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The development of community  
pharmacy services in Estonia – public and  
professional perceptions 1993–2006



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*To the future social pharmacy  
researchers in Estonia*



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## LIST OF ORIGINAL PUBLICATIONS

- I Volmer D, Bell JS, Janno R, Raal A, Hamilton DD, Airaksinen MS. Change in public satisfaction with community pharmacy services in Tartu, Estonia, between 1993 and 2005. *Res Social Adm Pharm* 2009;5(4):337–346.
- II Volmer D, Lilja J, Hamilton D. How well informed are pharmacy customers in Estonia about minor illnesses and over-the-counter medicines. *Medicina (Kaunas)* 2007;43(1):70–78.
- III Volmer D, Lilja J, Hamilton D, Bell JS, Veski P. Self-reported competence of Estonian pharmacists in relation to herbal products: findings from a health-system in transition. *Phytother Res*, 2010 Aug 23 [Epub ahead of print] DOI 10.1002/ptr.3266.
- IV Volmer D, Haavik S, Ekedahl A. Use of a generic study protocol in evaluation of prescription errors in different contexts in Estonia, Norway and Sweden. *J Clin Pharm Ther*, under revision.
- V Volmer D, Vendla K, Vetka A, Bell JS, Hamilton D. Pharmaceutical care in community pharmacies: practice and research in Estonia. *Ann Pharmacother* 2008;42(7):1104–1111.

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Paper I and Paper III: Survey design, adaptation of the survey instrument to the Estonian context, organising data collection, data analysis and writing the manuscript in collaboration with the other authors.

Paper II: Survey design, organising of data collection, data analysis and writing the manuscript in collaboration with the other authors.

Paper IV: Survey design, adaptation of the survey instrument to the Estonian context. Writing the first draft and finalising the manuscript in collaboration with the other authors.

Paper V: Collection and evaluation of literature. Writing the first draft and finalising the manuscript in collaboration with the other authors.

Description of the journals, in which the articles included in the thesis have been published or submitted, is presented in Appendix 1.

## **ABBREVIATIONS**

CAM	complementary and alternative medicine
EHIF	Estonian Health Insurance Fund
ESSR	Estonian Soviet Socialist Republic
EU	European Union
GP	general practitioner
MoSA	Ministry of Social Affairs
OTC	over-the-counter medicine, non-prescription medicine
PC	pharmaceutical care
SAM	State Agency of Medicines
USSR	Union of Soviet Socialist Republics
WHO	World Health Organization

## DEFINITIONS OF KEY TERMS

### **Primary health care**

Primary health care seeks to extend the first level of the health system from treatment to the promotion of health. Primary health care services involve continuity of care, health promotion and education, integration of prevention with treatment, a concern for health of the general population as well as the health of individuals; individual health, community involvement and the use of appropriate technology (1).

In Estonia primary health care was introduced and developed in the beginning of the 1990's (2). In the primary health care development plan for Estonia for 2009–2015, community pharmacy services have been included in primary health care services (3).

### **Pharmaceutical policy**

Pharmaceutical policy refers to activity concerning the principles guiding decision making in the realm of manufacturing and marketing of medicines and regulations pertaining to their use. The goal of pharmaceutical policy is to contribute to the overall health, welfare and well-being of society (4).

In Estonia the source document for pharmaceutical policy with respect to availability, price policy and rational use of medicines and distribution of community pharmacies was drawn up in 2002, and remains in effect through 2010 (5).

### **Pharmaceutical care (PC)**

PC is the responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient's quality of life (6). Cooperation between health care professionals (for example physician, pharmacist, and nurse) and the patient is crucial for effective PC. PC services such as counselling on specific diseases (asthma, hypertension, diabetes), patient medication review and prevention of adverse drug reactions have been introduced into community pharmacy practice in some European countries (7, 8).

### **Community pharmacy**

Community pharmacy has been defined as a pharmacy dispensing medicines to outpatients, as opposed to a hospital pharmacy; and is also known as a retail pharmacy.

According to Estonian law, community pharmacies in Estonia are not considered health-care institutions, nor are the services provided there regarded as health care services. The majority of community pharmacies are under private ownership. The owner of a pharmacy does not necessarily have to have higher education in the area of pharmacy, but the manager of the pharmacy must be a pharmacist. Estonian community pharmacies provide traditional pharmacy services.

**Pharmacist**

The pharmacist is a health care professional with higher education in pharmacy.

However, in Estonia holders of a masters' degree in pharmacy, which is awarded after five years of university study (9), is not legally defined as a health care professional. Pharmacists are employed mainly as managers of community pharmacies or as community pharmacists.

**Assistant pharmacist**

The assistant pharmacist is a health care professional with specialised education in pharmacy.

In Estonia, assistant pharmacists who have completed three years of specialised studies at Tallinn Health College (9, 10), are legally not defined as health care professionals. Assistant pharmacists are mainly employed at community pharmacies, but they are legally not permitted to manage a pharmacy.

**Pharmacy customer**

A member of the public who requires pharmacy service, such as prescription or OTC medicines, counselling concerning medicines and self-treatment, or advice on health promotion or alternative therapies. For purposes of the current thesis, patients collecting their prescription or OTC medicines, their representatives or people seeking information from a pharmacy are all regarded as pharmacy customers.

**Satisfaction with community pharmacy services**

The individual's evaluation of services provided at a community pharmacy, based on assessment of services performed, unfulfilled expectations, and other factors (11). Client satisfaction is considered important for development, and viability of community pharmacy services and for identification of areas for improvement (12).

**Traditional community pharmacy services**

Traditional community pharmacy services include dispensing of and counselling regarding prescription and OTC medicines, provision of advice on self-care, and self-medication (13). The main focus is the dispensing of the correct medicine along with correct information concerning dose and administration. Collaboration with the patient and other health care professionals is not regular.

In Estonia traditional community pharmacy services are dispensing of prescription and OTC medicines, provision of drug information, counselling on self-medication, and preparation of extemporaneous or serial medicines.

**Extended community pharmacy services**

Extended community pharmacy services consist of pharmaceutical care, monitoring of a patient's drug utilisation, informing health care professionals about medicines, and health promotion initiatives provided by community pharmacies (13, 14). In comparison to traditional community pharmacy services, the

pharmacist takes more responsibility for management of the patient's drug treatment. In Estonia the most frequently provided extended services are diagnostic screening of the patient (taking blood pressure, blood sugar and cholesterol) and counselling about herbal medicines.

### **Patient counselling**

Patient counselling is defined as the professional activity of the pharmacist that focuses on enhancing the patient's problem-solving skills for the purpose of improving or maintaining the quality of health and the quality of life. Counselling is based on the individual patient's needs. The nature of the relationship between the patient and health care provider is interactive and constitutes a collaborative learning process for both parties (15). Patient counselling is a concept closely related to medicine counselling, education of patients, communication between pharmacist and patient and provision of advice about medicines.

### **Drug information**

Information provided by a health care professional (for example a physician or pharmacist) or non-health care professional (for example a family member or friend) about the clinical aspects and safe handling of medicines. At the community pharmacy this consists of verbal advice supported by written information and constitutes one part of patient counselling (16).

In Estonia community pharmacists inform patients mainly about administration details of medicines, though discussion of the clinical aspects of medicines is increasing. In addition, the pharmacist has to provide information about cost and reimbursement of medicine, as requested by the patient.

### **Self-medication**

Selection and use of medicines by individuals to treat self-recognised illnesses or symptoms; self-medication should be of quality, effective and safe, medicines should be offered in the appropriate form and dosage (17).

### **Prescription medicine**

Medicine dispensed from a community pharmacy according to a prescription issued by authorised prescriber, mostly physician.

### **Over-the-counter (OTC) medicine**

Medicine dispensed from a community pharmacy without prescription, also known as non-prescription medicine.

### **Herbal medicine**

Herbal medicine contains one or more herbal substance/-s or constitutes herbal preparation/-s with pharmacological effect with potential to cause adverse reactions and drug interactions; herbal medicines are regulated as medicinal

products (18, 19). In Estonia herbal medicines are available only at community pharmacies.

**Herbal supplement**

An herbal supplement contains one or more herbal substance/-s or herbal preparation/-s, and is marketed as a food supplement (20).

**Herbal product**

Herbal products are one component of complementary and alternative medicine, the term includes both herbal supplements and herbal medicines (20).

**Prescription error**

Prescription error is a prescribing decision or prescription writing process resulting in unintentional significant reduction in the probability of timely and effective treatment, or increasing the risk of harm (21).

## I. INTRODUCTION

During the past two decades the Estonian health care system has undergone rapid changes; a centrally managed and governmentally financed system has had to change its focus to a market-oriented system. In the beginning of the 1990s the introduction of a new reimbursement system for health care services and introduction of primary health care were areas of primary emphasis (22).

The transition in Estonia's pharmacy system started with the establishment of pharmaceutical regulatory authorities, creation of a legislative framework and organisation of a reimbursement system for medicines (23). Rearrangement of the community pharmacy sector was initiated by privatisation and the elimination of restrictions on ownership of community pharmacies (24, 25). Similarly to other post-socialist countries (26), liberalisation of the community pharmacy sector in Estonia has led to the pharmacy's image in the eyes of society as a business rather than a health care institution.

Accession of Estonia to the EU in 2004 required the adoption of EU pharmaceutical legislation, including decisions of the European Commission concerning protection of public health and achievement of a common market. While EU legislation mostly regulates medicines (requirements for their quality, safety and efficacy), the organisation of the community pharmacy sector had to be determined by national legislation of the particular country (27).

In parallel with the transition of Estonia's health care system, considerable changes were taking place in the pharmacy profession internationally – a product-oriented approach was replaced with a patient-oriented conception (28, 29). The compounding of medicines decreased and counselling on ready-made medicines increased. In comparison to the Soviet period the selection of medicines was different and considerably more diverse. Both patients and physicians needed guidance from pharmacists to find the appropriate pharmaceutical product.

Due to private ownership of community pharmacies and legal exclusion of community pharmacies from the category of health care institutions, there has been no governmental involvement in the development of services provided at community pharmacy. Isolated attempts on the part of professional organisations toward improving the quality of pharmacy services have not had a significant influence on everyday professional activities in the pharmacy. Likewise, Estonian pharmacists have had limited enthusiasm toward participation in international projects aimed at developing pharmacy services (30–32).

There is little information available on the role of community pharmacies in the health care system of post-socialist countries. Similarly there is little data describing services provided at community pharmacies and public and professional perceptions on services described (26, 33–34). However, in health care systems with a focus on primary health care, the role of community pharmacists in counselling and monitoring of drug therapy of the patient is becoming increasingly important.

Using a multi-method approach the current research evaluates the development of community pharmacy services in Estonia between 1993–2006 using the opinions of the public and community pharmacists. The research describes public perceptions of the general image of community pharmacies and services provided with particular focus on counselling on OTC medicines and self-medication. The professional approach has been evaluated with respect to attitudes toward provision of extended services at community pharmacy and the role of pharmacists in assurance of drug safety.



## 2. REVIEW OF THE LITERATURE

### 2.1. Pharmacies in Estonia up to 1991

Pharmacies and pharmacists have played an important role in the history of medicine in Estonia. The first documentary evidence of pharmacies dates back to the Middle Ages. In Tallinn the council pharmacy began operation in 1422 and in Tartu (the second largest town in Estonia) the first town pharmacy was opened in 1426. The first pharmacy regulations were issued in 1695 in Tallinn and consisted of three parts:

- the regulations of the town council of Tallinn,
- *Catalogus cum Valore Omnium Medicamentorum, tam Simplicium quam Compoitorium, in Pharmacopoliis Revalensibus protestantium, Jussu Amplissimi Senatus ad omnium notitiam publicatus* (List of single and multiple-component medicines in use in pharmacies in Reval and directions concerning the preparation of medicines),
- *Taxacio Laborum, Vasorum et Pondera Medica* (Price list for preparation of medicines, vessels, containers, used in the pharmacy, and table of weights) (35).

For the right to practice, pharmacist had to take an oath to prepare all remedies as prescribed, diligently and faithfully. In addition to compounding of medicines, pharmacists cultivated their own herb gardens, made different sorts of wine and sold paper and ink. Over the course of several centuries, and until the University of Tartu started providing courses in pharmacy professional knowledge and practical experience in pharmacy was acquired by practicing at pharmacies or studying at universities abroad. On October 19, 1842 the independent pharmacy institute was established. Most of the early pharmacists were Germans. Pharmacists held good position in society, and were elected as chancellors, mayors or guild elders. In smaller towns or villages, pharmacists often replaced doctors, as their advice was practical, clear and easy to follow (35).

The first rural pharmacy was opened in 1766 in Põltsamaa. In 1897 there were 172 pharmacies in Estonia, most of them located in the northern part of the country. Besides pharmacies, it was possible to buy remedies from village shops and travelling pedlars (36).

Only at the end of 19th century Estonians started to practice pharmacy, and during the first period of independence 1918–1940, pharmacists became owners and managers of the majority of community pharmacies (35). During this period, the national pharmacy system and pharmacy legislation was developed. In 1918 there were 136 pharmacies with 11 druggists having masters' degree in pharmacy, 180 druggists and 436 assistants (37). Beginning in 1928, pharmacies were considered health care institutions and the ownership and/or status as pharmacy manager were limited with pharmacy profession (38). In 1937 a code of ethics for pharmacists was introduced (39). The first and only Estonian Pharmacopoeia was published in the same year (40).

The Soviet period (1944–1991) brought changes to the organisation and operation of the whole health care system. For the pharmacy sector, this began with

the reorganisation of management and the nationalisation of community pharmacies. As governing institution, The Central Pharmacy Body, responsible for planning and organising the whole pharmacy sector, including community pharmacies was established in 1944, and operating under the jurisdiction of the Ministry of Healthcare of the Estonian SSR. Regulations were developed for the quality control of medicines at the community pharmacy (41), as well as recommendations and instructions for organising and planning of the operation of community pharmacies (42, 43). Instead of names, all community pharmacies in Soviet Estonia had numbers (41). In 1965 the code of ethics of Soviet pharmacists was published (44), in which the pharmacist was described as a humane, polite, honest, accurate and modest person. It was possible to express dissatisfaction with services provided by the community pharmacy by using the official Complaints Book, which was available in all pharmacies. However, only a limited number of problems were registered and the official statistics regarded this as an indicator of a well-organised and effectively operating community pharmacy system (41, 44). In reality the main issue was the periodic shortages of essential medicines rather than the quality of community pharmacy services (41). At the beginning of the 1990's there were approximately 240 community pharmacies in Estonia (30).

