying factors that impact on dispensing, and prescribing practices and administering of therapeutic injections in Mongolia.

6.2.1 Respondents' characteristics

Of eighty distributed questionnaires, 61 were returned yielding a usable response rate of 76.3%. The majority of respondents were females (77.0%), and most of the respondents were aged between 31 and 50 years. This indicates the current gender distribution of Mongolia with most pharmacists being female (92.9%).(4) A little over half of the respondents were pharmacists (55.7%), and most respondents had been working for one to five years (65.6%) (Table 6.14).

Table 6.14 Demographic characteristics of respondents

Variable (N=61)[a]	Category	n (%)
Age (years)	20-30	22 (36.1)
	31-50	23 (37.7)
	≥51	16 (26.2)
Gender	Male	14 (23.0)
	Female	47 (77.0)
Pharmacy ownership	Owner	12 (19.7)
	Employee	49 (80.3)
Professional level	Pharmacist	34 (55.7)
	Pharmacy technician	27 (44.3)
Years of working experience	1-5	40 (65.6)
	6-10	11 (18.0)
	≥11	10 (16.4)
Income (MNT)	90.000-200.000	9 (15.0)
	201.000-300.000	13 (21.7)
	301.000-400.000	23 (38.3)
	≥401.000	15 (25.0)

[a] Some responses were missing for each category

6.2.2 Dispensing practice with prescriptions for CAP

Participants were asked about their dispensing practice in relation to prescribed medicines for treatment of CAP. The dispensing practices of more than one antibiotic prescribed by physicians was examined using a five-point Likert scale which ranged from never to always and the responses were reduced to three categories, never/rarely, sometimes and often/always. As shown in Table 6.15, 80% of respondents reported they dispensed more than one antibiotic sometimes with almost one-quarter reporting they do so frequently.

Table 6.15 Frequency of dispensing practice of more than one antibiotic prescribed for treatment of CAP

Never/Rarely [a] n (%)	Sometimes n (%)	Often/Always n (%)
12 (20.0)	34 (56.7)	14 (23.3)

[a] Likert scale answers were coded from 1 to 5, with 'Never' being 1 and 'Always' being

6.2.3 Factors influencing dispensing practice of prescribed medicines

When presented with questions regarding the respondents' dispensing practice of prescribed medicines, a number of contexts were identified, such as pharmacist's opinion on the importance of treatment guidelines, government control on dispensing practice, patient's condition and the price of medication.

Characteristics that influenced respondents' practices in dispensing prescriptions for CAP included reimbursable drugs from the Essential Drug List of Mongolia (EDLM) which are subsidized and usually generic medicines, making it cheaper to patients, patient's severity, children and adults' treatment, dosage form, duration and cost of prescribed medicines. These data together with other characteristics are presented in Table 6.16.

Table 6.16 Characteristics influencing practices of respondents dispensing prescribed medicines for patients with CAP

Characteristic [a]	SA/A n (%)	D/SD/N n (%)
Selection of reimbursable generic drugs via EDLM (concession rates)	43 (71.7)	17 (28.3)
Appropriate children's treatment (dosage adjustment)	50 (84.7)	9 (15.3)
Appropriate adults treatment (dosage adjustment)	43 (72.9)	16 (27.1)
Patient's severity	45 (76.3)	14 (23.7)
Duration of treatment of medicines in the prescription	46 (78.0)	13 (22.0)
Knowledge of adverse effects of drugs (e.g. drug allergies)	40 (65.6)	19 (32.2)
Legislative documents, such as standard on prescribing and dispensing practice of Mongolia	31 (52.5)	28 (47.5)
Guidelines for treatment of CAP	34 (58.6)	24 (41.4)
Patient's compliance with treatment	39 (66.1)	20 (33.9)
Patient is not satisfied with the treatment if injection is not prescribed	35 (59.3)	24 (40.7)
Ability of patient to buy prescription medicines without prescription	39 (66.1)	20 (33.9)
The price is important when dispensing generic and brand medicines	45 (76.3)	14 (23.7)
Expiry date of medicine	38 (64.4)	21 (35.6)
Practice to re-use medicines	29 (49.2)	30 (50.8)

SA- Strongly agree, A-Agree, D- Disagree, SD- Strongly disagree, N-Neutral

[a] Some responses were missing for each category

Most respondents agreed that patient's severity had an influence on their dispensing practice (76.3%).

Logistic regression was performed to assess the impact of a number of factors on the likelihood that respondents would agree that patient's ability to buy medicines without a prescription had an influence on their dispensing

practice for CAP. The model contained five independent variables (age, gender, pharmacy ownership, and pharmacist versus pharmacy technician and working years). The full model containing all predictors was statistically significant χ2 (5, N=59)=19.05. *p* = .004, indicating that the model was able to distinguish between respondents who supported and did not support the statement. The model as a whole explained between 27.6% (Cox and Shell R square) and 38.2% (Nagelkerke R square) of the variance in the statement, and correctly classified 78% of cases. As shown in Table 6.16, only three of the independent variables made a unique statistically significant contribution to the model (gender, pharmacists versus pharmacy technicians and working years). Males were less likely than females to agree that patient's ability to buy medicines had an influence on their dispensing practice and it was just significant (*p*= .044). Similarly, pharmacy technicians were less likely than pharmacists to agree with the statement (*p* = .008), as were respondents with more than 11 years of working experience (*p* = .019) (Table 6.17).

Table 6.17 Logistic regression predicting likelihood of agreeing that patient's ability to buy medicines influenced the dispensing practice

Independent variables [a]	n/N (,%) A/SA	*p*	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Age	-	.14	.53	.22	1.24
Gender		.044	6.6	1.05	40.74
Male	8/14 (57.1)				
Female	31/45 (68.9)				
Ownership		.16	.22	.03	1.82
Owner	7/11 (63.6)				
Employee	32/48 (66.7)				
Profession		.008	.14	.03	.59
Pharmacist Pharmacy technician	27/33 (81.8) 12/26 (46.2)				
Working years					
1-5	29/39 (74.4)	-	-	-	-
6-10	6/10 (60.0)	.06	.15	.02	1.04
≥11	4/10 (40.0)	.019	.09	.01	.67
Constant	-	.024	162.27	-	-

A-Agree, SA- Strongly agree
[a] Some responses were missing for each category

The likelihood of agreeing that the practice to re-use medicines was an important factor when dispensing was also tested by performing a logistic regression model with the five independent variables and found to be statistically significant χ2 (5, N=59)=18.64. *p* = .002. Pharmacy technicians were less likely to agree with the practice of re-using medicines than pharmacists (*p* = .001) and female respondents were six times more likely to agree with this practice when compared with males (*p* = .039) (Table 6.18).

Table 6.18 Logistic regression predicting likelihood of agree with the practice to re-use medicines

Independent variables [a]	n/N (,%) A/SA	*p*	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Age	-	.42	1.39	.62	3.16
Gender Male Female	 4/14 (28.6) 25/45 (55.6)	.039	6.19	1.09	35.02
Ownership Owner Employee	 4/11 (36.4) 25/48 (52.1)	.65	.66	.11	4.02
Profession Pharmacist Pharmacy technician	 23/33 (69.7) 6/26 (23.1)	.001	.09	.02	.35
Working years	-	.63	.81	.35	.189
Constant	-	.98	1.05	-	-

A-Agree, SA- Strongly agree

[a] Some responses were missing for each category

6.2.4 Changing the prescribed treatment for mild/ moderate CAP

Of sixty one respondents, 70% had to change the prescription for treatment of CAP sometimes or always because the prescribed treatment was inappropriate. Distribution of responses is presented in Table 6.19.

Table 6.19 Frequency of respondents' practice of changing prescribed treatment for CAP

Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)
18 (30.0)	33 (55.0)	9 (15.0)

Pharmacists were significantly more likely to change prescriptions for CAP when compared with pharmacy technicians [t (59) = 2.55, p = .013](Figure 6.6).

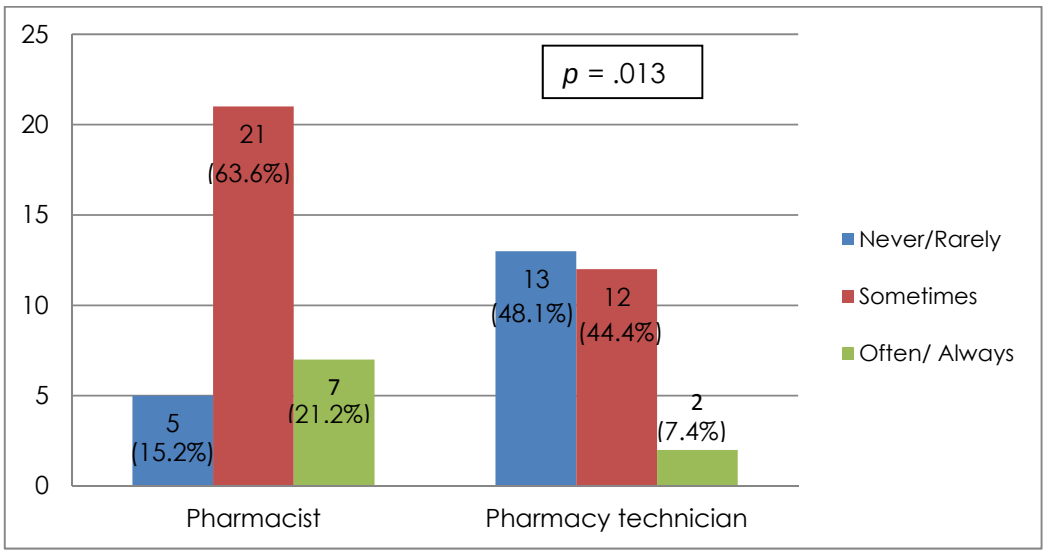


Figure 6.6 Frequency of prescriptions that were changed by a pharmacist/ pharmacy technicians

6.2.5 Duration of prescribed drugs for treatment of CAP

To assess the knowledge of respondents with regards to the duration of prescribed medicines, including an injectable, respondents were asked to identify the extent to which they agreed with the proposed extent of duration. The extent of duration started from less than three days to more than five days for duration of both oral and injectable medicines prescribed for the treatment of CAP. Regarding the conversion time from parenteral to oral antibiotic after commencing the treatment, four options were proposed, starting from within 24 hours to more than five days.

Of 61 respondents, 60.7% reported that the duration of treatment with prescribed injections was more than five days. Also, most respondents reported the same duration for oral antibiotics (68.9%). A majority of respondents indicated that the conversion from parenteral to oral antibiotic strongly depended on a patient's improvement and the highest proportion (44.3%) answered more than five days after commencing treatment (27/61), followed by three days 37.7% (23/61).

6.2.6 Types of dispensed antibiotics for CAP with prescription

The dispensed frequencies of prescribed antibiotics and other drugs were identified using 5-point Likert scales ranging from never, sometimes to always. Subsequently, the responses were collapsed into three categories and the details are shown in the Table 6.20 and Table 6.21. Commonly dispensed antibiotics with prescriptions were oral and injectable penicillins with extended spectrum and oral sulfonamides. Oral macrolides were dispensed more frequently than injetactables whereas in contrast, injectable quinolones and injectable cephalosporins were more frequently dispensed than oral forms (Table 6.20).

Table 6.20 Antibiotics dispensed with prescription for treatment of CAP

ATC classification [a]	Never/Rarely n(%)	Sometimes n(%)	Often/Always n(%)
Penicillin, oral	48 (78.7)	8 (13.1)	5 (8.2)
Penicillin, injection	35 (57.4)	17 (27.9)	9 (14.8)
Penicillin with extended spectrum, oral	22 (18.0)	36 (29.5)	64 (52.5)
Penicillin with extended spectrum, injection	20 (16.4)	34 (27.9)	68 (55.7)
Combination of penicillin, oral	7 (11.5)	26 (42.6)	28 (45.9)
Quinolone, oral	53 (43.4)	28 (23.0)	41 (33.6)
Quinolone, injection	13 (21.3)	14 (23.0)	34 (55.7)
Cefalosporin, oral	16 (26.2)	15 (24.6)	30 (49.2)
Cefalosporin, injection	7 (1.5)	8 (13.1)	46 (75.4)
Macrolides, oral	40 (21.9)	50 (27.3)	93 (50.8)
Macrolides, injection	131 (71.6)	26 (14.2)	26 (14.2)
Tetracycline, oral	103 (84.4)	16 (13.1)	3 (2.5)
Sulfonamid, oral	18 (29.5)	19 (31.1)	24 (39.3)

[a] Some responses were missing for each category

Other medicines dispensed with a prescription for treatment of CAP included mucolytics, vitamins and antihistamines (Table 6.21). Additionally, injectable corticosteroids and injectable xanthines were frequently dispensed non-antibiotics.

Table 6.21 Non-antibiotic medicines dispensed with prescription for treatment of CAP

Other medicines [a]	Never/Rarely n(%)	Sometimes n(%)	Often/Always n(%)
Corticosteroid, oral	31 (50.8)	19 (31.1)	11 (18.0)
Corticosteroid, injection	19 (31.1)	24 (39.3)	18 (29.5)
Mucolytics, oral	4 (6.6)	26 (42.6)	31 (50.8)
Vitamin, oral	31 (26.1)	42 (35.3)	46 (38.7)
Vitamin, injection	88 (49.4)	56 (31.5)	34 (19.1)
Antihistamin, oral	58 (48.7)	36 (30.3)	25 (21.0)
Antihistamin, injection	37 (62.7)	15 (25.4)	7 (11.9)
Xanthin, oral	18 (30.0)	25 (41.7)	17 (28.3)
Xanthin, injection	27 (45.8)	19 (32.2)	13 (22.0)
Pyrazolone, oral	45 (76.3)	7 (11.9)	7 (11.9)
Pyrazolone, injection	44 (75.9)	9 (15.5)	5 (8.6)

[a] Some responses were missing for each category

6.2.7 Dispensing practice of drugs issued without prescription for patients with CAP

6.2.7.1 Influencing factors of dispensing practice of non- prescribed drugs for treatment of CAP

According to the current regulation, only qualified medical doctors can prescribe medicines to patients.(305) However, the practice of providing non-prescribed medicines, including injections is commonly observed in Mongolian pharmacies.(35, 301) Therefore, respondents were asked to indicate the extent to which they agreed with issues that influenced their

dispensing practice of medicines without prescriptions (Table 6.22) and all their responses had a good internal consistency (Cronbach's a=0.76).

The questionnaire raised issues related to providing non-prescribed injectable medicines and it was commonly reported that injectables were provided if patients had severe CAP (79.3%) and to achieve better patient's compliance with treatment (68.4%).

Amongst respondents, a fairly high proportion (69%) specified that the clinical effect of injections was more than oral medicines (40/61), however no significant relationship was observed between pharmacists and pharmacy technicians [t (56) = .52, p = .603]. Additionally, the proportion of pharmacists supporting the idea that medication outcome from injections was better than tablets or capsules tended to be greater (62.5%) than pharmacy technicians (53.8%), yet, it was not statistically significant: [t (56)= .66, p = .514]

Table 6.22 Characteristics that influence practice of providing drugs without prescriptions

Characteristic [a]	SA/A n (%)	D/SD/N n (%)
The clinical effect of injections is more potent than oral medicines'	40 (69.0)	18 (31.0)
The quality of injections better than tablets/ capsules	34 (58.6)	24 (41.4)
The adverse events occur with oral drugs more than with injections	16 (27.6)	42 (72.4)
The dosage form of injection is chosen for better compliance of a patient	39 (68.4)	18 (31.6)
The injection requires new syringes and needles	48 (82.8)	10 (17.2)
There is no benefit for the transfer of patient with pneumonia from injection to oral medicines	22 (37.9)	36 (62.1)
Training promotes more about treatment with an injection than oral medicines	12 (20.7)	46 (79.3)
There is lot of advertisement about injection by drug companies	11 (19.0)	47 (81.0)
Prefer to dispense newly distributed medicines in the market	39 (67.2)	19 (32.8)
Cost of treatment by oral medicines is more than the treatment cost with injections (including cost of syringes and needles)	21 (36.2)	37 (63.8)
If patients are prescribed an injection, they are required to visit a pharmacy several times	23 (39.7)	35 (60.3)
Better patient compliance is achieved by choosing an injection	32 (55.2)	26 (44.8)
Patient prefer to use tablets rather than injection	17 (29.3)	41 (70.7)
When dispensing injection, patient's age, gender are important	44 (75.9)	14 (24.1)
Injection is chosen if patient had severe CAP	46 (79.3)	12 (20.7)

SA- Strongly agree, A-Agree, D- Disagree, SD- Strongly disagree, N-Neutral

[a] Some responses were missing for each category

Moreover, a majority of respondents did not support that there were frequent advertisements about injectables by drug companies (47[81.0%]). The impact

of factors on the likelihood that respondents disagreed with the statement that there is a lot advertisements about injections by pharmaceutical companies more than oral medicines was tested using logistic regression. The model contained two independent variables (pharmacy owners or employees; pharmacists or pharmacy technicians). The model was statistically significant [χ2 (2, N=58)=6.3. *p* = .043], indicating that the model was able to distinguish between respondents who supported and did not support the statement (Table 6.22). Employees were less supportive of the statement regarding advertisements than owners who are pharmacists only (*p* = .034) (Table 6.23). Pharmacists in comparison to pharmacy technicians were also less supportive of the statement that there were lots of injections advertised by the companies; however it was not statistically significant.

Table 6.23 Logistic regression predicting the likelihood of agreeing that there are a lot of advertisements about injections by pharmaceutical companies

Independent variables [a]	n/N (,%) A/SA	P	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Ownership Owner Employee	 5/11 (45.5) 6/47 (12.8)	.034	.2	.05	.89
Profession Pharmacist Pharmacy technician	 4/32 (12.5) 7/26 (26.9)	.32	2.08	0.49	8.68
Constant	-	.31	.25	-	-

A-Agree, SA- Strongly agree

[a] Some responses were missing for each category

Of 61 respondents, 36 (62.1%) disagreed that there was no benefit for the patient with CAP to transfer from injection to oral medicines. Logistic regression analysis was performed and a model containing three independent variables (pharmacy ownership, pharmacist or pharmacy technician and working years) was able to distinguish statistically significant differences, [χ2 (3, N=58)=9.17, *p* = .027]. The only variable that had a statistically significant independent effect was ownership, with employees

being less likely to agree that the cost of treatment by oral medication was more than with injections (p = .029).

Table 6.24 Logistic regression predicting the likelihood of agreeing with the cost of oral medicines being higher than cost of injections

Independent variables [a]	n/N (,%) A/SA	P	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Ownership Owner Employee	 7/11 (63.6) 14 (29.8)	.029	.173	.036	.839
Profession Pharmacist Pharmacy technician	 10/32 (31.2) 11/26 (42.3)	.48	1.54	.47	5.03
Working years 1-5 6-10 >11	 29/39 (74.4) 3/9 (33.3) 7/10 (70.0)	.053	.39	.15	1.01
Constant	-	.372	5.7	-	-

A-Agree, SA- Strongly agree

[a] Some responses were missing for each category

A practice of providing newly marketed medicines without prescription was preferred by most respondents (67.2%) and about 70% did not support that adverse effects occurred more with oral medications than with therapeutic injectables. Most respondents supported that an injection requires new syringes and new needles (82.8%).

6.2.7.2 Dispensing practice of antibiotics without prescription

Respondents were asked about their practice of providing antibiotics without a prescription. Most never or rarely dispensed medicines without a prescription (65.0%); on the other hand 13 (21.7%) respondents dispensed non-prescribed antibiotics sometimes. Differences between the practice of providing non-prescribed antibiotics and various groups are summarized in Table 6.25. Pharmacists provided more than one antibiotic to patients more frequently

than pharmacy technicians [t (58) = 2.26, p = .027]. However, pharmacy ownership did not influence this finding.

Table 6.25 Relationship between the practices of providing non-prescribed antibiotics across respondents in various demographic groups

Variable [a]	Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)	p Value
Age				.847[b]
20-30	12 (57.1)	7 (33.3)	2 (9.5)	
31-50	15 (65.2)	4 (17.4)	4 (17.4)	
≥51	12 (75.0)	2 (12.5)	2 (12.5)	
Gender				.631
Male	11 (78.6)	1 (7.1)	2 (14.3)	
Female	28 (60.9)	12 (26.1)	6 (13.0)	
Pharmacy ownership				.664
Owner	10 (83.3)	-	2 (16.7)	
Employee	29 (60.4)	13 (27.1)	6 (12.5)	
Professional level				.027
Pharmacist	18 (54.5)	8 (24.2)	7 (21.2)	
Pharmacy technician	21 (77.8)	5 (18.5)	1 (3.7)	
Year of working experience				.883[b]
1-5	25 (64.1)	9 (23.1)	5 (12.8)	
6-10	7 (63.6)	2 (18.2)	2 (18.2)	
>11	7 (70.0)	2 (20.0)	1 (10.0)	
Income				.456 [b]
91-200.000	6 (66.7)	3 (33.3)	-	
201.000-300.000	8 (61.5)	3 (23.1)	2 (15.4)	
301,000-400,000	13 (59.1)	4 (18.2)	5 (22.7)	
>401,000	11 (73.3)	3 (20.0)	1 (6.7)	

[a] Some responses were missing for each category

[b] p value was calculated using one-way ANOVA

6.2.7.3 Duration of non-prescribed drugs for treatment of CAP

Further analysis regarding respondents' practice of dispensing without prescription focused on the duration of oral and injectable antibiotics for CAP.

Most respondents indicated that the duration of dispensed non-prescribed antibiotics by injection was more than five days (58%), as well as the duration of dispensed medicine orally (70.0%).

In contrast to the result (60.7%) regarding the conversion time from parenteral to oral antibiotics with prescription (more than five days), 43.3% reported that it was three days after commencing the treatment without prescription (26/61).

6.2.7.4 Types of dispensed medicines for CAP without prescription

The most commonly dispensed antibiotics without prescription were similar to those dispensed with prescription: oral and injectable penicillins with extended spectrum and oral sulfonamides. Additionally, non-prescribed oral and injectable cefalosporins were frequently dispensed. In contrast, tetracyclines and injectable macrolides were less frequently dispensed.

Table 6.26 Antibiotics dispensed without prescription for treatment of CAP

ATC classification [a]	Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)
Penicillin, oral	28 (45.9)	16 (26.2)	17 (27.9)
Penicillin, injection	30 (49.2)	13 (21.3)	18 (29.5)
Penicillin with extended spectrum, oral	31 (25.4)	34 (27.9)	57 (46.7)
Penicillin with extended spectrum, injection	47 (38.5)	31 (25.4)	44 (36.1)
Combination of penicillin, oral	20 (32.8)	23 (37.7)	18 (29.5)
Quinolone, oral	67 (54.9)	30 (24.6)	25 (20.5)
Quinolone, injection	30 (49.2)	13 (21.3)	18 (29.5)
Cefalospin, oral	28 (45.9)	14 (23.0)	19 (31.1)
Cefalosporin, injection	28 (45.9)	10 (16.4)	23 (37.7)
Macrolides, oral	77 (42.1)	53 (29.0)	53 (29.0)
Macrolides, injection	134 (73.2)	29 (15.8)	20 (10.9)
Tetracycline, oral	91 (74.6)	19 (15.6)	12 (9.8)
Sulfonamid, oral	17 (27.9)	18 (29.5)	26 (42.6)

[a] Some responses were missing for each category

There was no hesitancy to dispense oral or injectable non-antibiotic medicines without a prescription with regards to corticosteroids, pyrazolones and

xanthines. The most common medicines dispensed without prescription for treatment of CAP were oral mucolytics, vitamins and xanthines (Table 6.27).

Table 6.27 Non-antibiotic medicines dispensed without prescription for treatment of CAP

ATC classification [a]	Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)
Corticosteroid, oral	35 (59.3)	16 (27.1)	8 (13.6)
Corticosteroid, injection	28 (48.3)	24 (41.4)	6 (10.3)
Mucolytics, oral	6 (10.0)	19 (31.7)	35 (58.3)
Vitamin, oral	28 (23.7)	30 (25.4)	60 (50.8)
Vitamin, injection	97 (55.1)	42 (23.9)	37 (21.0)
Antihistamine, oral	63 (53.4)	24 (20.3)	31 (26.3)
Antihistamine, injection	41 (70.7)	11 (19.0)	6 (10.3)
Xanthin, oral	21 (35.0)	15 (25.0)	24 (40.0)
Xanthin, injection	34 (57.6)	12 (20.3)	13 (22.0)
Pyrazolone, oral	35 (60.3)	13 (22.4)	10 (17.2)
Pyrazolone, injection	37 (63.8)	13 (22.4)	8 (13.8)

[a] Some responses were missing for each category

6.2.8 Antimicrobial resistance

Knowledge and up-to-date information about antimicrobial resistance is essential to perform appropriate treatment for CAP patients. Therefore, questions were asked about the government's effort to manage the use of antimicrobials with regards to surveillance, implementation and update of antibiotic policies in Mongolia.

The results showed that the government did not frequently distribute antimicrobial resistance data to relevant health professionals with about one-half of respondents (53.3%) answering that they received government information about antibiotic resistance only once a year (Figure 6.7).

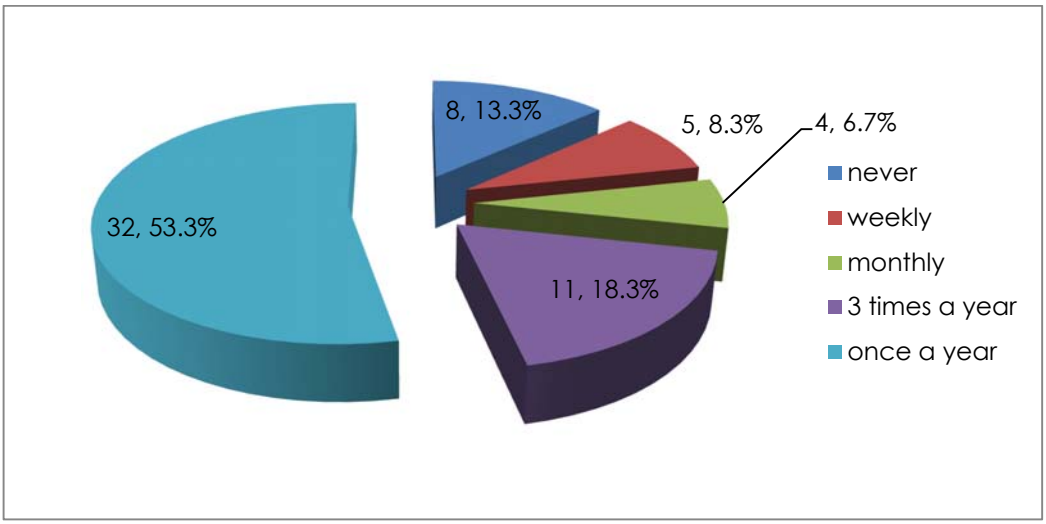


Figure 6.7 Frequency of information about antimicrobial resistance from government

6.2.9 Appropriateness of treatment guidelines

Treatment guidelines are crucial for an evidence-based treatment outcome. The role of pharmacists and pharmacy technicians is of high importance in providing quality health-care services for those in need.

In order to gain an insight into respondents' attitudes on the current standard treatment guidelines for CAP in Mongolia, participants were asked to indicate the extent to which they agreed with their appropriateness. As the results showed, a majority of respondents considered that the current treatment guidelines for CAP were not appropriate (80%). In addition, it was common that they referred the patients with CAP to hospitals (73.3%).

6.2.10 Treatment cost of CAP

To examine the respondents' view on the financial benefits from prescribing and providing injectable medicines to patients, questions were asked about this practice.

As Table 6.28 shows, the views of respondents was that the people who had the most financial benefit from treatment with an injection were often or always the patients (52.5%), followed by nurses and doctors.

Table 6.28 Person who financially benefits from injections

Category	Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)
Doctor	35 (59.3)	9 (15.3)	15 (25.4)
Pharmacist	36 (60.0)	19 (31.7)	5 (8.3)
Patient	22 (37.3)	6 (10.2)	31 (52.5)
Nurse	33 (54.1)	8 (13.3)	19 (31.7)

Kruskal-Wallis test was performed to demonstrate variances among respondents. A significant relationship was found across respondents with different income in regards to their opinion on the various individuals who financially benefited most from injections. Respondents were divided into 4 groups according to their income level (1: ≤200.000, 2: 201-300.000, 3:301-400.000, 4:≥ 401.000 MNT) and pairwaise comparisons was employed to locate the differences. Respondents with lower income compared with higher earners reported that doctors benefited most often from prescribing injections (Table 6.29).

Similarly, respondents with lower income compared with higher wage earners identified themselves or pharmacists as another individual benefitting from injections (Table 6.29).