## **2.2. Health care reforms in Estonia since 1991**

After regaining independence the republics of the former Soviet Union had to transform their societies from a hierarchical structure to a market-oriented model. During the Soviet period the health care system had been organised according to the Semashko model, characterised by centralised planning, universal access to, but poor quality of health care and hospital capacity (45). The keywords of the reforms were introduction of a mandatory social health insurance system, and development of primary health care, focusing on initiating family medicine and restructuring the hospital network (22).

Reforms in primary health care began with introduction of a new specialty – family medicine (1991) and changes in the remuneration system of primary care physicians (46). Over the past 15 years, the changes have been considerable and primary health care can now be described as the basis of the health care system not only in Estonia, but in the rest of the Baltic countries as well, where similar reforms have been taken place (47).

The efficiency of the primary health care system in Estonia can be measured by improved management and reduced hospital admissions for key chronic conditions (2). According to a survey undertaken in 2002, the Estonian population has accepted the primary health care system (48). Satisfaction with services provided by family physicians was extended to the operation of the health care system as a whole. However, a survey evaluating satisfaction with the health care services on the part of people with chronic conditions revealed some problems. Patients with chronic illnesses were less satisfied with access to

health services and with the existing health insurance system (49). Another study exploring availability of and satisfaction with health care services in the older population in Estonia nevertheless did not detect any differences between experiences of older people and the rest of the population (50).

In 2009 the development plan of primary health care in Estonia for 2009–2015 was approved (3). According to this plan, the efficacy of ambulatory care will be improved through the concept of primary health care centres, where besides the service of family physicians, other primary health care services (for example home care, physiotherapy, service of midwife) will be provided. Community pharmacy services are described as one of the primary health care services and the plan foresaw the development of standards of quality for services provided at community pharmacies.

### **2.3. Meaning of pharmaceutical policy**

The importance of pharmaceutical policy has increased in keeping with the development of the pharmacy profession from a monopolised, highly specialised field of activity involving the storage, preparation and distribution of medicines into a multi-national industry with remarkable social and global influence (4, 51).

There are both similarities and differences between pharmaceutical and health policy. In general, pharmaceutical policy could be considered as a component, but as a distinct component of the health care policy. Due to the different players involved, different degrees of involvement of business and politics in the decision-making process, and varying relationships between professionals and management, pharmaceutical policy has to solve a wide range of problems different from those recognised in health care policy (52).

The pharmacy profession has thus been faced with two contrasting concepts – business interests versus professional interests (53). If the policy makers regard pharmacy as a business, it will be regulated just as any other commercial enterprise. In contrast, if the pharmacy is considered as a part of the health care system, the pharmacists are regarded as health care professionals providing health care services (53). Currently the politics of the European pharmacy sector is dominated by the examination of economic determinants (4).

Pharmaceutical policy is charged with enhancing the access to medicines; ensuring the quality of and promoting the rational use of medicines; minimising the costs of medicines and health care services (4, 54). In the development of pharmaceutical policy it is important to consider the role of lay public as the final consumer or main object of the planned activities and services. However, it would be complicated to involve in pharmaceutical policy discussions those social groups without chronic illnesses which are not organised into patient societies. Nowadays the mass media also plays an important role in informing the public about planned changes in health care (55).

### **2.3.1. Pharmaceutical policy reforms in post-socialist countries**

The term post-socialist countries refer to the former republics of USSR and the countries of Central and Eastern Europe former under socialist regime. All these countries have experienced a collapse of their centrally managed and governmentally financed pharmacy system. Reforms in health care system, including the pharmacy sector, were influenced by structural changes in the wider economy and dissatisfaction with the previous system (27).

Reforms in the pharmacy sector started with privatisation of pharmaceutical manufacturing and distribution companies. In those countries without a local drug industry, the Western import medicines engaged a remarkable share of the pharmaceutical market. In those countries with strong local drug manufacturers, these continued their operations in production of medicines, but now mainly as manufacturers of generic medicines (27).

In many countries, community pharmacies were privatised; however in some cases state community pharmacies continued to operate (26, 33). In many countries, the location of community pharmacies has not been regulated; while the number of community pharmacies has increased in towns, a number of rural settlements have been left with limited or nonexistent access to farmers; this applies even in those countries with more than half of their populations living in rural areas (26, 33). Central and Eastern European countries serve approximately 3000–5000 customers per pharmacy; in addition to prescription and OTC medicines, a large selection of different health care products is available at the community pharmacy (7).

Accession to the EU in 2004 forced a number of post-socialist countries to redefine their existing pharmacy legislation. Implementation of *acquis communautaire* required the adoption of EU pharmaceutical legislation, including decisions of the European Commission concerning protection of public health and completing the common market. The EU legislation mostly applies to the regulation of medicines (requirements for quality, safety and efficacy), leaving the regulation of the operation of community pharmacies up to legislation at the national level (27).

During the past decades, post-socialist countries have undergone liberalisation of their community pharmacy systems, similarly to the existing model in the Nordic countries. The key-issues of liberalisation have been:

- ownership, establishment and purchasing of community pharmacies not being limited to the pharmacy profession; introduction of pharmacy chains;
- encouragement of competitive pricing for prescription medicines and
- opportunities to sell OTC medicines outside of community pharmacies (24, 27, 56).

Some indicators of community pharmacy sector of post-socialist countries are described in Appendix 2.

Development of the area of medicines pricing has eclipsed the other aspects of pharmaceutical policy, including development of services provided by the

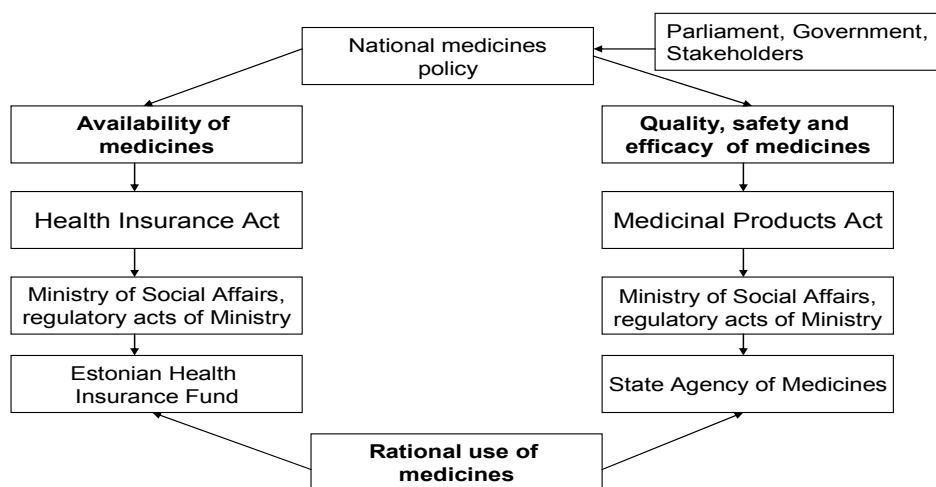
community pharmacy. In some countries a shortage of pharmacists makes it necessary for assistant pharmacists to manage community pharmacies. A few post-socialist countries struggle with cases where prescription medicines are sold without prescription (34). In the situation thus described, the main professional task has been assuring the even quality of traditional community pharmacy services, and not primarily the development of new or extended services (26, 33). However, there are examples of countries attempting to introduce pharmaceutical care services into community pharmacy practice (62).

### 2.3.2. Pharmaceutical policy reforms in Estonia

In 1990's the pharmaceutical sector in Estonia was permeated by substantial reforms. It was necessary to establish pharmaceutical regulatory authorities, create a legislative framework, organise a reimbursement system for medicines and rearrange the pharmacy sector (23).

The regulatory framework of the pharmaceutical sector is based on the Medicinal Products Act (9) (first adopted in 1996 and revised in 2005 and 2010) and the Health Insurance Act (63).

The main stakeholders in the pharmaceutical sector are the Ministry of Social Affairs (MoSA), the State Agency of Medicines (SAM) and the Estonian Health Insurance Fund (EHIF) (Figure 1). MoSA is responsible for strategic planning in terms of medicines, pricing and reimbursement decisions. As a subordinate unit of MoSA, SAM controls all pharmaceutical activities, including the community pharmacy sector. EHIF is responsible for the reimbursement of medicines (23).



**Figure 1.** Implementation of pharmaceutical policy in Estonia (Source: MoSA).

In 2002 a source document for pharmaceutical policy was drafted to cover the period up to and including until 2010, in which the following key problems were addressed:

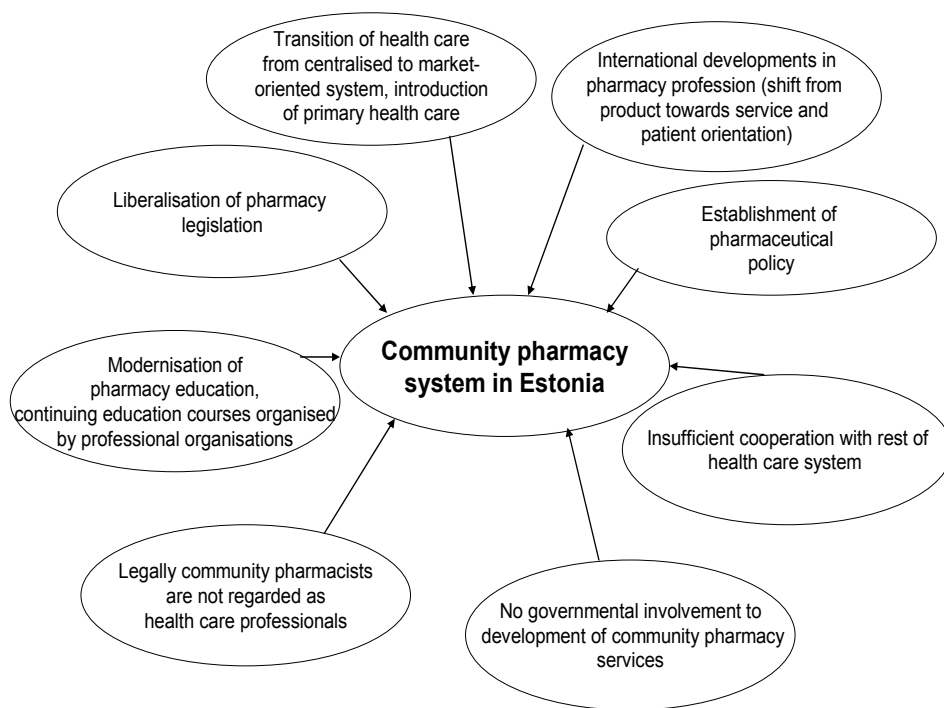
- public dissatisfaction with the availability of medicines, perceivable social inequality and neglect of the people's interests in making decisions concerning medicines;
- increases in the prices of both prescription and OTC medicines due to the liberal price policy;
- uneven distribution of community pharmacies decreasing geographical availability of medicines;
- irrational prescription and use of medicines (5).

Reorganisation of the community pharmacy sector in Estonia began immediately after regaining of independence in 1991. The opening, operation and management of community pharmacies are strictly regulated by the Medicinal Products Act. However since 1996 the ownership of community pharmacies has no longer been limited to the pharmacy profession, and until 2006 there were no restrictions on the opening or location of new entity. The liberal system led to the rapid growth in the number of community pharmacies, from about 250 in 1993 to 496 (308 main pharmacies with 188 structural units) in 2009 (25).

Since the second half of the 1990's, both vertical and horizontal integration of community pharmacies started to emerge. According to the legal terms in effect, wholesale pharmaceutical companies cannot own community pharmacies directly. However, the subsidiary companies of wholesalers can be owners or purchase shares in community pharmacies (24). In 1999 72% of Estonian pharmacy managers who participated in a survey evaluating the economic efficiency of Estonian community pharmacies, regarded the competitiveness of their pharmacies as good (64). However, 71% of pharmacy managers who participated in a survey in 2003 listed economical considerations as their main reason for joining pharmacy chains (65). Currently, 80% of community pharmacies (majority operating in larger towns) are joined through ownership or partner status to four main community pharmacy chains (24).

During the last two decades Estonian community pharmacy system has been influenced by several factors connected to international developments in the pharmacy profession, transition of health care system and changes in pharmacy education (Figure 2).

Detailed description of health care and pharmacy policy changes, developments in pharmacy practice and pharmacy education and description of professional organisations is presented in the publication V included to the thesis.



**Figure 2.** Factors influencing the community pharmacy system in Estonia.

## **2.4. The role of community pharmacies and community pharmacy services in the health care system**

According to the Pharmaceutical Group of the European Union (PGEU) community pharmacies are the most accessible primary health care institutions (66). For consultation with a pharmacist it is not necessary to reserve appointments and information could be sought by others besides the particular patient. In general, time for consultations is not limited and patients can discuss their problems in a relaxed and friendly atmosphere. However, it should be kept in mind that pharmacists are primarily experts on medicines not illnesses (67).

All over Europe community pharmacists are considered trustworthy providers of advice concerning medicines (64, 68, 69). On the other hand, results of different surveys among lay public and medical practitioners have indicated ignorance regarding the professional knowledge of pharmacists (67, 70). More support from governmental institutions and pharmacy policy makers may be important for advertising pharmaceutical knowledge and integrating it more in the health care system. In addition, pharmacists themselves should be more active in presenting and advocating for their professional skills.

### **2.4.1. Services provided**

Community pharmacists have traditionally provided two types of services – dispensing of and counselling on prescription medicines, and provision of advice on self-care and self-medication (13). Despite a decrease of preparation of extemporaneous medicines, community pharmacies in Europe continue to prepare medicines adapted to the needs of an individual patient. In some countries community pharmacies sell and provide information concerning products of complementary and alternative medicine's (13). As extended services, community pharmacies offer pharmaceutical care, monitoring of patient drug utilisation, distribution of information about medicines to other health professionals, and health promotion initiatives (13, 14).

Estonian community pharmacies provide traditional pharmacy services such as preparation of extemporaneous medicines, counselling and sale of prescription and OTC medicines, counselling of self-medication and provision of health care information to pharmacy customers (Figure 3). Within the scope of extended services, the most common is counselling with respect to food supplements and herbal products. In addition diagnostic screening of blood pressure is possible in several community pharmacies of Estonia (30). Estonian community pharmacists have participated in several international projects, for example in WHO and EuroPharm Forum Campaign “Questions to Ask About Your Medicine” in 2000 (31) and in the CINDI (Countrywide Integrated Noncommunicable Diseases Intervention Program) project of prevention of hypertension in 2002 (32). However, experience gained from such non-regular campaigns and projects has not apparently had sufficient influence on everyday practice. Currently quality standards for community pharmacy services do not exist in Estonia.