Table 6.29 Differences between income level and person who financially benefits from injection

Category	Income levels with significant difference				Kruskal-Wallis Sig.
	Pairwise comparison between groups	M (SD)	M (SD)	M (SD)	
Doctors	Group 1 versus 3	4.1 (1.4)	2.5 (1.1)		.003
	Group 1 versus 4			2.7 (1.0)	.002
Pharmacists	Group 1 versus 2	3.3 (1.3)	2.4 (0.9)		.002
	Group 1 versus 3			2.3 (0.5)	.012

6.2.11 Administration of therapeutic injections for treatment of CAP

When presented with questions regarding their practice of administering injections to patients, a high proportion of respondents reported they did not administer injections. The administration of injections is only allowed in hospital settings and only by qualified health personnel. This does not include pharmacists or pharmacy technicians.(305) However, some of the dispensers said that they would administer an injection if it was purchased from their pharmacy. Forty-four respondents (73.3%) did not charge anything for administering injections to patients.

Participants were asked for their opinions about affordability of administration fees for the patient. Less than one-half thought that the fee of dispensed and administered injection was affordable to the patient.

6.2.12 Dispensing of injectables

When presented with questions regarding factors that have an impact on their dispensing practice of injectables to patients (Table 6.29), the majority of respondents considered obtaining their medicines from wholesaling companies with authorization from the Ministry of Health and use of new sterile syringe and needles as major factors.

On the other hand, self-diagnosis by the patient was another noteworthy matter, as a majority [33 (55.9%)] of respondents indicated, it was common for

patients to come to the pharmacy and request injections for their self-diagnosed symptoms. More detailed results are summarized in Table 6.30.

Table 6.30 Characteristics influencing dispensing of injectables

Characteristic [a]	Never/Rarely n (%)	Sometimes n (%)	Often/Always n (%)
Supply of injectables from registered and wholesaling companies with authorization	2 (3.4)	4 (6.8)	53 (89.8)
Use of sterile syringes and needles	4 (6.8)	1 (1.7)	54 (91.5)
Completeness of injection's package	7 (11.9)	14 (23.7)	38 (64.4)
Self-diagnosis of patient and his/her wishes to buy injection	16 (27.1)	10 (16.9)	33 (55.9)
Re-use of antibiotic	19 (32.2)	24 (40.7)	16 (27.1)
Expired date of re-used product	17 (28.8)	8 (13.6)	34 (57.6)

[a] Some responses were missing for each category

6.2.13 Overuse of antibiotics

Misusing or overusing antibiotics can have a number of disadvantages such as increased antimicrobial resistance, increased treatment cost.(306) Therefore, it is essential an appropriate treatment duration of antibiotics is prescribed to the patient.

A majority of respondents supported that antibiotics were overused in Mongolia (41, 69.5%). The main reported reason for overusing antibiotics was the ability to purchase antibiotics from pharmacies (35, 59.3%), a significant difference was obtained performing a logistic regression analysis containing two predictors (gender, pharmacist versus pharmacy technician), [$\chi 2$ (2, N=59)=6.82, p = .033]. As Table 6.31 shows, only one variable made a statistically significant contribution to the model (pharmacist and pharmacy technician). This indicated that pharmacy technicians were less likely to agree

with patients being able to easily buy injectable antibiotics, when compared with pharmacists (p = .02).

Table 6.31 Logistic regression predicting the likelihood of agreeing with patients being able to easily buy injectable antibiotics from pharmacies

Independent variables [a]	n/N (,%) A/SA	*P*	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Gender Male Female	 10/14 (71.4) 25/45 (55.6)	.287	.48	.12	1.86
Profession Pharmacist Pharmacy technician	 24/33 (72.7) 22/26 (42.3)	.02	.27	.09	.82
Constant	-	.08	10.01	-	-

A-Agree, SA- Strongly agree

[a] Some responses were missing for each category

Additionally, respondents tended to agree that the overuse of antibiotics was related to a strong public desire for therapeutic injectables including antibiotic injections (36, 61.0%). On the other hand, most respondents were reluctant to support that there was insufficient government control for retail sales of antibiotics (34, 57.6%).

6.2.14 Injection safety

Most of the surveyed participants were aware of safe practices relating to injections and similar scores were provided for never keeping the syringes for reuse (93.2%) and never reusing the needle and syringe after sterilization (89.8%) and always using it once and destroyed it (80.0%). After administering an intravenous drip, respondents rarely kept the remaining volume of injection for the next use (90.0%), or used the remaining powder for the next patient (81.7%). Instead, most of them used the intravenous drip once and discarded everything (68.3%).

Regarding the supply of injectable medicines, they were always obtained either from a drug wholesaler (70%) or a pharmacy (65.0%), while they were

rarely purchased from an agent/seller or from elsewhere, for example: personal importation.

6.2.15 Counterfeit medicines in Mongolia

According to WHO, counterfeit medicines are defined as "a medicine which is deliberately and fraudulently mislabeled with respect to identity and/or source. Counterfeiting can apply to both branded and generic products and counterfeit products may include products with the correct ingredients or with the wrong ingredients, without active ingredients, with insufficient active ingredients or with fake packaging".(307)

At the present time, about 75% of all required medications are imported in Mongolia and the pharmaceutical procurement sector is 100% privatized.(281) Respondents were concerned about counterfeit and substandard medicines in Mongolia (93.4%). As reported by most participants, counterfeit medicines were those without or with little effect, or faulty looking products. As shown in Figure 6.8, respondents were more concerned about antibiotics than other medicines.

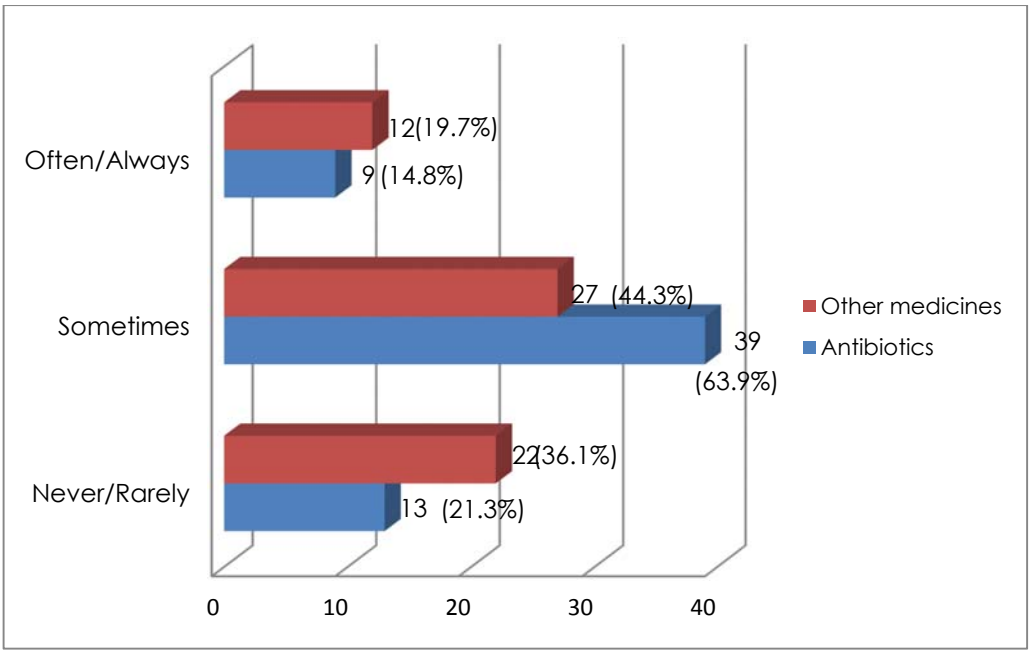


Figure 6.8 Prevalence of counterfeit and substandard medicines in Mongolia

It was commonly reported that respondents only purchased their medicines from well-known wholesaling companies because they were mainly concerned about the prevalent counterfeit/substandard medicines from unreliable providers.

6.2.16 Summary of findings of the questionnaire study with pharmacists and pharmacy technicians

This is the first study that explored pharmacists' and pharmacy technicians' practice of dispensing and prescribing medicines for the treatment of CAP and investigated the underlying factors that impact on dispensing, prescribing practices and administering of therapeutic injections in Mongolia.

Respondents indicated that a wide range of antibiotics and non-antibiotics were dispensed with prescription. A similar wide range were issued without prescription.

Attitude and knowledge of STGs for CAP was assessed and a majority considered that the STGs for CAP were not appropriate (80%). In addition, it was common that they referred the patients with CAP to hospitals (73.3%).

Moreover, respondents commonly reported that injectables were provided if patients had severe CAP (79.3%) and to achieve better patient compliance with treatment (68.4%). Amongst respondents, a fairly high proportion (69%) specified that the clinical effect of injections was more than oral medicines. On the other hand, self-diagnosis by the patient was another noteworthy matter, as a majority (55.9%) of respondents indicated that it was common for patients to come to the pharmacy and request injections for their self-diagnosed symptoms. Additionally, about 70% of respondents agreed that patients preferred having an injection rather than tablets or capsules.

Despite administration of injections by pharmacists or pharmacy technicians not being consistent with the guidelines in Mongolia, some respondents said that they would administer an injection if it was purchased from their pharmacy. Safe injection practice was observed in the study, most respondents never keep the syringes for reuse (93.2%) even after sterilization (89.8%) and they always used it once and destroyed it (80.0%).

A majority of respondents agreed that antibiotics were overused in Mongolia (69.5%). The main reported reason of overusing antibiotics was the ability to purchase antibiotics from pharmacies (59.3%). Pharmacy technicians were less likely to agree with patients being able to easily buy injectable antibiotics, when compared with pharmacists (p = .02). Additionally, a strong public need for therapeutic injections including antibiotic injections was also evident from the questionnaire (61.0%). On the other hand, most respondents were reluctant to support that there was insufficient government control for retail sales of antibiotics (57.6%). Respondents were concerned about counterfeit and substandard medicines, in particular counterfeit antibiotics in Mongolia.

6.3 Results of a questionnaire issued to doctors

This section presents data from the questionnaire study with doctors regarding their prescribing practice for treatment of mild/moderate CAP. This included prescribing antibiotics and non-antibiotic medicines and administering injections. Also, the questions focused on doctors' views on current treatment guidelines for CAP, their experience with prescribing treatment with injectable medicines, attitudes and knowledge about injectables, patients' expectations and demands from patients and prevalence of counterfeit and substandard medicines in Mongolia.

6.3.1 Respondents' characteristics

The study enrolled 71 participants and the response rate was 88.8%. Of seventy-one participants, 83.1% were female doctors, which is comparable to the gender distribution of Mongolian doctors (79.1%)(4). Most respondents were working in public hospitals and about 70% of respondents were specialists. A majority was over 30 years (63.4%). Most respondents had a monthly income of over 300.000 MNT per month. More details are provided in Table 6.32.

Table 6.32 Demographic characteristics of respondents (N=71)

Variable [a]	Category	n (%)
Gender	Male	12 (16.9)
	Female	59 (83.1)
Age (years)	20-30	26 (36.6)
	≥31	45 (63.4)
Practice setting	Public hospital	54 (76.1)
	Private setting (including FGPs and others)	17 (23.9)
Profession	General doctor	22 (31.0)
	Specialist	49 (69.0)
Years of work experience	1-5	34 (47.9)
	6-10	12 (16.9)
	≥11	25 (35.2)
Income (MNT) [b]	≤90.000-200.000	12 (17.1)
	201.000-300.000	28 (40.0)
	≥301.000-400.000	30 (42.9)

[a] Some responses were missing for each category

[b] Mongolian National Tugrug, currency, equivalent to 1300 USD at the time of study

6.3.2 Prescribing characteristics for treatment of CAP

The participants were asked to identify the factors that influence their prescribing practice for patients with CAP. Factors included their own experience (67.6%), the STGs (57.7%), information on previously used antibiotics bought from a pharmacy by a patient (52.1%), the availability of medicines (50.7%) and that the best choice is an effective antibiotic with proven low resistance (54.9%). Information and knowledge gained though continuous medical training and seminars were less likely to be considered (38.0%) (Table 6.33). STGs tended to be considered more by younger respondents than those aged over 30 years, [t (69) = 2.69, p = 0.09]. A significant relationship was found using a t-test, with females more frequently supporting the STG as an influencing factor on their prescribing practice for mild/moderate CAP [t (69) = -2.09, p = .039].

Moreover, information about local antibiotic resistance (18.3%), and patient's antimicrobial sensitivity data (28.2%) had a low importance when prescribing medicines for patients with CAP. Specialists were more concerned about patient antimicrobial sensitivity data when prescribing for patients with CAP than general doctors, and it was just significant [t (69) =-2.07, p = .042].

On the other hand, patient demand and expectation played a minor role (16.9%) and reimbursable drugs from the essential drug list of Mongolia were also weakly highlighted (16.9%).

Preference was given to newly marketed and broad spectrum antibiotics (47.9%) and information from specialists (39.4%). Medicine's availability and patient's ability to afford medicines were also taken into account when prescribing medicines (49.3%).

Participants confirmed that they often had visits from pharmaceutical company representatives; however most of them stated that these visits did not have any influence on their practice. A similar number of respondents said they never or rarely considered benefits from drug companies. In particular, less female respondents were likely to accept incentives from pharmaceutical companies when compared with males [t (69) =-2.42, p = .018].

Generally, doctors tended to rely on previous experience whether it was their own or the patient's (who previously had purchased and used antibiotics).

Participants did not recognize governmental control on prescribing practice as a worthy consideration (22.5%) and they explained that this was mainly because they did not prescribe anything prohibited. Specialists were more likely to acknowledge governmental control as an influence on their prescribing practice compared with general doctors, however it was just statistically significant [t (69) =-2.0, (p = .049).

Table 6.33 Characteristics that have influenced prescribing practice for mild/moderate CAP

Characteristics [a]	Never/ Rarely n(%)	Sometimes n(%)	Often/ Always n(%)
Patient expectation/ need	41 (57.7)	18 (25.4)	12 (16.9)
Patient's ability to buy medicine	11 (15.5)	25 (35.2)	35 (49.3)
Likelihood of side effects	26 (36.6)	28 (39.4)	17 (23.9)
Local antibiotic resistance data	40 (56.3)	18 (15.4)	13 (18.3)
Information about patient's antibiotic sensitivity	28 (39.4)	23 (32.4)	20 (28.2)
Information on previously used antibiotics bought from pharmacy by a patient	17 (23.9)	17 (23.9)	37 (52.1)
Reimbursable drugs of EDL	36 (50.7)	23 (32.4)	12 (16.9)
Medicine's availability	14 (19.7)	21 (29.6)	36 (50.7)
The best choice is effective antibiotic with proven low resistance	10 (14.1)	22 (31.0)	39 (54.9)
Standard treatment guidelines	15 (21.1)	15 (21.1)	41 (57.7)
Intensive training and text information	23 (32.4)	21 (29.6)	27 (38.0)
Journals, books and professional publications	27 (38.0)	18 (25.4)	26 (36.6)
Influence from co-workers, doctors and directors	29 (40.8)	24 (33.8)	18 (25.4)
Influence from specialists	19 (26.8)	24 (33.8)	28 (39.4)
Own experience	10 (14.1)	13 (18.3)	48 (67.6)
Government control on prescribing	35 (49.3)	20 (28.2)	16 (22.5)
Pharmaceutical company information	26 (36.6)	30 (42.3)	15 (21.1)
Pharmaceutical company representatives visit	48 (67.6)	17 (23.9)	6 (8.5)
Prefer to choose newly distributed brands in the market	12 (16.9)	25 (35.2)	34 (47.9)
Incentive from drug companies	59 (83.1)	9 (12.7)	3 (4.2)

[a] Some responses were missing for each category

6.3.3 Attitude and perception of injectable medicines for treatment of CAP

When presented with questions regarding their choice of an injectable dosage form when prescribing for patients with pneumonia, key items were identified and results are summarized in Table 6.34.

A similar proportion of respondents stated that injections had often or always better effects than oral medicines and that the quality of injections was better than oral medicines (43.7% and 40.8% respectively). Respondents did not agree that the prevalence of side effects was higher with injections than with oral medicines, and the cost of treatment with injections was higher than with oral medicines.

Most respondents acknowledged the importance of patient characteristics and severity of pneumonia when choosing a medicine for them. Only eleven respondents indicated a frequent practice of choosing an injection to improve patient compliance with treatment and male respondents tended to agree more than females with injections improving patient compliance with a treatment [t (69) = 2.53, p = .014].

Furthermore, most recognized the benefit and importance of switching from injections to oral treatment once the patient's condition had improved. In addition, most doctors supported the statement that patients never or rarely preferred oral medicines than injections (42.3%) (Table 6.34).

Table 6.34 Important factors when choosing medicines for patients with CAP

Factors [a]	Never/ Rarely n(%)	Sometimes n(%)	Often/ Always n(%)
Injection has a better effect than oral medicine	16 (22.5)	24 (33.8)	31 (43.7)
Patients prefer oral medicine than injection	30 (42.3)	24 (33.8)	17 (23.9)
The pharmaceutical quality of injection is better than oral medicine	15 (21.1)	27 (38.0)	29 (40.8)
Oral medicines have more side effects	39 (54.9)	22 (31.0)	10 (14.1)
Cost of treatment by injection (incl. syringes and needles) is more than cost of treatment by oral medicines	45 (63.4)	11 (15.5)	15 (21.1)
If patient has an injection, he/she is required to visit a hospital several times	7 (9.9)	19 (26.8)	44 (62.0)
The injection requires new sterile syringes and needles	2 (2.8)	7 (9.9)	62 (87.3)
When treating patient with pneumonia it is better to shift injection treatment to oral medicine treatment once the patient's condition has improved	9 (12.7)	23 (32.4)	39 (54.9)
Medicine companies advertise more about injection treatment	35 (49.3)	27 (38.0)	9 (12.7)
In order to follow treatment more effectively by patient, injection was chosen	34 (47.9)	26 (36.6)	11 (15.5)
Trainings teach the usage of injections more than usage of tablets/capsules	52 (73.2)	15 (21.1)	4 (5.6)
The severity of pneumonia influences the prescribing of injection	16 (22.5)	21 (29.6)	34 (47.9)
Patient's characteristics, such as age, gender and severity have influence on prescribing	8 (11.3)	16 (22.5)	47 (66.2)

[a] Some responses were missing for each category

6.3.4 Appropriateness of standard treatment guidelines (STG) for CAP

Doctors were asked their opinion regarding the appropriateness of STGs of pneumonia in Mongolia and only twenty two (31%) respondents supported the appropriateness of the current treatment guidelines of pneumonia. Furthermore, about one-half of respondents reported that they sometimes have prescribed more than one antibiotic to patients with pneumonia at the same time (n=38, 53.5%).

Forty-two doctors (59.2%) reported they had to change the prescribed antibiotic sometimes because the first chosen one showed no effect (Table 6.35). Respondents with one to five years of working experience were less likely to change antibiotics for mild/ moderate CAP compared with respondents with more than 11 or more years of working experience, however this was not significant [F (2, 68) =2.56, p = .09].

Table 6.35 Frequency of respondents' practice of changing prescribed antibiotic for patients with mild/moderate CAP

Never/Rarely n (%)	Sometimes n (%)	Often/ Always n (%)
17 (23.9)	42 (59.2)	12 (16.9)

6.3.5 Treatment practice of patients with CAP

Respondents were asked about the duration of treatment of CAP with injectables and oral medicines and most agreed that treatment was more than five days for treatment both injections and oral medicines (56.3%, 74.6%). Whilst most respondents agreed that the duration to switch from treatment with injection to oral medicine was subject to patient's illness characteristics (Table 6.36), a small proportion indicated it was less than two days (15.5%), whereas about 49% reported between three to five days after initial treatment. When presented with questions regarding their treatment practice, most respondents stated that they often or always send their patients diagnosed with CAP to hospitals (57.7%). There was no significant relationship

between respondents in different practice settings [t (69) =-1.03, p = .31] and years of working experience [F (2, 68) = .22, p = .8] with regards to referring patients with CAP to hospitals.

Table 6.36 Duration of prescribed treatment for patients with mild/moderate CAP

Duration	Treatment with injection, n (%)	Treatment with oral antibiotic, n (%)	Switch from injection to oral antibiotic, n (%)
≤ 24 hours	-	-	5 (7.0)
≤3 days	5/71 (7.0)	-	2 days: 6 (8.5)
4-5 days	26 (36.6)	18 (25.4)	3-5 days: 35 (49.3)
>5 days	40 (56.3)	53 (74.6)	25 (35.2)

6.3.6 Commonly prescribed medicines for patients with CAP

Participants were asked to identify the most commonly prescribed medicines for the treatment of CAP (Table 6.37 and Table 6.38).

The most common were antibiotics such as cefalosporins, oral combination of penicillin, penicillins with extended spectrum, oral macrolides and oral sulfonamides. Injectable macrolides were not frequently prescribed nor were oral quinolones when compared to their injectable counterparts.

Table 6.37 Antibiotics prescribed for treatment of CAP

ATC classification	Never/Rarely n(%)	Sometimes n(%)	Often/Always n(%)
Penicillin, oral	64 (90.1)	3 (4.2)	4 (5.6)
Penicillin, injection	51 (71.8)	14 (19.7)	6 (8.5)
Penicillin with extended spectrum, oral	52 (36.6)	49 (34.5)	41 (28.9)
Penicillin with extended spectrum, injection	43 (30.3)	43 (30.3)	56 (39.4)
Combination of penicillin, oral	12 (16.9)	28 (39.4)	31 (43.7)
Quinolone, oral	74 (52.1)	37 (26.1)	31 (21.8)
Quinolone, injection	18 (25.4)	26 (36.6)	27 (38.0)
Cefalosporin, oral	22 (31.0)	22 (31.0)	27 (38.0)
Cefalosporin, injection	6 (8.5)	20 (28.2)	45 (63.4)
Macrolides, oral	66 (31.0)	58 (27.2)	89 (41.8)
Macrolides, injection	145 (68.1)	42 (19.7)	26 (12.2)
Tetracycline, oral	132 (93.0)	6 (4.2)	4 (2.8)
Sulfonamid, oral	32 (45.1)	15 (21.1)	24 (33.8)

In addition to antibiotics, other common medicines prescribed were vitamins, mucolytics, antihistamines and corticosteroids. On the other hand, xanthins and pyrazolones were never or rarely prescribed. When comparing the frequency of prescribing of oral medicines and injections, doctors were more likely to report that they prescribed more oral medicines than injectables for patients with CAP, for example a little less than half of respondents prescribed oral vitamins often or always, whereas only 26% prescribed vitamin injection (Table 6.38).

Table 6.38 Non-antibiotic medicines prescribed for treatment of CAP

Other medicines	Never/Rarely n(%)	Sometimes n(%)	Often/Always n(%)
Corticosteroid, oral	44 (62.0)	16 (22.5)	11 (15.5)
Corticosteroid, injection	40 (56.3)	17 (23.9)	14 (19.7)
Mucolytics, oral	15 (21.1)	19 (26.8)	37 (52.1)
Vitamin, oral	30 (21.1)	54 (38.0)	58 (40.8)
Vitamin, injection	80 (37.6)	78 (36.6)	55 (25.8)
Antihistamin, oral	74 (52.1)	43 (30.3)	25 (17.6)
Antihistamin, injection	49 (69.0)	17 (23.9)	5 (7.0)
Xanthin, oral	30 (42.3)	27 (38.0)	14 (19.7)
Xanthin, injection	34 (47.9)	23 (32.4)	14 (19.7)
Pyrazolone, oral	59 (83.1)	11 (15.5)	1 (1.4)
Pyrazolone, injection	51 (71.8)	17 (23.9)	3 (4.2)

6.3.7 Patients' history prior to consulting a doctor

Respondents were asked where patients obtained or bought antibiotics from prior to consulting with them (Figure 6.9). The main source of antibiotics without a prescription was from a pharmacy (n=61, 87.1%) and only a small proportion were obtained from other sources such as their relatives or friends (n=8, 11.3%).

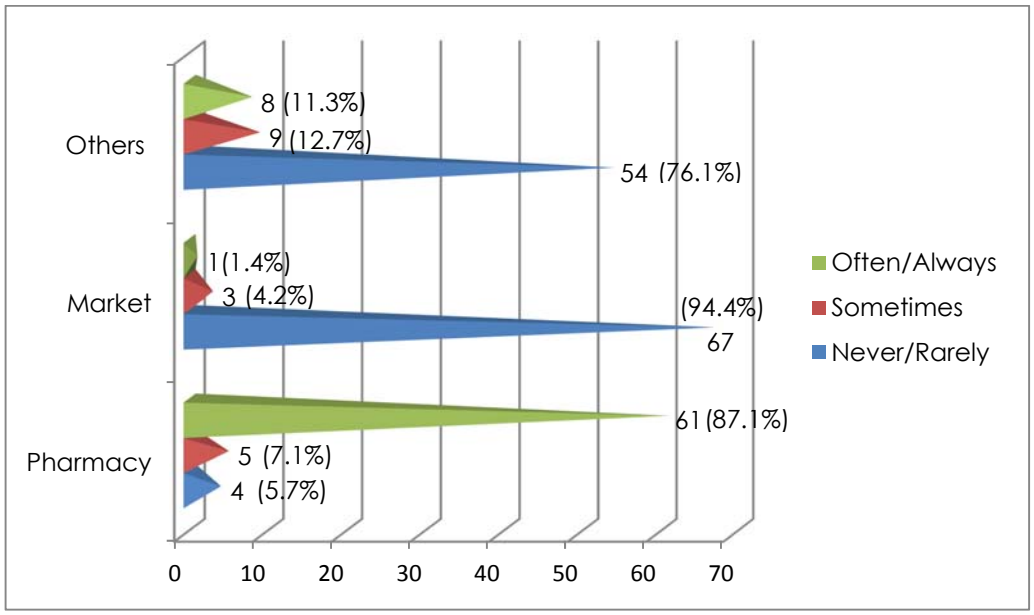


Figure 6.9 Source of obtaining antibiotics prior visiting doctor

Respondents were asked their opinions regarding the use of antibiotics in Mongolia and to suggest possible explanations. Fifty-nine respondents agreed that antibiotics were overused in Mongolia (83.1%). Older respondents were more likely to disagree that antibiotics were overused, however this relationship was not significant [t (69) =2.24, p = .82].

The majority of respondents agreed that governmental control of medicines was insufficient (76.1%). A statistically significant difference was found using binary logistic regression with a model containing three independent variables (gender, general doctors versus specialists and working years), $\chi^2(3, N=64)=10.5$, p = .015. The model as a whole explained between 15.2% (Cox and Shell R square) and 26.1% (Nagelkerke R square) of the variance in the statement, and correctly classified 84.4% of cases. Female respondents compared with males were more likely to agree with insufficient government regulation (p = .008) (Table 6.39).

Table 6.39 Logistic regression analysis for likelihood of agreeing with insufficient control for medicines across different variables

Independent variables [a]	n/N (,%) A/SA	*p*	Odds ratio (OR)	95.0% CI for OR	
				Lower	Upper
Gender Male Female	 6/12 (50.0) 48/59 (81.4)	.008	 12.1	1.9	76.2
General doctor Specialist	18 (94.7) 36 (80.0)	.12	.14	.01	1.64
Working years 1-5 6-10 ≥11	 28 (90.3) 8 (72.7) 18 (81.8)	.46	1.46	.54	3.96
Constant	-	.22	15.9	-	-

[a] Some responses were missing for each category

Moreover, doctors agreed that purchasing medicines from pharmacies was easy (n=60, 84.5%). They also indicated that public need and demand for antibiotics was one of the main reasons for overusing antibiotics in Mongolia (n=39, 54.3%).

6.3.8 Generic prescribing

The issue of generic prescribing was examined and twenty eight respondents (39.4%) stated that they often or always prescribed generic medicines. However, a smaller proportion (12.7%) did not know what generic medicines were and requested more information.

Statistical analysis showed a significant relationship between generic prescribing across professional levels, with general doctors stating more frequent practice of generic prescribing compared with specialists [t (69) =2.47, p = .016]. Additionally, more frequent extent of this practice was observed among doctors in private settings than respondents working in public hospitals [t (69) =3.92, p < .0001].

6.3.9 Antimicrobial sensitivity information

When presented with questions regarding the source of antimicrobial sensitivity data, respondents stated it was obtained from the packaging information of the medicines (39.4%). General doctors were more likely to extract antimicrobial sensitivity data from the packages of the medicines than specialists [t (69) =-2.7, p = .009].

Frequent sources to obtain information about antimicrobial sensitivity were from package of antibiotics and professional books. Other sources such as the internet and patient samples were less frequently cited as place to get information about antimicrobial sensitivity. Respondents indicated information from government and co-workers in a similar frequency. In addition, less frequent responses scores were obtained for obtaining information from cured patients and peers (12.7%). Only two respondents reported that they find out about antimicrobial sensitivity after the prescribed antibiotic was not effective. Further details regarding different sources to obtain information are shown in Table 6.40.