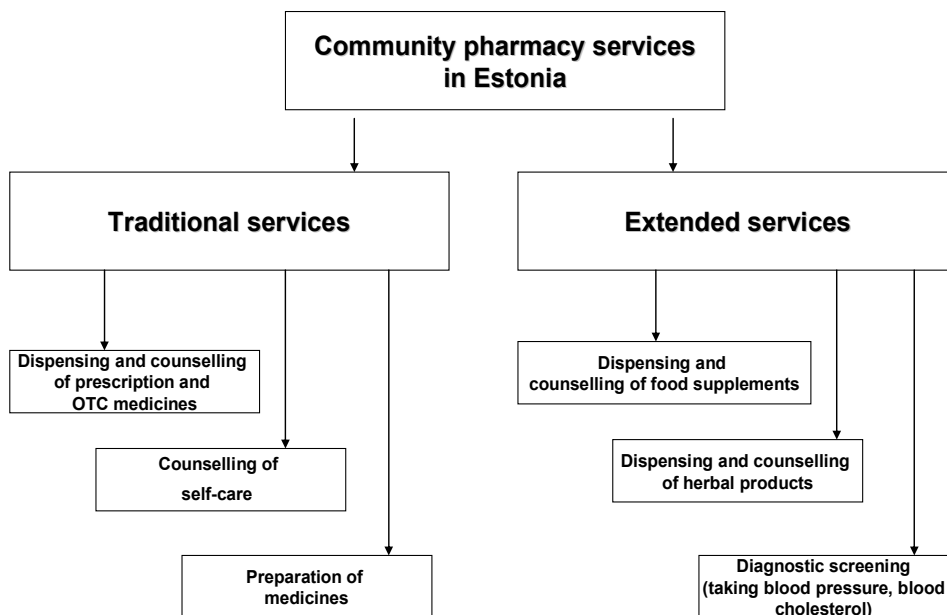
### **2.4.2. Counselling about prescription medicines**

With regard to prescription medicines, patients consider physicians as the primary and pharmacists as the secondary source of information (71). At the community pharmacy provision of information concerning prescription medicines is initiated and guided by the pharmacist. During the counselling process pharmacist can identify possible drug-related problems, increase the likelihood of patients' adherence to drug therapy and optimise the quality of care of the particular patient (71).

According to several available guidelines, counselling about prescription medicines should include name and purpose (indication) of the preparation, directions for use, possible side-effects, interactions and contraindications (72, 73). In discussion of safety issues of medicines with patient it is important for pharmacist to have access to the medical record of the patient (74). In a Flemish study, the majority of problems that have arisen due to prescription errors or



insufficient information provided to the patient concerning medicines were solved with the help of the patient medical record (74).



**Figure 3.** Services provided at community pharmacies of Estonia.

A review of counselling practices on prescription medicines demonstrated a higher rate of counselling for new compared with regular prescriptions. Information concerning safety aspects of medicines (side-effects, interactions, precautions) was less frequent than directions for use, dose, name and indications of medicine (73). Similar results were received in an Estonian survey, where only 42% of the general practitioners and community pharmacists participating in the study provided information about side effects and only 40% about interactions of medicines (75).

#### **2.4.3. Assurance of drug safety at community pharmacies**

In recent years safety issues regarding medicines have been discussed frequently (76). Community pharmacists have an important role in ensuring safe, effective and adherent drug therapy. To create a better medication safety culture, the Council of Europe established an Expert Group on Safe Medication Practices. According to their report (77) reviewing the safety of prescriptions and the use of medicines is part of the core responsibilities of community pharmacists. According to many other studies community pharmacists have an

important part in preventing, detecting and correcting prescription errors (78, 79). In general suggestions made by pharmacists were approved by the prescribing physician (80).

One of the most frequently encountered prescription problems at the community pharmacy, prescription errors are defined as mistakes in prescribing decisions or the prescription writing process, resulting in an unintentional significant reduction in the probability of treatment being timely and effective or an increase in the risk of harm (21). Despite many studies describing the content and number of prescription errors (77–79), there is a lack of methodological consistency in how to classify, record and interpret prescription errors which in turn complicates the comparison of different study results (21). Appendix 3 presents an overview of studies that evaluated the professional activity of pharmacists in identifying and solving of prescription errors.

#### **2.4.4. Counselling about OTC medicines and self-medication**

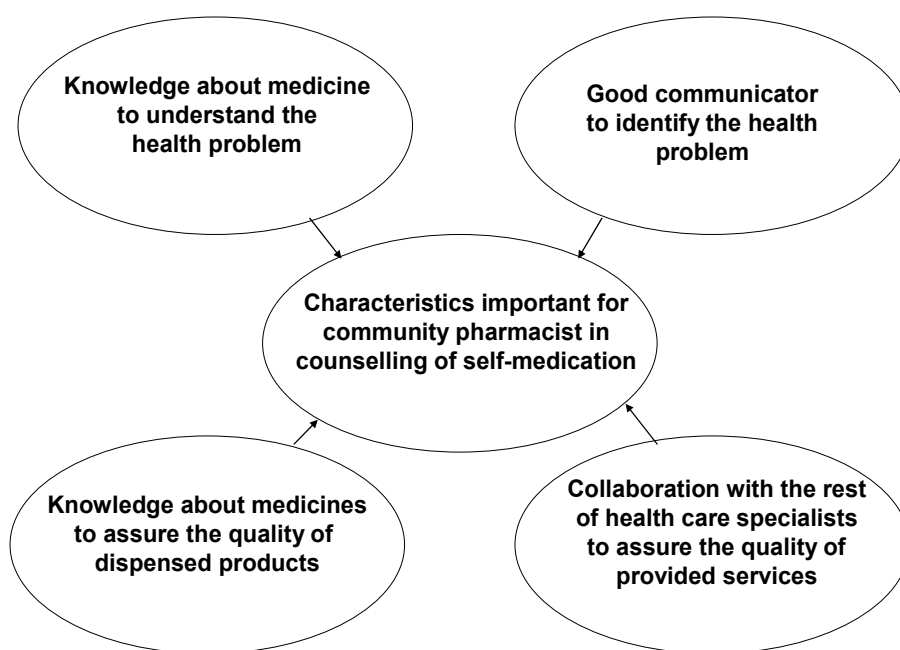
According to the definitions presented by WHO, self-care is what people do for themselves to establish and maintain health, and to prevent and cope with illness (17). As one part of the self-care self-medication is described as the selection and use of medicines by individuals to treat self-recognised illnesses or symptoms. Medicines used for self-treatment should be of quality, effective and safe as well as presented in appropriate dose and dosage form. Self-medication with OTC medicines is the most utilised form of health care (17, 91).

Reclassification of medicines from prescription to OTC medicines provides greater accessibility to more medicines and empowers self-care. However, there are concerns regarding appropriate supply and use of reclassified medicines, as patients take individual responsibility for their health (92, 93). The variety of information sources concerning OTC medicines used among public is wide, including marketer dominated sources (advertisements in TV, radio, journals); professional or expert sources (pharmacist, physician); lay sources (family, friends), point-of-sale information (store displays, package labels) and general media sources (consumer reports). While awareness and interest towards particular product is often created with marketer sources and point-of-sale information, the “individualisation” of the medicine according to the needs of the patient is mainly carried out by the help received from professional sources. However, the latter source of information is credible, if the knowledge provided is believable and presented in understandable form (72, 92, 93).

The role of the pharmacist in giving advice concerning OTC medicines and self-medication has increased during last decades. If surveys carried out 10–15 years ago reported negative attitudes of patients about the pharmacist being a therapeutic consultant or suggesting OTC medicines proposed by physician (94), later studies refer to pharmacists as credible and accessible sources of information in case of minor ailments and OTC medicines (92, 95).

WHO defined the role of the pharmacist in self-medication according to several functions (17), (Figure 4).

During the past decades standards have been introduced for providing counselling on self-medication and use of OTC medicines (96–98); some authors suggest in-house protocols to organise and facilitate sale of and counselling concerning medicines (98, 99). The counselling standards could be divided into two sections: evaluation of the condition of the patient and provision of information concerning OTC medicines. Few European countries make patient medical histories accessible; therefore the community pharmacist is expected to be able to conduct an effective interview without prior knowledge of the patient or his medical history (100).



**Figure 4.** Important characteristics of community pharmacist for counselling of self-medication.

There are no considerable differences in providing information concerning OTC medicines or prescription medicines. In both cases, the information should include name of the medicine; purpose of the treatment or indication; directions for use; side effects; precautions and time frame for effectiveness. Where appropriate for some minor ailments non-medicinal treatment could be recommended. It is important for pharmacist to encourage patients for the follow-up consultations even the symptoms diminish and the medicine used has been effective (72, 101).

There exists a myth concerning unimportance of counselling of OTC medicines. This view could have arisen due to passive behaviour of pharmacy customers, especially if they know or think they know what medicine they need (101, 102). Another reason could be connected with different expectations towards drug information among pharmacists and pharmacy customers. What pharmacists considered important was information about dose instructions and storage of the medicine, while pharmacy customers expected clarification of side effects and drug interactions (102). An Estonian study revealed different aspects in perception of provided pharmacy services among community pharmacists and pharmacy customers. If pharmacists stressed importance of fast service, pharmacy customers emphasised help in selection of appropriate medicine and pleasant service as more important factors in quality pharmacy service (103).

Based on a review of different surveys, the variety in quality of services provided to counsel self-treatment and OTC customers at community pharmacies is notable. Studies undertaken in Estonia to evaluate the quality of counselling of OTC medicines and self-medication are presented in Appendix 4.

Standards for counselling of OTC and prescription medicines as well as self-medication at community pharmacy have been found to be important in unifying the quality of services and to serve as a basis for the provision of evidence based counselling (97, 104).

#### **2.4.5. Extended services**

##### **Provision of pharmaceutical care services**

Changes in the pharmacy profession have forced pharmacists to seek opportunities to expand their professional activities. According to the well known definition presented by Hepler and Strand in 1990, pharmaceutical care (PC) is the “responsible provision of drug therapy for the purpose of achieving definite outcomes that improve a patient’s quality of life” (6). The pharmacist is not an integral part of this definition and in theory any health care specialist could provide PC. In the new complemented version the PC was defined as “a practice for which the practitioner takes responsibility for a patient’s drug therapy needs and is held accountable for this commitment” (110).

In Europe, where major differences prevail in health care policies and practices, approaches to PC show a great deal of variation (111, 112). A more clinically based approach is most common, since PC is seen in the context of a disease and outcome-based approach. In the Scottish policy document “The right medicine: the future for pharmaceutical care in Scotland” four PC service components are identified: a minor ailment service, a chronic medication service, an acute medication service and a public health service (113).

The document clearly articulates the conclusion that “dispensing will no longer provide the bulk of income for many community pharmacies”. Thus in the 1990’s the professional pharmaceutical organisations in Europe started to

look to PC as the strategic future of the profession. From the 1990s onward, PC services such as disease oriented (asthma, hypertension, diabetes) counselling, patient medication review and prevention of adverse drug reactions have been introduced into community pharmacy practice in many European countries (7, 114).

### **Counselling about complementary medicines**

Complementary and alternative medicine (CAM) is an umbrella term for different approaches for diagnosis and treatment of diseases (115). Different types of CAM including anthroposophic, ayurvedic, herbal, homoeopathic, traditional Chinese medicines, dietary supplements, essential oils, flower remedies, vitamin and mineral products have been described. Nowadays CAM is becoming an increasingly popular health care approach, which has been used for both general maintenance of health and for treatment of minor illnesses (115).

In some European countries, the sale and counselling of complementary medicines is one part of the professional role of community pharmacists (115, 116). Pharmacists have frequently had to respond to questions concerning these products from both patients and health care specialists (117, 118).

Besides general public satisfaction with respect to counselling on complementary medicines, two problems of professional ethics have been raised. First of all, pharmacist should dispense and advice only these products with scientific evidence of effectiveness or safety. If a pharmacy is handling complementary products with unproved quality, efficacy or safety, it is questionable whether pharmacist can assure help and protection to the patient (119).

Another ethical problem is connected with pharmacists' insufficient knowledge concerning complementary medicines, making it difficult to give proper advice (119). Current practice in communication with patients concerning complementary medicines should be improved towards more evidence-based counselling on side-effects and interactions between complementary medicines and conventional medicines (120). Reasons for pharmacists being less proactive in counselling on side effects and interaction of complementary medicines are insufficient scientific information and professional knowledge in this field (121, 122). Since many pharmacy schools do not provide courses concerning complementary medicines, continuing education is needed to support the activity of pharmacists in counselling on complementary medicines (117, 123).

According to the systematic documentary analysis of dietary supplements and herbal products in pharmacy practice several authors stressed importance of these products. In their view, the pharmacist should be more than just an information provider for conventional medicines and medical devices; thus the basis for pharmacist involvement with complementary medicines could be seen as extension of their established roles in PC (119).

## **2.5. Public perception of community pharmacy services and community pharmacists**

Before evaluation of public perception of community pharmacy services and community pharmacists it is necessary to take a look at the lay understanding of medicines. The variety in describing of medicines is considerable, starting with regarding medicines as basically evil to seeing them as something useful and positive; as products for profit only or products with highly regulated sale requirements (124, 125). The meaning of medicines and drug therapy for the lay public has been divided according to four themes: a reason for use, bodily effects, chronic use of medicines and problems in taking control over the use of medicines (126). To perform satisfactory service, health care professionals must learn the lay perception concerning medicines (127).

Despite the fact that drug treatment is the most frequently used method in the cure and prevention of different medical conditions, it remains unclear who should take responsibility for the outcomes of drug therapy. In light of recent developments within the pharmacy profession, pharmacists are well positioned to take this responsibility (128). Does public share this opinion? Early studies of public perception of pharmacists have described them mostly as friends of the drug manufacturer with primarily commercial motivation (128). Later surveys support the idea of the pharmacist being a qualified provider of both traditional and extended community pharmacy services (64, 68, 69, 91). However, it should be mentioned that patient satisfaction with provided services may sometimes be deceptively high due to low expectations and limited experience of different distribution of services (129, 130).

Patient satisfaction is frequently measured as an outcome of different health care services and could be seen as

- an important indicator for evaluation and quality improvement of services provided;
- a guarantee for a valuable relationship with health care provider leading to adherent drug therapy and improved health outcomes;
- an opportunity to identify patients perceptions, expectations and concerns towards health care services (12).

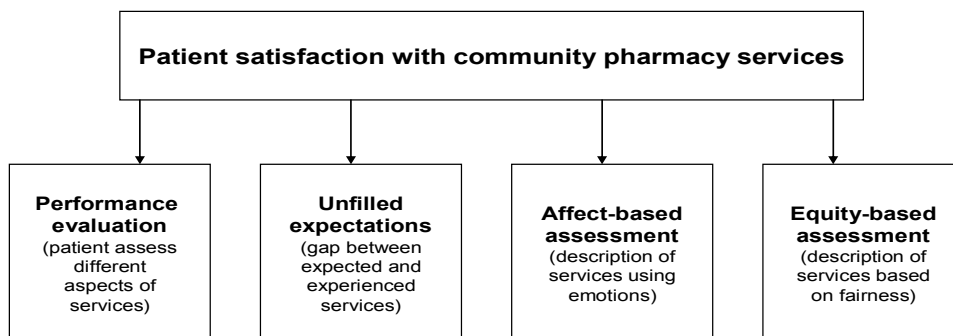
However, before beginning to evaluate public satisfaction, it is important first to define it. Schommer and Kucukarslan (131) have classified description of patient satisfaction with services provided into four categories (Figure 5).

Patient satisfaction should not only indicate how well the service was performed, but how well it was adapted to the needs of the particular patient (132).

An overview of studies evaluating patient satisfaction with community pharmacy services revealed a generally positive attitude of the public towards community pharmacies (facilities, location, availability of medicines) and community pharmacy services (both traditional and extended services) (12). However, several studies indicated high baseline satisfaction even before receiving any

services from a pharmacy or despite receiving services with insufficient quality (129, 130).

Detailed descriptions of studies evaluating patient satisfaction with the community pharmacy services are presented in Appendix 5.



**Figure 5.** Criteria of patient satisfaction with community pharmacy services.

As described earlier, there is clear evidence of correlation between satisfaction of the patient with community pharmacy service and adherence with drug therapy (133, 134). Patient adherence to drug therapy could be improved with a lucid, comprehensible explanation of why it is important to take the medicine. Patients stressed the importance of concordant communication, in which decision-making is shared between patient and pharmacist. This is necessary in both prescription and OTC medicines counselling, especially since in the latter case the pharmacist is considered the first point of contact (69, 91).

Despite patients' appreciation of concordant counselling model, there was some hesitation towards performing this type of service due to lack of time and financial resources as well as the gap of competence and power between patients and health care providers, especially doctors (133, 134).

Although more recent developments in pharmacy have emphasised the role of community pharmacists in providing information concerning medicines and self-medication and monitoring the quality of drug therapy of patients, the importance of professional activities of community pharmacists in primary health care should be more effectively introduced to the public.

## 2.6. Survey methods used in social pharmacy research

In the current thesis the following research methods were used.

**Social survey research**, a quantitative method widely used to survey pharmacy practice (138, 139). Most of the surveys are descriptive, illustrating characteristics, activities and/or opinions of different groups of the population. In general the surveys are cross-sectional and the data are collected only on a single occasion. This has been considered a relatively quick and cost-effective method to gather information from a large number of respondents, enabling the researcher to make generalisations to a wider population (140).

### *Survey instrument*

A self-completed, structured questionnaire, distributed to the respondents by researcher or by mail is commonly used as the survey instrument. Many social survey instruments use scales; the one most commonly employed is the five-point Likert scale (strongly agree, agree, neither agree nor disagree, disagree, strongly disagree) (30, 136).

### *Validity and reliability*

The self-completed survey instrument may contain incomplete answers or some of the questions may not have been understood correctly. The described factors have an impact to the reliability and validity of survey results.

For validation of the survey instrument face validity, criterion validity, construct and content validity are used. Despite the validity of the survey instrument, the reliability of the individual questions should be verified as well. Ambiguity in the wording of questions, variation in the style of questions and questioning could make it impossible for the respondent to give appropriate information (140).

### *Sample of the survey*

Survey participants could be selected randomly or by cluster or stratified sampling. The last mentioned method enables to compare population groups (141, 142). Depending on the respondents in the sample the selection of survey participants could be different. For example health care providers (pharmacists and physicians) could be involved to the survey by the professional registry, lay public by the registry of inhabitants of selected regions or cities, by database of general practitioner or using patient organisations to select appropriate survey sample (143–145).

In descriptive surveys the sample size should be sufficient to carry out statistical analysis and make a generalisation to the population or certain groups of the population (140).

### *Response rate*

One of the problems of social survey research is low response rate. Several different measures (for example pre-paid return envelope, covering letter



addressing importance of participation in survey, remainder letters) have been taken to increase the response rate. However, the response rate may vary in great extent. For example for surveys where pharmacists and pharmacy customers were involved the response rate varied from 20% to 90% (140). In case of low response rate it would be necessary to investigate non-responders as well (146).

**Observational research** gives the opportunity to avoid non-objectivity of the results collected by self-reported surveys. During observational research defined activities are recorded; the results are used to identify different relationships and if possible make generalisation of the data. Observational research could be employed as qualitative or quantitative method alone or in combination with other methods (140, 147).

Participant observational research is not common in the investigation of pharmacy practice. Where this method has been employed, the survey has been carried out in a single or at a small number of pharmacies with the objective of describing the observed activity in the situation it was performed (141).

#### *Survey instrument*

Special pre-coded forms have been used to collect the data for quantitative analysis. To guarantee the representativeness of the data, data collection should be undertaken during different times (for example day, weekday) (87–89).

#### *Validity and reliability*

During observational research the Hawthorne effect could be seen: for example, where pharmacists are aware of presence of observer, they perform pharmacy services differently from their regular behaviour. To reach valid data collected by observational research different measures have been taken, including delay of the beginning of recording of activities and not reporting the real objectives of the survey to pharmacists. In this latter mentioned case the ethical questions should be carefully considered (140).

Reliability of the results of observational research is mainly connected with consistency of data collection. If in the survey several researchers involved or partly the data have to be collected by pharmacists, this could generate bias in survey results. In such a case pilot-surveys clarifying possible differences in interpretation and recording of pharmacists' behaviour by observers should be performed (87–88, 148).

**Literature review** is conducted to evaluate published information on a particular topic, sometimes within a certain time period. A literature review can be a summary of sources, but usually it combines both summary and synthesis of evaluated literature. Literature reviews provide a brief guide to the subject area of interest. For literature review it is important to use several databases of scientific journals, books, legislation and other sources for receiving an overview of particular area (149).

### **3. AIMS OF THE RESEARCH**

The general aim of the research was to determine and evaluate the current role of community pharmacies and community pharmacists in the primary health care system of Estonia and to provide suggestions for further improvement.

The specific objectives of the research were as follows:

1. To evaluate the changes in public satisfaction with community pharmacy services in Estonia during the period 1993–2005.
2. To study public knowledge about OTC medicines and self-medication and to evaluate public experiences and expectations towards respective counselling provided at community pharmacies in Estonia.
3. To assess and compare the pattern and extent/magnitude of prescription errors and professional activities of community pharmacists in Estonia with Nordic countries with respect to identification and solving of prescription errors.
4. To learn about the professional perception of community pharmacists in Estonia concerning extended services provided at community pharmacies using the example of counselling on herbal products.

## **4. MATERIALS AND METHODS**

### **4.1. Overall methodological approach**

This dissertation presents the first systematic overview of community pharmacy practice in Estonia. Since the beginning of the 1990's single surveys have been conducted with small numbers of participants to investigate public and professional perception of services provided at community pharmacies in Estonia. However, these studies lacked a systematic approach for the evaluation of the quality of services provided at the community pharmacy.

In order to move toward such systematic evaluation of the quality of community pharmacy services, it was decided to employ a multi-method research, common for surveys in social sciences. Multi-method research is defined as an approach combining data in different forms (for example figures, narratives, hypothesis testing) to encompass and engage different aspects of the research topic (56). In the current dissertation different aspects of multiple approaches have been employed. Survey research, observational research and review article have been used as components of the multi-method approach. In addition multiple perspectives such as those of the customer and pharmacist, and potentially contrasting aspects such as pharmaceutical policy and patient perspective have been included.

### **4.2. Survey design**

To reach the general goal of the current thesis it was planned to use both public and professional perspectives. Survey research was undertaken to evaluate public satisfaction with community pharmacy services in general, counselling quality with respect to OTC medicines and self-care and herbal products. Observational research was undertaken to evaluate the role of community pharmacists in identifying and solving of prescription errors. Literature review was employed to give an overview of transition in the health care system, particularly in the pharmacy sector with more detailed description of community pharmacy services, pharmacy education and future developments of the pharmacy profession in Estonia.

In the public surveys satisfaction with provided services was used as the main indicator. In the pharmacist's surveys evaluation of professional competency in performing pharmacy services was employed.

### **4.3. Survey research, population surveys**

#### ***Changes in satisfaction with community pharmacy services and professional competence of community pharmacists (I)***

##### *Survey sample and data collection*

The cross-sectional postal survey was undertaken in 1993 and 2005. This method was chosen for its validity in reaching the numerous population in the second largest town in Estonia, Tartu. A stratified random sample of Estonian residents aged 20–69 was selected. In both survey years the survey instruments were mailed to the respondents only once; in 1993 the survey sample was 711 and in 2005 990 residents in Tartu. Due to one-time permission to use the personal data of the survey participants it was not possible to carry out repeat mailing nor analyse the sample of non-respondents. Nevertheless, in 2005 a reminder concerning filling in the survey instrument was published in a local newspaper one month after the initial mailing of the survey.

Altogether, 448 (63%) completed survey instruments were received in 1993 and 386 (39%) in 2005. Comparison of age and gender distribution of the survey population with the Estonian population of Tartu showed that the survey population was representative.

##### *Survey instrument*

The survey instrument used in both survey years was adapted from a questionnaire used by the Finnish National Agency of Medicines in 1988 (136). In 1993 the survey instrument was adapted to the Estonian context in cooperation with sociology researchers from the Department of Sociology at the University of Tartu. In 2005 the content validity of the survey instrument was assessed by a panel of 5 researchers in social and pharmacy sciences. In 1993 the survey instrument included 40 and in 2005 21 questions, 15 being similar in both survey years.

In 1993 there were more questions devoted to the cost of medicines and in 2005 to the issues evaluating deregulation of the community pharmacy sector and the future of community pharmacy services.

The survey instruments were divided into two main sections:

- general views towards community pharmacies, community pharmacists and provided services;
- desire for drug information and extended services.

#### ***Evaluation of counselling of OTC medicines and self-medication (II)***

##### *Survey sample and data collection*

A multiple-choice structured questionnaire was distributed in 2003 to 31 pharmacies and one GP centre in Estonia. To achieve a random sample, patients of different ages, sex, area of residence and social background were invited to participate in the survey. In the eight regions of Estonia, 436 survey instruments

were given out in community pharmacies of large cities, 300 survey instruments at community pharmacies of small cities, and 150 survey instruments in community pharmacies of rural areas. At selected community pharmacies, pharmacy customers requesting prescriptions or OTC medicines were invited to participate in the survey. In the community pharmacies and GP centre the survey instruments were distributed to the patients by pharmacy students. Participants had the option of filling in the questionnaire immediately or taking it home and returning it after one week.

Altogether, 886 survey instruments were distributed and 727 were received as filled (response rate 82%).

#### *The survey instrument*

The survey instrument was adapted from the previous survey carried out in Estonia (64). The face validity of the survey instrument was performed with 10 representatives of the public ranging in age from 25–73. The survey instrument consisted of 20 questions with optional answers. Depending on the question there were 2–11 different options to reply.

The survey instrument was divided into five sections:

- self-assessment of health;
- knowledge and actions with respect to minor illnesses;
- knowledge and actions with respect to OTC medicines;
- information regarding self-medication and OTC medicines expected from community pharmacy;
- demographic data of the respondents.

## **4.4. Survey research, pharmacists' survey**

### ***Counselling on herbal medicines and supplements (III)***

#### *Survey sample and data collection*

The cross-sectional written postal questionnaire was mailed to a random sample of 50% of Estonian community pharmacies (n=154) in 2005. The data were received from the community pharmacy register at Estonian State Agency of Medicines. Each community pharmacy received one copy of the survey instrument with the request to be completed by the pharmacist or the assistant pharmacist counselling OTC customers. A reminder was sent to all community pharmacies by e-mail after two weeks.

Of the 154 mailed survey instruments 120 (78%) were received as filled, 74% from town and 26% of rural community pharmacies.

#### *Survey instrument*

A survey instrument used to survey a stratified random sample of community pharmacists in United States (150) was adapted to the Estonian context.

The survey instrument included the following items:

- the frequency of customers' requests for information concerning herbal products;
- the perceived importance of factors determining the use of herbal products;
- the perceived importance of different aspects of herbal products information;
- self-reported competence of pharmacists in providing counselling about herbal products.

The content validity of the survey instrument was assessed by a panel of 8 researchers and practitioners with an interest in herbal products. The survey instrument was pilot tested for face validity among a convenience sample of five community pharmacists. Minor changes to the wording of the items were made based on the feedback received.

## **4.5. Observational research, pharmacists' survey**

*Use of a generic study protocol in evaluation of prescription errors in different contexts in Estonia, Norway and Sweden (IV)*

### *Survey sample and data collection*

In Estonia the survey was undertaken in four community pharmacies located in three different regions of Estonia in January, July and September 2006. In all community pharmacies the data were collected during six weeks and thirty weekdays per pharmacy within three months as described above.

In Sweden the protocol was implemented in a study of seven community pharmacies in large cities in the middle and northern part of country, and carried out during three consecutive weeks, fifteen weekdays per pharmacy from February 2007 to February 2008.

In Norway the protocol was at nine community pharmacies located in the western and eastern regions of the country. The study was undertaken over the course of five weeks, twentyfive weekdays per pharmacy in September and October 2004.

In Estonia and Sweden the observation survey was carried out by pharmacy students. In Norway the study protocol was self-completed by community pharmacists. The observers followed closely the evaluation of prescriptions, error detection and problem solving activities performed by community pharmacists, recorded each case separately to the protocol and attached a copy of the prescription to the protocol.