Table 6.40 Sources to acquire information about antibiotic sensitivity

Source	Never/ rarely n(%)	Sometimes n(%)	Often/ Always n(%)
Government information	34 (47.9)	23 (32.4)	14 (19.7)
Professional books, journals	26 (36.6)	22 (31.0)	23 (32.4)
Package of antibiotic	25 (35.2)	18 (25.4)	28 (39.4)
Patient samples	33 (46.5)	21 (29.6)	17 (23.9)
Cured patient	42 (59.2)	20 (28.2)	9 (12.7)
Co-workers, colleagues	32 (45.1)	30 (42.3)	9 (12.7)
No effect of antibiotic	50 (70.4)	19 (26.8)	2 (2.8)
Internet source	30 (42.3)	22 (31.0)	19 (26.8)

Only nine people referred to co-workers or colleagues as a source of information about antibiotic sensitivity (12.7%). A significant relationship between obtaining information from colleagues and years of working experience was found in Kruskal-Wallis test [H=8.6, df=2, p = .013] (Table 6.41).

Table 6.41 Statistical differences between obtaining information from co-workers with regards to working years of experience

Category	Working years with significant difference			Kruskal-Wallis Sig.
	Pairwise comparison between groups	M (SD)	M (SD)	
Co-workers	1-5 years versus ≥11 years	2.5 (0.8)	3.2 (1.0)	.004

Correspondingly, younger respondents aged between 20 to 30 years were unlikely to get antimicrobial sensitivity information than older ones and this was just significant [t (69) =-2.01, (p = .044)].

The frequency of government distribution regarding antimicrobial resistance revealed that almost one-third of respondents received information from the government once a year (n=20, 28.2%). Only two people (2.8%) stated that they received information about antimicrobial resistance from government every week (Figure 6.10).

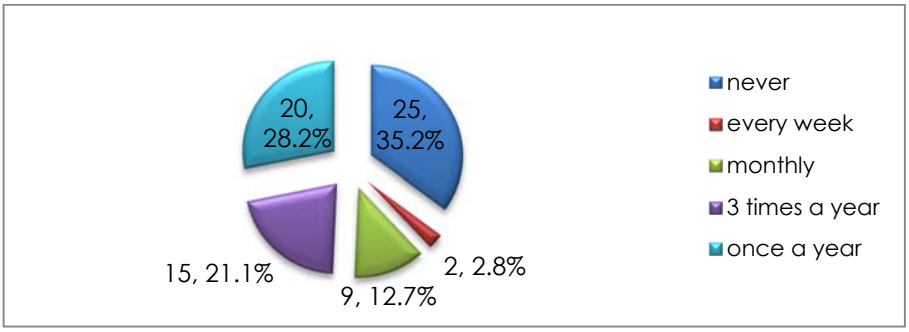


Figure 6.10 Frequency of information about antimicrobial resistance from government

6.3.10 Counterfeit and substandard medicines in Mongolia

Respondents were predominantly aware of counterfeit and substandard medicines in Mongolia (n=65, 91.5%). As the frequency analysis showed, respondents did not separate the type of medicines, reporting a similar proportion for both antibiotics and non-antibiotic medicines (Figure 6.11).

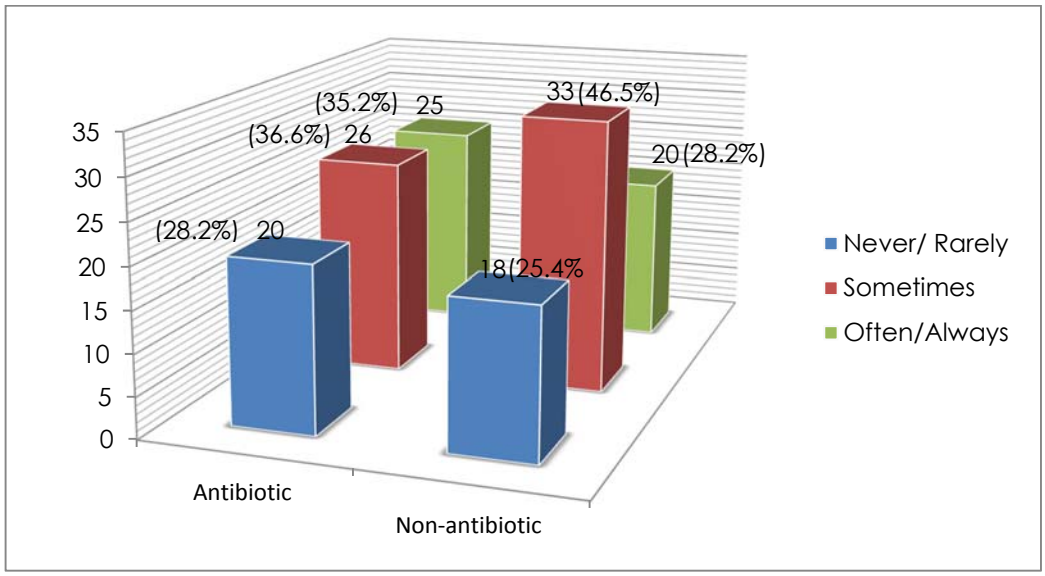


Figure 6.11 Prevalence of counterfeit/substandard medicines in Mongolia

6.3.11 Summary of findings from the questionnaire study with doctors

The questionnaire study examined the prescribing practice of doctors for treatment of mild/moderate CAP, in particular the prescribing of antibiotics and non-antibiotic medicines and administering injections in Mongolia. Factors influencing the prescribing of a treatment for patients with mild/ moderate CAP were identified and STGs were often or always considered, however only twenty two (31%) respondents supported the appropriateness of the STGs for pneumonia. Younger respondents compared with those aged over 30 years tended to consider STGs [t (69) = 2.69, p = 0.09]. Furthermore, about one-half of respondents reported that they sometimes have prescribed more than one antibiotic to patients with pneumonia at the same time (53.5%).

Confirming results obtained from the prescription and questionnaire study with providers (pharmacists and pharmacy technicians), a wide range of antibiotics and non-antibiotics were identified for the treatment of mild/ moderate CAP.

Similar to pharmacists and pharmacy technicians, preference was given to newly marketed and broad spectrum antibiotics (47.9%) when prescribing a treatment for patients with CAP. On the other hand, patient demand and expectation played a minor role (16.9%) and reimbursable drugs from the EDL were also not strongly highlighted (16.9%). Moreover, participants did not recognize governmental control on prescribing practice as a worthy consideration (22.5%).

Factors influenced the prescribing practice of an injection for patients with pneumonia were the importance of patient characteristics and severity of pneumonia. In addition, most doctors supported the statement that patients never or rarely preferred oral medicines than injections (42.3%). A little less than half of respondents reported that injections had often or always better effects and quality than oral medicines (43.7%, 40.8%).

Information regarding the local antibiotic resistance (18.3%) and patient's antimicrobial sensitivity data (28.2%) had a low status when prescribing medicines for patients with CAP.

A majority of respondents agreed that antibiotics were overused in Mongolia (83.1%). The main reasons were the governmental control of medicines was insufficient (76.1%), purchasing medicines from pharmacies was easy (84.5%) and public demand for antibiotics (54.3%). Furthermore, respondents were predominantly aware of existing counterfeit and substandard medicines in Mongolia (91.5%).

Chapter 7 Discussion

This Chapter discussion of the main findings from the study. It starts with discussion of the primary findings from the prescription analysis, followed by findings from questionnaire studies regarding the prescribing and dispensing practices of antibiotic and non-antibiotic medicines for treatment of mild/moderate CAP. Thereafter, the discussion of different prescribing practices in urban and rural areas is presented. In addition, findings regarding the parenteral therapy, attitude towards treatment guidelines for CAP and safe injection practice are discussed in the next section. Finally, methodological aspects and limitations are discussed.

7.1 Prescription analysis

This is the first study to explore prescribing practices for mild/moderate CAP in Mongolia and involved evaluating drug prescribing by doctors with respect to government initiated treatment guidelines. It was found that the prescribing practice for the treatment of mild/moderate CAP at outpatient settings was highly inappropriate with respect to these guidelines. It was also highly variable regarding antibiotic selection and dosage form selection.

WHO has recommended the indicators to measure appropriate use of medicines including the average number of drugs per prescription to be less than two and the proportion of antibiotics per prescription to be less than 30%, but these may vary from country to country and also may need to be modified over time.(287) Moreover, the WHO indicators are measured on randomly selected prescription samples whereas this study was a purposeful sample of prescriptions for CAP hence these indicators would not be relevant. This study has revealed low levels of poly-pharmacy with the average number of drugs prescribed being three per patient. This was consistent with previous findings of two drugs per encounter in public health facilities and three in private dispensaries in Mongolia in 2009.(281) In addition, other studies based on randomly selected outpatient records from developing countries have indicated the average number of drugs per prescription was similar (2 to 3), showing that poly-pharmacy was not a major problem in the treatment of

CAP in the surveyed health facilities.(308-311) In accordance with guidelines an antibiotic would be appropriate for patients diagnosed with CAP.

The systematic review on appropriate prescribing of antibiotics for the treatment of mild/ moderate CAP in developing countries indicated that despite the existing guidelines, no study published between 1990 and 2013 has assessed all eight parameters (antibiotic selection, correct antibiotic, dose, dosage form, frequency, duration of an antibiotic, to explaining how to use the medicine appropriately and treatment outcome) of appropriate prescribing. From the extracted 29 studies only one was located that included six parameters. The overall treatment of patients with mild/moderate CAP was poor, in particular the frequency of patients receiving a correct antibiotic was below 60% and only about one half of patients received a correct treatment (48%).

In this study of pharmacy-based prescriptions high levels of inappropriate prescribing were found with 84% of all drugs being inappropriately prescribed. Since each prescription included the diagnosis written by the prescriber, it was clear there was no doubt regarding the diagnosis for which the prescribing occurred. The major reason causing inappropriate prescribing for both adults and children was inappropriate drug selection (about 60%). However, 54.7% of all prescribed antibiotics were appropriately selected for children aged less than five (86/157). A study from Uganda reported a lower finding with approximately 42% of children aged less than five with self-reported pneumonia symptoms received a correct antibiotic.(212)

The correct dose of a correctly selected antibiotic was given to 59% of children and 62.5% of adults in this study. A study from Africa observed a better prescribing result with 87% of correct doses of an antibiotic for children under five with pneumonia at outpatient settings.(215) A lower result was obtained in a comparison study; only 20% of children with self-reported pneumonia received a recommended antibiotic and dose.(212) A study from India also indicated a similar finding of 14% of pneumonia cases with a wrong dose of sulfamethoxazole-trimethoprim.(206)

The findings of this study showed that the inappropriate dosing frequency of antibiotic prescribing also contributed to the inappropriate prescribing practice for patients with mild/moderate CAP. Particularly, inappropriate frequency was greater for adults (49%) when compared with children (2.9%). In contrast, a higher extent of inappropriate prescribing for children aged less than five (16%) was reported from Uganda.(212) No data were located regarding the dosing frequency of antibiotics prescribed for adult patients with mild/moderate CAP in developing countries.

According to the WHO, the target for indicators measuring the proportion of prescribed medicines dispensed and adherence to treatment guidelines is ideally to be 100%.(287) However, the evaluation of prescriptions indicated diverse prescribing practices for patients with mild/moderate CAP. Moreover, in this study approximately 10% of children and 3% of adults were prescribed no antibiotic, adding to the poor prescribing practice for CAP. Literature evidence indicates that prompt and appropriate antibiotic therapy is crucial for patients with even mild CAP caused by bacteria, because of a risk of deterioration of the disease within a very short time period.(312) A meta-analysis has suggested that interventions mainly performed in settings where a control group had no access to antibiotics showed a significant reduction in the mortality by 42%, 36% and 36% among neonates, infants and children aged up to four with pneumonia in developing countries.(233)

This study also found about 13% of encounters were prescribed more than one antibiotic, with 7.5% of children aged less than five receiving more than one antibiotic for treatment of mild pneumonia. This was lower than a previous finding in 2009 for Mongolia, where about 80% of children under five with mild/moderate CAP received ampicillin (first-line antibiotic) and 21% received more than one antibiotic.(281) Prescribing more than one antibiotic for children with CAP is recommended in some guidelines depending on several factors including patient's characteristics or existence of any treatment failure.(142) The appropriateness of this practice of prescribing more than one antibiotic should be therefore further investigated from a patient outcome perspective and antibiotic resistance implications.

In a South-African study examining adherence to treatment guidelines for CAP, empirical antibiotic treatment for severe CAP accorded with local guidelines for 14 patients (8%) only. The remaining 168 patients (92%) were given treatment that was inconsistent with the guidelines.(313) Poor adherence to treatment guidelines for mild/moderate pneumonia was also observed in Nigeria, with only 40% of children aged less than five receiving first-line antibiotics and a similar proportion of children were prescribed more than one antibiotic.(314) A Jamaican study reported a low adherence of prescribing to recommended guidelines, only 30.2% of children with mild pneumonia received first-line antibiotics and about 2.2% received more than one antibiotic.(280) The results observed in Kenya were notably better with 95% of patients receiving first-line antibiotics in public facilities and 61.3% in faith based health services. But the median proportion of children receiving more than one antibiotic was higher in both surveyed health facilities (20% and 34%) in Kenya.(277) A study from Ghana reported a better result, most children (90.5%) and adults (87.5%) received first-line antibiotics, recommended in STGs.(315) However, the appropriateness of multiple prescribing of antimicrobials for CAP was not assessed in these studies.

7.2. Prescribing and providing antibiotics for patients with mild/moderate CAP

The prescription analysis carried out in this study showed that at least one antibiotic was prescribed in most encounters (93.4%). Examining the range of antibiotics, aminopenicillins (40.9%), macrolides (14.5%) cephalosporins (14.3%) and quinolones (14%) were commonly prescribed. Similarly, doctors, pharmacists and pharmacy technicians in the questionnaire studies indicated that amoxicillin or ampicillin were commonly prescribed and dispensed for CAP. This practice was in compliance with the guidelines.(7) However, the guidelines allow for only oral aminopenicillins and 25% were injectables. No significant difference was observed between the frequency of prescribing practice of oral and injection aminopenicillins among doctors and this was supported by the questionnaire result with dispensers. Also, pharmacists and pharmacy technicians indicated a similar likelihood of supplying oral or injectable aminopenicillins without prescription (53% versus 56%).

Cephalosporins were prescribed for patients with mild pneumonia and doctors tended to prescribe injectable cephalosporins (cefazolin) rather than oral, and this was supported by the questionnaire study with pharmacists and pharmacy technicians. Providing cefazolin without prescription was also reported in the questionnaire study, but the pharmacists and pharmacy technicians did not indicate any preference for either of the dosage forms.

The prescription analysis showed that prescribing of ciprofloxacin occurred, with an estimated prevalence of 12.6% based on the total number of prescribed antibiotics. In the questionnaire studies, most pharmacists and pharmacy technicians indicated oral ciprofloxacin as a frequently prescribed (33.6%) and dispensed antibiotic on prescription for CAP. Fewer doctors reported that they prescribed oral ciprofloxacin (22%). Notably, a comparable proportion of pharmacists and pharmacy technicians (21%) indicated oral ciprofloxacin was a frequently provided antibiotic without prescription for patients with CAP.

The prescription analysis showed the proportion of injectable ciprofloxacin was 7.7% (4/52). In terms of the questionnaire results, a greater proportion of pharmacists and pharmacy technicians indicated it was a frequently dispensed dosage form with prescription (55.7%) whereas fewer doctors confirmed this practice (38%). The prescription analysis however did not support this level of prescribing. It is possible the questionnaire data may have been contaminated from the pharmacists reporting the general level of prescribing rather than just for CAP. Additionally, pharmacists and pharmacy technicians reported the practice of providing injectable ciprofloxacin without prescription (30%). The prescription analysis however did not support this level of prescribing. It is possible the questionnaire data may have been contaminated from the pharmacists reporting the general level of prescribing rather than just for CAP.

In addition, the prescription analysis showed that about 14.5% of macrolides were prescribed in this study (60/413). When comparing this result with reports from the questionnaire studies with doctors and pharmacists, including pharmacy technicians, about 42% of doctors indicated that oral macrolides were a frequently prescribed antibiotic, and a comparable percentage of

pharmacist and pharmacy technicians confirmed this practice (51%). On the other hand, 29% of pharmacist and pharmacy technicians reported the practice of providing oral macrolides without a prescription from a doctor.

Injectable macrolides were not found in the prescription analysis and only approximately 10% of both doctors and providers reported the prescribing and dispensing practice of injectable macrolides for patients with mild/moderate CAP. Similarly, about 11% of pharmacists and pharmacy technicians confirmed the practice of providing non-prescribed injectable macrolides for patients with CAP.

Concerning the widespread resistance of older antibiotics, macrolides are usually promoted by the pharmaceutical industry as better or 'stronger' antibiotics.(316) However, macrolides should only be used with caution for the elderly, because of drug interactions and adverse effects.(312)

7.3. Prescribing and providing non-antibiotic medicines for patients with CAP

The range of non-antibiotic medicines prescribed for patients with mild/moderate CAP included vitamins, mucolytics, corticosteroids and antihistamines. According to the frequency results of the prescription analysis, vitamins were commonly prescribed (10.3%).

In the questionnaire study, a similar percentage of doctors and providers indicated that oral vitamins were also frequently prescribed and dispensed with prescription (about 40%). A higher proportion of pharmacists and pharmacy technicians indicated oral vitamins as a frequently provided non-antibiotic medicine for patients with CAP without prescription (51%). According to the current regulations, the OTC sale of oral vitamins is legal in Mongolia. Prescription results showed that only three injectable vitamins were prescribed.

Questionnaire studies with doctors indicated that about 26% of prescribed injectable vitamins often/always for patients with mild CAP, this result was confirmed by pharmacists and pharmacy technicians. The practice of selling by pharmacies of non-prescribed injectable vitamins was also found to be at a similar level (21%). The practice of providing vitamin injections without a

prescription is not consistent with current regulations. Detailed results from the prescription analysis and questionnaire studies showed that vitamins A and C were frequently prescribed and dispensed for the treatment of mild/moderate CAP. This could reflect a low fresh food intake containing necessary vitamins in Mongolia. A previous research study reported low levels of vitamin D among children in Ulaanbaatar indicating that this deficiency was prevalent among children who were not exposed to the sunlight due to the long winter period of six to eight months.(317) A later study revealed that 78% of 243 children aged six to 36 months were at risk of more than two coexisting micronutrient deficiencies.(318) Vitamin A supplementation was confirmed to be an effective treatment for only pneumonia complicated with measles and it contributed to a significant reduction of pneumonia and case fatality.(319) However, for children with non-measles pneumonia, the value from intake of vitamin A should be further investigated.(320) A Cochrane review of five trials suggested vitamin C was beneficial in both prevention and treatment of pneumonia. However, caution must be exercised with generalisations made from trials owing to the conditions in which the trials were conducted. But for those patients who have low plasma vitamin C levels, intake of vitamin C could be beneficial.(321)

The prescription study showed that 15 (1.4%) prescribed items were corticosteroids (dexamethasone) of which 66.7% were injections. In the questionnaire study with doctors, a greater extent of injectable rather than oral corticosteroids (20% versus 16%) was reported. This practice was also confirmed by the questionnaire result regarding dispensing practice with prescriptions amongst surveyed pharmacists and pharmacy technicians (29.5% versus 18%). This could be related to prescribers' perception about the severity of CAP and preference for corticosteroid injections. According to a recent review of randomised clinical trials, corticosteroids are generally beneficial for accelerating the time to resolution of symptoms; however this area needs further investigation.(322)

Another commonly prescribed non-antibiotic medicine was a mucolytic (bromhexine) and this was confirmed by doctors. Pharmacists and pharmacy technicians also reported the practice of dispensing mucolytics on

prescription and providing them without a prescription for patients with mild/moderate CAP.

Adjunctive therapies for CAP were compared in a previous review but this analysis was unable to find any clinical trials assessing the effectiveness of over-the-counter preparations for cough.(323) Intake of OTC medications, including mucolytics and antitussives was reviewed by an Australian team and they concluded that there was insufficient evidence to support the effectiveness of any OTC taken as an adjunct for cough associated with pneumonia in children or adults.(323) In addition, a review to assess clinical trials of medications, including antitussives, expectorants, mucolytics, antihistamine–decongestant combinations and histamine H1 receptor antagonists, in adults with acute cough due to upper respiratory infection concluded that insufficient evidence existed to recommend OTC cough medicines in the treatment of CAP.(324) This conclusion was supported by another review in 2006 confirming a low efficacy of OTC medicines may be applied to patients with LRIs, including CAP.(323)

7.4 Prescribing practices in urban and rural settings

The prescription study showed that the median number of drugs per patient was three in both urban and rural areas. In terms of prescribed antibiotics, doctors prescribed a comparable extent of antibiotics in both settings (36% versus 39%).

There were differences in prescribing practices between rural and urban areas. Generally, the prescription analysis showed that Mongolian doctors in rural areas performed better with respect to the guidelines compared with urban prescribers. In particular, the selection of appropriate drugs was significantly higher in rural areas compared with their counterparts in urban areas. Prescribing of injectables was significantly higher for adults in urban areas compared with rural areas; however the difference between urban and rural prescribing of injectables was not significant for children in this study. Also, a different prescribing practice of antibiotic injections was recorded where the prescribed proportion estimated from the total number of prescribed drugs in each area was 15.9% in the urban and 8.4% in rural areas,

respectively. Findings regarding different prescribing practices for the treatment of CAP can be found in the literature. A study from the U.S reported that a significantly better treatment practice for inpatient pneumonia was observed in rural hospitals than those in urban areas. The possible explanations included a lower patient load in comparison to their urban counterparts, resulting in a better performance of medical staff regarding evaluating and treating patients.(325) Knowledge and practical competence in a 'pneumonia scenario' in children under five years was measured among health care practitioners in Vietnam and a significantly better result was observed for those who were in highland and mountainous areas than those in the lowland area.(269) Data have also suggested that appropriate use of antibiotics for pneumonia was somewhat higher among children less than five years in urban areas (24%) compared to children in rural regions (17%). A study from China reported a contrary finding, where inappropriate use of antibiotics for ARIs including pneumonia by health care workers was higher in villages than in the county and township areas combined, however the difference was not statistically significant ($.005 < p < .1$).(209) The appropriate prescribing practice of antibiotics for ARIs, including pneumonia was slightly higher in urban clinics in Bangladesh, compared to rural health complexes (19% versus 10%), reporting that urban clinics performed relatively better when prescribing antibiotics.(177)

In the case of Mongolia, prescribing for CAP in rural areas showed improved conformity with the guidelines compared with the metropolitan area but both areas need marked improvement.

7.5 Parenteral therapy for patients with CAP

Parenteral therapy for outpatients is considered appropriate only when one of the following three factors exist: impaired gastrointestinal absorption, non-availability of oral antibiotics or severity of the disease.(326) In general, intravenous antibiotics (and to a lesser extent intramuscular antibiotics) are considered to guarantee prompt and high serum levels, which the oral route cannot always ensure.(326) In this study, the prescribing level of injectables based on total medicines for the treatment of mild/moderate CAP was approximately 18% of all drugs and the proportion of patients prescribed at

least one injection was 29.3%. Also, the proportion of antibiotic injectables prescribed compared to the total number of antibiotics was 34.7% in urban and 18.5% in rural areas, respectively. A study from China analysed randomly selected outpatient records from township health centres and a high proportion of prescriptions with a diagnosis of pneumonia contained at least one injection (74%).(188) Previous research by Kundi reported that 100% of unlicensed practitioners and 60% of qualified doctors gave injections for pneumonia regardless of the severity of the disease.(327)

Inconsistency is evident in the Mongolian guidelines. Gentamicin is recommended in the current treatment guidelines for children with CAP.(7) However, it is available only as injectable and this recommendation does not comply with the standard prescription requirement (MNS 5376:2008) of Mongolia.(295)

The questionnaire studies with doctors and pharmacists including pharmacy technicians indicated that they chose an injection if the patient was severe. This perspective is consistent with guidelines and several findings from other countries.(328-330) Likewise, considering the period of study (cold winter) and risk of deterioration of the patient, this practice may reflect clinical concern. However, choosing an injection for patients with mild/moderate CAP is non-compliant with current guidelines.(7) (295)

Additionally, one of the factors that has contributed to inappropriate use of injections in developing countries has been the prescriber's perception that patients preferred them.(76, 82, 299, 329, 330). In the questionnaire study conducted as a part of this research, only 24% of doctors and 29% of pharmacists, plus pharmacy technicians in the questionnaire study strongly supported the notion that patients often/always preferred oral medications. This contrasted with a finding from this study that only 16% of community members always/often expected injections to be prescribed. A previous research study that investigated maternal perception of mild pneumonia in an outpatient clinic found that 40% of mothers stated doctors should give their child at least one injection. However, the generalisation of this study to a larger population might be questionable, due to a small number and poorer understanding of the participants (n=50).(327) From those who expected

injections, older people in this study tended to expect injections for common medical conditions and this was similar to other findings.(328, 331, 332)Also a finding by Raglow, indicated that attitudes of patients towards injections was rather balanced and open. Although, patients stated they paid higher prices for injections and thought they were more powerful, they disagreed that injections lasted longer than tablets, one in five patients would prefer oral medications, if they were told oral medicines were equally effective.(84, 301) However, the number of patients should be considered when interpreting these results (one in five). Other literature has confirmed that injections were often not preferred by patients, when they were advised about the clinical efficacy and potential risks associated with unsafe injection practices.(299) Health workers in developing countries believed that patient's compliance was better with injections than with oral medication(70, 85) and similarly, doctors and providers in the questionnaire study indicated choosing an injection was to avoid non-compliance problems.

Financial considerations are another important reason why injections are preferred by prescribers and providers. The questionnaire study with pharmacists and pharmacy technicians indicated that 27% charged fees for administering an injection to a patient. Administration of an injection is not permitted in community pharmacies and this finding was inconsistent with the current Mongolian guidelines.(305) Also, questionnaire data from pharmacists and pharmacy technicians indicated that apart from patients, doctors (25%) had a financial benefit from prescribing and administering injections. Even though, nurses are not allowed to prescribe or dispense medications in Mongolia, about one third of providers (pharmacists and pharmacy technicians) indicated nurses often/always had financially benefitted from prescribing and administering injections. Economic incentives from prescribing an injection were reported in a previous study where 19% of high rate injection prescribers admitted having economic incentives for prescribing injections in Iran.(82) Correspondingly, in addition to the formal administrators (for example: nurses, doctors and traditional practitioners), pharmacists and friends/relatives were indicated by community members in the questionnaire study as injection administrators. A study in Egypt reported that informal medical providers, including relatives, housekeepers of government clinics

and assistants of private medical doctors often administered injections.(333) (173) Reasons for choosing informal medical providers were explained by their availability and accessibility at low or without any extra cost.(333) (173) The large number of doctors in Mongolia is a potential factor for doctors to seek additional income sources.

7.6 Attitude towards treatment guidelines of CAP

The prescription analysis showed that only 40% of drugs were appropriately selected and only 16% of prescriptions were appropriately prescribed in accordance with Mongolian guidelines. At the same time, a separate questionnaire study with doctors and pharmacists including pharmacy technicians indicated that only about 30% strongly agreed/agreed with the appropriateness of guidelines for the treatment of CAP.

Reasons for poor adherence to guidelines can be related with the fact that the WHO adopted guidelines by the government authorities in Mongolia may not be applicable to Mongolia with a severe winter climate and harsh environment. Prescriber's perceptions about the effectiveness of recommended antibiotics and resistance patterns may also be important. Presently, there has been little done regarding the investigation of antimicrobial resistance in Mongolia to support these perceptions.(33, 35) In the questionnaire study, most doctors (83.1%) and pharmacists, plus pharmacy technicians (69.5%) strongly agreed/agreed that antibiotics were overused in Mongolia and common reasons included patients being able to easily purchase antibiotics with or without prescription. Perceptions regarding treatment with commonly purchased antibiotics among Mongolian doctors was surveyed by Nakajima, and doctors doubted the effectiveness of some antibiotics such as benzyl penicillin, gentamicin, metronidazole, ampicillin, phenoxymethyl penicillin, and ciprofloxacin, due to antibiotic resistance.(33) Some of the current choices can be predicated on past treatment failures. Past experience was also selected in the questionnaire study with doctors as a characteristic that was often/always considered when prescribing for patients with mild CAP (68%).