To focus more on errors with clinical hazard, only those prescriptions with errors, ambiguities or other problems required contact with the prescriber before dispensing were evaluated. All attempts to contact the prescribers were included in the survey, whether or not they resulted in a contact during the survey period.

### *The survey instrument*

Prescribing errors and the corresponding interventions were reported on a form originally developed in the United States and translated and adapted to the Nordic context (86, 148).

The survey instrument could be divided into the following sections:

- reasons for intervention (prescribing error, prescribing omission, drug therapy monitoring, drug interactions, contraindications, other);
- interventions, recommendations, outcomes;
- demographics and description of the intervention (prescription status, prescription source, prescriber type, patient sex, patient age, event description).

In all three countries, the examination and validation of the classification was performed. Classification problems of identified prescription errors were discussed with the observers, and an appropriate classification code was determined. The Estonian version of the intervention report was piloted for three days in one of the community pharmacies that later participated in the survey. Swedish version was piloted by independent observers in a pre-study at four community pharmacies for two weeks per pharmacy.

## **4.6. Review article**

### *Pharmaceutical care in community pharmacies: practice and research in Estonia (V)*

For the literature review concerning practice and research in Estonian community pharmacies, three sources were used: surveys evaluating changes and developments in the health care system of Estonia; pharmacy practice research undertaken in Estonia; information from professional organisations (The Estonian Pharmacists' Association, Estonian Academical Society of Pharmacy) and governmental institutions (MoSA, SAM, Department of Pharmacy, University of Tartu).

The published articles in English (1992–2009) were identified, based on searches of the on-line databases PubMed, Medline, EMBASE and Science Direct. In addition the cited references of the identified articles were used. The following key words, based on Medical Subject Headings, were used: “health care”, “health care systems”, “preventive medicine & public health”, “primary health care”, “legislation, pharmacy”, education”, “education pharmacy“, “ethics pharmacy”, “community pharmacy services”, “Estonia”, “Baltic states”. Research concerning pharmacy practice in Estonia was searched from Estonian professional journals (1992–2009) “Eesti Rohuteadlane”, “Apteeker”, “Perearst” and “Eesti Arst”.

## **4.7. Statistical analyses**

In survey research it is common to have a large number of data due to a large number of respondents and questionnaire items. For statistical analysis the programme Statistical Package for the Social Sciences (SPSS, v. 11.0, Chicago, IL) was used. Data of nominal or ordinal scale were analysed using non-parametric statistical procedures – analysis of relationships between variables (I, II, III, IV).

Descriptive statistics (frequencies and percentages) were calculated (I, II, III, IV). Correlations between variables were mainly analysed using cross-tabulation.

To compare counts between nominal variables Pearson's chi-square test was used (I, II, III).

In the surveys I, II and III statistical significance was reported. The level of statistical significance was set at  $p \leq 0.05$ . A p value  $< 0.05$  means that there is less than 5% chance that the analysed situation or activity would occur.



## **5. RESULTS**

### **5.1. Public surveys (I, II, V)**

#### **5.1.1. Perception towards and satisfaction with community pharmacists and community pharmacy services (I, V)**

Despite the rapid and major changes that took place in Estonian pharmacy system, community pharmacies have continued to play an important role in primary health care. In the years between 1993–2005, the number of people visiting a pharmacy once or more per month has increased 1.6 times. Compared to the earlier survey year, results for the latter survey year showed that the community pharmacy was selected more because of the quality of information provided concerning medicines ( $p<0.001$ ) and the convenience for visits (appropriate location and opening hours, both  $p<0.001$ ). In 2005, 71% of the respondents visited the same pharmacy, compared to 35% of the respondents in 1993.

Compared to 1993, in 2005 community pharmacies were described more as contemporary health care institutions ( $p<0.001$ ) providing patient centred services ( $p<0.001$ ). In addition lay people noted better job management at community pharmacies: the waiting time was decreased ( $p<0.05$ ) and time for talking with patient increased during the survey period ( $p<0.001$ ). However, more survey participants of the latter survey described community pharmacies as profit makers from the peoples' sickness ( $p=0.018$ ). In neither year did survey participants consider it important to have special designated place at the community pharmacy for private communications. Despite the statistically significant ( $p=0.025$ ) increase in the opinions indicating good cooperation between community pharmacies and the rest of the health care system, future collaboration could be closer and more effective.

In both survey years community pharmacists were perceived as trustworthy ( $p=0.917$ ) and credible sources of drug information ( $p=0.037$ ), who liked their profession ( $p=0.861$ ). In comparison to 1993, in 2005 the readiness of community pharmacists for communication and responding to the patients' questions ( $p<0.001$ ) was increased; communication skills in making drug information understandable to the patients were improved ( $p=0.017$ ).

Estonian community pharmacies provide mainly traditional services – sale and counselling of prescription and OTC medicines, advice concerning minor illnesses and self-medication, and compounding of medicines. Despite the fact that the number of extemporaneous medicines available at community pharmacies has decreased, 46% of the survey participants in 2005 considered this type of preparation important. The most popular medicines were nasal ointments against colds (32%), headache powders (22%) and zinc ointment (15%).

In comparison to 1993, in 2005 some decrease was noted in the interest of survey participants towards OTC drug information ( $p=0.022$ ) and an increase

towards information concerning prescription medicines and minor illnesses (both  $p<0.001$ ).

Public interest towards details of drug information has increased (Table 1). While in both survey years information concerning the duration of treatment, side effects, and interactions were rated as equally important to indication and mode of action, other factors such as storage of medicine at home, use of alcohol during the drug treatment and concern about whom to turn to in case of problems during drug treatment became more relevant in 2005 than they were in 1993.

**Table 1.** Public perception toward importance of drug information details provided at community pharmacy in 1993 and 2005

	1993			2005			p
	Agree (%)	Neutral (%)	Disagree (%)	Agree (%)	Neutral (%)	Disagree (%)	
Indications, mode of action	65	18	17	91	3	6	$p<0.001$
Repetition of written package information	41	11	48	80	5	15	$p<0.001$
Duration of treatment	63	8	26	65	5	30	$p=0.036$
Storage of medicine at home	65	12	23	65	5	30	$p<0.001$
Side effects of the medicine	78	11	11	88	3	9	$p=0.003$
Interactions with other medicines	77	11	12	87	3	10	$p<0.001$
Use of alcohol during the drug treatment	36	13	51	77	5	18	$p<0.001$
Where to turn in case of possible problems during treatment	53	18	29	66	10	24	$p<0.001$

The survey participants did not emphasise the importance of extended community pharmacy services. While interest towards taking blood pressure and the possibility to perform a pregnancy test at the community pharmacy remained the same during the period between two survey years, a statistically significant decrease of interest concerning home delivery of medicines or for the separate service of drug counselling was identified in 2005 (Table 2).

**Table 2.** Public views toward provision of extended community pharmacy services in 1993 and 2005

	1993			2005			p
	Agree (%)	Neutral (%)	Disagree (%)	Agree (%)	Neutral (%)	Disagree (%)	
Taking of blood pressure	69	17	14	69	10	21	p=0.431
Pregnancy test	27	35	38	31	20	49	p<0.001
Home delivery of medicines	48	21	31	36	18	47	p<0.001
Separate desk for drug counselling	83	12	5	63	20	17	p<0.001

In 2005 74% of the respondents did not regard medication review of the patients with chronic conditions performed at the community pharmacy as an important service. Instead there was greater demand for provision of more detailed drug information.

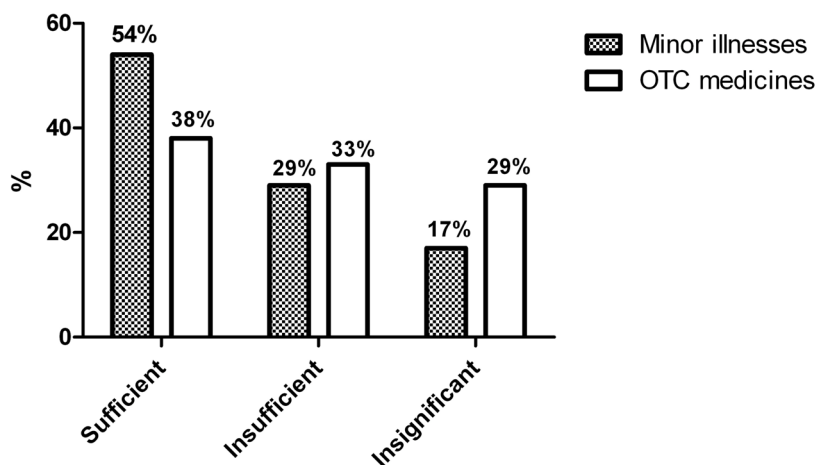
In 2005 more than half of the respondents (54%) supported the idea of maintaining the monopoly of sale of medicines at community pharmacies. However, 30% considered physicians and 25% supermarkets as alternative sources for purchasing OTC medicines.

Despite public satisfaction with changes in community pharmacy services, there is a need for continuous development. According to public opinion, community pharmacists should improve their professional skill (98%) and expand their role in providing drug information (95%); services should be more patient centred (95%), and there should be sufficient time to communicate with the patient (95%). Despite the fact that privacy at community pharmacy was not considered very important, 80% of the respondents indicated that they would like to see conditions for undisturbed communication in the future. Apparently these respondents, who trusted their own knowledge concerning medicines, would expect faster service (76%) and possibility of self-selecting OTC medicines from the open shelves (53%).

### **5.1.2. Expectations with respect to providing information concerning OTC medicines and counselling on self-medication at the community pharmacy (II, V)**

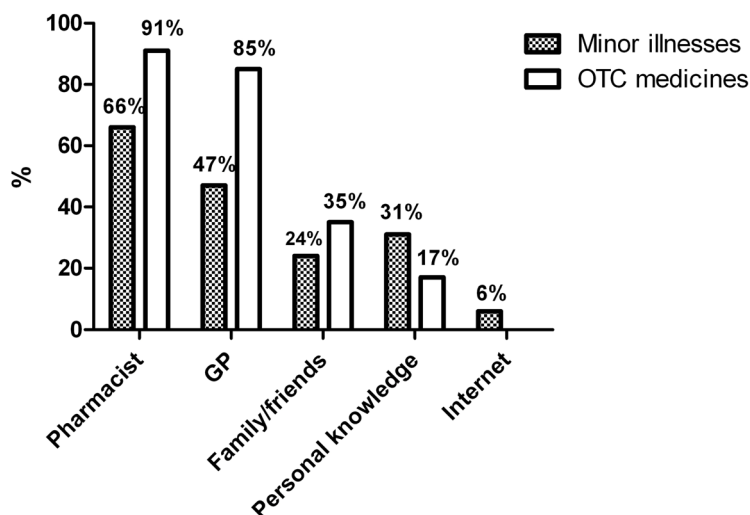
Survey participants demonstrated responsible attitudes towards treatment of minor illnesses; 58% of the respondents indicated that in such cases they would select self-medication and 28% that they would contact their GP. For self-medication the most popular methods were use of home-made remedies (89%) or OTC medicines (78%). However, 35% of the elderly respondents indicated that for minor illnesses they preferred to self-medicate using prescription medicines.

Considerable differences can be observed in self-evaluated knowledge concerning minor illnesses and OTC medicines: respondents' knowledge of minor illnesses was higher than their knowledge of OTC medicines; indeed, 1/3 of the respondents even regarded knowledge concerning OTC medicines as unnecessary (Figure 6).



**Figure 6.** Public self-evaluated knowledge concerning minor illnesses and OTC medicines.

The public used different information sources to receive knowledge concerning minor illnesses and OTC medicines. The pharmacist was regarded as a top-specialist with respect to both questions (Figure 7).



**Figure 7.** Public information sources about minor illnesses and OTC medicines.

Satisfaction with the counselling and drug information received from the pharmacy was practically equally divided between always satisfied (51%) and satisfied to some extent (45%). Only 4% of the respondents were dissatisfied with counselling on self-medication and OTC medicines. There was no statistically significant variation in the interest of lay people towards different details of drug information concerning OTC medicines; these were high for all aspects of information.

## **5.2. Pharmacists' surveys (III, IV, V)**

### **5.2.1. Identification and correction of prescription errors at the community pharmacy (IV)**

The generic survey instrument used in different contexts – Estonia, Norway and Sweden, was appropriate for evaluating the identification and correction of prescription errors at community pharmacy.

At the community pharmacies participated in the survey during the survey period 13,221 prescriptions were dispensed in Estonia, 69,315 prescriptions in Norway and 59,901 prescriptions in Sweden.

Of the dispensed prescriptions, 1.5% in Estonia, 0.5% in Norway and 0.4% in Sweden required contact with the prescriber. There was variation in the number of this type prescriptions identified at participating community pharmacies: 2.3-fold in Sweden and 5-fold in Norway and Estonia. About 80% of the prescriptions with errors or omissions were new prescriptions. Of erroneous prescriptions, 73%, were handwritten prescriptions in Estonia, 11% in Norway and 9% in Sweden. In Norway, the majority of the problem prescriptions were computerised physician order entry for prescriptions outprints and in Sweden more than half of the prescriptions with problems were electronic prescriptions. The median time to solve the problem was 5 minutes in all three countries. However, approximately 33% of the problems took more than 10 minutes in Norway, compared to approximately 20% in Estonia and Sweden respectively.

The pharmacist was unsuccessful in getting in touch with the prescriber for 15 (8%) prescriptions in Estonia, 71 (23%) in Norway and 63 (28%) in Sweden. In addition to contact with the prescriber, Estonian pharmacists discussed prescription problems with the patient with respect to 33% of the prescriptions. In Sweden, the solution of choice in such prescription error cases was contact with a GP other than the prescriber, a nurse at the ward/surgery, or another specialist; this procedure was followed in approximately 25% of the cases where contact with the prescriber was attempted.

In Norway the prescription was changed and dispensed in 55% of the cases, and the prescriber was contacted afterwards.

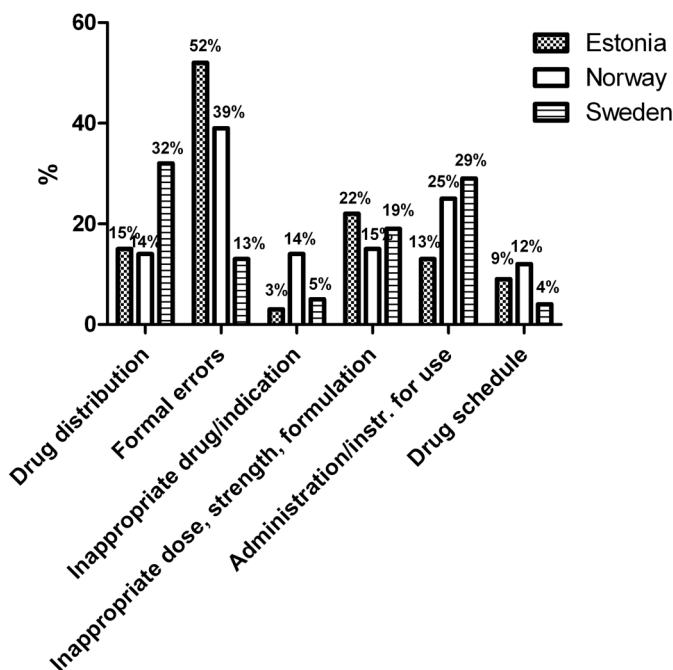
The problems identified at the prescription were divided into three major groups: formal (technical) errors or ambiguities, problems connected with clinical hazard to the patient and drug distribution problems.

Formal errors (for example incomplete information about prescriber or patient, missing or erroneous date, reimbursement issues and licensing issues) were more common in Estonia and Norway and the reason for more than one third of all contacts with the prescribers (Figure 8).

The prescription problems with potential clinical hazards varied. The more frequent problems were related to insufficient information concerning administration and instructions for use of medicine (Norway and Sweden), followed by inappropriate medicine or indication (Sweden) and inappropriate dose, strength and formulation of medicine (Estonia). Prescriptions issued to the wrong patient were reported both in Norway and Sweden, but not in Estonia. Few errors were identified concerning potential risk towards interactions, contraindications and side effects of medicines (Figure 8).

Drug distribution problems (for example determination that a medicine was not on the market, that a medicine was not available in the stock of the medicine wholesale company or community pharmacy) were more frequent in Sweden (Figure 8).

If a pharmacist contacted the prescriber, the suggestions proposed by the pharmacist were approved by the prescriber in the majority of cases – 69% in Estonia and Norway and 67% in Sweden.

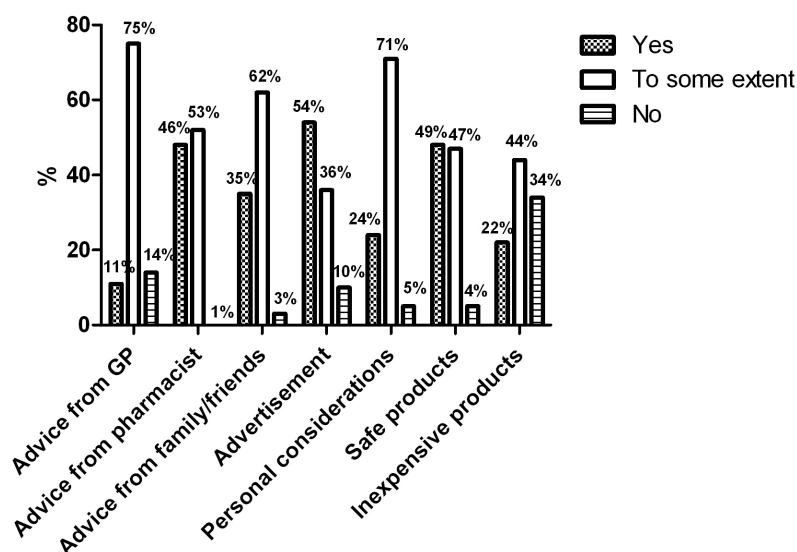


**Figure 8.** Distribution of errors and omissions on prescriptions necessitating contact with the prescriber prior to dispensing in Estonia, Norway and Sweden.

### 5.2.2. Counselling on herbal products at the community pharmacy (III, V)

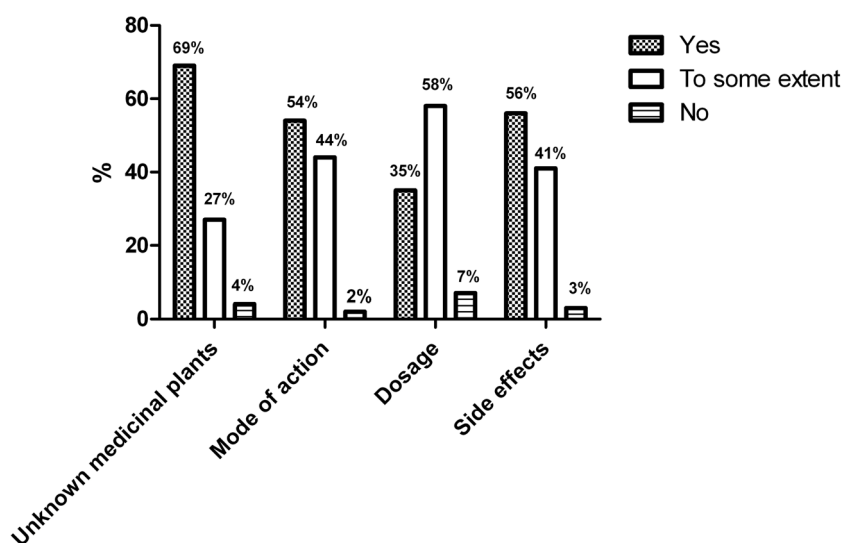
According to the perception of community pharmacists who participated in the survey, the pharmacy is an important source for information concerning herbal products. The community pharmacy was visited for both reasons: for consultation only (46%) or for consultation and purchase (61%) of herbal products. According to pharmacists, the typical customer of herbal products was a middle-aged woman or an older man from the town. Pharmacists pointed out several reasons for selection and purchasing herbal products; advertisement in mass-media, considerations about safety of herbal products, and advice given by pharmacist were indicated as the more important factors (Figure 9).

Pharmacists considered indications and mode of action (93%), administration details (81%) and side effects and contraindications (36%) of herbal products to be the information most frequently sought-after information by pharmacy customers.



**Figure 9.** Perception of community pharmacists towards reasons lay people prefer/purchase herbal products.

Self-evaluated competency concerning herbal products by community pharmacists who participated in the survey was remarkably high, being good or excellent according to 64% of the respondents. Despite these high assessments of self-evaluated competency, only 35% of the respondents reported that they had not encountered any problems in counselling on herbal products; 19% admitted that, for the problems in counselling were to some extent due to insufficient professional knowledge. Thirty six percent of the survey participants regarded continuing education concerning herbal products necessary. The most perceived gap in knowledge was connected with unknown medicinal plants, safety and the mode of action of herbal products (Figure 10).



**Figure 10.** Fields requiring for continuing education about herbal products according to community pharmacists.



## **6. DISCUSSION**

### **6.1. Context of the research**

This was the first systematic investigation of changes in the community pharmacy system in Estonia that has taken into consideration both public and professional perceptions. The changes that have taken place include the transition from a planned to a free market economy, reorganisation of the health care system along with operation of the community pharmacy sector, and establishment of the national law; all of these have shaped public expectations towards community pharmacy services.

The research described in this thesis was undertaken from 1993–2006 when the changes were taking place in the pharmacy sector of Estonia. During the first survey in 1993, national pharmacy legislation was under development; the process of privatisation of community pharmacies was in midstream; the selection of medicines had changed, but was still not sufficient to cover all products in the list of essential medicines. The results of survey I showed that in 1993 the respondents were visiting more different community pharmacies than in 2005, result supported by another Estonian survey where selection of community pharmacies was studied in 2003 (103). This different behaviour could be linked with the need to find necessary medicine more in 1993 than in 2005. In addition respondents in 1993 were less interested in drug information or other services provided at community pharmacy than they were in 2005; this could again be seen as people focusing more on receiving required medicines than expecting counselling or evaluating its quality. Despite the fact that it was not possible to find respective results from studies describing the pharmacy sector in other post-socialist countries (26, 34), it could safely be assumed that due to insufficient selection of medicines in 1990's the behaviour of pharmacy customers in these countries could be described similarly.

The second period of changes was connected with accession of Estonia to the EU in 2004. The national pharmacy legislation, which had been established in the 1990's, was changed one more time. However, these changes were more concerned with legislation dealing with medicinal products (9); operation of community pharmacies was continuously regulated by national law, and this is the reason why changes described in surveys I-III have been more influenced by intra-country developments and less by accession of Estonia to EU. The surveys evaluating counselling on self-medication and OTC medicines and extended community pharmacy services were undertaken in 2003–2005, when the private community pharmacy sector had existed for approximately 10 years, liberalisation of mentioned sector had already begun, and pharmacy chains had been operating for approximately 5 years. In community pharmacies the evaluation of prescriptions, as well as ordering and management of medicines at the pharmacy were computerised (25). The preparation of extemporaneous medicines decreased and focus was redirected towards counselling of patients. Increase in public interest about drug information and readiness of community pharmacists

to provide patient-centred counselling was described in surveys I–III. These results were consistent with the findings of studies conducted in other post-socialist countries (33, 62).

Most of the pharmacy practice surveys undertaken in Estonia have evaluated community pharmacy services in general or focused more on counselling on OTC medicines and self-treatment (64, 103, 107). A new series of surveys was initiated in 2006, with a focus on the handling of drug prescriptions and prescription medicines in the pharmacy: evaluation of prescriptions, identification of potential sources of error, solution of potential errors and dispensing of the prescribed medicines. All of these are important components of the pharmacist's professional activities aimed toward ensuring the safety of medicines (151).

Preparation of the digital prescription system, which was first tested already in 2001 and according to survey V, intended to be introduced in 2009, was finally launched in the beginning of 2010; this gave the survey series a new focus, allowing comparison of the quality of different types of prescriptions in Estonia and the respective results of surveys undertaken in Nordic countries. Previous research performed in Nordic countries presented new types of prescription errors evaluated on electronic prescriptions (87–89).

Development of community pharmacy services in post-socialist countries has been influenced by several factors: external determinants, such as transition in the economy, the social sphere and the political organisation of the country, and internal factors, such as worldwide reorientation within the pharmacy profession, changing the position of pharmacist within health care system (27, 29). In the described situation many post-socialist countries retained traditional community pharmacy services along with step-by-step improvement towards patient orientation and provision of more detailed drug information to assure safe and effective use of medicines (26, 33). In the light of current dissertation Estonia can be seen as one example of a post-socialist country providing mostly traditional community pharmacy services – dispensing and counselling of prescription and OTC medicines; counselling on self-medication and preparation of medicines as described in the surveys I, II, IV and V. On the basis of surveys I and III, counselling on herbal products, the measurement of blood pressure and some other services can be regarded as examples of supplementary services offered by Estonian pharmacies.

## **6.2. Main findings of public surveys**

### *Change in the public image of community pharmacies and community pharmacy services*

Based on current dissertation, the overall public satisfaction with operation and service provision of community pharmacies has increased within the past 15 years. In survey I community pharmacies have been described as an accessible source for medicines and drug information. In comparison to the first years after

the regaining of independence in the beginning of the 1990's and the period after Estonia accessed to the EU in 2004, current research indicates that pharmacy customers described community pharmacies as up-to-date institutions providing patient-oriented services.

In surveys I, II, III and V community pharmacists were regarded as reliable specialists concerning medicines. Over the course of the twelve-year survey (survey I), improvement in communication skills was detected, which was expressed as increased readiness of pharmacists to respond to the questions of pharmacy customers and to explain drug information. Counselling on minor ailments and OTC medicines by pharmacists was highly appreciated and used by patients. Trust towards community pharmacists as reliable source of drug information was similarly indicated by other surveys (64, 68, 69).

In the current research, both positive and negative trends in the public perception of community pharmacy were observed. Positive examples included increased selection of prescription and OTC medicines available at the community pharmacy (surveys I, II), opening of new pharmacies with contemporary design and suitable opening hours (survey I) of community pharmacies. Similar trends could be seen in the other post-socialist countries (57–61).

However, transition in health care has not only brought positive changes. Influence of the liberalisation policy in community pharmacies can be seen in the results of survey I, where in 2005 more respondents regarded community pharmacies as institutions making profit at the expense of sick people than respondents in 1993; this finding resembled results presented by other surveys describing the situation in post-socialist countries (26). In addition the perceived contemporary design of community pharmacies was not always accompanied by the possibility for private communication, an important factor in the provision of more detailed drug information and pharmaceutical care services reported in the other surveys (30).

#### *Expectations towards counselling of self-medication and OTC medicines at community pharmacy*

Based on the present research, Estonian customers value counselling concerning minor illnesses and OTC medicines provided at the community pharmacy. Similar results were obtained in the other surveys of pharmacy customers in Belgium and UK (91, 94, 95). Nevertheless, in addition to the half of survey participants who were always satisfied with provided services, another half of the respondents reported as occasionally satisfied. One reason for dissatisfaction could be connected with insufficient communication skills of pharmacists in identifying health problems of the patient, stressed by WHO as an important guarantee for effective self-medication (17). Pseudo-customer surveys undertaken to evaluate the quality of counselling services on minor illnesses and the provision of advice on OTC medicines in Estonian community pharmacies (107, 108) demonstrated insufficient quality in identifying health problems; similar results were reported in international surveys (152).

Another reason for dissatisfaction could be connected with change in public expectations towards services provided at the community pharmacy. As availability of different information sources has increased and given the possibility of receiving basic information concerning medicines from the Internet or the patient information leaflet, what is expected more often from the pharmacy is counselling directed toward the specific needs of the particular patient (69, 91).

Dissatisfaction with community pharmacy services could be caused by insufficient time and motivation of the pharmacist to communicate with the patient. Due to shortages of professional personnel at Estonian community pharmacies (according to pharmacy statistics of the State Agency of Medicines in 2008 there were on an average 1.6 pharmacists and 1 assistant pharmacist per pharmacy (25)) and work- stress, the quality of communication with patients may suffer.

Problems could also arise about the effectiveness of treatment with OTC medicines. As distinct from self-evaluated knowledge concerning minor illnesses, the level of knowledge concerning OTC medicines was much lower and was even considered unimportant, since there were specialists to whom one could turn and ask. Variation in understanding of the meaning of medicines and their functions reported in other surveys (125) should serve as a signal for pharmacists to provide information concerning medicines tailored to the needs and knowledge of the particular patient.