Poor awareness and not acknowledging the appropriateness of guidelines are reported to be the common reasons for not using guidelines.(334) A study has identified facilitators and barriers to compliance with an institutional antibiotic prescribing policy and antimicrobial stewardship committee members (prescribers) indicated lack of knowledge as the main barrier to compliance with the antibiotic prescribing policy.(335) In this study the prescribers were introduced to a case of moderate CAP and most prescribers were familiar with this scenario. While most said they would start with 'ceftriaxone', a broad-spectrum antibiotic such as 'ceftriaxone' is not indicated in the hospital policy nor the Australian Therapeutic Guidelines. (142, 335) Common barriers to guideline adherence were classified into 'knowledge', 'attitude' and 'external barriers such as guideline related, patient related and environmental.(336) A number of reasons for policy/guideline non-compliance were identified, including knowledge deficiency, uncertainty avoidance (reluctance to tolerate uncertainty risks), conflicts with patients' interests and insufficient resources.(337, 338) As reviewed by Holloway, results from 900 studies over two decades showed suboptimal prescribing practice in primary care indicating than less than half of all patients treated in accordance with the STGs. In addition, the review concluded that medicines use overall has not improved in the most recent period. The reasons included increasing practice of prescribing antibiotics persistently over time and failure to reduce use of injections resulting in inappropriate practices for primary care patients. Moreover, the review concluded that there was little change in the results over two decades of WHO initiated indicators to measure medicine use.(289)

Inadequate dissemination of the recommended information can also lead to poor guideline awareness and adherence to guidelines.(339, 340) Likewise, previous reports from Mongolia emphasized that there was no dissemination and implementation nor promotion through continuing medical education (CME) of these guidelines, (including treatment guidelines for pneumonia) for general doctors in Mongolia.(5) Detailed analysis of factors influencing the lack of adherence to guidelines need to be carried out in Mongolia.

Despite only 4% of doctors in the questionnaire study often considering incentives from drug companies when prescribing, almost half of doctors (48%) often/always preferred to prescribe newly marketed and broad spectrum antimicrobials for patients with mild/moderate CAP. This finding could be related to visits from representatives of pharmaceutical companies. As the Law on Medicine and Medical Devices of Mongolia (2010) states, "*It is prohibited to advertise drugs that are issued by prescription in order to sell them*".(341) However, specific information regarding the audience and permitted details are lacking in the law(341) and there were reports related to public advertisements of prescription only medicines and unethical practices between wholesalers and doctors in Mongolia.(281) In contrast, the advertising and promotion of prescription only medicines is regulated in Australia by the Therapeutic Goods Act 1989, advertising prescription medicines directly to consumers is prohibited, whereas advertising to health professionals is permitted within the scope of the legislation. In addition, advertisements for prescription medicines must also meet the requirements of the Competition and Consumer Act 2010, Section 22(5).(342)

Another possible explanation for poor guideline adherence in relation to antibiotics can be related to the prescriber's perception about the increased risk of antibiotic resistance through intake of meat from animals. People in rural areas are more exposed to animals than in urban, and therefore doctors may be more sceptical about the efficacy of antibiotics that have been given to animals which can lead to the development of antimicrobial resistance in humans. However, no data are available regarding the use of antibiotics for animal husbandry in Mongolia to date.

The questionnaire study with doctors and providers indicated further non-adherent practices with current treatment guidelines for CAP, including the prescribing and dispensing standard of Mongolia. In particular, doctors (16.9%), pharmacists and pharmacy technicians (15%) often/always changed a prescribed antibiotic. Furthermore, 23% of doctors indicated that they often/always prescribe more than one antibiotic for patients with pneumonia at the same time, and this was confirmed by the providers (14.1%). Previous research has identified barriers to guideline use for CAP among junior doctors

working in hospitals in the UK and respondents were also sceptical about guidelines along with increasing clinical experience.(343) Similar to this finding, in the questionnaire study, doctors with more years of working experience tended to change a prescribed antibiotic for patients diagnosing the treatment of mild/moderate CAP compared to those with less years of working experience.

7.7 Safe injection practice

The questionnaire study with community members revealed that about 20% of respondents had experienced one of the proffered unwanted side effects of injections, such as experiencing a warm feeling under the skin, or a swollen or hard lump under the skin. In terms of reasons regarding side effects, about one-third did not know that these effects could occur as a reason of an injection or because of the injection. A study on adverse drug events (ADE)s was completed with 140 health professionals and 70 patients in Mongolia (unpublished).(344) It showed that of sixty-four cases of ADEs, 76.6% were associated with injections, including antibiotic injections. Frequent symptoms were abdominal pain, nausea and rash caused by dextran and ampicillin injection administration.(344) Consistent with our results, most patients did not know about ADEs.(344)

In terms of safe injection practices, the questionnaire study with community members showed some advances in certain areas as no respondents reported the administration to have involved re-used needles and syringes and a majority was aware of using new clean needles and syringes for every injection. As proposed by Logez,(78) this improvement can be explained by three main changes in the health care practices of Mongolia: (i) improved knowledge about risks related with transmission of blood-bourne pathogens, (ii) a better supply of injection equipment with local production of needles and syringes and (iii) an introduction of methodical destroying of sharp waste after use in each health care facility.(78) Such improved safe practices were found in other developing communities, reporting a high use of disposable syringes.(302, 345) However, contrary findings could be observed from other countries such as Pakistan(346) indicating that only 53% of participants used freshly opened new syringes for administration of an injection and India,(347)

reporting about one-third of respondents having disposable syringes for injection administration.

In addition, the findings of this study showed that doctors, pharmacists and pharmacy technicians had good knowledge, reporting using new needles and syringes for every injection administration. This was consistent with previous findings from Cambodia, with 90% of injection prescribers and providers being aware of HBV, HCV and HIV transmitted through unsafe injection practices.(330) Furthermore, reports from Mongolia indicated a comparably good knowledge among doctors.(78, 79) However, there are still challenges due to a high rate of injection use, potential break-down in infection control, and poor health care protection.(78, 79) The latest study on injection practice in Mongolia in 2007 indicated that only 7% of prescribers (doctors) and 12% of surveyed nurses were immunised against Hepatitis B.(79) No other data are available regarding the immunisation status of injection administrators, including doctors and nurses in Mongolia.

7.8 Methodological aspects

This study assessed the treatment practices for mild/ moderate CAP in Mongolia and the reliability of the study results was measured by a triangulation method, comparing the prescription data with questionnaire responses from doctors, pharmacists, pharmacy technicians and community members.

Despite the strengths of this study, some methodological aspects must be considered when interpreting results.

Prescription study

The study has two main limitations. Firstly, the estimates were based on a one point in time observation completed in the winter period of 2010. Secondly, the relatively small number of pharmacies (about 4% of all main community pharmacies) selected for the prescription study may affect the generalisibility of the study results. To counterbalance this weakness, the sample was stratified by district and type of pharmacy and personal data collection assured that no particular pharmacy type was excluded from this study. In addition, the

study assessed 394 prescriptions from 22 pharmacies which consented giving a high response rate (73%). These included twelve pharmacies in Ulaanbaatar area and ten pharmacies in eight provinces. All pharmacies that did not consent were in the urban area due to their busy workload.

Moreover, the study selected only those prescriptions with only a diagnosis of CAP, approximately one in five of prescriptions were issued without a diagnosis creating a potential risk of not including those prescriptions for patients, some of whom have CAP and those without the diagnosis may neglect a particular type of prescriber. In practice, the pharmacy asks the patients what the diagnosis was and records it. These prescriptions were excluded because of the prescribing of patient inaccuracy. However it is the habits of prescribers that were assessed in this study. Therefore, the results should be reasonably representative of the prescribing practice for the treatment of CAP at the urban and rural levels.

Questionnaire studies

Pilot studies with validated questionnaires were completed in order to assure the accuracy. The selection of community members was not random, however the response rate of community members was high (79%). The study aimed to recruit community members that represented various socioeconomic groups, for example: age, marital status, employment status, educational and income level by selecting participants from 55 different regions of Ulaanbaatar city, shopping centres, hospitals and pharmacies that were located in the central and semi-rural parts. However, differences were apparent in demographic characteristics of respondents compared with the general population. Secondly, the responses from community members could be influenced by issues of social desirability. The questionnaires were however, anonymous and confidentiality was emphasized encouraging honesty. In addition, questionnaires were completed in public quiet areas, ensuring the sufficient time and lack of disturbances whilst completion of the questions. Some of the questions were based on recall of events; however, completed forms were assessed for completion by the researcher. Therefore, responses do provide some insight to community members' behaviour and perception regarding the treatment of CAP.

The selection of pharmacists and pharmacy technicians was based on convenience selection of 40 community pharmacies, aiming to include at least one pharmacist or pharmacy technician from each location (district type, location to the health facility). Based on a discussion with local professionals, the selection of pharmacies included a range of pharmacies regarding the size, accessibility and distance from clinics, ensuring that no particular type of pharmacies was excluded. Additionally, a personal delivery and collection of the questionnaires was used to improve the response rate. The high response rate (76%) obtained was likely to avoid significant responder bias. Non-respondents (19) were working in pharmacies located in large districts and was due to a busy workload.

The relatively small number of samples of health settings (eleven hospitals and 20 FGPs located in Ulaanbaatar city) may lead to selection bias and imprecise estimate. However, the doctors in the questionnaire study were recruited randomly from the list provided by the human resource department of each hospital and a high response rate (89%) indicated low potential risk of selection bias.

The study aimed to select at least two doctors, one general doctor and one specialist, from each setting. Similar to the questionnaire study with pharmacists and pharmacy technicians, where there were two at the same hospital, they completed the questionnaire independently from each other. This study recruited more specialists than general doctors, suggesting that the results may be more generalisable to them. However, the study included twenty-two general doctors, also providing information about their practice of treatment of CAP.

The study has identified a lack of coherent antibiotic prescribing for mild/moderate CAP in Mongolia. It also reports inconsistent protocols applied to antibiotic and non-antibiotic treatments including the prescribing of injections. Some evidence points to a proportion antibiotic treatment failures, requiring other antibiotics to be subsequently prescribed. There maybe some influence of drug companies on the prescribing of the most recent antibiotics to be marketed. There is little evidence of prescribing "reserve" antibiotics at

a high level. However, this study has also identified issues that potentially negative impact on the long-term public health of the Mongolian population.

Chapter 8 Conclusion

This is one of the most comprehensive studies carried out in a general practice setting in a developing country that has assessed the prescribing practice for mild/ moderate CAP.

A prescription analysis showed a wide range of antibiotic and non-antibiotic prescribing for mild/moderate CAP in Mongolia and a low conformity with health department prescribing guidelines. In addition, the study used a triangulation method to assess the veracity of the obtained results. In addition to prescription data, findings from questionnaire studies with community members, doctors and pharmacists, including pharmacy technicians provided additional insight into current prescribing practices for treatment of CAP in Mongolia.

The study revealed that there was no consensus on appropriate prescribing of antibiotics and non-antibiotic medicines for the treatment of CAP. Possible reasons for this include flaws and inconsistencies in the treatment guidelines which are based upon WHO recommendations and provide no guidance for children aged six to 16 years. This gives rise to a lack of respect for the current guidelines. In addition there has been inadequate promotion by health department authorities. Consequently, the currently adopted WHO guidelines need replacement with ones that are locally developed based upon local expertise including considerations of pathogen resistance patterns, the unusual climatic conditions and access of patients to medical care. With respect to CAP, the guidelines should include any non-antibiotic medicines considered appropriate for the Mongolian environment especially for the low winter temperatures. Techniques for successful implementation of guidelines are well-known in the literature, such as those adopted by the NPS MedicineWise in Australia.(348)

The supply of antibiotics from pharmacies although currently indicating a similar range of selections being made to those prescribed by physicians should be ceased unless this would markedly reduce access to treatment for poorer patients.

Although adjunctive therapy was reported to be inefficacious in more moderate climates, these findings need to be reviewed by an expert panel representing senior physicians and government authorities for Mongolia.

Differences in prescribing practices between rural and urban areas indicate that government control and monitoring of prescribing practices need to be improved, especially in the urban areas of Mongolia.

The discrepancies between the expectations and attitudes towards therapeutic injections between prescribers, providers and public were evident in this study. Most prescribers and providers specified patient's self-diagnosis and expectation was an important factor for prescribing/dispensing injections for treatment of CAP. This was at variance with community views where only a small percentage of mainly older respondents preferred having an injection. In addition, OTC provision of injectables and antibiotics was evident in the study.The responses from the public was mainly focused on the general use of injections, however this finding shows that prescribers were poorly informed regarding the community attitudes towards injections. Long-term medical education targeted at prescribers, providers and community members should be implemented regarding appropriate prescribing of injections. The study found that prescribers and providers had a good knowledge about safe injection practice; however health care protection needs to be improved due to the current high injection use in Mongolia. The high levels of inappropriate antibiotic prescribing is a public health hazard for Mongolia.

Chapter 9 Recommendations

The Mongolian government takes an active role in implementing policies, guidelines and processes that manages the use of antibiotics and non-antibiotic medicines that reflect the requirements of the Mongolian people. This includes updating of treatment policies for mild/ moderate CAP relevant to Mongolia. Based on the findings from this study, the recommendations should include the following:

- To meet public health requirements in Mongolia treatment guidelines for antibiotic use including for the ten most important diseases of Mongolia should be developed by independent expert teams involving senior physicians' views on optimum treatment in the Mongolian context and an implementation strategy developed.
- Current practice guidelines relevant for treating mild/moderate CAP with antibiotics at outpatient settings needs to be reviewed by appropriate Mongolian experts and should be followed by prescriber education and made widely available to health care professionals in Mongolia.
- Adjunctive therapy for mild/moderate CAP should be investigated and assessed by an expert team. Outcomes should be included in revised guidelines.
- Investigations regarding the underlying problems for non-adherence to treatment guidelines should be specifically carried out.
- OTC sale of antibiotics should be banned from the community-based pharmacies. The current supply from community pharmacies should be investigated for public access for the needy and the government should move when appropriate to control the provision of antibiotics from pharmacies without a prescription.
- OTC sale of injectable medicines should be ceased from the community-based pharmacies and legislative rules need to address a compliance procedure to ensure this is adhered with.
- Educational programs targeted at improving prescribers' and providers' knowledge of the small level of public support for injectable

medicines and attitudes towards injectable medicines and safe injection practices should be implemented.

- A mass educational campaign for the public regarding the inappropriate use of antibiotic and non-antibiotic medicines, including injections needs to be implemented in Mongolia.
- A decision by experts needs to resolve the discontinuity if the case of injectable gentamicin in the guidelines but not allow prescribing of injections for community-based patients.

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Appendix A - Publication

1. Peer reviewed journal

- Gereltuya Dorj, Delia Hendrie, Richard Parsons, Bruce Sunderland, 2013

Evaluation of prescribing practices for treatment of community-acquired pneumonia (CAP) in Mongolia,

BMC Health Services Research - Impact factor 1.66,

This paper is under review.

2. Peer reviewed conference

Gereltuya Dorj, Delia Hendrie, Richard Parsons, Bruce Sunderland,

"Results of an evaluation of prescribing practices forcommunity-acquired pneumonia (CAP) in Mongolia" in *AustralAsian Pharmaceutical Science Association Annual Conference Adelaide 11-14 December, 2011*

Appendix B - Systematic Review Data Extraction Sheet

Table 9.1 Example of data extraction sheet for systematic review

SIGN rating:

Country				
Sample				
Study type				
Objectives				
Statistical analysis				
Results				
Author specific comments				
Reviewers comments				
SIGN levels	☐ Randomisation	☐ High	☐ Moderate	☐ Low quality/ not applicable
	☐Controls	☐ High	☐ Moderate	☐ Low quality/ not applicable
	☐Bias	☐ High	☐ Moderate	☐ high risk
	☐Probability that relationship is causal	☐ High	☐ Moderate	☐ Low quality/ not applicable
	☐Study design and quality	☐ High	☐ Moderate	☐ Low quality

Table 9.2 Scottish Intercollegiate Guidelines Network levels of evidence

1++	High quality metaanalyses, systematic reviews of RCTs, or RCTs with a very low risk of bias
1+	Well conducted metaanalyses, systematic reviews of RCTs, or RCTs with a low risk of bias
1-	Metaanalyses, systematic reviews or RCTs, or RCTs with a high risk of bias
2++	High quality systematic reviews of casecontrol or cohort studies, or high quality casecontrol or cohort studies with a very low risk of confounding, bias, or chance and a high probability that the relationship is causal
2+	Well conducted casecontrol or cohort studies with a low risk of confounding, bias, or chance and a moderate probability that the relationship is causal
2-	Casecontrol or cohort studies with a high risk of confounding, bias, or chance and a significant risk that the relationship is not causal
3	Nonanalytic studies e.g. case report
4	Expert opinion

Table 9.3 Scottish Intercollegiate Guidelines Network grades of recommendations

A	At least one meta-analysis, systematic review or RCT rated as 1++ and directly applicable to the target population or a systematic review of RCTS or a body of evidence consisting principally of studies rated as 1+ directly applicable to the target population and demonstrating overall consistency of results
B	A body of evidence including studies rated as 2++ directly applicable to the target population and demonstrating overall consistency of results or extrapolated evidence from studies rates as 1++ or 1+
C	A body of evidence including studies rated as 2+ directly applicable to the target population and demonstrating overall consistency of results or extrapolated evidence from studies rated as 2++
D	Evidence level 3 or 4 or extrapolated evidence from studies rated as 2+

Appendix C - Ethical approval

minute

Curtin University of Technology

To	Gereltuya Dorj
From	Mrs Jennifer Ramsay Ethics Committee Secretary
Subject	Protocol Approval **PH-11-2010**
Date	16 July, 2010
Copy	Prof. Bruce Sunderland & Delia Hendrie

Division of Heath Sciences

School of Pharmacy
GPO Box U1987
Perth WA 6845

Telephone +61 8 9266 7528
Facsimile +61 8 9266 2769
Email pharmacy@curtin.edu.au
Web www.curtin.edu.au

Thank you for your "Form C Application for Approval of Research with Minimal Risk (Ethical Requirements)" for the project titled **"EVALUATION OF RATIONAL USE OF ANTIBIOTICS (INJECTIONS) FOR TREATMENT OF CAP IN MOGOLIA"**. On behalf of the Human Research Ethics Committee I am authorised to inform you that the project is approved.

Approval of this project is for a period of twelve months from **15 July, 2010** to **15 July, 2011**.

If at any time during the twelve months changes amendments occur, or if a serious or unexpected adverse event occurs, please advise me immediately. The approval number for your project is **PH-11-2010**. *Please quote this number in any future correspondence.*

Mrs Jennifer H. Ramsay
Committee Secretary
Human Research Ethics Committee

This study has been approved by the Curtin University Human Research Ethics Committee. If needed, verification of approval can be obtained either by writing to the Curtin University Human Research Ethics Committee, c/ - Office of Research and Development, Curtin University of Technology, GPO Box U1987, Perth, 6845 or by telephoning 9266 2784.

Appendix D Verbal participant consent form

EVALUATION OF THE TREATMENT OF COMMUNITY-ACQUIRED PNEUMONIA (CAP) IN MONGOLIA

Date _____

You are being informed about the study on evaluation of the treatment of community-acquired pneumonia (CAP) in Mongolia. By participating in this study, you can withdraw any time without any reason or affecting your current and future treatment or practice.

All information provided will be treated with strict confidentiality and will not be released unless required by law. The aim of the research, data will be collected and only de-identified data is stored and published

I agree that research data from this project can be published provided my name or other identifying information is not used.

Participation information sheet

EVALUATION OF THE TREATMENT OF COMMUNITY-ACQUIRED PNEUMONIA (CAP) IN MONGOLIA

Date _____

This research is being undertaken by a PhD student of School of Pharmacy, Curtin University of Technology in collaboration with supervisors from the School of Public Health and School of Pharmacy, Curtin University of Technology of Western Australia.

This research will study the use of injections and it is anticipated that the study will recommend strategies to reduce inappropriate prescribing practices in Mongolia. Therefore, this research will contribute to the development of scientific evidence in this area and provide useful information for policy makers.

By participating in this study, you can withdraw any time without any reason or affecting your current and future treatment.
All information provided will be treated with strict confidentiality and will not be released unless required by law.

For further information on this research or queries regarding your participation please contact the researcher Gereltuya Dorj on +976-99968988 or email: gereltuya.dorj@postgrad.curtin.edu.au

If you have any issues regarding the research, you can forward them by phone or writing to the following staff at Curtin:

Ms. Delia Hendrie
Lecturer
School of Public Health
Curtin University of Technology, WA
Tel: (+618) 9266 9068
Email: D.V.Hendrie@curtin.edu.au

or alternatively to:
The Secretary
Human Research Ethics Committee
Office of Research and Development
Curtin University of Technology
Tel: (+618)9266 2784
Email: hrec@curtin.edu.au
PO Box U 1987, Perth WA 6845

Appendix E Prescription data collection form

Part I.

Patient details

Code:

Location /Name of retail pharmacy/:

Date of birth:

Gender:

Date:

Diagnosis:

Part II. Prescribed drug details

#	1.	2.	3.	4.	5.	6.	7.	8.	9.	10.
Drug name										
Dosage form										
Dose										
Quantity										
Direction for use										
Brand/Generic										
Prescribed date										
Dispensed date										

Appendix F Questionnaire data collection form

INTERVIEW WITH COMMUNITY MEMBERS

DATA COLLECTION FORM

_____
Date

Code _____

Residential location (suburb/town)_____

1. Age: ☐ 20-30 ☐ 30-50 ☐ 60+
2. Gender: ☐ M ☐ F
3. Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Separated ☐ Widowed
4. Education: ☐ Primary ☐ Secondary ☐ Tertiary ☐ Other
5. Occupation: ☐ Unemployed ☐ Civil servant ☐ Employed ☐ Military
6. (a) Have you had an injection in the past? Yes / No

   (b) If 'Yes', how long ago did you have your last injection?

   ☐< 1 month ☐ 1-6 months ☐ 6-12 months ☐ > 1 year

7. What reason did you have the last injection?

	Yes	No
01. Treatment of an illness	☐	☐
02. Immunisation	☐	☐
03. Contraception (only female respondents)	☐	☐
04. Other- vitamins, etc.	☐	☐

8. Was the injection you had

	Yes	No
01. Single injection(s)	☐	☐
02. Continuous drip	☐	☐

9. Can you remember how many injections you had for the last single course of treatment?

☐ one ☐ 2 – 4 ☐ 5 – 8 ☐ >8

10. Do you remember if after some injections you then had similar medication by mouth?

☐ Yes ☐ No

11. Do you remember what the illness was?

_____

12. Do you know what the medicine was?

_____

These are questions related to your past experience with injections

13. When you had an injection, did you have any of the following unwanted/adverse effects?

	Yes	**No**
01. Persistent redness	☐	☐
02. Warmth at the injection site	☐	☐
03. Swelling or hardness under the skin	☐	☐
04. Drainage of fluid from the injection site	☐	☐
05. Fever caused by the injection	☐	☐
06. Persistent pain at the injection site	☐	☐
07. Felt weak	☐	☐
08. Fainted	☐	☐

14. What do you think was the cause of that complication/ side effect?

	Yes	**No**
01. Person who administered the injection	☐	☐
02. The drug itself	☐	☐
03. Bad equipment, syringe, drip etc	☐	☐
04. I do not know	☐	☐
05. Others, specify	☐	☐

15. What happened following your unwanted/side effect?

	Yes	No
01. Went to hospital	☐	☐
02. Consulted doctor	☐	☐
03. Consulted the pharmacist	☐	☐
04. Nothing	☐	☐

16. How long did it last? _____

17. Who prescribed injections for you?

	Yes	Sometimes	No
01. Doctor	☐	☐	☐
02. Pharmacist	☐	☐	☐
03. Nurse	☐	☐	☐
04. Traditional practitioner	☐	☐	☐

18. Where do you purchase your injections?

	Yes	Sometimes	No
01. Doctor	☐	☐	☐
02. Pharmacy	☐	☐	☐
03. Nurse	☐	☐	☐
04. Detailer	☐	☐	☐

19. Who administered your injections to you?

	Yes	Sometimes	No
01. Doctor	☐	☐	☐
02. Pharmacy	☐	☐	☐
03. Nurse	☐	☐	☐
04. Friend / relative	☐	☐	☐
05. Traditional practitioner	☐	☐	☐
06. Other (specify)	☐	☐	☐

	Amount /MNT/	Did you think that the price was affordable?		Was it reimbursed?	
		Yes	No	Yes	No
20. How much did you pay for your last visit to the doctor?		☐	☐	☐	☐
21. How much did you pay for purchasing injections from a pharmacy?		☐	☐	☐	☐
22. How much did you pay for administration of injection purchased from a pharmacy?		☐	☐	☐	☐

23. If you go to see the doctor, do you expect to receive injections for treatment?

☐ Yes ☐ Sometimes ☐ No

If yes,	Yes	Sometimes	No
	☐	☐	☐
01. The doctors prescribe injections	☐	☐	☐
02. I would prefer the doctor to prescribe me with an injection	☐	☐	☐

24. Do you think an injection is a better treatment?

☐ Yes ☐ Sometimes ☐ No

If yes,	Yes	Sometimes	No
01. The treatment with injection works faster	☐	☐	☐
02. The treatment with injection is more affordable	☐	☐	☐
03. You prefer injections because you would forget to take tablets/capsules	☐	☐	☐
04. If a doctor prescribes tablets/capsules do you think that treatment will work for you	☐	☐	☐
05. Injections are recommended by friends, relatives, colleagues	☐	☐	☐

06. Injection advertisement by pharmaceutical companies	☐	☐	☐
07. Habit/ custom	☐	☐	☐

25. Are you aware of the need for using new clean syringes and needles for every injection?

☐ Yes ☐Sometimes ☐No

26. Which of the following is important to you when getting an injection?

	Yes	**Sometimes**	**No**
01. Price	☐	☐	☐
02. Local or imported product	☐	☐	☐
03. Package condition	☐	☐	☐
(a) Expiry date	☐	☐	☐

27. Would you go to another doctor/ pharmacy, if an injection was not prescribed/ dispensed by the

first person?

☐Yes ☐Sometimes ☐No

28. Would you be disappointed if an injection was not prescribed/ dispensed?

☐ Yes ☐ Sometimes ☐No

29. Do you refuse injections when prescribed/ dispensed?

☐ Yes ☐ Sometimes ☐ No

If yes, please explain the reasons:	**Yes**	**Sometimes**	**No**
01. Fear of pain	☐	☐	☐
02. Fear of needle, infection etc.	☐	☐	☐
03. Do not trust the doctor/ pharmacist	☐	☐	☐
04. Other (specify)	☐	☐	☐
05. It is possible to get better without an injection	☐	☐	☐
06. There are many tablets available for many common diseases	☐	☐	☐

07. The illness will go away on its own with time	☐	☐	☐
08. Lack of clean syringes and needles	☐	☐	☐

30. Are you aware of counterfeit medicines in Mongolia? ☐ Yes ☐ No

31. If yes, have you encountered problems with counterfeit medicines?

	Yes	**Sometimes**	**No**
01. Antibiotics	☐	☐	☐
02. Other medications	☐	☐	☐

32. May I ask about your approximate monthly income?

☐≤ 90.000MNT ☐ 91-200.000MNT ☐201-300.000MNT

☐301-400.000MNT ☐ 401-500.000MNT ☐ ≥501.000MNT

33. Do you want to discuss about any other issues related to the treatment of CAP and injection practices in Mongolia?

Thank you for your time

INTERVIEW WITH PHARMACISTS/PHARMACY TECHNICIANS

DATA COLLECTION FORM

_____
Date

Code _____

Residential location_____

1. Age: ☐ 20-30 ☐ 30-50 ☐ 50-60 ☐ 60+
2. Gender: ☐ M ☐ F
3. Working level: ☐ Owner ☐ Employee
4. Pharmaceutical role: ☐ Pharmacist ☐ Pharmacy technician
5. Years of work as pharmacist/pharmacy technician: _____

The following questions are related to medicines that are prescribed.

6. List the antibiotics that are being frequently dispensed for community-acquired pneumonia

(CAP) with a prescription from a doctor

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
01	Penicillin, oral	☐	☐	☐	☐	☐
02	Penicillin, injection	☐	☐	☐	☐	☐
03	Amoxicillin, oral	☐	☐	☐	☐	☐
04	Amoxicillin, injection	☐	☐	☐	☐	☐
05	Ampicillin, oral	☐	☐	☐	☐	☐
06	Ampicillin, injection	☐	☐	☐	☐	☐
07	Ciprofloxacin, oral	☐	☐	☐	☐	☐
08	Ciprofloxacin, injection	☐	☐	☐	☐	☐
09	Cefazolin, oral	☐	☐	☐	☐	☐
10	Cefazolin, injection	☐	☐	☐	☐	☐
11	Erythromycin, oral	☐	☐	☐	☐	☐
12	Erythromycin, injection	☐	☐	☐	☐	☐

13	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
14	Clarythromycin, oral	☐	☐	☐	☐	☐
15	Clarythromycin, injection	☐	☐	☐	☐	☐
16	Azithromycin, oral	☐	☐	☐	☐	☐
17	Azithromycin, injection	☐	☐	☐	☐	☐
18	Levofloxacin, oral	☐	☐	☐	☐	☐
19	Tetracycline, oral	☐	☐	☐	☐	☐
20	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
21	Doxycycline, oral	☐	☐	☐	☐	☐

7. What other prescribed medications are also prescribed with antibiotics for CAP?

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
01	Dexamethasone, oral	☐	☐	☐	☐	☐
02	Dexamethasone, injection	☐	☐	☐	☐	☐
03	Bromhexine, oral	☐	☐	☐	☐	☐
04	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
05	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
06	Chlorfenamin, tab	☐	☐	☐	☐	☐
07	Vitamin B complex, oral	☐	☐	☐	☐	☐
08	Vitamin B complex, injection	☐	☐	☐	☐	☐
09	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
10	Euphyllin, oral	☐	☐	☐	☐	☐
11	Euphyllin, injection	☐	☐	☐	☐	☐
12	Analgin, oral	☐	☐	☐	☐	☐
13	Analgin, injection	☐	☐	☐	☐	☐
14	Dimedrol, oral	☐	☐	☐	☐	☐
15	Dimedrol, injection	☐	☐	☐	☐	☐

8. How frequently do the doctors prescribe more than one antibiotic for patients with CAP at the same time?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
	☐	☐	☐	☐	☐

9. When dispensing a particular dosage form that is prescribed by a doctor for patients with CAP, what are issues that influence your dispensing?