Results of survey II reflected some appearance of irrational use of medicines in case of minor illnesses. For curing of minor illnesses, one third of the older respondents consumed prescription medicines they had left from previous treatments. This described situation may indicate irrational drug prescribing or low adherence to drug treatment. According to previous research the latter problem could be reduced or solved by consultations at the community pharmacy (71).

Since the 1990's in Estonia expectations with regard to the quality of drug information provided by the community pharmacy have increased. The results obtained are in correspondence with similar developments in Europe (7, 28). If we compare surveys undertaken in 2003 (survey II) and 2005 (survey I) some decrease of interest in OTC medicines was detected in the latter survey. However when we evaluate changes of interest towards drug information details between 1993 and 2005, interest was shown to increase for all details in the latter survey.

While information concerning dosage and administration details has been provided regularly (surveys I and II), safety issues of medicines (side effects and interactions) should be discussed more often. A similar problem has been stressed in other surveys (153, 154). Yet another survey carried out in Estonia revealed differences in theoretical understanding and practical behaviour of physicians and pharmacists in providing drug information to patients. The most remarkable variation was in intention and actual discussion of safety questions with the patient (75).

The deficiency in providing this type of information may be connected with different causes which can be characterised as pharmacist-based (insufficient professional knowledge and communication skills), pharmacy-based (unavailability for private communication, orientation to sale and not counselling of medicines), patient-based (insufficient knowledge concerning illnesses and medicines, poor communication skills, lack of trust in the pharmacist) and policy-based (unavailability of access to patients' health records to improve counselling quality) (16, 75, 106).

#### *Need for extended community pharmacy services*

Despite some dissatisfaction with access to and quality of treatment identified in the survey of chronically ill patients in Estonia (49), community pharmacies cannot currently be seen as institutions taking up responsibility for the monitoring of drug treatment of these patient groups. Differently from the other European countries, where a medication review of chronic patients is performed (7, 8, 113), participants in survey I did not favour the described extended services. One reason for this could be connected with pharmacy customers' lack of awareness of the availability of this type of services at the community pharmacy. During the Soviet period for example, drug dispensing rather than drug counselling was emphasised at community pharmacies (41–43).

Development of extended services requires several changes in community pharmacy practice, starting with resources for reorganising of job management and the practice environment, and educating pharmacists for providing of new services (155). All these listed factors could serve as barriers to developing extended community pharmacy services in Estonia. In both years of survey I (1993 and 2005), collaboration between community pharmacies and the rest of the health care system, regarded as backbone of extended services, was evaluated similarly: only 1/5 of survey participants in 1993 and 1/3 in 2005 described it as good. This means that due to insufficient contacts within the health care system, the development of extended services may face yet another obstacle.

In contrast to the presented results, survey IV showed more frequent contact between Estonian pharmacists and physicians than was evidenced in Norway and Sweden. However, this result may have been due to formal errors on prescriptions rather than pointing toward a greater involvement in patient care.

### 6.3. Main findings of community pharmacists' surveys

#### *The role of community pharmacists in safe use of medicines*

Public and professional interest towards drug safety issues has increased recently (76, 77). Evaluation of prescriptions before dispensing medicine has been identified and assessed as a core responsibility of pharmacists by different scientists of several countries (78–80). In survey IV the generic survey instrument was employed to evaluate handling of prescription errors at the community pharmacy in three different contexts (countries – Estonia, Norway and Sweden; prescription types and recording methods). Due to the methodology of the survey (observational survey) it is not possible to make a direct evaluation of the perception of community pharmacists towards provided services. However, positive attitudes of community pharmacists who participated in the mentioned survey and careful detection of prescription problems identified during the survey indicate high degree of recognition of the importance of this described service by community pharmacists. Moreover, comparison of the professional activity of Estonian and Nordic community pharmacists provides a favourable opportunity to evaluate performance of the basic roles of community pharmacists in the international context.

The survey instrument described in survey IV and used in all three countries was well adapted to record errors associated with different type of prescriptions and well-suited to record different types of prescription errors or omissions, as well as actions taken by the pharmacist and the respective outcomes. No difference was detected between the results recorded by independent observers and pharmacists themselves.

Prescription error rates were directly influenced by the type of prescription, being more frequent for handwritten prescriptions and less frequent for computerised physician order entry for prescriptions and electronic prescriptions. While the correlations mentioned in the previous sentence have been demonstrated by the results of other research (78, 80), then as distinct from previous international research clinically significant prescription errors were found for all three prescription types (156, 157).

These results suggest that with the introduction of electronic prescriptions the number of formal errors will decrease, but the incidence of problems posing a hazard to patients' lives have been modified, but not reduced (87, 88).

In comparison to the two other Nordic countries community pharmacists in Estonia contacted the drug prescriber more frequently. This could be due to lack of professional knowledge to solve the problem, but as the errors identified were mainly formal, the main reason might rather be differences in reporting prescription information to the drug reimbursement institution. In Estonia community pharmacies are responsible for forwarding such information to EHIF; therefore correction of prescriptions is entirely the responsibility of community pharmacists.

In addition survey IV revealed considerable inter- and intra-country variability in identification and recording rates of prescription errors, reported similarly

in previous surveys (79, 84, 97). The variation in the present survey may thus also reflect differences in the health care system, professional training, work routines and focus by the pharmacists in the three countries.

In survey IV, only a few cases of side effects, contraindications, or interactions with prescribed medicines were identified. Current results were not in line with other surveys, where the number of identified and described problems was higher (88, 158). Differently from Norway, pharmacists in Estonia and Sweden did not have access to electronic medical record of patients to identify possible interactions between medicines already in use and those prescribed. The experience of other countries, where pharmacists could access patients' electronic medical record of patients showed their increased independence in handling of prescription errors (74).

In more than half of the cases corrections of prescription errors presented by pharmacists to physicians were approved, and this was true in all three countries. However, in addition to the professional knowledge of pharmacist, which in some cases was sufficient to identify the problem, further contact with the physician was required to solve the questions that arose. Here the cooperation between pharmacists and physicians could stand to be more flexible to assure safe use of medicines.

#### *Community pharmacists and the performance of extended services*

In Estonia changes in the use of herbal products have been influenced by a transition in health care towards evidence-based medicine. Estonian community pharmacists have been faced with traditional and contemporary scientific approaches concerning herbal products already known in Asian countries (159). When discussing herbal products with pharmacy customers, the pharmacist has to consider more safety questions and possible interactions with regular medicines (160).

Despite the existence of a long tradition of use of local medicinal plants by people themselves in Estonia, community pharmacies have always been an important information source about different aspects of herbal products (160). According to survey III people do not come to the pharmacy only to purchase herbal products, but to seek for such advice as well. Survey II revealed increased public interest towards information about herbal products. This was interesting given the concurrent trends towards greater interest in evidence based medicine.

For community pharmacists who participated in the survey III, counselling on herbal products was common everyday practice. Over against the results of international research (117–120) their self-assessment of knowledge concerning herbal products was high, most likely because of the fact that Estonian pharmacists take a course on herbal medicines and herbal preparations during their studies at Tartu University.

Despite highly self-evaluated professional knowledge, more than half of the respondents in survey III reported some problems in counselling of patients concerning herbal products. Problems appeared due to insufficient professional knowledge (often described in the international surveys (117–120)), incorrect

patient information leaflets or wrong understanding of herbal products presented by pharmacy customers. One explanation for all three described problems could be lack of access or understanding of evidence-based information about herbal products.

The abovementioned argument could be supported by the results of survey III where more than half of the survey participants favoured continuing education courses and were interested in supplementing their knowledge about unknown medicinal plants and the safety aspects of herbal products.

To guarantee the continuous provision of quality counselling on herbal products in Estonia, it would be important to focus more on contemporary aspects of the information concerning these products. Nowadays, when herb-medicine interactions are discussed more often, focus in both under- and postgraduate levels of pharmacy studies should be directed to discussion of safety issues of herbal products (161).

## **6.4. Strengths and limitations of the research**

The multi-method approach provided a wide-ranging overview of the research topic. Conversely, when different community pharmacy services were studied using different methods, it was complicated to compare results from different research papers.

Regardless of the research methods used, it is always important to find out and consider the context of the survey. The research presented in the current thesis has considered Estonia as a country and a health care system in transition. To generalise the survey results it would be important to compare these with respective data from similar societies or systems. However, as has already been discussed, only scant information is available about developments in the community pharmacy sector of transition countries. This is the reason why in some cases examples from Nordic countries have been presented in comparison with Estonian data.

### *Survey research*

#### *– Sample size, response rate*

In the survey research surveys I and III, random selection of survey participants was used. In survey II, a convenient sample of pharmacy customers was used by approaching different pharmacy customers on different weekdays and at different times during the day. In survey II results from eight different regions of Estonia were presented. Survey III covered all of the regions of the Estonian mainland. In surveys I–III, the sample size was sufficient to perform quantitative analysis.

In survey research using mailings for collection of data, the response rate achieved is not always high (140). In survey III a response rate 78% was reached. In the survey undertaken in 1993, the response rate was 63%. However in the 2005 survey the response rate was lower (39%), but this was due to the



use of larger size of the sample; the number of respondents was similar to the previous survey conducted twelve years before. In the 2005 survey it was impossible to undertake the analysis of non-respondents, since due to data confidentiality legislation, the personal data of the respondents were delivered in printed form on single use labels. However, the respondents' characteristics were compared to the characteristics of Tartu's population.

Generalisability of results. The results of surveys II and III, where the sample was based on eight counties or the whole country of Estonia respectively can be regarded as representative of the perceptions of pharmacists and the public at large.

In survey I the data were collected only in the second largest town of Estonia, Tartu. Due to the stratified random sample, it was possible to extrapolate the results to the whole population of Tartu, but not to the entire population in Estonia. The results showing satisfaction with access to community pharmacy services in survey I may be overestimated due to the high number of community pharmacies in Tartu. Due to uneven distribution of community pharmacies elsewhere, access to medicines could be a problem in the rural areas of Estonia. However, data collected by other surveys undertaken in different regions of Estonia (64, 103) supported the results of survey I concerning the positive public image of community pharmacists and provided services.

Public surveys (surveys I and II) were carried out both outside and inside the pharmacy. Similar results received by means of both surveys suggest that the setting of the survey may not have direct influence on the public perception towards community pharmacies and community pharmacy services.

#### *– Validity of survey instrument*

Survey instruments of surveys I and III were discussed for content validity beforehand with researchers of the respective scientific fields; for survey II the face validity was performed on a convenient sample of the public.

In the development of the survey instrument for survey II, multiple choice questions were presented. The questions were worded in informal style to make it easier for the respondent to express his/her perceptions, expectations or attitudes. Surveys I and III were based on an international questionnaire and were adapted to the Estonian context in order to ensure the collection of all required data and to make it easier and understandable for the respondents to reply to the questions.

#### *Observational research*

##### *– Sample size and generalisability of results*

In survey IV inclusion criteria for participating pharmacies were not standardised for all three countries. While in Estonia the community pharmacies were selected according to location (nearby or at the same building with ambulatory clinic) and selection of prescription medicines, in Sweden large town community pharmacies and in Norway community pharmacies of different regions without detailed description were included to the survey. It would be

complicated to generalise the results of survey IV to all three countries, but it does give a sample of pattern and magnitude of different prescription errors in the respective countries.

The survey evaluated only prescription errors that required contact with the prescriber before dispensing. The choice could be explained by a desire to focus more on screening for essential problems than on technical errors.

– *Validity of survey instrument*

The survey instrument has not been validated according to international standards, because there was not any standard to follow. However, the coded items in the survey protocol were discussed with researchers prior to conducting the survey to avoid possible bias in classifying of errors and omissions identified on prescription. The activities of community pharmacists were recorded after a short period of activities to avoid re-call bias in the survey protocol.

## 7. CONCLUSIONS

The research presented in this thesis was the first systematic investigation into the professional role of community pharmacists in the Estonian health care system for the past 15–20 years. The research was based on both public and professional perceptions of services provided at community pharmacies. According to the specific aims of the research, the following conclusions can be made.

1. Community pharmacies are one important but under-recognised component of the primary health care system in Estonia.
2. The public perceived that the quality and accessibility of community pharmacy services improved between 1993 and 2005. Community pharmacies were described as contemporary health care institutions providing patient-centred community pharmacy services. Community pharmacists were perceived as valuable sources of drug information. They were perceived as primarily providers of traditional community pharmacy services, such as counselling on prescription and OTC medicines and the provision of advice for treatment of minor illnesses.
3. Estonian community pharmacists were perceived as trustworthy. They were also frequently consulted for advice about minor illnesses and OTC medicines. However, some pharmacy customers were not always satisfied with service provided at community pharmacies. Dissatisfaction may be attributed in part to pharmacists not providing sufficient drug information (for example, about side effects and drug interactions). In addition, pharmacy customers expected pharmacists to provide services more oriented to the needs of particular patients.
4. Similarly to pharmacists in the Nordic countries, Estonian community pharmacists identified and solved prescription errors as part of their everyday practice. This may have prevented prescription errors from turning into adverse drug events that may endanger patients' lives.
5. Estonian community pharmacists provide information about herbal products as part of their everyday professional practice. However, in some cases there was a lack of evidence-based information available to pharmacists to use as the basis for providing advice to pharmacy customers.
6. There was a varied but generally low public expectation to receive extended services at Estonian community pharmacies. Pharmacists were not expected to conduct monitoring of drug treatment. The low public expectation may be because pharmacy customers have a low awareness of new community pharmacy services being delivered in other countries, for example, medication review. This is despite the fact that new pharmacy services have the potential to improve the quality of drug treatment.

### *Recommendations and future directions*

In order to facilitate greater integration of community pharmacies into the health care system, and to guarantee the continuous development of community pharmacy services, the following measures should be taken.