SA: Strongly agree, A: Agree, D: Disagree, SD: Strongly Disagree, NR: No response

	SA	A	D	SD	NR
01. Essential drug list with reimbursement	☐	☐	☐	☐	☐
02. Medical profile of children	☐	☐	☐	☐	☐
03. Medical profile of adults	☐	☐	☐	☐	☐
04. Patient characteristics, severity	☐	☐	☐	☐	☐
05. Dosage forms of the prescribed medicine	☐	☐	☐	☐	☐
06. Duration of the prescribed medications	☐	☐	☐	☐	☐
07. Knowledge about adverse reactions, side effects	☐	☐	☐	☐	☐
08. Medical- legal concerns	☐	☐	☐	☐	☐
09. Treatment guideline information	☐	☐	☐	☐	☐
10. Patient compliance with medications	☐	☐	☐	☐	☐
11. Patient is not satisfied if not injected	☐	☐	☐	☐	☐
12. Affordability of medications to the patient	☐	☐	☐	☐	☐
13. Cost of brand vs generic medicines is important when dispensing	☐	☐	☐	☐	☐
14. Expiry date of medication	☐	☐	☐	☐	☐
15. Need for reconstitution	☐	☐	☐	☐	☐

10. How frequently do you have to change the prescriptions for CAP because the prescription
appears to be inappropriate?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
	☐	☐	☐	☐	☐

11.

01. The normal duration of **prescribed** antibiotics for CAP by injection is:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days

02. The normal duration of **prescribed** antibiotics for CAP orally is:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days

03. If the treatment of CAP is switched from injection to oral, the time of the switch from an injection is:

☐ ≤ 24 hours ☐ 2 days ☐ 3 days ☐ > 5 days after commencing treatment

The following questions are related to medicines that are dispensed in the pharmacy without prescription.

12. List the antibiotics that are being frequently dispensed for community-acquired pneumonia (CAP) without a prescription

		Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01.	Penicillin, oral	☐	☐	☐	☐	☐
02.	Penicillin, injection	☐	☐	☐	☐	☐
03.	Amoxicillin, oral	☐	☐	☐	☐	☐
04.	Amoxicillin, injection	☐	☐	☐	☐	☐
05.	Ampicillin, oral	☐	☐	☐	☐	☐
06.	Ampicillin, injection	☐	☐	☐	☐	☐
07.	Ciprofloxacin, oral	☐	☐	☐	☐	☐
08.	Ciprofloxacin, injection	☐	☐	☐	☐	☐
09.	Cefazolin, oral	☐	☐	☐	☐	☐
10.	Cefazolin, injection	☐	☐	☐	☐	☐
11.	Erythromycin, oral	☐	☐	☐	☐	☐
12.	Erythromycin, injection	☐	☐	☐	☐	☐
13.	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
14.	Clarythromycin, oral	☐	☐	☐	☐	☐
15.	Clarythromycin, injection	☐	☐	☐	☐	☐
16.	Azithromycin, oral	☐	☐	☐	☐	☐
17.	Azithromycin, injection	☐	☐	☐	☐	☐
18.	Levofloxacin, oral	☐	☐	☐	☐	☐
19.	Tetracycline, oral	☐	☐	☐	☐	☐
20.	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
21.	Doxycycline, oral	☐	☐	☐	☐	☐

13. What other medications would you dispense with antibiotics for CAP without a prescription?

		Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01.	Dexamethasone, oral	☐	☐	☐	☐	☐
02.	Dexamethasone, injection	☐	☐	☐	☐	☐
03.	Bromhexine, oral	☐	☐	☐	☐	☐
04.	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
05.	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
06.	Chlorfenamin, tab	☐	☐	☐	☐	☐
07.	Vitamin B complex, oral	☐	☐	☐	☐	☐
08.	Vitamin B complex, injection	☐	☐	☐	☐	☐
09.	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
10.	Euphyllin, oral	☐	☐	☐	☐	☐
11.	Euphyllin, injection	☐	☐	☐	☐	☐
12.	Analgin, oral	☐	☐	☐	☐	☐
13.	Analgin, injection	☐	☐	☐	☐	☐
14.	Dimedrol, oral	☐	☐	☐	☐	☐
15.	Dimedrol, injection	☐	☐	☐	☐	☐

14. When dispensing a particular dosage form for the treatment of CAP without a prescription, what issues influence that choice?

		SA	A	D	SD	NR
01.	Injections are more effective than oral administration	☐	☐	☐	☐	☐
02.	The medication product quality is better in an injection rather than tablet or capsule	☐	☐	☐	☐	☐
03.	Adverse effects are less likely with an oral than injection treatment	☐	☐	☐	☐	☐
04.	The doses of injections are chosen to provide better patient compliance	☐	☐	☐	☐	☐
05.	New needles, syringes and single dose ampoules are necessary for injections	☐	☐	☐	☐	☐

06.	There is no treatment benefit to switch from injection to oral during an antibiotic course for CAP	☐	☐	☐	☐	☐
07.	Your pharmaceutical training promoted the use of injections rather than oral medication	☐	☐	☐	☐	☐
08.	Drug companies promote injectable rather than oral medications	☐	☐	☐	☐	☐
09.	Prefer to dispense newly marketed products	☐	☐	☐	☐	☐
10.	The total treatment with oral medications is a more costly form of treatment than with injections including the cost of syringes, needles and administration	☐	☐	☐	☐	☐
11.	More repeat visits to the pharmacies are caused by injections	☐	☐	☐	☐	☐
12.	Injections are chosen to provide better patient compliance	☐	☐	☐	☐	☐
13.	Patients prefer an oral medication rather than treatment with injections	☐	☐	☐	☐	☐
14.	The age and gender of the patients can have influence on dispensing injections	☐	☐	☐	☐	☐
15.	The severity of the patient with CAP influences the dispensing of injections	☐	☐	☐	☐	☐

15. Do you dispense more than one antibiotic without prescription for CAP at the same time?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

01. The normal duration of **dispensed** antibiotics for CAP by injection is:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days

02. The normal duration of **dispensed** antibiotics for CAP orally is:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days

03. If the treatment of CAP is switched from injection to oral, the time of the switch from an injection is:

☐ ≤ 24 hours ☐ 2 days ☐ 3 days ☐ > 5 days after commencing treatment

16. How often do you receive governmental information about antibiotic sensitivity data?

	Never	Weekly	Monthly	3 times a year	Once a year
	☐	☐	☐	☐	☐

17. Do you find the current Mongolian treatment guidelines for CAP appropriate?

☐ Yes ☐ No ☐ NR

18. How often would you refer a patient with CAP who comes to the pharmacy to a doctor?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
	☐	☐	☐	☐	☐

19. Do you consider injections s more effective treatment for CAP?

☐ Yes ☐ No

20. If yes, what is the effect of injections?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. More rapid cure	☐	☐	☐	☐	☐
02. Adverse effects are less frequent than with oral treatment	☐	☐	☐	☐	☐

21. To what extent do you agree that there is more financial benefit with injections to the following people?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. Doctor	☐	☐	☐	☐	☐
02. Pharmacist	☐	☐	☐	☐	☐
03. Patient	☐	☐	☐	☐	☐
04. Nurse	☐	☐	☐	☐	☐

22. Do you charge a special fee for administering injections?

☐ Yes, amount_____ ☐ No

23. Do you think the fee for dispensing and administering injections is affordable to the patient?

☐ Yes ☐ No ☐ NR

24. When dispensing injections, which of the following are considered:

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
01. Supplied from reliable source	☐	☐	☐	☐	☐
02. Using sterile drips, syringes and needles	☐	☐	☐	☐	☐
03. Package condition of the medication	☐	☐	☐	☐	☐
04. Patient's self diagnosis and request for injection	☐	☐	☐	☐	☐
05. Reconstitution of the antibiotic	☐	☐	☐	☐	☐
06. Expiry date of the reconstituted product	☐	☐	☐	☐	☐

25. Do you think that injections for treatment of diseases in general are overused in Mongolia?

	SA	**A**	**D**	**SD**	**NR**
	☐	☐	☐	☐	☐

26. If yes, please specify the reasons?

	SA	**A**	**D**	**SD**	**NR**
01. Patients are able to easily buy injections from many pharmacies	☐	☐	☐	☐	☐
02. Lack of government control on drug sale	☐	☐	☐	☐	☐
03. Public demand for injections is high	☐	☐	☐	☐	☐

27. After using a disposable syringe:

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. You change the needle and retain the syringe for reuse	☐	☐	☐	☐	☐
02. You sterilize the syringe and needle and reuse it	☐	☐	☐	☐	☐
03. You discard all	☐	☐	☐	☐	☐
04. You discard and destroy it after the first time it was used	☐	☐	☐	☐	☐

28. When administering an intravenous drip:

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. You give the whole vial as a drip to a patient	☐	☐	☐	☐	☐
02. You retain the residual not required for that dose	☐	☐	☐	☐	☐
03. You reconstitute what remained of the powder for the next patient	☐	☐	☐	☐	☐
04. You discard everything the first time you used it	☐	☐	☐	☐	☐

29. From where do you obtain injectable drugs for the treatment of diseases?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. Pharmaceutical wholesaler	☐	☐	☐	☐	☐
02. Pharmacy	☐	☐	☐	☐	☐
03. Detailer	☐	☐	☐	☐	☐
04. Others (private import)	☐	☐	☐	☐	☐

30. Are you aware of counterfeit medicines in Mongolia? ☐ Yes ☐ No

31. If yes, have you experienced problems with counterfeit medicines?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
a. Antibiotics	☐	☐	☐	☐	☐
b. Other medications	☐	☐	☐	☐	☐

32. May I ask about your approximate monthly income?

☐≤ 90.000MNT ☐ 91-200.000MNT ☐201-300.000MNT

☐301-400.000MNT ☐ 401-500.000MNT ☐ ≥501.000MNT

33. Do you want to discuss any other issues related to prescribing for CAP and its treatment in Mongolia?

Thank you for your time.

INTERVIEW WITH DOCTORS

DATA COLLECTION FORM

_____
Date

Code _____

Residential location_____

1. Age: ☐ 20-30 ☐ 31-50 ☐ 51-60 ☐ 61+
2. Gender: ☐ M ☐ F
3. Work level: ☐ FGP ☐ Public hospital ☐ Private hospital ☐ Others
4. Medical Role: ☐ G/P ☐ Specialist
5. Years of work in this field: _____
6. When prescribing antibiotics for patients with community-acquired pneumonia (CAP), what are the issues that influence your prescribing?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
01. Patient expectations/demand	☐	☐	☐	☐	☐
02. Essential drug list with reimbursement	☐	☐	☐	☐	☐
03. Drug company information	☐	☐	☐	☐	☐
04. Drug company representative visits	☐	☐	☐	☐	☐
05. Treatment guidelines for CAP	☐	☐	☐	☐	☐
06. Information from CPD programs/ seminars	☐	☐	☐	☐	☐
07. Likelihood of adverse effects	☐	☐	☐	☐	☐
08. Regional antibiotic sensitivity data	☐	☐	☐	☐	☐
09. Patient antibiotic sensitivity data	☐	☐	☐	☐	☐
10. Journals, publications, articles	☐	☐	☐	☐	☐
11. Influence of peers, fellow GP's	☐	☐	☐	☐	☐
12. Influence of specialists	☐	☐	☐	☐	☐
13. Personal experience	☐	☐	☐	☐	☐
14. Information about previous use of antibiotics obtained from a pharmacy by the patient	☐	☐	☐	☐	☐

15. Drug availability	☐	☐	☐	☐	☐
16. Affordability of medications for patient	☐	☐	☐	☐	☐
17. Broad spectrum of antibiotic activity are the best option	☐	☐	☐	☐	☐
18. Preference for recently marketed medications	☐	☐	☐	☐	☐
19. Government monitoring of prescribing	☐	☐	☐	☐	☐
20. Risk of being charged for litigation	☐	☐	☐	☐	☐
21. Incentives from pharmaceutical companies	☐	☐	☐	☐	☐

7. When prescribing a particular dosage form for the treatment of CAP, what issues influence that choice?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
01. Injections are more effective than oral administration	☐	☐	☐	☐	☐
02. Patients prefer an oral medication rather than treatment with injections	☐	☐	☐	☐	☐
03. The medication product quality is better in an injection rather than tablet or capsule	☐	☐	☐	☐	☐
04. Adverse effects are less likely with an oral than injection treatment	☐	☐	☐	☐	☐
05. The treatment with oral medications is a more costly form of treatment than an injection including the cost of syringes, needles and the administration	☐	☐	☐	☐	☐
06. More repeat visits to the hospital/clinic are caused by injections	☐	☐	☐	☐	☐
07. New needles, syringes and single dose ampoules are necessary for injections	☐	☐	☐	☐	☐

08. To switch from injection to oral administration during an antibiotic course for CAP	☐	☐	☐	☐	☐
09. Drug companies promote injectable rather than oral medications	☐	☐	☐	☐	☐
10. Injections are chosen to provide better patient compliance	☐	☐	☐	☐	☐
11. Your medical training promoted the use of injections rather than oral medication	☐	☐	☐	☐	☐
12. The severity of CAP influences the prescribing of injections	☐	☐	☐	☐	☐
13. Patient demographic characteristics have an influence on the prescribing	☐	☐	☐	☐	☐

8.

01. The normal duration of prescribing antibiotics for CAP by injection is:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days

02. The normal duration of prescribing antibiotics for CAP orally is:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days

03. If you switch a patient with CAP from injection to oral when do you recommend that the oral dosage starts:

☐ ≤ 24 hours ☐ 2 days ☐ 3-5 days ☐ > 5 days after the initial treatment

9. Do you find the Mongolian treatment guidelines for CAP appropriate?

☐ Yes ☐ No ☐ Don't know

10. Do you prescribe more than one antibiotic for CAP at the same time?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

11. How often do you have to change the antibiotic as the first one did not work?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
	☐	☐	☐	☐	☐

12. List of antibiotics that you frequently prescribe for CAP

		Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
22.	Penicillin, oral	☐	☐	☐	☐	☐
23.	Penicillin, injection	☐	☐	☐	☐	☐
24.	Amoxicillin, oral	☐	☐	☐	☐	☐
25.	Amoxicillin, injection	☐	☐	☐	☐	☐
26.	Ampicillin, oral	☐	☐	☐	☐	☐
27.	Ampicillin, injection	☐	☐	☐	☐	☐
28.	Ciprofloxacin, oral	☐	☐	☐	☐	☐
29.	Ciprofloxacin, injection	☐	☐	☐	☐	☐
30.	Cefazolin, oral	☐	☐	☐	☐	☐
31.	Cefazolin, injection	☐	☐	☐	☐	☐
32.	Erythromycin, oral	☐	☐	☐	☐	☐
33.	Erythromycin, injection	☐	☐	☐	☐	☐
34.	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
35.	Clarythromycin, oral	☐	☐	☐	☐	☐
36.	Clarythromycin, injection	☐	☐	☐	☐	☐
37.	Azithromycin, oral	☐	☐	☐	☐	☐
38.	Azithromycin, injection	☐	☐	☐	☐	☐
39.	Levofloxacin, oral	☐	☐	☐	☐	☐
40.	Tetracycline, oral	☐	☐	☐	☐	☐
41.	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
42.	Doxycycline, oral	☐	☐	☐	☐	☐

13. What other medication group would you prescribe with antibiotics for CAP?

		Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
16.	Dexamethasone, oral	☐	☐	☐	☐	☐
17.	Dexamethasone, injection	☐	☐	☐	☐	☐
18.	Bromhexine, oral	☐	☐	☐	☐	☐
19.	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
20.	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
21.	Chlorfenamin, tab	☐	☐	☐	☐	☐
22.	Vitamin B complex, oral	☐	☐	☐	☐	☐
23.	Vitamin B complex, injection	☐	☐	☐	☐	☐
24.	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
25.	Euphyllin, oral	☐	☐	☐	☐	☐
26.	Euphyllin, injection	☐	☐	☐	☐	☐
27.	Analgin, oral	☐	☐	☐	☐	☐
28.	Analgin, injection	☐	☐	☐	☐	☐
29.	Dimedrol, oral	☐	☐	☐	☐	☐
30.	Dimedrol, injection	☐	☐	☐	☐	☐

14. How often do you receive governmental information about prescribing antibiotics?

	Never	Weekly	Monthly	3 times a year	Once a year
	☐	☐	☐	☐	☐

15. To what extent do the patients come to you for treatment of CAP who have already purchased antibiotics from the following?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
01. Pharmacy	☐	☐	☐	☐	☐
02. Market	☐	☐	☐	☐	☐
03. Other, specify_____	☐	☐	☐	☐	☐

16. When you prescribe antibiotics what is the frequency of generic prescribing?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

17. Where do you obtain antibiotic sensitivity data from?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
01. Governmental information	☐	☐	☐	☐	☐
02. Governmental publications	☐	☐	☐	☐	☐
03. Antibiotic package leaflet	☐	☐	☐	☐	☐
04. Hospital	☐	☐	☐	☐	☐
05. Treated patients	☐	☐	☐	☐	☐
06. Colleagues	☐	☐	☐	☐	☐
07. Antibiotics not working	☐	☐	☐	☐	☐
08. Internet	☐	☐	☐	☐	☐

18. How frequently do you admit/send a patient to hospital with CAP?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

19. Do you think that injections for treatment of diseases in general are overused in Mongolia?

	SA	A	D	SD	NR
	☐	☐	☐	☐	☐

20. If yes, please specify the reasons?

		SA	A	D	SD	NR
01.	Patients are able to easily buy the medicines from many pharmacies	☐	☐	☐	☐	☐
02.	Lack of government control on drug sale	☐	☐	☐	☐	☐
03.	Public demand	☐	☐	☐	☐	☐

21. Are you aware of counterfeit medicines in Mongolia? ☐ Yes ☐ No

22. If yes, have you experienced problems with counterfeit medicines?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
01. Antibiotics	☐	☐	☐	☐	☐
02. Other medications	☐	☐	☐	☐	☐

23. May I ask about your approximate monthly income?

☐≤ 90.000MNT ☐ 91-200.000MNT ☐201-300.000MNT

☐301-400.000MNT ☐ 401-500.000MNT ☐ ≥501.000MNT

24. Do you want to discuss about any other issues related to CAP and its treatment in Mongolia?

_____

Thank you for your time.

ИРГЭДЭД ЗОРИУЛСАН АМАН ЗӨВШӨӨРЛИЙН ХУУДАС

МОНГОЛ УЛС ДАХЬ
УУШИГНЫ ХАТГАЛГАА ӨВЧНИЙ ЭМЧИЛГЭЭНИЙ ҮНЭЛГЭЭ

Огноо _____

Танд Монгол улс дахь уушигны хатгалгаа өвчний үнэлгээ сэдэвт судалгааны ажлын талаар танилцуулж байна. Энэ судалгаанд оролцсоноор та өмнө нь эмчилгээнд хэрэглэж байсан тарианы талаар хариулах болно.

Та энэ судалгаанд зөвхөн өөрийн хүсэлтээр оролцох бөгөөд таны нэр болон бусад холбогдох мэдээлэл шаардлагагүй. Энэ судалгаанд оролцсоноор та дуртай үедээ татгалзах, зогсоох эрхтэй бөгөөд таны одоо болон ирээдүйн эмчилгээнд аливаа өөрчлөлт гарахгүй.

Судалгаанд авах мэдээллийг чандлан нууцлах бөгөөд асуумжаас гарах аливаа бичлэг, протоколыг нэргүйгээр хадгалах болно.

Судалгааны мэдээллийг миний нэр болон холбогдох мэдээлэлгүйгээр ашиглахыг оролцохыг зөвшөөрч байна.

ИРГЭДЭД ЗОРИУЛСАН СУДАЛГААНД ХАМРАГДАХ МЭДЭЭЛЛИЙН ХУУДАС

МОНГОЛ УЛС ДАХЬ
УУШИГНЫ ХАТГАЛГАА ӨВЧНИЙ ЭМЧИЛГЭЭНИЙ ҮНЭЛГЭЭ

Огноо _____

Миний нэрийг Гэрэлтуяа гэдэг бөгөөд би Австрали улсын Куртины Их Сургуулийн Эм Зүйн Сургуулийн докторантурт сурч байна. Докторантурын ажлыг Нийгмийн Эрүүл Мэндийн Сургууль болон Эм Зүйн Сургуулийн 2 багш удирдаж байна.
Докторантурын ажил Монгол улс дахь эмчилгээнд зориулсан тарианы хэрэглээг судлах бөгөөд шаардлагагүй, тохиромжгүй зуршилыг багасгах зорилготой юм. Тийм учир энэ судалгаа нь гадна шинжлэх ухааны баримт боловсруулахад тус болохоос гадна шийдвэр гаргагч нарт хэрэгцээтэй мэдээлэл болно.

Энэ судалгаанд оролцсоноор та өмнө нь эмчилгээнд хэрэглэж байсан тарианы талаар хариулах болно. Та энэ судалгаанд зөвхөн өөрийн хүсэлтээр оролцох бөгөөд таны нэр болон бусад холбогдох мэдээлэл шаардлагагүй. Энэ судалгаанд оролцсоноор та дуртай үедээ татгалзах, зогсоох эрхтэй бөгөөд таны одоо болон ирээдүйн эмчилгээнд аливаа өөрчлөлт гарахгүй.

Судалгаанд авах мэдээллийг чандлан нууцлах бөгөөд асуумжаас гарах аливаа бичлэг, протоколыг нэргүйгээр хадгалах болно.
Энэ судалгааг Куртин Их сургуулийн Хүний Ёс зүйн хороо зөвшөөрөн баталсан. Нэмэлт мэдээлэл болон асуух зүйл байвал та судлаач Д. Гэрэлтуяа /утас: 99968988, и-мэйл: gereltuya.dorj@postgrad.curtin.edu.au/ -тай холбогдох буюу доорхи хүмүүст хандана уу:

Делиа Хендрие
Куртин Их Сургуулийн Нийгмийн эрүүл мэндийн сургуулийн ахлах багш
Утас: (+618) 9266 9068
И-мэйл: D.V.Hendrie@curtin.edu.au

эсвэл:
Хүний Ёс Зүйн Хороо
Куртин Их Сургуулийн Судалгаа болон Хөгжлийн Газар
Утас: (+618)9266 2784
И-мэйл: hrec@curtin.edu.au
PO Box U 1987, Perth WA 6845

ИРГЭДТЭЙ ХИЙХ ЯРИЛЦЛАГА

Мэдээлэл цуглуулах маягт

_____

Огноо

Дугаар _____

Харъяалал (дүүрэг/хот)_____

1. Нас: ☐ 20-30 ☐ 31-50 ☐ 51-60 ☐ 61+
2. Хүйс: ☐ Эр ☐ Эм
3. Гэрлэлтийн байдал: ☐ Ганц бие ☐ Гэрлэсэн ☐ Салсан ☐ Тусдаа амьдардаг ☐ Бэлэвсэн
4. Боловсролын түвшин: ☐ Анхан ☐ Бүрэн дунд ☐ Дээд ☐ Бусад
5. Ажил: ☐ Ажилгүй ☐ Төрийн албан хаагч ☐ Ажилтай ☐ Цэргийн ☐ Оюутан
6. (a) Урьд нь тариа тариулж байсан уу? ☐ Тийм ☐ Үгүй

   (b) Хэрэв тийм бол хамгийн сүүлд хэзээ хийлгэсэн бэ?

   ☐ < 1 сар ☐ 1-6 сар ☐ 6-12 сар ☐ > 1 жил

<u>Та 7-12 асуултад хариулахдаа 6 (b) хариулсан хүгацаагаа бодож хариулна уу.</u>

7. Та ямар учраас тариа хийлгэсэн бэ?

	Тийм	Үгүй
1. Өвчин	☐	☐
2. Дархлаажуулалт (вакцин)	☐	☐
3. Хамгаалалт (зөвхөн эмэгтэй хүмүүс)	☐	☐
4. Бусад- витамин, гэх мэт.	☐	☐

8. Та ямар тариа хийлгэсэн бэ?

	Тийм	Үгүй
1. Нэг удаагийн (булчин, судас тариа)	☐	☐
2. Дусал	☐	☐

9. Нэг удаагийн эмчилгээнд хэдэн төрлийн тариа хийлгэсэн бэ?

☐ нэг ☐ 2 – 4 ☐ 5 – 8 ☐ >8

10. Тариа хийлгэсний дараа төстэй эм ууж байсан уу?

☐ Тийм ☐ Үгүй

11. Ямар өвчин байсан бэ? _____

12. Ямар эм ууж байсан бэ? _____

<u>Дараах асуултууд таны өмнө нь хийлгэж байсан тариатай холбоотой</u>

13. Тариа хийлгэсний дараа танд дараах гаж урвал/ нөлөөнөөс аль нэг нь илэрч байсан уу?

	Тийм	**Үгүй**
1. Байнгын улаалт	☐	☐
2. Тариа хийлгэсэн газар халуу оргих	☐	☐
3. Арьсан дор хавдах эсвэл хатуурах	☐	☐
4. Тариа хийлгэсэн газраас шингэн гарах	☐	☐
5. Тарианаас шалтгаалсан халууралт	☐	☐
6. Тариа хийлгэсэн газар байнга өвдөх	☐	☐
7. Бие сул болох	☐	☐
8. Ухаан алдах	☐	☐

14. Таны бодлоор дээрх гаж нөлөө юунаас болж илэрсэн бэ?

	Тийм	**Үгүй**
1. Тариа хийсэн хүнээс шалтгаалсан	☐	☐
2. Тарианаас болсон	☐	☐
3. Чанар муутай багаж, хатгуур, зүү зэргээс болсон	☐	☐
4. Мэдэхгүй	☐	☐
5. Бусад, тодруулна уу.....	☐	☐

15. Та гаж нөлөө илэрсэн үед ямар арга хэмжээ авсан бэ?

	Тийм	**Үгүй**
1. Эмнэлэг явсан	☐	☐
2. Эмчээс зөвлөлгөө авсан	☐	☐
3. Эм зүйчээс зөвлөлгөө авсан	☐	☐

4. Юу ч хийгээгүй	☐	☐
5. Бусад, тодруулна уу.....	☐	☐

16. Хэр удаан үргэлжилсэн бэ? _____(хоног/цаг)

17. Тариа хийлгэхийг хэн танд зөвлөж, бичиж өгдөг вэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Эмч	☐	☐	☐
2. Эмч зүйч	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Уламжлалтын эмч	☐	☐	☐

18. Та тариаг ихэвчлэн хаанаас авдаг вэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Эмч/ эмнэлэг	☐	☐	☐
2. Эм зүйч/эмийн сан	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Хувираа эм худалдагч	☐	☐	☐

19. Танд тариа хэн хийдэг вэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Эмч	☐	☐	☐
2. Эм зүйч	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Найз / хамаатан	☐	☐	☐
5. Уламжлалтын эмч	☐	☐	☐
6. Бусад (тодруулна уу)_____	☐	☐	☐

	Мөнгөн дүн /₮/	**Энэ төлбөр таны хувьд бололцооны байсан уу?**		**Даатгалаас нөхөн олгогдсон уу?**	
20. Эмч дээр хамгийн сүүлд очихдоо ямар төлбөр төлсөн		**Тийм**	**Үгүй**	**Тийм**	**Үгүй**
		☐	☐	☐	☐

бэ? (ойролцоогоор)					
21. Эмийн сангаас тариа авахдаа ямар төлбөр төлсөн бэ? (ойролцоогоор)		☐	☐	☐	☐
22. Эмийн сангаас авсан тариа хийлгэхдээ хэдэн төгрөг төлсөн бэ? (ойролцоогоор)		☐	☐	☐	☐

23. Та эмч рүү очихдоо тариа бичүүлнэ гэж боддог уу?

☐ Тийм ☐Заримдаа ☐ Үгүй

Шалтгаан нь юу вэ?	**Тийм**	**Заримдаа**	**Үгүй**
1. Эмч тариа бичдэг	☐	☐	☐
2. Эмч надад тариа бичээсэй гэж би хүсдэг	☐	☐	☐

24. Тариагаар эмчлэх нь илүү үр дүнтэй гэж боддог уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

Шалтгаан нь юу вэ?	**Тийм**	**Заримдаа**	**Үгүй**
1. Тариагаар эмчлэхэд илүү хурдан эдгэрдэг	☐	☐	☐
2. Тариагаар эмчлэх нь илүү хямд	☐	☐	☐
3. Эм уухаа мартаад байдаг учир тариагаар эмчлэхийг илүүд үздэг	☐	☐	☐
4. Эмч шахмал капсултай эм бичиж өгөхөд уг эмчилгээ үр дүнтэй гэж боддог	☐	☐	☐
5. Миний найз нөхөд, хамаатан, хамт ажилладаг хүмүүс надад тариа хийлгэхийг зөвлөдөг	☐	☐	☐

6. Эмийн компаниуд тариаг сурталчилдаг	☐	☐	☐
7. Тариа хийлгэх зуршил	☐	☐	☐

25. Тариа хийлгэх болгонд шинэ цэвэр зүү тариур хэрэглэх ёстой гэж та мэддэг үү?

☐ Тийм ☐Заримдаа ☐Үгүй

26. Таны бодлоор доорх сонголтуудаас тариа хийлгэхэд юу нь чухал бэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Үнэ	☐	☐	☐
2. Импортын эсвэл дотоодын бүтээгдэхүүн	☐	☐	☐
3. Савлалтын байдал	☐	☐	☐
4. Дуусах хугацаа	☐	☐	☐

27. Хэрвээ анх очсон эмч, эмийн санч танд тариа өгөхгүй бол та өөр газар луу явдаг уу?

☐Тийм ☐Заримдаа ☐Үгүй

28. Хэрвээ танд тариа өгөхгүй бол та сэтгэл дундуур байдаг уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

29. Тариаг хэрвээ танд бичсэн, олгосон тохиолдолд та татгалзах уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

Шалтгааныг тайлбарлана уу:	**Тийм**	**Заримдаа**	**Үгүй**
1. Өвдөхөөс айдаг	☐	☐	☐
2. Зүү, халдвар зэргээс айдаг	☐	☐	☐
3. Эмч, эмийн санчид итгэдэггүй	☐	☐	☐
4. Цэвэр тариур, зүү байхгүй бол татгалзана	☐	☐	☐
5. Тариа хийлгэхгүйгээр эдгэрэх боломжтой	☐	☐	☐
6. Ихэнх өвчнийг эдгээх эм байдаг	☐	☐	☐
7. Хэсэг хугацааны дараа өвчин өөрөө эдгэрнэ	☐	☐	☐

8. Бусад (тодруулна уу)_____	☐	☐	☐

30. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй

31. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Антибиотик	☐	☐	☐
03. Бусад эм (тодруулна уу)_____	☐	☐	☐

32. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

33. Уушигны хатгалгаа өвчин болон бусад өвчний үед тариа хэрэглэхийг та юу гэж боддог вэ? Саналаа бичнэ үү.

_____

Танд баярлалаа

ЭМ ЗҮЙЧ, ЭМ НАЙРУУЛАГЧТАЙ ХИЙХ ЯРИЛЦЛАГА

Мэдээлэл цуглуулах маягт

_____
Огноо

Код _____

Харъяалал_____

1. Нас: ☐ 20-30 ☐ 30-50 ☐ 50-60 ☐ 60+
2. Хүйс: ☐ Эр ☐ Эм
3. Ажлын зэрэглэл: ☐ Эзэмшигч ☐ Ажилтан
4. Мэргэжил: ☐ Эм зүйч ☐ Эм найруулагч
5. Ажилласан жил: _____

<u>Жоронд бичигдсэн эмүүдэд дараах асуултууд хамаатай</u>

6. Уушигны Хатгалгаатай /УХ/-тай өвчтөнд эмч жор бичихдээ дараах эмүүдийг бичдэг

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐

15.	Кларитромицин, тариа	☐	☐	☐	☐	☐
16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐
20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐
21.	Доксициллин, уух	☐	☐	☐	☐	☐

7. УХ-тай өвчтөнд ямар эмүүдийг давхар бичдэг вэ?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

8. УХ-тай өвчтөнд эм бичихдээ эмч нар нэгээс олон антибиотик хэр их бичдэг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

9. УХ-тай өвчтөнд жоронд бичигдсэн эм олгоход дараах хүчин зүйлс нөлөөтэй?
ХЗ: Хүчтэй зөвшөөрч байна, З: Зөвшөөрч байна, Т: Татгалзаж байна, ХТ: Хүчтэй татгалзаж байна, ХБ: Хариулт байхгүй

	ХЗ	**З**	**Т**	**ХТ**	**ХБ**
1. Хөнгөлөлттэй олгогдох зайлшгүй шаардлагатай эм	☐	☐	☐	☐	☐
2. Хүүхдийн эмчилгээ	☐	☐	☐	☐	☐
3. Насанд хүрсэн хүний эмчилгээ	☐	☐	☐	☐	☐
4. Өвчтөний байдал, онцлог	☐	☐	☐	☐	☐
5. Жоронд бичигдсэн эмийн тун	☐	☐	☐	☐	☐
6. Жоронд бичигдсэн эмэн эмчилгээний хугацаа	☐	☐	☐	☐	☐
7. Эмийн гаж нөлөөний тухай мэдлэг	☐	☐	☐	☐	☐
8. Эмнэлэг, хууль	☐	☐	☐	☐	☐
9. Эмчилгээний удирдамж	☐	☐	☐	☐	☐
10. Өвчтөний эмчилгээ дагах чадвар	☐	☐	☐	☐	☐
11. Өвчтөн тариа хийлгэхгүй бол сэтгэл дундуур байна	☐	☐	☐	☐	☐
12. Өвчтөний эм худалдан авах чадвар	☐	☐	☐	☐	☐
13. Эм олгоход женерик болон брэнд эмийн үнэ чухал байдаг	☐	☐	☐	☐	☐
14. Эмийн дуусах хугацаа	☐	☐	☐	☐	☐
15. Дахин хэрэглэх шаардлага	☐	☐	☐	☐	☐

10. УХ-тай өвчтөнд бичигдсэн жор тохиромжгүй учир өөрчлөх шаардлага хэр их гардаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

11.

04. УХ-тай өвчтөнд **эмчийн бичсэн** тариан эмчилгээ дунджаар ... хоног үргэлжилдэг:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

05. УХ-тай өвчтөнд **эмчийн бичсэн** уух эмийн хугацаа ... байдаг:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

06. УХ-тай өвчтөнийг тариан эмчилгээнээс уух хэлбэр лүү шилжүүлэхэд дараах хугацаа болно:

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3 өдөр ☐ > 5 өдөр /эмчилгээ эхэлсэний дараа /

<u>Дараах асуултууд жоргүй олгогдож бүй эмэнд хамаарагдана</u>

12. УХ-тай өвчтөнд дараах эмүүдийг жоргүй олгодог

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐

15.	Кларитромицин, тариа	☐	☐	☐	☐	☐
16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐
20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐
21.	Доксициллин, уух	☐	☐	☐	☐	☐

13. Антибиотикаас гадна УХ-тай өвчтөнд ямар эм олгодог вэ /жоргүй/?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

14. УХ-тай өвчтөнд жоргүйгээр эм олгоход дараах хүчин зүйлс хамаатай?

ХЗ: Хүчтэй зөвшөөрч байна, З: Зөвшөөрч байна, Т: Татгалзаж байна, ХТ: Хүчтэй татгалзаж байна ХБ: Хариулт байхгүй

	ХЗ	З	Т	ХТ	ХБ
1. Тариа уух хэлбэрээс илүү үйлчилгээ сайтай	☐	☐	☐	☐	☐
2. Тарианы чанар шахмал/капсултай эмийн чанараас илүү сайн	☐	☐	☐	☐	☐
3. Эмийг ууж хэрэглэхэд тарьснаас илүү гаж нөлөө гардаг	☐	☐	☐	☐	☐
4. Тарианы тун тухайн өвчтөн эмчилгээг илүү сайн дагахад сонгогдсон	☐	☐	☐	☐	☐
5. Тариа хийхэд шинэ зүү, тариур, ампул шаардлагатай	☐	☐	☐	☐	☐
6. УХ өвчний үед өвчтөнийг антибиотикаар эмчилж байх үед тарианаас уух хэлбэр лүү шилжүүлэхэд ямар нэгэн ашиг байхгүй	☐	☐	☐	☐	☐
7. Таны сургалтанд тариаг уух хэлбэрийн эмнээс илүү их заадаг	☐	☐	☐	☐	☐
8. Эмийн компаниуд тариаг илүү ихээр сурталчилдаг	☐	☐	☐	☐	☐
9. Шинээр гарч буй бүтээгдэхүүнийг олгохыг илүүд үздэг	☐	☐	☐	☐	☐
10. Уух хэлбэрийн эмийн зардал тариан эмчилгээний зардлаас/үүнд зүү тариурны үнэ багтсан/ илүү үнэтэй болдог	☐	☐	☐	☐	☐
11. Тариан эмчилгээ хийлгэхэд эмийн сан руу илүү олон удаа явах хэрэгтэй болдог	☐	☐	☐	☐	☐
12. Өвчтөн эмчилгээг илүү сайн даган мөрдүүлэхийн тулд тариаг сонгосон	☐	☐	☐	☐	☐
13. Өвчтөн шахмал эмийг тарианаас илүүд үздэг	☐	☐	☐	☐	☐
14. Тариаг олгоход өвчтөний нас, хүйс хамаатай	☐	☐	☐	☐	☐
15. Тариаг олгоход УХ-тай өвчтөний байдал хамаатай	☐	☐	☐	☐	☐

15. Та УХ-тай өвчтөнд жоргүйгээр эм олгохдоо нэгээс олон антибиотик нэгэн зэрэг өгдөг үү?

	Хэзээ ч үгүй **0%**	**Цөөхөн** **1-10%**	**Заримдаа** **11-40%**	**Ихэнхдээ** **41-80%**	**Байнга** **>80%**
	☐	☐	☐	☐	☐

1. УХ өвчинд хэрэглэх **олгосон** антибиотик эм тарих хугацаа дунджаар:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

2. УХ өвчинд хэрэглэх **олгосон** антибиотик эмийг уух дундаж хугацаа:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

3. УХ –тай өвчтөнийг тариан эмчилгээнээс уух хэлбэр лүү шилжүүлсэн бол дундаж хугацаа:

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3 өдөр ☐ > 5 өдөр /эмчилгээ эхэлсэний дараа/

16. Антибиотик эмийн мэдрэг чанарын талаар улсаас мэдээлэл хэр их авдаг вэ?

	Хэзээ ч үгүй	**7 хоног тутам**	**Сар болгон**	**Жилд 3 удаа**	**Жилд 1 удаа**
	☐	☐	☐	☐	☐

17. Монгол улсын УХ өвчний эмчилгээний удирдамжийг та тохиромжтой гэж үздэг үү?
☐ Тийм ☐ Үгүй ☐ ХБ

18. Эмийн санд ирж буй УХ-тай өвчтөнийг та хэр их эмнэлэг рүү явуулдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

19. Та УХ өвчинд тариа илүү сайн үр дүнтэй эмчилгээ гэж боддог уу?
☐ Тийм ☐ Үгүй

20. Хэрэв тийм бол тарианы үйлчилгээ юу вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Илүү хурдан эдгэнэ	☐	☐	☐	☐	☐
2. Гаж нөлөө шахмал/капсултай эм ууж хэрэглэснээс арай бага гардаг	☐	☐	☐	☐	☐

21. Тариа хийхэд/эмчлэхэд дараах хүмүүст илүү их ашигтай байдаг гэж та бодож байна вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Эмч	☐	☐	☐	☐	☐
2. Эм зүйч	☐	☐	☐	☐	☐
3. Өвчтөн	☐	☐	☐	☐	☐
4. Сувилагч	☐	☐	☐	☐	☐

22. Тариа хийхэд та нэмэлт төлбөр авдаг уу?

☐ Тийм, _____₮ ☐ Үгүй

23. Таны бодлоор тариа худалдаж авах болон хийлгэх төлбөр өвчтөний хувьд боломжийн байсан уу?

☐ Тийм ☐ Үгүй ☐ ХБ

24. Тариа олгоход дараах зүйлүүдийг та яаж анхаардаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Найдвартай газраас ханган нийлүүлсэн	☐	☐	☐	☐	☐
2. Ариун зүү тариур болон дусал ашиглах	☐	☐	☐	☐	☐
3. Эмийн савлалтын байдал	☐	☐	☐	☐	☐
4. Өвчтөний өөрийн онош болон тариа авах хүсэл	☐	☐	☐	☐	☐
5. Антибиотикийг дахин хэрэглэх	☐	☐	☐	☐	☐
6. Дахин хэрэглэсэн бүтээгдэхүүний дуусах хугацаа	☐	☐	☐	☐	☐

25. Монгол улсын аливаа өвчинд тариаг хэтрүүлэн ашигладаг гэж та боддог уу?

	МЗ	**З**	**Т**	**МТ**	**ХБ**
	☐	☐	☐	☐	☐

26. Хэрэв тийм бол шалтгааныг нэрлэнэ үү?

	МЗ	З	Т	МТ	ХБ
1. Тариаг эмийн сангуудаас маш хялбар аргаар худалдан авах боломжтой	☐	☐	☐	☐	☐
2. Эмийн худалдааг улсаас хянах шалгалт хангалтгүй	☐	☐	☐	☐	☐
3. Олон нийт тариаг их шаарддаг/ хэрэглэдэг	☐	☐	☐	☐	☐

27. Нэг удаагийн тариур ашигласны дараа:

	Хэзээ ч үгүй 0%	Цөөхөн 1-10%	Заримдаа 11-40%	Ихэнхдээ 41-80%	Байнга >80%
1. Зүүг солин тариурыг дахин хэрэглэж болно	☐	☐	☐	☐	☐
2. Зүү тариурыг ариутгаад дахин хэрэглэж болно	☐	☐	☐	☐	☐
3. Бүгдийг хаяна	☐	☐	☐	☐	☐
4. Эхний удаа хэрэглэсний дараа бүгдийг устгаад хаяна	☐	☐	☐	☐	☐

28. Дусал хийсний дараа:

	Хэзээ ч үгүй 0%	Цөөхөн 1-10%	Заримдаа 11-40%	Ихэнхдээ 41-80%	Байнга >80%
1. Бүтэн шил/савыг өвчтөнд тарина	☐	☐	☐	☐	☐
2. Илүү гарсан үлдэгдэлийг хадгална	☐	☐	☐	☐	☐
3. Илүү гарсан нунтагийг дараачийн өвчтөнд хэрэглэнэ	☐	☐	☐	☐	☐
4. Эхний удаа хэрэглэсний дараа бүгдийг устгана	☐	☐	☐	☐	☐

29. Эм тариаг хаанаас авдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Эмийн бөөний худалдаа	☐	☐	☐	☐	☐
2. Эмийн сан	☐	☐	☐	☐	☐
3. Борлуулагч	☐	☐	☐	☐	☐
4. Бусад (хувийн импорт)	☐	☐	☐	☐	☐

30. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй

31. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
a. Антибиотик	☐	☐	☐	☐	☐
b. Бусад эм	☐	☐	☐	☐	☐

32. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

33. Уушигны хатгалгаа болон тарианы хэрэглээний талаар та өөр юу гэж боддог вэ?

Танд баярлалаа

ЭМЧ НАРТАЙ ХИЙХ ЯРИЛЦЛАГА

Мэдээлэл цуглуулах загвар

_____
Огноо

Дугаар _____

Байршил_____

1. Нас: ☐ 20-30 ☐ 31-50 ☐ 51-60 ☐ 61+
2. Хүйс: ☐ Эр ☐ Эм
3. Ажлын түвшин: ☐ өрхийн эмч ☐ улсын эмнэлэг ☐ хувийн эмнэлэг ☐ бусад
4. Мэргэжил: ☐ ерөнхий эмч ☐ нарийн мэргэжлийн
5. Хэдэн жил ажиллаж байгаа вэ? _____
6. Уушигны хатгалгаатай өвчтөнд эмчилгээ бичихэд юу нөлөөлдөг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Өвчтөний хүлээлт / шаардлага	☐	☐	☐	☐	☐
2. Зайлшгүй шаардлагатай хөнгөлөлттэй олгогдох эм	☐	☐	☐	☐	☐
3. Эмийн компаний мэдээлэл	☐	☐	☐	☐	☐
4. Эмийн компанийн төлөөлөгчийн айлчлал	☐	☐	☐	☐	☐
5. Уушигны хатгалгаа өвчний оношлогоо, эмчилгээний удирдамж	☐	☐	☐	☐	☐
6. Тасралтгүй сургалт, хичээлийн мэдээлэл	☐	☐	☐	☐	☐
7. Гаж нөлөө үүсэх магадлал	☐	☐	☐	☐	☐
8. Орон нутгийн антибиотикийн даслын тухай мэдээлэл	☐	☐	☐	☐	☐
9. Өвчтөний антибиотикийн даслын мэдээлэл	☐	☐	☐	☐	☐
10. Ном, сэтгүүл	☐	☐	☐	☐	☐
11. Хамт ажилладаг дарга, хүмүүс, эмч нарын нөлөө	☐	☐	☐	☐	☐
12. Нарийн мэргэжлийн эмч	☐	☐	☐	☐	☐

нарын нөлөө					
13. Хувийн туршлага	☐	☐	☐	☐	☐
14. Өвчтөний урьд нь эмийн сангаас авсан, хэрэглэж байсан антибиотикийн тухай мэдээлэл	☐	☐	☐	☐	☐
15. Эмийн хүртээмж	☐	☐	☐	☐	☐
16. Өвчтөний эм худалдан авах Чадвар	☐	☐	☐	☐	☐
17. Өргөн хүрээний идэвхтэй антибиотик хамгийн шилдэг сонголт	☐	☐	☐	☐	☐
18. Зах зээлд шинээр гарч буй эмүүдийг сонгох/ илүүд үзэх	☐	☐	☐	☐	☐
19. Жор бичилтийг хянах улсын шалгалт	☐	☐	☐	☐	☐
20. Хууль бус зүйл хийх эрсдэл	☐	☐	☐	☐	☐
21. Эмийн компаниас авах урамшуулал, шагнал	☐	☐	☐	☐	☐

7. Уушигны хатгалгаатай өвчтөнд тодорхой эмийн тун бичихэд ямар хүчин зүйлс нөлөөлдөг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Тариан эмчилгээ уух эмнээс илүү үр дүнтэй байдаг	☐	☐	☐	☐	☐
2. Өвчтөн уух эмийг тарианаас илүүд үздэг	☐	☐	☐	☐	☐
3. Тарилгын эмийн чанар уух эмнээс илүү сайн	☐	☐	☐	☐	☐
4. Эмийг ууж хэрэглэхэд тарьснаас илүү их гаж нөлөө үүсдэг	☐	☐	☐	☐	☐
5. Тарилгын эмээс зүү тариурын хамт, уух эмийн зардал илүү үнэтэй	☐	☐	☐	☐	☐
6. Тариан эмчилгээ хийлгэж байгаа тохиолдолд эмнэлэг рүү илүү олон удаа явах хэрэгтэй байдаг	☐	☐	☐	☐	☐
7. Тариа хийхэд шинэ, ариун зүү	☐	☐	☐	☐	☐

тариур ашиглах шаардлагатай					
8. Уушигны хатгалгаатай өвчтөнг эмчилж байх явцад тарианаас уух антибиотик эмийн хэлбэр лүү шилжих хэрэгтэй	☐	☐	☐	☐	☐
9. Эмийн компаниуд тарилгын эмийг илүү ихээр сурталчилдаг	☐	☐	☐	☐	☐
10. Өвчтөнийг эмчилгээг илүү сайн даган мөрдүүлэхийн тулд тариаг сонгосон	☐	☐	☐	☐	☐
11. Сургалтанд тариаг шахмал/ капсултай эмнээс илүү ихээр хэрэглэхийг заадаг	☐	☐	☐	☐	☐
12. Тариа бичихэд УХ өвчний явц/хүндрэл нөлөөлдөг	☐	☐	☐	☐	☐
13. Эм бичихэд өвчтөний онцлог, нас хүйс хамаатай	☐	☐	☐	☐	☐

8.

1. УХ өвчнийг тариагаар эмчлэх дундаж хугацаа:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

2. УХ өвчнийг эмээр эмчлэх дундаж хугацаа:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

3. УХ-тай өвчтөнийг тариан эмчилгээнээс эмийн эмчилгээнд шилжүүлэхэд ямар хугацаа шаардлагатай вэ?

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

9. Монгол улсын УХ өвчний удирдамжмийг та тохиромжтой гэж боддог уу?

☐ Тийм ☐ Үгүй ☐ ХБ

/Хариулах боломжгүй/

10. УХ-тай өвчтөнд та нэгээс илүү антибиотик нэгэн зэрэг бичдэг үү?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

11. Эхний бичсэн антибиотик амжилтгүй байсан тул антибиотикийг солих шаардлага хэр олон удаа байсан бэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

12. УХ-тай өвчтөнд ихэвчлэн бичдэг антибиотикийн жагсаалт

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐
15.	Кларитромицин, тариа	☐	☐	☐	☐	☐
16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐

20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐
21.	Доксициллин, уух	☐	☐	☐	☐	☐

13. УХ-тай өвчтөнд антибиотикаас гадна ямар эм бичдэг вэ?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

14. Антибиотикийг жороор бичих талаар улсаас хэдэн удаа мэдээлэл авдаг вэ?

	Хэзээ ч үгүй	**7 хоног тутам**	**Сар болгон**	**Жилд 3 удаа**	**Жилд 1 удаа**
	☐	☐	☐	☐	☐

15. УХ-тай өвчтөн тань дээр ирэхээсээ өмнө антибиотик хаанаас ихэвчлэн худалдан авсан
байдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Эмийн сан	☐	☐	☐	☐	☐
2. Зах	☐	☐	☐	☐	☐
3. Бусад/хувиараа/__	☐	☐	☐	☐	☐

16. Антибиотик бичихдээ та хэр их женерик эм бичдэг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

17. Антибиотикийн мэдрэг чанар, идэвхийн талаар хаанаас мэдээлэл авдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Улсын мэдээлэл	☐	☐	☐	☐	☐
2. Улсын ном, сэтгүүл	☐	☐	☐	☐	☐
3. Антибиотик эмийн савны хуудас	☐	☐	☐	☐	☐
4. Эмнэлэг	☐	☐	☐	☐	☐
5. Эмчлэгдсэн өвчтөн	☐	☐	☐	☐	☐
6. Хамт ажилладаг хүмүүс	☐	☐	☐	☐	☐
7. Антибиотик идэвхгүй	☐	☐	☐	☐	☐
8. Интернэт	☐	☐	☐	☐	☐

18. УХ-тай өвчтөнг хэр их эмнэлэг рүү явуулдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

19. Монгол улсад тариаг хэтрүүлэн хэрэглэдэг гэж та боддог уу?
МЗ- Маш их зөвшөөрч байна, З- Зөвшөөрч байна, Т- Татгалзаж байна

МТ- Маш их татгалзаж байна, ХБ- Хариулах боломжгүй

	МЗ	**З**	**Т**	**МТ**	**ХБ**
	☐	☐	☐	☐	☐

20. Хэрэв тийм бол тодруулна уу?

	МЗ	**З**	**Т**	**МТ**	**ХБ**
1. Өвчтөн эмийн сангаас тариа худалдан авах боломжтой	☐	☐	☐	☐	☐
2. Улсаас эмийн худалдааг хянах шалгалт хангалтгүй	☐	☐	☐	☐	☐
3. Олон нийтийн шаардлага, хэрэгцээ	☐	☐	☐	☐	☐

21. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй
22. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
a. Антибиотик	☐	☐	☐	☐	☐
b. Бусад эм	☐	☐	☐	☐	☐

23. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

24. Уушигны хатгалгаа болон тарианы хэрэглээний талаар та өөр юу гэж боддог вэ?

_____

Танд баярлалаа

Appendix G Revised questionnaire forms

After piloting questionnaires to ensure that questions were clear and understandable, some word modifications and order of the questions were made.

INTERVIEW WITH COMMUNITY MEMBERS (REVISED)

DATA COLLECTION FORM

_____
Date

Code _____

Residential location (suburb/town)_____

1. Age: ☐ 20-30 ☐ 30-50 ☐ 60+
2. Gender: ☐ M ☐ F
3. Marital Status: ☐ Single ☐ Married ☐ Divorced ☐ Separated ☐ Widowed
4. Education: ☐ Primary ☐ Secondary ☐ Tertiary ☐ Other
5. Occupation: ☐ Unemployed ☐ Civil servant ☐ Employed ☐ Military
6. (a) Have you had an injection in the past? Yes / No

   (b) If 'Yes', how long ago did you have your last injection?

   ☐< 1 month ☐ 1-6 months ☐ 6-12 months ☐ > 1 year

7. What reason did you have the last injection?

	Yes	No
1. Treatment of an illness	☐	☐
2. Immunisation	☐	☐
3. Contraception (only female respondents)	☐	☐
4. Other- vitamins, etc.	☐	☐

8. Was the injection you had?

	Yes	No
1. Single injection(s)	☐	☐
2. Continuous drip	☐	☐

9. Can you remember how many injections you had for the last single course of treatment?

☐ one ☐ 2 – 4 ☐ 5 – 8 ☐ >8

10. Do you remember if after some injections you then had similar medication by mouth?

☐ Yes ☐ No

11. Do you remember what the illness was?

_____

12. Do you know what the medicine was?

_____

These are questions related to your past experience with injections

13. When you had an injection, did you have any of the following unwanted/adverse effects?

	Yes	**No**
1. Persistent redness	☐	☐
2. Warmth at the injection site	☐	☐
3. Swelling or hardness under the skin	☐	☐
4. Drainage of fluid from the injection site	☐	☐
5. Fever caused by the injection	☐	☐
6. Persistent pain at the injection site	☐	☐
7. Felt weak	☐	☐
8. Fainted	☐	☐

14. What do you think was the cause of that complication/ side effect?

	Yes	**No**
1. Person who administered the injection	☐	☐
2. The drug itself	☐	☐
3. Bad equipment, syringe, drip etc	☐	☐
4. I do not know these effects could occur	☐	☐
5. Others, specify	☐	☐

15. What happened following your unwanted/side effect?

	Yes	No
1. Went to hospital	☐	☐
2. Consulted doctor	☐	☐
3. Consulted the pharmacist	☐	☐
4. Nothing	☐	☐

16. How long did it last? _____

17. Who prescribed injections for you?

	Yes	Sometimes	No
1. Doctor	☐	☐	☐
2. Pharmacist	☐	☐	☐
3. Nurse	☐	☐	☐
4. Traditional practitioner	☐	☐	☐

18. Where do you purchase your injections?

	Yes	Sometimes	No
1. Doctor	☐	☐	☐
2. Pharmacy	☐	☐	☐
3. Nurse	☐	☐	☐
4. Detailer	☐	☐	☐

19. Who administered your injections to you?

	Yes	Sometimes	No
1. Doctor	☐	☐	☐
2. Pharmacy	☐	☐	☐
3. Nurse	☐	☐	☐
4. Friend / relative	☐	☐	☐
5. Traditional practitioner	☐	☐	☐
6. Other (specify)	☐	☐	☐

	Amount /MNT/	Did you think that the price was affordable?		Was it reimbursed?	
20. How much did you pay for your last visit to the doctor?		Yes	No	Yes	No
		☐	☐	☐	☐
21. How much did you pay for purchasing injections from a pharmacy?		☐	☐	☐	☐
22. How much did you pay for administration of injection purchased from a pharmacy?		☐	☐	☐	☐

23. If you go to see the doctor, do you expect to receive injections for treatment?

☐ Yes ☐ Sometimes ☐ No

If yes,	Yes	Sometimes	No
	☐	☐	☐
1. The doctors prescribe injections when I don't want to have	☐	☐	☐
2. I would prefer the doctor to prescribe me with an injection	☐	☐	☐

24. Do you think an injection is a better treatment?

☐ Yes ☐ Sometimes ☐ No

If yes,	Yes	Sometimes	No
1. The treatment with injection works faster	☐	☐	☐
2. The treatment with injection is more affordable	☐	☐	☐
3. You prefer injections because you would forget to take tablets/capsules	☐	☐	☐
4. If a doctor prescribes tablets/capsules do you think that treatment will work for you	☐	☐	☐
5. Injections are recommended by friends, relatives, colleagues	☐	☐	☐

6. Injections are advertised more by pharmaceutical companies than oral drugs	☐	☐	☐
7. Having an injection is a personal preference	☐	☐	☐

25. Are you aware of the need for using new clean syringes and needles for every injection?

☐ Yes ☐Sometimes ☐No

26. Which of the following is important to you when getting an injection?

	Yes	**Sometimes**	**No**
1. Price	☐	☐	☐
2. Local or imported product	☐	☐	☐
3. Package condition	☐	☐	☐
4. Expiry date	☐	☐	☐

27. Would you go to another doctor/ pharmacy, if an injection was not prescribed/ dispensed by the first person?

☐Yes ☐Sometimes ☐No

28. Would you be disappointed if an injection was not prescribed/ dispensed?

☐ Yes ☐ Sometimes ☐No

29. Do you refuse injections when prescribed/ dispensed?

☐ Yes ☐ Sometimes ☐ No

If yes, please explain the reasons:	**Yes**	**Sometimes**	**No**
1. Fear of pain	☐	☐	☐
2. Fear of needle, infection etc.	☐	☐	☐
3. Do not trust the doctor/ pharmacist	☐	☐	☐
4. It is possible to get better without an injection	☐	☐	☐

5. There are many tablets available for many common diseases	☐	☐	☐
6. The illness will go away on its own with time	☐	☐	☐
7. Lack of clean syringes and needles	☐	☐	☐
8. Other (specify)	☐	☐	☐

30. Are you aware of counterfeit medicines in Mongolia? ☐ Yes ☐ No

31. If yes, have you encountered problems with counterfeit medicines?

	Yes	**Sometimes**	**No**
a. Antibiotics	☐	☐	☐
b. Other medications	☐	☐	☐

32. May I ask about your approximate monthly income?

☐≤ 90.000MNT ☐ 91-200.000MNT ☐201-300.000MNT

☐301-400.000MNT ☐ 401-500.000MNT ☐ ≥501.000MNT

33. Do you want to discuss about any other issues related to the treatment of CAP and injection practices in Mongolia?

_____

Thank you for your time

INTERVIEW WITH PHARMACITS, PHARMACY TECHNICIANS (REVISED)

DATA COLLECTION CARD

_____
Date

Code _____

Location_____

1. Age: ☐ 20-30 ☐ 30-50 ☐ 50-60 ☐ 60+
2. Sex: ☐ Male ☐ Female
3. Occupation level: ☐ Owner ☐ Employer
4. Profession: ☐ Pharmacist ☐ Pharmacy technician
5. Working years: _____

Following questions are related to the prescribed medicines

6. List of antibiotics dispensed for patients with pneumonia with prescription from a doctor:

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1	Penicillin, oral	☐	☐	☐	☐	☐
2	Penicillin, injection	☐	☐	☐	☐	☐
3.	Amoxicillin, oral	☐	☐	☐	☐	☐
4.	Amoxicillin, injection	☐	☐	☐	☐	☐
5.	Ampicillin, oral	☐	☐	☐	☐	☐
6.	Ampicillin, injection	☐	☐	☐	☐	☐
7.	Ciprofloxacin, oral	☐	☐	☐	☐	☐
8.	Ciprofloxacin, injection	☐	☐	☐	☐	☐
9.	Cefazolin, oral	☐	☐	☐	☐	☐
10.	Cefazolin, injection	☐	☐	☐	☐	☐
11.	Erythromycin, oral	☐	☐	☐	☐	☐
12.	Erythromycin, injection	☐	☐	☐	☐	☐

13.	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
14.	Clarythromycin, oral	☐	☐	☐	☐	☐
15.	Clarythromycin, injection	☐	☐	☐	☐	☐
16.	Azithromycin, oral	☐	☐	☐	☐	☐
17.	Azithromycin, injection	☐	☐	☐	☐	☐
18.	Levofloxacin, oral	☐	☐	☐	☐	☐
19.	Tetracycline, oral	☐	☐	☐	☐	☐
20.	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
21.	Doxycycline, oral	☐	☐	☐	☐	☐

7. Which other medicines the physician also prescribes for patients with pneumonia?

		Never 0%	**Few 1-10%**	**Sometimes 11-40%**	**Mostly 41-80%**	**Always >80%**
1.	Dexamethasone, oral	☐	☐	☐	☐	☐
2.	Dexamethasone, injection	☐	☐	☐	☐	☐
3.	Bromhexine, oral	☐	☐	☐	☐	☐
4.	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
5.	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
6.	Chlorfenamin, tab	☐	☐	☐	☐	☐
7.	Vitamin B complex, oral	☐	☐	☐	☐	☐
8.	Vitamin B complex, injection	☐	☐	☐	☐	☐
9.	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
10.	Euphyllin, oral	☐	☐	☐	☐	☐
11.	Euphyllin, injection	☐	☐	☐	☐	☐
12.	Analgin, oral	☐	☐	☐	☐	☐
13.	Analgin, injection	☐	☐	☐	☐	☐
14.	Dimedrol, oral	☐	☐	☐	☐	☐
15.	Dimedrol, injection	☐	☐	☐	☐	☐

8. How often the physician prescribes more than one antibiotic for patients with pneumonia at the same time?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

9. The following influence your dispensing the prescribed medicines for patient with pneumonia?

	SA	**A**	**D**	**SD**	**NR**
1. Selection of reimbursable generic drugs via EDLM (concession rates)	☐	☐	☐	☐	☐
2. Appropriate children's treatment (dosage adjustment)	☐	☐	☐	☐	☐
3. Appropriate adults treatment (dosage adjustment)	☐	☐	☐	☐	☐
4. Patient's severity	☐	☐	☐	☐	☐
5. Duration of treatment of medicines in the prescription	☐	☐	☐	☐	☐
6. Knowledge of adverse effects of drugs (e.g. drug allergies)	☐	☐	☐	☐	☐
7. Legislative documents, such as standard on prescribing and dispensing practice of Mongolia	☐	☐	☐	☐	☐
8. Guidelines for treatment of CAP	☐	☐	☐	☐	☐
9. Patient's compliance with treatment	☐	☐	☐	☐	☐
10. Patient is not satisfied with the treatment if injection is not prescribed	☐	☐	☐	☐	☐
11. Ability of patient to buy prescription medicines without prescription	☐	☐	☐	☐	☐
12. The price is important when dispensing generic and brand medicines	☐	☐	☐	☐	☐
13. Expiry date of medicine	☐	☐	☐	☐	☐
14. Practice to re-use medicines	☐	☐	☐	☐	☐

10. How often do you have to change the prescriptions for CAP because the prescription was inappropriate?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
	☐	☐	☐	☐	☐

11.

1. Duration of treatment by prescribed injections continues… days:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days

2. Duration of treatment by prescribed oral medicines lasts for … days:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days

3. To transfer the patient with pneumonia from injection to oral medicines the switch time is:

☐ ≤ 24 hours ☐ 2 days ☐ 3 days ☐ > 5 days /after the beginning of treatment/

<u>The following questions are related to non prescribed medicines</u>

12. Following drugs are dispensed for the patients with pneumonia without prescription:

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1.	Penicillin, oral	☐	☐	☐	☐	☐
2.	Penicillin, injection	☐	☐	☐	☐	☐
3.	Amoxicillin, oral	☐	☐	☐	☐	☐
4.	Amoxicillin, injection	☐	☐	☐	☐	☐
5.	Ampicillin, oral	☐	☐	☐	☐	☐
6.	Ampicillin, injection	☐	☐	☐	☐	☐
7.	Ciprofloxacin, oral	☐	☐	☐	☐	☐
8.	Ciprofloxacin, injection	☐	☐	☐	☐	☐

9.	Cefazolin, oral	☐	☐	☐	☐	☐
10.	Cefazolin, injection	☐	☐	☐	☐	☐
11.	Erythromycin, oral	☐	☐	☐	☐	☐
12.	Erythromycin, injection	☐	☐	☐	☐	☐
13.	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
14.	Clarythromycin, oral	☐	☐	☐	☐	☐
15.	Clarythromycin, injection	☐	☐	☐	☐	☐
16.	Azithromycin, oral	☐	☐	☐	☐	☐
17.	Azithromycin, injection	☐	☐	☐	☐	☐
18.	Levofloxacin, oral	☐	☐	☐	☐	☐
19.	Tetracycline, oral	☐	☐	☐	☐	☐
20.	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
21.	Doxycycline, oral	☐	☐	☐	☐	☐

13. Which medicines are dispensed without prescription for the patient with pneumonia?

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1.	Dexamethasone, oral	☐	☐	☐	☐	☐
2.	Dexamethasone, injection	☐	☐	☐	☐	☐
3.	Bromhexine, oral	☐	☐	☐	☐	☐
4.	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
5.	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
6.	Chlorfenamin, tab	☐	☐	☐	☐	☐
7.	Vitamin B complex, oral	☐	☐	☐	☐	☐
8.	Vitamin B complex, injection	☐	☐	☐	☐	☐
9.	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
10.	Euphyllin, oral	☐	☐	☐	☐	☐

11.	Euphyllin, injection	☐	☐	☐	☐	☐
12.	Analgin, oral	☐	☐	☐	☐	☐
13.	Analgin, injection	☐	☐	☐	☐	☐
14.	Dimedrol, oral	☐	☐	☐	☐	☐
15.	Dimedrol, injection	☐	☐	☐	☐	☐

14. The followings influence the dispensing the not prescribed medicines for patient with pneumonia?

	SA	**A**	**DA**	**SD**	**NR**
1. The clinical effect of injections is more potent than oral medicines'	☐	☐	☐	☐	☐
2. The quality of injections better than tablets/ capsules	☐	☐	☐	☐	☐
3. The adverse events occur with oral drugs more than with injections	☐	☐	☐	☐	☐
4. The dosage form of injection is chosen for better compliance of a patient	☐	☐	☐	☐	☐
5. The injection requires new syringes and needles	☐	☐	☐	☐	☐
6. There is no benefit for the transfer of patient with pneumonia from injection to oral medicines	☐	☐	☐	☐	☐
7. Training promotes more about treatment with an injection than oral medicines	☐	☐	☐	☐	☐
8. There is lot of advertisement about injection by drug companies compared to oral medicines	☐	☐	☐	☐	☐
9. Prefer to dispense newly distributed medicines in the market	☐	☐	☐	☐	☐
10. Cost of treatment by oral medicines is more than the treatment cost with injections /including cost of syringes and needles/	☐	☐	☐	☐	☐
11. If patients are prescribed an injection, they are required to visit a pharmacy several times	☐	☐	☐	☐	☐
12. Better patient compliance is achieved by choosing an injection	☐	☐	☐	☐	☐
13. Patient prefer to use tablets rather than injection	☐	☐	☐	☐	☐

14. When dispensing injection, patient's age, gender are important	☐	☐	☐	☐	☐
15. Injection is chosen if patient had severe CAP	☐	☐	☐	☐	☐

15. When you dispense not prescribed drugs for patient with pneumonia how often do you give more than one antibiotic at the same time?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
	☐	☐	☐	☐	☐

1. The normal duration of **dispensed** antibiotics for CAP by injection is:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days

2. The normal duration of **dispensed** antibiotics for CAP orally is:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days

3. If the treatment of CAP is switched from injection to oral, the time of the switch from an injection is:

☐ ≤ 24 hours ☐ 2 days ☐ 3 days ☐ > 5 days after commencing treatment

16. How often do you receive governmental information of antibiotic's resistance?

	Never	**Weekly**	**Monthly**	**3 times a year**	**Once a year**
	☐	☐	☐	☐	☐

17. Do you think that Mongolian pneumonia treatment guide is appropriate?
☐ Yes ☐ No ☐ NR

18. How often do you send the patients with pneumonia who come to your pharmacy to hospital?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
	☐	☐	☐	☐	☐

19. Do you think treatment of patient with pneumonia by injection is more effective than oral medicines?

☐ Yes ☐ No

20. If yes, what is effect of injection?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. The effect is quick	☐	☐	☐	☐	☐
2. Adverse effect is less frequent than with tablets/capsules	☐	☐	☐	☐	☐

21. Who financially benefits most from treatment with an injection?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Physician	☐	☐	☐	☐	☐
2. Pharmacist	☐	☐	☐	☐	☐
3. Patient	☐	☐	☐	☐	☐
4. Nurse	☐	☐	☐	☐	☐

22. Do you charge money for administering injection to the patient?

☐ Yes, _____ ~~₮~~ ☐ No

23. Do you think that the price is affordable for dispensing and administering the injection to patient?

☐ Yes ☐ No ☐ NR

24. When dispensing injections what do you think about the most?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Supply of injectables from registered and wholesaling companies with authorization	☐	☐	☐	☐	☐
2. Use of sterile syringes and needles	☐	☐	☐	☐	☐
3. Completeness of injection's package	☐	☐	☐	☐	☐
4. Self-diagnosis of patient and his/her wishes to buy injection	☐	☐	☐	☐	☐

5. Re-use of antibiotic	☐	☐	☐	☐	☐
6. Expired date of re-used product	☐	☐	☐	☐	☐

25. Do you think in Mongolia people overuse antibiotics?

	SA	A	D	SD	NR
	☐	☐	☐	☐	☐

26. If yes, please describe the reasons?

	SA	A	D	SD	NR
1. Ability to easily buy injection from pharmacies	☐	☐	☐	☐	☐
2. Insufficient government control for retail sale	☐	☐	☐	☐	☐
3. Strong public desire of injection	☐	☐	☐	☐	☐

27. After use of syringe:

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
1. You can change the needle and keep the syringes to reuse	☐	☐	☐	☐	☐
2. Use and reuse the needle and syringe after sterilizing	☐	☐	☐	☐	☐
3. Discard	☐	☐	☐	☐	☐
4. Use once and destroy	☐	☐	☐	☐	☐

28. After administering an intravenous drip:

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
1. You give bottle to patient	☐	☐	☐	☐	☐
2. Keep the remaining volume of injection for next use	☐	☐	☐	☐	☐
3. Use remaining powder for next patient	☐	☐	☐	☐	☐
4. Use once and discard all	☐	☐	☐	☐	☐

29. Where do you obtain the pharmaceutical?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Drug wholesaler	☐	☐	☐	☐	☐
2. Pharmacy	☐	☐	☐	☐	☐
3. Seller/ Agent	☐	☐	☐	☐	☐
4. Other (personal import)	☐	☐	☐	☐	☐

30. Do you know if there are any counterfeit medicines in Mongolia? ☐ Yes ☐ No

31. If yes what kind of?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
a. Antibiotic	☐	☐	☐	☐	☐
b. Other drugs	☐	☐	☐	☐	☐

32. May I ask your monthly average income?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

33. Do you want to discuss about any other issues related to prescribing for CAP and its treatment in Mongolia?

Thank you very much!

INTERVIEW WITH DOCTORS (REVISED)

DATA COLLECTION CARD

_____
Date

Code _____

Location _____

1. Age: ☐ 20-30 ☐ 31-50 ☐ 51+
2. Sex: ☐ Male ☐ Female
3. Occupation level: ☐ Family doctor ☐ Governmental hospital
   ☐ Private hospital ☐ Other
4. Profession: ☐ General doctor ☐ specialist
5. How many years are you working? _____
6. What influences to prescribe a treatment on patients with pneumonia?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Patient expectation/ need	☐	☐	☐	☐	☐
2. Reimbursable drugs of EDL	☐	☐	☐	☐	☐
3. Pharmaceutical company information	☐	☐	☐	☐	☐
4. Pharmaceutical company representatives visit	☐	☐	☐	☐	☐
5. Pneumonia treatment guidelines	☐	☐	☐	☐	☐
6. Intensive training and lessons information	☐	☐	☐	☐	☐
7. Likelihood of side effects	☐	☐	☐	☐	☐
8. Local antibiotic resistance data	☐	☐	☐	☐	☐
9. Information about patient's antibiotic sensitivity	☐	☐	☐	☐	☐
10. Journals, books and professional publications	☐	☐	☐	☐	☐

11. Influence from co-workers, doctors and directors	☐	☐	☐	☐	☐
12. Influence from specialists	☐	☐	☐	☐	☐
13. Own experience	☐	☐	☐	☐	☐
14. Information on previously used antibiotics bought from pharmacy by a patient	☐	☐	☐	☐	☐
15. Medicine's availability	☐	☐	☐	☐	☐
16. Patient's ability to buy medicine	☐	☐	☐	☐	☐
17. The best choice is effective antibiotic with proven low resistance	☐	☐	☐	☐	☐
18. Prefer to choose newly distributed brands in the market	☐	☐	☐	☐	☐
19. Government control on prescribing	☐	☐	☐	☐	☐
20. Incentive from drug companies	☐	☐	☐	☐	☐

7. What influences your choice when prescribing medicines to patient with pneumonia?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Injection has a better effect than oral medicine	☐	☐	☐	☐	☐
2.Patients prefer oral medicine than injection	☐	☐	☐	☐	☐
3. The pharmaceutical quality of injection is better than oral medicine	☐	☐	☐	☐	☐
4. Oral medicines have more side effects	☐	☐	☐	☐	☐
5. Cost of treatment by injection (incl. syringes and needles) is more than cost of treatment by oral medicines	☐	☐	☐	☐	☐

6. If patient has an injection, he/she is required to visit a hospital several times	☐	☐	☐	☐	☐
7. The injection requires new sterile syringes and needles	☐	☐	☐	☐	☐
8. When treating patient with pneumonia it is better to shift injection treatment to oral medicine treatment once the patient's condition had improved	☐	☐	☐	☐	☐
9. Medicine companies advertise more about injection treatment than oral forms	☐	☐	☐	☐	☐
10. In order to follow treatment more effectively by patient, injection was chosen	☐	☐	☐	☐	☐
11. Trainings teach the usage of injections more than usage of tablets/capsules	☐	☐	☐	☐	☐
12. The severity of pneumonia influences the prescribing of injection	☐	☐	☐	☐	☐
13. Patient's characteristics, such as age, gender and severity have influence on prescribing	☐	☐	☐	☐	☐

8.

1. Average treatment days with injection for patients with pneumonia:

☐ ≤3 days ☐ 4-5 days ☐ > 5 days after treatment started

2. Average treatment days with oral medicine for patients with pneumonia:

☐ ≤ 3 days ☐ 4-5 days ☐ > 5 days after treatment started

3. How many days required shifting injection treatment to oral medicine treatment?

☐ ≤ 24 hours ☐ 2 days ☐ 3-5 days ☐ > 5 days after treatment started

9. Do you think that Mongolian pneumonia treatment guide is appropriate?

☐ Yes ☐ No ☐ don't know

10. Do you prescribe more than one antibiotic to patient with pneumonia at the same time?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

11. How many times did you change antibiotics when first antibiotic did not have any effect?

	Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
	☐	☐	☐	☐	☐

12. What kind of antibiotic do you prescribe usually for patients with pneumonia?

		Never **0%**	**Rarely** **1-10%**	**Sometimes** **11-40%**	**Often** **41-80%**	**Always** **>80%**
1.	Penicillin, oral	☐	☐	☐	☐	☐
2.	Penicillin, injection	☐	☐	☐	☐	☐
3.	Amoxicillin, oral	☐	☐	☐	☐	☐
4.	Amoxicillin, injection	☐	☐	☐	☐	☐
5.	Ampicillin, oral	☐	☐	☐	☐	☐
6.	Ampicillin, injection	☐	☐	☐	☐	☐
7.	Ciprofloxacin, oral	☐	☐	☐	☐	☐
8.	Ciprofloxacin, injection	☐	☐	☐	☐	☐
9.	Cefazolin, oral	☐	☐	☐	☐	☐
10.	Cefazolin, injection	☐	☐	☐	☐	☐
11.	Erythromycin, oral	☐	☐	☐	☐	☐

12.	Erythromycin, injection	☐	☐	☐	☐	☐
13.	Amoxicillin/clavulanate, oral	☐	☐	☐	☐	☐
14.	Clarythromycin, oral	☐	☐	☐	☐	☐
15.	Clarythromycin, injection	☐	☐	☐	☐	☐
16.	Azithromycin, oral	☐	☐	☐	☐	☐
17.	Azithromycin, injection	☐	☐	☐	☐	☐
18.	Levofloxacin, oral	☐	☐	☐	☐	☐
19.	Tetracycline, oral	☐	☐	☐	☐	☐
20.	Trimethopim- sulfamethoxazole, oral	☐	☐	☐	☐	☐
21.	Doxycycline, oral	☐	☐	☐	☐	☐

13. Beside antibiotics, what other kind of medicines do you prescribe to patient with pneumonia?

		Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1.	Dexamethasone, oral	☐	☐	☐	☐	☐
2.	Dexamethasone, injection	☐	☐	☐	☐	☐
3.	Bromhexine, oral	☐	☐	☐	☐	☐
4.	Acidi ascorbinici, oral	☐	☐	☐	☐	☐
5.	Acidi ascorbinici, injection	☐	☐	☐	☐	☐
6.	Chlorfenamin, tab	☐	☐	☐	☐	☐
7.	Vitamin B complex, oral	☐	☐	☐	☐	☐
8.	Vitamin B complex, injection	☐	☐	☐	☐	☐
9.	Cocorcarboxylase, injection	☐	☐	☐	☐	☐
10	Euphyllin, oral	☐	☐	☐	☐	☐
11	Euphyllin, injection	☐	☐	☐	☐	☐
12	Analgin, oral	☐	☐	☐	☐	☐
13	Analgin, injection	☐	☐	☐	☐	☐
14	Dimedrol, oral	☐	☐	☐	☐	☐

15	Dimedrol, injection	☐	☐	☐	☐	☐

14. How often do you receive information from government to prescribe antibiotics?

	Never	**Every week**	**Every month**	**3 times a year**	**Once a year**
	☐	☐	☐	☐	☐

15. Where do your patients obtain/ buy antibiotics prior coming to you?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Pharmacy	☐	☐	☐	☐	☐
2. Market	☐	☐	☐	☐	☐
3. Other /specify/__	☐	☐	☐	☐	☐

16. How often do you prescribe generic medicine when you prescribe antibiotics?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
	☐	☐	☐	☐	☐

17. Where do you obtain information about antibiotic's effect, sensitivity data?

	Never 0%	**Rarely 1-10%**	**Sometimes 11-40%**	**Often 41-80%**	**Always >80%**
1. Government information	☐	☐	☐	☐	☐
2. Professional books, journals	☐	☐	☐	☐	☐
3. Package of antibiotic	☐	☐	☐	☐	☐
4. Patient samples	☐	☐	☐	☐	☐
5. Cured patient	☐	☐	☐	☐	☐
6. Co-workers, colleagues	☐	☐	☐	☐	☐
7. No effect of antibiotic	☐	☐	☐	☐	☐
8. Internet source	☐	☐	☐	☐	☐

18. How often do you send patients with pneumonia to hospital?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
	☐	☐	☐	☐	☐

19. Do you think in Mongolia people overuse antibiotics?

	SA	A	DA	SD	NR
	☐	☐	☐	☐	☐

20. If yes, indicate please?

	SA	A	DA	SD	NR
1. Patients are able to buy medicine from pharmacy	☐	☐	☐	☐	☐
2. Insufficient control of medicine from government	☐	☐	☐	☐	☐
3. Public need and demand	☐	☐	☐	☐	☐

21. Do you know, is there any counterfeit/artificial medicines in Mongolia?

☐ Yes ☐ No

22. If yes, what kind of?

	Never 0%	Rarely 1-10%	Sometimes 11-40%	Often 41-80%	Always >80%
a. Antibiotic	☐	☐	☐	☐	☐
b. Other	☐	☐	☐	☐	☐

23. May I ask your monthly average income?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

24. Do you want to discuss about any other issues related to prescribing for pneumonia and its treatment in Mongolia?

_____

Thank you very much!

Mongolian data collection forms (revised)

ИРГЭДТЭЙ ХИЙХ ЯРИЛЦЛАГА (ШИНЭЧИЛСЭН)

Мэдээлэл цуглуулах маягт

_____
Огноо

Дугаар _____

Харъяалал (дүүрэг/хот)_____

1. Нас: ☐ 20-30 ☐ 31-50 ☐ 51-60 ☐ 61+
2. Хүйс: ☐Эр ☐ Эм
3. Гэрлэлтийн байдал: ☐ Ганц бие ☐ Гэрлэсэн ☐ Салсан ☐ Тусдаа амьдардаг ☐ Бэлэвсэн
4. Боловсролын түвшин: ☐ Анхан ☐Бүрэн дунд ☐ Дээд ☐ Бусад
5. Ажил: ☐ Ажилгүй ☐ Төрийн албан хаагч ☐Ажилтай ☐ Цэргийн ☐ Оюутан
6. (a) Урьд нь тариа тариулж байсан уу? ☐ Тийм ☐ Үгүй
   (b) Хэрэв тийм бол хамгийн сүүлд хэзээ хийлгэсэн бэ?
   ☐< 1 сар ☐ 1-6 сар ☐ 6-12 сар ☐ > 1 жил

<u>Та 7-12 асуултад хариулахдаа 6 (b) хариулсан хүгацаагаа бодож хариулна уу.</u>

7. Та ямар учраас тариа хийлгэсэн бэ?

	Тийм	**Үгүй**
1. Өвчин	☐	☐
2. Дархлаажуулалт (вакцин)	☐	☐
3. Хамгаалалт (зөвхөн эмэгтэй хүмүүс)	☐	☐
4. Бусад- витамин, гэх мэт.	☐	☐

8. Та ямар тариа хийлгэсэн бэ?

9. Нэг удаагийн эмчилгээнд хэдэн төрлийн тариа хийлгэсэн бэ?

	Тийм	Үгүй
1. Нэг удаагийн (булчин, судас тариа)	☐	☐
2. Дусал	☐	☐

☐ нэг ☐ 2 – 4 ☐ 5 – 8 ☐ >8

10. Тариа хийлгэсний дараа төстэй эм ууж байсан уу?

☐ Тийм ☐ Үгүй

11. Ямар өвчин байсан бэ? _____

12. Ямар эм ууж байсан бэ? _____

<u>Дараах асуултууд таны өмнө нь хийлгэж байсан тариатай холбоотой</u>

13. Тариа хийлгэсний дараа танд дараах гаж урвал/ нөлөөнөөс аль нэг нь илэрч байсан уу?

	Тийм	Үгүй
1. Байнгын улаалт	☐	☐
2. Тариа хийлгэсэн газар халуу оргих	☐	☐
3. Арьсан дор хавдах эсвэл хатуурах	☐	☐
4. Тариа хийлгэсэн газраас шингэн гарах	☐	☐
5. Тарианаас шалтгаалсан халууралт	☐	☐
6. Тариа хийлгэсэн газар байнга өвдөх	☐	☐
7. Бие сул болох	☐	☐
8. Ухаан алдах	☐	☐

14. Таны бодлоор дээрх гаж нөлөө юунаас болж илэрсэн бэ?

	Тийм	Үгүй
1. Тариа хийсэн хүнээс шалтгаалсан	☐	☐
2. Тарианаас болсон	☐	☐
3. Чанар муутай багаж, хатгуур, зүү зэргээс болсон	☐	☐
4. Гаж нөлөө илэрнэ гэж мэдээгүй	☐	☐
5. Бусад, тодруулна уу.....	☐	☐

15. Та гаж нөлөө илэрсэн үед ямар арга хэмжээ авсан бэ?

	Тийм	Үгүй
1. Эмнэлэг явсан	☐	☐
2. Эмчээс зөвлөлгөө авсан	☐	☐
3. Эм зүйчээс зөвлөлгөө авсан	☐	☐
4. Юу ч хийгээгүй	☐	☐
5. Бусад, тодруулна уу.....	☐	☐

16. Хэр удаан үргэлжилсэн бэ? _____(хоног/цаг)

17. Тариа хийлгэхийг хэн танд зөвлөж, бичиж өгдөг вэ?

	Тийм	Заримдаа	Үгүй
1. Эмч	☐	☐	☐
2. Эмч зүйч	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Уламжлалтын эмч	☐	☐	☐

18. Та тариаг ихэвчлэн хаанаас авдаг вэ?

	Тийм	Заримдаа	Үгүй
1. Эмч/ эмнэлэг	☐	☐	☐
2. Эм зүйч/эмийн сан	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Хувираа эм худалдагч	☐	☐	☐

19. Танд тариа хэн хийдэг вэ?

	Тийм	Заримдаа	Үгүй
1. Эмч	☐	☐	☐
2. Эм зүйч	☐	☐	☐
3. Сувилагч	☐	☐	☐
4. Найз / хамаатан	☐	☐	☐
5. Уламжлалтын эмч	☐	☐	☐
6. Бусад (тодруулна уу)_____	☐	☐	☐

	Мөнгөн дүн /₮/	Энэ төлбөр таны хувьд бололцооны байсан уу?		Даатгалаас нөхөн олгогдсон уу?	
		Тийм	Үгүй	Тийм	Үгүй
20. Эмч дээр хамгийн сүүлд очихдоо ямар төлбөр төлсөн бэ? (ойролцоогоор)		☐	☐	☐	☐
21. Эмийн сангаас тариа авахдаа ямар төлбөр төлсөн бэ? (ойролцоогоор)		☐	☐	☐	☐
22. Эмийн сангаас авсан тариа хийлгэхдээ хэдэн төгрөг төлсөн бэ? (ойролцоогоор)		☐	☐	☐	☐

23. Та эмч рүү очихдоо тариа бичүүлнэ гэж боддог уу?

☐ Тийм ☐Заримдаа ☐ Үгүй

Шалтгаан нь юу вэ?	Тийм	Заримдаа	Үгүй
1. Эмч намайг хүсээгүй байхад тариа бичдэг	☐	☐	☐
2. Эмч надад тариа бичээсэй гэж би хүсдэг	☐	☐	☐

24. Тариагаар эмчлэх нь илүү үр дүнтэй гэж боддог уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

Шалтгаан нь юу вэ?	Тийм	Заримдаа	Үгүй
1. Тариагаар эмчлэхэд илүү хурдан эдгэрдэг	☐	☐	☐
2. Тариагаар эмчлэх нь илүү хямд	☐	☐	☐
3. Эм уухаа мартаад байдаг учир тариагаар эмчлэхийг илүүд үздэг	☐	☐	☐

4. Эмч шахмал капсултай эм бичиж өгөхөд уг эмчилгээ үр дүнтэй гэж боддог	☐	☐	☐
5. Миний найз нөхөд, хамаатан, хамт ажилладаг хүмүүс надад тариа хийлгэхийг зөвлөдөг	☐	☐	☐
6. Эмийн компаниуд тариаг уух эмийн хэлбэрээс илүү сурталчилдаг	☐	☐	☐
7. Хувьдаа тариа хийлгэхийг илүүд үздэг	☐	☐	☐

25. Тариа хийлгэх болгонд шинэ цэвэр зүү тариур хэрэглэх ёстой гэж та мэддэг үү?

☐ Тийм ☐Заримдаа ☐Үгүй

26. Таны бодлоор доорх сонголтуудаас тариа хийлгэхэд юу нь чухал бэ?

	Тийм	**Заримдаа**	**Үгүй**
1. Үнэ	☐	☐	☐
2. Импортын эсвэл дотоодын бүтээгдэхүүн	☐	☐	☐
3. Савлалтын байдал	☐	☐	☐
4. Дуусах хугацаа	☐	☐	☐

27. Хэрвээ анх очсон эмч, эмийн санч танд тариа өгөхгүй бол та өөр газар луу явдаг уу?

☐Тийм ☐Заримдаа ☐Үгүй

28. Хэрвээ танд тариа өгөхгүй бол та сэтгэл дундуур байдаг уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

29. Тариаг хэрвээ танд бичсэн, олгосон тохиолдолд та татгалзах уу?

☐ Тийм ☐ Заримдаа ☐ Үгүй

Шалтгааныг тайлбарлана уу:	**Тийм**	**Заримдаа**	**Үгүй**
1. Өвдөхөөс айдаг	☐	☐	☐
2. Зүү, тариа зэргээс айдаг	☐	☐	☐
3. Эмч, эмийн санчид итгэдэггүй	☐	☐	☐

4. Тариа хийлгэхгүйгээр эдгэрэх боломжтой	☐	☐	☐
5. Ихэнх өвчнийг эдгээх уух шахмал эм, капсул байдаг	☐	☐	☐
6. Хэсэг хугацааны дараа өвчин өөрөө эдгэрнэ	☐	☐	☐
7. Цэвэр тариур, зүү байхгүй бол Татгалзана	☐	☐	☐
8. Бусад (тодруулна уу)_____	☐	☐	☐

30. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй

31. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Тийм	**Заримдаа**	**Үгүй**
a. Антибиотик	☐	☐	☐
b. Бусад эм (тодруулна уу)_____	☐	☐	☐

32. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

33. Уушигны хатгалгаа өвчин болон бусад өвчний үед тариа хэрэглэхийг та юу гэж боддог вэ? Саналаа бичнэ үү.

_____

Танд баярлалаа

ЭМ ЗҮЙЧ, ЭМ НАЙРУУЛАГЧТАЙ ХИЙХ ЯРИЛЦЛАГА (ШИНЭЧИЛСЭН)

Мэдээлэл цуглуулах маягт

_____
Огноо

Код _____

Харъяалал_____

1. Нас: ☐ 20-30 ☐ 30-50 ☐ 50-60 ☐ 60+
2. Хүйс: ☐ Эр ☐ Эм
3. Ажлын зэрэглэл: ☐ Эзэмшигч ☐ Ажилтан
4. Мэргэжил: ☐ Эм зүйч ☐ Эм найруулагч
5. Ажилласан жил: _____

<u>Жоронд бичигдсэн эмүүдэд дараах асуултууд хамаатай</u>

6. Уушигны Хатгалгаатай /УХ/-тай өвчтөнд эмч жор бичихдээ дараах эмүүдийг бичдэг

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐

15.	Кларитромицин, тариа	☐	☐	☐	☐	☐
16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐
20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐
21.	Доксициллин, уух	☐	☐	☐	☐	☐

7. УХ-тай өвчтөнд ямар эмүүдийг давхар бичдэг вэ?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

8. УХ-тай өвчтөнд эм бичихдээ эмч нар нэгээс олон антибиотик хэр их бичдэг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

9. УХ-тай өвчтөнд жоронд бичигдсэн эм олгоход дараах хүчин зүйлс нөлөөтэй?
ХЗ: Хүчтэй зөвшөөрч байна, З: Зөвшөөрч байна, Т: Татгалзаж байна, ХТ: Хүчтэй татгалзаж байна, ХБ: Хариулт байхгүй

	ХЗ	**З**	**Т**	**ХТ**	**ХБ**
1. Хөнгөлөлттэй үнээр олгогдох зайлшгүй шаардлагатай эм	☐	☐	☐	☐	☐
2. Хүүхдийн эмчилгээ (тун, хэлбэрийг тохируулах)	☐	☐	☐	☐	☐
3. Насанд хүрсэн хүний эмчилгээ (тун, хэлбэрийг тохируулах)	☐	☐	☐	☐	☐
4. Өвчтөний биеийн байдал	☐	☐	☐	☐	☐
5. Жоронд бичигдсэн эмийн хугацаа	☐	☐	☐	☐	☐
6. Эмийн гаж нөлөөний тухай мэдлэг	☐	☐	☐	☐	☐
7. Жоронд бичигдсэн эмэн эмчилгээний хугацаа	☐	☐	☐	☐	☐
8. Эм олгох журам, стандарт зэрэг баримт	☐	☐	☐	☐	☐
9. Эмчилгээний удирдамж	☐	☐	☐	☐	☐
10. Өвчтөний эмчилгээ дагах чадвар	☐	☐	☐	☐	☐
11. Өвчтөн тариа хийлгэхгүй бол сэтгэл дундуур байна	☐	☐	☐	☐	☐
12. Өвчтөний жоргүй эм худалдан авах чадвар	☐	☐	☐	☐	☐
13. Эм олгоход женерик болон брэнд эмийн үнэ чухал байдаг	☐	☐	☐	☐	☐
14. Эмийн дуусах хугацаа	☐	☐	☐	☐	☐
15. Дахин хэрэглэх шаардлага	☐	☐	☐	☐	☐

10. УХ-тай өвчтөнд бичигдсэн жор тохиромжгүй учир өөрчлөх шаардлага хэр их гардаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

11.

1. УХ-тай өвчтөнд **эмчийн бичсэн** тариан эмчилгээ дунджаар ... хоног үргэлжилдэг:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

2. УХ-тай өвчтөнд **эмчийн бичсэн** уух эмийн хугацаа ... байдаг:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

3. УХ-тай өвчтөнийг тариан эмчилгээнээс уух хэлбэр лүү шилжүүлэхэд дараах хугацаа болно:

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3 өдөр ☐ > 5 өдөр /эмчилгээ эхэлсэний дараа /

<u>Дараах асуултууд жоргүй олгогдож буй эмэнд хамаарагдана</u>

12. УХ-тай өвчтөнд дараах эмүүдийг жоргүй олгодог

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐
15.	Кларитромицин, тариа	☐	☐	☐	☐	☐

16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐
20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐
21.	Доксициллин, уух	☐	☐	☐	☐	☐

13. Антибиотикаас гадна УХ-тай өвчтөнд ямар эм олгодог вэ /жоргүй/?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

14. УХ-тай өвчтөнд жоргүйгээр эм олгоход дараах хүчин зүйлс хамаатай?
ХЗ: Хүчтэй зөвшөөрч байна, З: Зөвшөөрч байна, Т: Татгалзаж байна, ХТ: Хүчтэй татгалзаж байна ХБ: Хариулт байхгүй

	ХЗ	З	Т	ХТ	ХБ
1. Тариа уух хэлбэрээс илүү клиникийн үйлчилгээ сайтай	☐	☐	☐	☐	☐
2. Тарианы чанар шахмал/капсултай эмийн чанараас илүү сайн	☐	☐	☐	☐	☐
3. Эмийг ууж хэрэглэхэд тарьснаас илүү гаж нөлөө гардаг	☐	☐	☐	☐	☐
4. Эмийн хэлбэр тухайн өвчтөн эмчилгээг илүү сайн дагахад сонгогдсон	☐	☐	☐	☐	☐
5. Тариа хийхэд шинэ зүү, тариур, ампул шаардлагатай	☐	☐	☐	☐	☐
6. УХ өвчний үед өвчтөнийг антибиотикаар эмчилж байх үед тарианаас уух хэлбэр лүү шилжүүлэхэд ямар нэгэн ашиг байхгүй	☐	☐	☐	☐	☐
7. Таны сургалтанд тариаг уух хэлбэрийн эмнээс илүү их заадаг	☐	☐	☐	☐	☐
8. Эмийн компаниуд тариаг уух хэлбэрээс илүү ихээр сурталчилдаг	☐	☐	☐	☐	☐
9. Шинээр гарч буй бүтээгдэхүүнийг олгохыг илүүд үздэг	☐	☐	☐	☐	☐
10. Уух хэлбэрийн эмийн зардал тариан эмчилгээний зардлаас/үүнд зүү тариурны үнэ багтсан/ илүү үнэтэй болдог	☐	☐	☐	☐	☐
11. Тариан эмчилгээ хийлгэхэд эмийн сан руу илүү олон удаа явах хэрэгтэй болдог	☐	☐	☐	☐	☐
12. Өвчтөн эмчилгээг илүү сайн даган мөрдүүлэхийн тулд тариаг сонгосон	☐	☐	☐	☐	☐
13. Өвчтөн шахмал эмийг тарианаас илүүд үздэг	☐	☐	☐	☐	☐
14. Тариаг олгоход өвчтөний нас, хүйс хамаатай	☐	☐	☐	☐	☐
15. Тариаг УХ-тай өвчтөний байдал хүнд бол олгоно	☐	☐	☐	☐	☐

15. Та УХ-тай өвчтөнд жоргүйгээр эм олгохдоо нэгээс олон антибиотик нэгэн зэрэг өгдөг үү?

	Хэзээ ч үгүй **0%**	**Цөөхөн** **1-10%**	**Заримдаа** **11-40%**	**Ихэнхдээ** **41-80%**	**Байнга** **>80%**
	☐	☐	☐	☐	☐

15.

1. УХ өвчинд хэрэглэх **олгосон** антибиотик эм тарих хугацаа дунджаар:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

2. УХ өвчинд хэрэглэх **олгосон** антибиотик эмийг уух дундаж хугацаа:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр

3. УХ –тай өвчтөнийг тариан эмчилгээнээс уух хэлбэр лүү шилжүүлсэн бол дундаж хугацаа:

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3 өдөр ☐ > 5 өдөр /эмчилгээ эхэлсэний дараа/

16. Антибиотик эмийн мэдрэг чанарын талаар улсаас мэдээлэл хэр их авдаг вэ?

	Хэзээ ч үгүй	**7 хоног тутам**	**Сар болгон**	**Жилд 3 удаа**	**Жилд 1 удаа**
	☐	☐	☐	☐	☐

17. Монгол улсын УХ өвчний эмчилгээний удирдамжийг та тохиромжтой гэж үздэг үү?

☐ Тийм ☐ Үгүй ☐ ХБ

18. Эмийн санд ирж буй УХ-тай өвчтөнийг та хэр их эмнэлэг рүү явуулдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

19. Та УХ өвчинд тариа илүү сайн үр дүнтэй эмчилгээ гэж боддог уу?

☐ Тийм ☐ Үгүй

20. Хэрэв тийм бол тарианы үйлчилгээ юу вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Илүү хурдан эдгэнэ	☐	☐	☐	☐	☐
2. Гаж нөлөө шахмал/капсултай эм ууж хэрэглэснээс арай бага гардаг	☐	☐	☐	☐	☐

21. Тариа хийхэд/эмчлэхэд дараах хүмүүст илүү их ашигтай байдаг гэж та бодож байна вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Эмч	☐	☐	☐	☐	☐
2. Эм зүйч	☐	☐	☐	☐	☐
3. Өвчтөн	☐	☐	☐	☐	☐
4. Сувилагч	☐	☐	☐	☐	☐

22. Тариа хийхэд та нэмэлт төлбөр авдаг уу?

☐ Тийм, _____₮ ☐ Үгүй

23. Таны бодлоор тариа худалдаж авах болон хийлгэх төлбөр өвчтөний хувьд боломжийн байсан уу?

☐ Тийм ☐ Үгүй ☐ ХБ

24. Тариа олгоход дараах зүйлүүдийг та яаж анхаардаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Тариаг найдвартай газраас ханган нийлүүлсэн	☐	☐	☐	☐	☐
2. Ариун зүү тариур болон дусал ашиглах	☐	☐	☐	☐	☐
3. Эмийн савлалтын бүрэн бүтэн байдал	☐	☐	☐	☐	☐
4. Өвчтөний өөрийн онош болон тариа авах хүсэл	☐	☐	☐	☐	☐
5. Антибиотикийг дахин хэрэглэх	☐	☐	☐	☐	☐
6. Дахин хэрэглэсэн бүтээгдэхүүний дуусах хугацаа	☐	☐	☐	☐	☐

25. Монгол улсын аливаа өвчинд тариаг хэтрүүлэн ашигладаг гэж та боддог уу?

	МЗ	**З**	**Т**	**МТ**	**ХБ**
	☐	☐	☐	☐	☐

26. Хэрэв тийм бол шалтгааныг нэрлэнэ үү?

	МЗ	З	Т	МТ	ХБ
1. Тариаг эмийн сангуудаас маш хялбар аргаар худалдан авах боломжтой	☐	☐	☐	☐	☐
2. Эмийн худалдааг улсаас хянах шалгалт хангалтгүй	☐	☐	☐	☐	☐
3. Олон нийт тариаг их шаарддаг/ хэрэглэдэг	☐	☐	☐	☐	☐

27. Нэг удаагийн тариур ашигласны дараа:

	Хэзээ ч үгүй 0%	Цөөхөн 1-10%	Заримдаа 11-40%	Ихэнхдээ 41-80%	Байнга >80%
1. Зүүг солин тариурыг дахин хэрэглэж болно	☐	☐	☐	☐	☐
2. Зүү тариурыг ариутгаад дахин хэрэглэж болно	☐	☐	☐	☐	☐
3. Бүгдийг хаяна	☐	☐	☐	☐	☐
4. Эхний удаа хэрэглэсний дараа бүгдийг устгаад хаяна	☐	☐	☐	☐	☐

28. Дусал хийсний дараа:

	Хэзээ ч үгүй 0%	Цөөхөн 1-10%	Заримдаа 11-40%	Ихэнхдээ 41-80%	Байнга >80%
1. Бүтэн шил/савыг өвчтөнд тарина	☐	☐	☐	☐	☐
2. Илүү гарсан үлдэгдэлийг хадгална	☐	☐	☐	☐	☐
3. Илүү гарсан нунтагийг дараачийн өвчтөнд хэрэглэнэ	☐	☐	☐	☐	☐
4. Эхний удаа хэрэглэсний дараа бүгдийг устгана	☐	☐	☐	☐	☐

29. Эм тариаг хаанаас авдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Эмийн бөөний худалдаа	☐	☐	☐	☐	☐
2. Эмийн сан	☐	☐	☐	☐	☐
3. Борлуулагч	☐	☐	☐	☐	☐
4. Бусад (хувийн импорт)	☐	☐	☐	☐	☐

30. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй

30. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
a. Антибиотик	☐	☐	☐	☐	☐
b. Бусад эм	☐	☐	☐	☐	☐

32. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

33. Уушигны хатгалгаа болон тарианы хэрэглээний талаар та өөр юу гэж боддог вэ?

Танд баярлалаа

ЭМЧ НАРТАЙ ХИЙХ ЯРИЛЦЛАГА (ШИНЭЧИЛСЭН)

Мэдээлэл цуглуулах загвар

_____
Огноо

Дугаар _____

Байршил_____

1. Нас: ☐ 20-30 ☐ 31-50 ☐ 51-60 ☐ 61+
2. Хүйс: ☐ Эр ☐ Эм
3. Ажлын түвшин: ☐ өрхийн эмч ☐ улсын эмнэлэг ☐ хувийн эмнэлэг ☐ бусад
4. Мэргэжил: ☐ ерөнхий эмч ☐ нарийн мэргэжлийн
5. Хэдэн жил ажиллаж байгаа вэ? _____
6. Уушигны хатгалгаатай өвчтөнд эмчилгээ бичихэд юу нөлөөлдөг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Өвчтөний хүлээлт / шаардлага	☐	☐	☐	☐	☐
2. Зайлшгүй шаардлагатай хөнгөлөлттэй олгогдох эм	☐	☐	☐	☐	☐
3. Эмийн компаний мэдээлэл	☐	☐	☐	☐	☐
4. Эмийн компанийн төлөөлөгчийн айлчлал	☐	☐	☐	☐	☐
5. Уушигны хатгалгаа өвчний оношлогоо, эмчилгээний удирдамж	☐	☐	☐	☐	☐
6. Тасралтгүй сургалт, хичээлийн мэдээлэл	☐	☐	☐	☐	☐
7. Гаж нөлөө үүсэх магадлал	☐	☐	☐	☐	☐
8. Орон нутгийн антибиотикийн даслын тухай мэдээлэл	☐	☐	☐	☐	☐
9. Өвчтөний антибиотикийн даслын мэдээлэл	☐	☐	☐	☐	☐
10. Ном, сэтгүүл	☐	☐	☐	☐	☐
11. Хамт ажилладаг дарга,	☐	☐	☐	☐	☐

хүмүүс, эмч нарын нөлөө					
12. Нарийн мэргэжлийн эмч нарын нөлөө	☐	☐	☐	☐	☐
13. Хувийн туршлага	☐	☐	☐	☐	☐
14. Өвчтөний урьд нь эмийн сангаас авсан, хэрэглэж байсан антибиотикийн тухай мэдээлэл	☐	☐	☐	☐	☐
15. Эмийн хүртээмж	☐	☐	☐	☐	☐
16. Өвчтөний эм худалдан авах чадвар	☐	☐	☐	☐	☐
17. Гаж нөлөө багатай нь батлагдсан антибиотик хамгийн шилдэг сонголт	☐	☐	☐	☐	☐
18. Зах зээлд шинээр гарч буй эмүүдийг сонгох/ илүүд үзэх	☐	☐	☐	☐	☐
19. Жор бичилтийг хянах улсын шалгалт	☐	☐	☐	☐	☐
20. Эмийн компаниас авах урамшуулал, шагнал	☐	☐	☐	☐	☐

7. Уушигны хатгалгаатай өвчтөнд тодорхой эмийн тун бичихэд ямар хүчин зүйлс нөлөөлдөг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Тариан эмчилгээ уух эмнээс илүү үр дүнтэй байдаг	☐	☐	☐	☐	☐
2. Өвчтөн уух эмийг тарианаас илүүд үздэг	☐	☐	☐	☐	☐
3. Тарилгын эмийн чанар уух эмнээс илүү сайн	☐	☐	☐	☐	☐
4. Эмийг ууж хэрэглэхэд тарьснаас илүү их гаж нөлөө үүсдэг	☐	☐	☐	☐	☐
5. Тарилгын эмээс зүү тариурын хамт, уух эмийн зардал илүү үнэтэй	☐	☐	☐	☐	☐
6. Тариан эмчилгээ хийлгэж байгаа тохиолдолд эмнэлэг рүү илүү олон удаа явах хэрэгтэй байдаг	☐	☐	☐	☐	☐

7. Тариа хийхэд шинэ, ариун зүү тариур ашиглах шаардлагатай	☐	☐	☐	☐	☐
8. УХ-тай өвчтөнг эмчилж байх явцад өвчтөний биеийн байдал сайжирсаг тохиолдолд тарианаас уух антибиотик эмийн хэлбэр лүү шилжих хэрэгтэй	☐	☐	☐	☐	☐
9. Эмийн компаниуд тарилгын эмийг илүү ихээр сурталчилдаг	☐	☐	☐	☐	☐
10. Өвчтөнийг эмчилгээг илүү сайн даган мөрдүүлэхийн тулд тариаг сонгосон	☐	☐	☐	☐	☐
11. Сургалтанд тариаг шахмал/ капсултай эмнээс илүү ихээр хэрэглэхийг заадаг	☐	☐	☐	☐	☐
12. Тариа бичихэд УХ-тай өвчний явц/хүндрэл нөлөөлдөг	☐	☐	☐	☐	☐
13. Эм бичихэд өвчтөний онцлог, нас хүйс хамаатай	☐	☐	☐	☐	☐

8.

1. УХ өвчнийг тариагаар эмчлэх дундаж хугацаа:

☐ ≤3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

2. УХ өвчнийг эмээр эмчлэх дундаж хугацаа:

☐ ≤ 3 өдөр ☐ 4-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

3. УХ-тай өвчтөнийг тариан эмчилгээнээс эмийн эмчилгээнд шилжүүлэхэд ямар хугацаа шаардлагатай вэ?

☐ ≤ 24 цаг ☐ 2 өдөр ☐ 3-5 өдөр ☐ > 5 өдөр эмчилгээ эхэлсний дараа

9. Монгол улсын УХ өвчний удирдамжмийг та тохиромжтой гэж боддог уу?
☐ Тийм ☐ Үгүй ☐ ХБ /Хариулах боломжгүй/

10. УХ-тай өвчтөнд та нэгээс илүү антибиотик нэгэн зэрэг бичдэг үү?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

11. Эхний бичсэн антибиотик амжилтгүй байсан тул антибиотикийг солих шаардлага хэр олон удаа байсан бэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

12. УХ-тай өвчтөнд ихэвчлэн бичдэг антибиотикийн жагсаалт

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Пенициллин,уух	☐	☐	☐	☐	☐
2.	Пенициллин, тариа	☐	☐	☐	☐	☐
3.	Амоксициллин, уух	☐	☐	☐	☐	☐
4.	Амоксициллин, тариа	☐	☐	☐	☐	☐
5.	Ампициллин, уух	☐	☐	☐	☐	☐
6.	Ампициллин, тариа	☐	☐	☐	☐	☐
7.	Ципрофлоксацин, уух	☐	☐	☐	☐	☐
8.	Ципрофлоксацин, тариа	☐	☐	☐	☐	☐
9.	Цефазолин, уух	☐	☐	☐	☐	☐
10.	Цефазолин, тариа	☐	☐	☐	☐	☐
11.	Эритромицин, уух	☐	☐	☐	☐	☐
12.	Эритромицин, тариа	☐	☐	☐	☐	☐
13.	Амоксициллин/клавунат, уух	☐	☐	☐	☐	☐
14.	Кларитромицин, уух	☐	☐	☐	☐	☐
15.	Кларитромицин, тариа	☐	☐	☐	☐	☐
16.	Азитромицин, уух	☐	☐	☐	☐	☐
17.	Азитромицин, тариа	☐	☐	☐	☐	☐
18.	Левофлоксацин, уух	☐	☐	☐	☐	☐
19.	Тетрациклин, уух	☐	☐	☐	☐	☐
20.	Триметопим-сульфаметоксазол, уух	☐	☐	☐	☐	☐

21.	Доксициллин, уух	☐	☐	☐	☐	☐

13. УХ-тай өвчтөнд антибиотикаас гадна ямар эм бичдэг вэ?

		Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1.	Дексаметазон, уух	☐	☐	☐	☐	☐
2.	Дексаметазон, тариа	☐	☐	☐	☐	☐
3.	Бромгексин, уух	☐	☐	☐	☐	☐
4.	Витамин С, уух	☐	☐	☐	☐	☐
5.	Витамин С, тариа	☐	☐	☐	☐	☐
6.	Хлорфенамин, уух	☐	☐	☐	☐	☐
7.	Витамин В, уух	☐	☐	☐	☐	☐
8.	Витамин В, тариа	☐	☐	☐	☐	☐
9.	Кокоркарбоксилаз, тариа	☐	☐	☐	☐	☐
10.	Эуфиллин, уух	☐	☐	☐	☐	☐
11.	Эуфиллин, тариа	☐	☐	☐	☐	☐
12.	Анальгин, уух	☐	☐	☐	☐	☐
13.	Анальгин, тариа	☐	☐	☐	☐	☐
14.	Димедрол, уух	☐	☐	☐	☐	☐
15.	Димедрол, тариа	☐	☐	☐	☐	☐

14. Антибиотикийг жороор бичих талаар улсаас хэдэн удаа мэдээлэл авдаг вэ?

	Хэзээ ч үгүй	**7 хоног тутам**	**Сар болгон**	**Жилд 3 удаа**	**Жилд 1 удаа**
	☐	☐	☐	☐	☐

15. УХ-тай өвчтөн тань дээр ирэхээсээ өмнө антибиотик хаанаас ихэвчлэн худалдан авсан байдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**

1. Эмийн сан	☐	☐	☐	☐	☐
2. Зах	☐	☐	☐	☐	☐
3. Бусад/хувираа/__	☐	☐	☐	☐	☐

16. Антибиотик бичихдээ та хэр их женерик эм бичдэг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

17. Антибиотикийн мэдрэг чанар, идэвхийн талаар хаанаас мэдээлэл авдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
1. Улсын мэдээлэл	☐	☐	☐	☐	☐
2. Улсын ном, сэтгүүл	☐	☐	☐	☐	☐
3. Антибиотик эмийн савны хуудас	☐	☐	☐	☐	☐
4. Өвчтөнөөс авсан шинжилгээнд хэрэглэх дээж	☐	☐	☐	☐	☐
5. Эмчлэгдсэн өвчтөн	☐	☐	☐	☐	☐
6. Хамт ажилладаг хүмүүс	☐	☐	☐	☐	☐
7. Антибиотик идэвхгүй	☐	☐	☐	☐	☐
8. Интернэт	☐	☐	☐	☐	☐

18. УХ-тай өвчтөнг хэр их эмнэлэг рүү явуулдаг вэ?

	Хэзээ ч үгүй 0%	**Цөөхөн 1-10%**	**Заримдаа 11-40%**	**Ихэнхдээ 41-80%**	**Байнга >80%**
	☐	☐	☐	☐	☐

19. Монгол улсад тариаг хэтрүүлэн хэрэглэдэг гэж та боддог уу?
МЗ- Маш их зөвшөөрч байна, З- Зөвшөөрч байна, Т- Татгалзаж байна

МТ- Маш их татгалзаж байна, ХБ- Хариулах боломжгүй

	МЗ	З	Т	МТ	ХБ
	☐	☐	☐	☐	☐

20. Хэрэв тийм бол тодруулна уу?

	МЗ	З	Т	МТ	ХБ
1. Өвчтөн эмийн сангаас тариа худалдан авах боломжтой	☐	☐	☐	☐	☐
2. Улсаас эмийн худалдааг хянах шалгалт хангалтгүй	☐	☐	☐	☐	☐
3. Олон нийтийн шаардлага, хэрэгцээ	☐	☐	☐	☐	☐

21. Монголд хуурамч эм байдаг эсэхийг та мэдэх үү? ☐ Тийм ☐ Үгүй

22. Хэрэв тийм бол ямар эм хуурамч байсан бэ?

	Тийм	Заримдаа	Үгүй
a. Антибиотик	☐	☐	☐
b. Бусад эм (тодруулна уу)_____	☐	☐	☐

23. Таны дундаж орлогыг мэдэж болох уу?

☐≤ 90.000₮ ☐ 91-200.000₮ ☐201-300.000₮

☐301-400.000₮ ☐ 401-500.000₮ ☐ ≥501.000₮

24. Уушигны хатгалгаа өвчин болон бусад өвчний үед тариа хэрэглэхийг та юу гэж боддог вэ? Саналаа бичнэ үү.

_____

Танд баярлалаа.