1. *In pharmaceutical policy:* Community pharmacy services should receive greater recognition among pharmaceutical policy makers and governmental institutions in Estonia. Conducting joint workshops for community pharmacists and GPs may generate greater recognition of the professional role of pharmacists among the wider health care community. This may result in pharmaceutical policy changes.
2. *In pharmacy education:* Clinical pharmacy and pharmaceutical care should be further emphasised during undergraduate pharmacy studies and at continuing professional development courses. Additional funding should be allocated to organise and participate in international courses for pharmacists.
3. *In pharmacy practice research:* The research presented in this thesis should be supplemented by research conducted using different research methods, for example, qualitative methods and pseudo-customer surveys. Ongoing pharmacy practice research should be conducted to guide and inform the further development of community pharmacy services in Estonia. The development of social pharmacy as a discipline at the University of Tartu should assist new researchers to develop the skills necessary to conduct this research.
4. *For academicians, professional organisations and governmental institutions:* Professional practice standards should be developed and implemented in an attempt to create uniformly high levels of professional practice throughout the country. These professional practice standards are not yet available in Estonia.
5. *For academics, professional organisations and governmental institutions:* Due to the apparent lack of public demand for extended pharmacy services and the limited extra resources for educating community pharmacists, it may be challenging to introduce entirely new services (for example, medication adherence monitoring). In the short term, efforts should be made to capitalise on the public interest towards receiving traditional pharmacy services. Pharmacists could extend the services they already provide by implementing the principles of pharmaceutical care within their everyday practice.

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## APPENDIXES

**Appendix 1.** List of journals, where the articles included to the thesis have been published or submitted.

### **1. Research in Social and Administrative Pharmacy**

Peer reviewed quarterly scientific journal. Publishes original scientific reports and comprehensive review articles in the social and administrative pharmaceutical sciences. Topics of interest include outcomes evaluation of products, programs, or services; pharmacoepidemiology; medication adherence; direct-to-consumer advertising of prescription medications; disease state management; health systems reform; drug marketing; medication distribution systems such as e-prescribing; web-based pharmaceutical/medical services; drug commerce and re-importation; and health professions workforce issues. Indexed and Abstracted in PubMed/MEDLINE, Science Citation Index, and International Pharmaceutical Abstracts, Thomson Reuters.

### **2. Medicina (Kaunas)**

Peer reviewed monthly scientific journal of Lithuanian Medical Association, Kaunas University of Medicine and Vilnius University. Publishes original scientific articles, literature reviews, clinical case analyses and information for physicians of different specialties, other specialists of medicine and public health as well as to researchers. Indexed and abstracted in Thomson Reuters Science Citation Index Expanded (SciSearch®), Journal Citation Reports/Science Edition, MEDLINE, Index Copernicus and Directory of Open Access Journals (DOAJ).

### **3. Phytotherapy Research**

Peer reviewed monthly scientific journal. Publishes original research papers, short communications, reviews and letters on medicinal plant research. Key areas of interest are pharmacology, toxicology, and the clinical applications of herbs and natural products in medicine, from case histories to full clinical trials, including studies of herb-drug interactions and other aspects of the safety of herbal medicines. Impact factor 1.7. Indexed and abstracted in Journal Citation Reports/Science Edition (Thomson ISI), MEDLINE/PubMed (NLM), Natural Products Update (RSC), Neurosciences Abstracts (CSA/CIG), Science Citation Index Expanded™ (Thomson ISI), Science Citation Index® (Thomson ISI), SCOPUS (Elsevier).

### **4. The Annals of Pharmacotherapy**

Peer reviewed monthly scientific journal. Publishes research reports, reviews, commentaries, case reports, and other articles in pharmacotherapy. Impact factor 2.45. Indexed and abstracted in MEDLINE, PubMed, Current Contents, Index Medicus, Science Citation Index, EMBASE, and SIIC Data Bases.

## **5. Journal of Clinical Pharmacy and Therapeutics**

Peer reviewed bimonthly scientific journal. Publishes reviews (including systematic overviews and meta-analyses), original research and reports on rational therapeutics, safety, cost-effectiveness and clinical efficacy of medicines, drug interactions, formulation of medicines, pharmacogenetics, drug prescribing and clinical pharmacokinetics. Impact factor 1.67. Indexed and abstracted in Abstracts in Current Contents® (Thomson ISI), Current Contents®/Clinical Medicine (Thomson ISI), EMBASE/Excerpta Medica (Elsevier), Index Medicus/MEDLINE (NLM), International Pharmaceutical Abstracts (Thomson Scientific), MEDLINE/PubMed (NLM), Science Citation Index® (Thomson ISI), SCOPUS (Elsevier).

**Appendix 2.** Some indicators of community pharmacy sector in post-socialist countries.

Country	Ownership of community pharmacies	Number of community pharmacies	Geographic and demographic restrictions to opening of new pharmacies	Nomenclature of pharmacy goods	Main services
Estonia (24)	Not limited to pharmacy profession (1996). Mostly privately owned. Pharmacy manager should be pharmacist. Pharmacy chains allowed. Internet and mail-order pharmacies not allowed.	In 2006 – 524 (main and branch pharmacies). 3200 inhabitants per pharmacy.	Both restrictions exist (2006).	Pharmacies have monopoly over the sale of medicines. Prescription and non-prescription medicines, food supplements, natural products, pharmacy cosmetics.	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication.
Latvia (57)	Limited to pharmacy profession for new pharmacies (2010). Mostly privately owned. Pharmacy chains allowed. Internet and mail-order pharmacies not allowed.	In 2007 – 899 (main and branch pharmacies). 3800 inhabitants per pharmacy.	Both restrictions exist. Year?	Pharmacies have monopoly over the sale of medicines. Prescription and non-prescription medicines, food supplements, natural products, pharmacy cosmetics.	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication, development of pharmaceutical care services
Lithuania (58)	Not limited to pharmacy profession. Mostly privately owned. Pharmacy manager should be pharmacist. Pharmacy chains allowed. Internet and mail-order pharmacies not allowed.	In 2008 – 1561 (main and branch pharmacies). 2200 inhabitants per pharmacy.	No restrictions (2002).	In general pharmacies have monopoly over the sale of medicines. As an exception, health care centres in rural areas can dispense medicines. Prescription and non-prescription medicines and other goods according to the list of Ministry of Health	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication.



Country	Ownership of community pharmacies	Number of community pharmacies	Geographic and demographic restrictions to opening of new pharmacies	Nomenclature of pharmacy goods	Main services
Poland (59)	Not limited to pharmacy profession. Mostly privately owned. Pharmacy manager should be pharmacist. Pharmacy chains allowed. Internet pharmacies allowed for OTC-medicines. Mail-order pharmacies not allowed.	In 2006 – 12,800 3250 inhabitants per pharmacy.	No restrictions.	Pharmacies have monopoly over the sale of prescription medicines. Non-prescription medicines are distributed in supermarkets and via Internet. Prescription and non-prescription medicines, food supplements, natural products, pharmacy cosmetics.	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication. Delivery of medicines.
Slovakia (60)	Not limited to pharmacy profession (2004). Mostly privately owned. Pharmacy manager should be pharmacist. Pharmacy chains allowed. Internet and mail-order pharmacies not allowed.	In 2006 – 1,523 (main and branch pharmacies). 3540 inhabitants per pharmacy.	No restrictions	Pharmacies have monopoly over the sale of medicines. Prescription and non-prescription medicines, food supplements, natural products, pharmacy cosmetics.	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication.
Hungary (61)	Pharmacist should own more than 50% of pharmacy, the minority ownership is not limited by pharmacy profession (2001). Informal pharmacy chains exist. Internet pharmacies not allowed. Mail-order pharmacies allowed (2005).	In 2006 – 2,654 (main and branch pharmacies). 2300 inhabitants per pharmacy.	Both restrictions exist (1994).	In general pharmacies have monopoly over the sale of medicines. Besides, self-dispensing doctors exist in rural areas. Prescription and non-prescription medicines, food supplements, natural products, pharmacy cosmetics.	Dispensing and counselling on prescription and non-prescription medicines, preparation of medicines, counselling on self-medication.

**Appendix 3.** International surveys on prescription errors identified and corrected in community pharmacy.

Survey	Method and survey sample, (year)	Main outcomes
<b>ESTONIA</b> Sarv A, (2008) (81)	Observational survey, validated form for describing interventions. Community pharmacy in Tallinn (2006).	12% of prescriptions were modified, 2.1 problems per one modified prescription. Most frequent (86%) were formal errors (missing information at the prescription concerning patient or prescriber). Problems were solved mainly in discussions with patient and were always approved by prescriber.
<b>THE NETHERLANDS AND BELGIUM</b> Buurma H, et al., (2001) (82) Leemans L, et al., (2003) (74)	Prospective case-control survey Dutch community pharmacies (n=141) (1999). Self-recording of validated form. Flemish community pharmacists (n=124) (2000).	4.9% of prescriptions were modified. Most frequent were formal errors (78%) followed by errors with clinical hazard (22%). 4.1% of prescriptions were modified. Most frequent were formal errors (average 20.2 errors solved per pharmacy) followed by clinical interventions (8.4 per pharmacy). Problems were mostly solved using patient medication record.
Leufkens HGM, et al., (2001) (83)	Self-recording of prescription interventions by pharmacists in Zeeland region community pharmacies (n=23) (1998).	One prescription out of ten required modification. New prescription and complexity of drug treatment were stressed as more frequent reasons for appearance of prescription errors.
<b>UNITED STATES</b> Rupp MT, (1992) (84)	Self-reported recording of interventions. Community pharmacists (n=89) of five states.	1.9% of prescriptions were modified. 28% of identified prescription problems could have clinical hazard to the patient.
Warholak TL, et al., (2009) (85)	Non-experimental, cross-sectional survey. Community pharmacies (n=122) dispensing e-prescriptions in five states (2006).	Modification was necessary for 4.1% of new and 2.2% of repeat e-prescriptions. More frequent reasons for interventions were omitted information concerning directions for use (32%) or dosing errors (18%). In 64% of the cases prescriber was contacted and 56% the prescriptions was changed.

Survey	Method and survey sample, (year)	Main outcomes
<b>UNITED STATES</b> Kennedy AG, et al., (2004) (86)	Self-reported prescription interventions by dictation method and completing of intervention form.	For reporting of prescription errors completing of intervention form was preferred to dictation method.
<b>SWEDEN</b> Ekedahl A., (2010) (87)	Observational survey, validated for describing interventions. Community pharmacies in the central and northern region of Sweden (n=14) (2007–2008).	Only prescriptions required contact with physician were evaluated. 1% of these prescriptions required modification by pharmacist. 60% of problems were with clinical hazard to the patient. Suggestions presented by pharmacist were mainly accepted by prescriber.
Astrand B, et al., (2009) (88)	Observational survey, mail-order pharmacies in Sweden (n=3) (2006).	Due to dosage and direction for use clarification contact with prescriber was necessary for 2% of e-prescriptions and 1% of non-electronic prescriptions. In 90% of the cases the pharmacists' suggestions were accepted.
<b>NORWAY</b> Mandt I, et al., (2010) (89)	Focus-group interview of community pharmacists of urban and rural areas of Norway (n=14).	Working environment, technology, management and professional skills may all contribute to variations in pharmacists' prescription intervention practices in and between community pharmacies.
Haavik S, et al., (2010) (90)	Self-recording of validated form. Community pharmacies (n=10) and public hospital pharmacies (n=2) (2004 and 2006).	2.6% of prescriptions were modified. Omissions and errors were more frequent on prescriptions of hospital physicians than general practitioners. 1/4 of the problems had potential impact to drug therapy.

**Appendix 4.** Surveys undertaken in Estonia to evaluate quality of counselling of self-medication and OTC medicines.

Survey	Method and survey sample, (year)	Main outcomes
Volmer D, et al., (2005) (105).	Discourse analysis of video-vignette survey of pharmacy students at the University of Tartu (n=12) and at the Abo Akademi University (n=18) (2003).	The students assessed the customers in the same way in Estonia and in Finland, no influence of cultural differences was detected to patient counselling. However, characteristics of the customers was different, being more patient related in Finland and neutral in Estonia and could be explained by differences in pharmacy education. Estonian students tended to assume customers wanted full information concerning OTC medicines. Students of both countries recommended similar medicines.
Volmer D, et al., (2007) (106).	Self-completed questionnaire by pharmacy customers of South-Estonia (n=313) (2006).	Pharmacy customers regarded drug information as important and preferred professional information sources (GP, pharmacist). However, the knowledge of survey participants concerning OTC medicines was poor and the information provided by pharmacist one-sided (mainly dealing with administration details of the medicine). Interest of pharmacy customers towards side effects and contraindications of medicines is higher than this information provided in reality by pharmacists.
Volmer D, et al., (2007) (107).	Pseudo-customer survey (problem with dry cough) undertaken at community pharmacies in capital city of Estonia Tallinn (n=90) (2006).	General communication was considered as medium level – 10.77 (0–20) and professional counselling less than medium level – 8.90. In general communication the frequent shortcoming was in providing to the customer chance to turn back to the pharmacy in case of possible problems in use of medicines. In professional counselling description of the symptoms and side effects were less frequently discussed with customers.

Survey	Method and survey sample, (year)	Main outcomes
Dubova M, et al., (2008) (108).	Pseudo-customer survey (stomach complaints) undertaken at community pharmacies in capital city of Estonia Tallinn (n=30) (2007).	Similarly to the previous survey the pseudo-customers were more satisfied with general communication than professional counselling. There was identified correlation between the activity of the customer in asking questions and the quantity of information provided by pharmacist. With less talkative customers pharmacists did not discuss symptoms nor possible side effects of medicines. There was no statistical difference in counselling of male or female customer. However, women tended to be more active in asking questions and for this reason pharmacists communicated with them more often than with men.
Samm T, et al., (2008) (109).	Self-completed questionnaire by community pharmacists in Tartu (n=74) (2006).	In counselling of OTC medicines professional knowledge and positive customer feedback of the customers were regarded as the most important factors. Commercial interests were less emphasised. Insufficient theoretical knowledge and practical skills, misleading knowledge of pharmacy customers and problems in job management at pharmacy were regarded as most frequent problems in counselling of OTC medicines.
Volmer D, et al., (2009) (75).	Self-completed questionnaire by community pharmacists (n=188), general practitioners (n=166) and pharmacy customers (n=475) of South-Estonia (2005–2006).	Slightly fewer pharmacy customers (71%) than pharmacists (81%) and GPs (79%) considered drug information very important to the patient. Self-assessed knowledge of medicines was higher among GPs than pharmacists. During contact with the patient pharmacists spent on average 2.5 and GPs 2.3 minutes on drug counselling. Pharmacy customers preferred to receive drug information from personal professional sources rather than impersonally, for example, from PIL's, advertisements. According to the pharmacy customers GPs and pharmacists underestimated the interest of patients in the mode of action and overestimated patients' concern over dosage and price. Despite GPs and pharmacists considering drug information important, in practice they did not provide all the necessary details.

## Appendix 5. Surveys evaluating patient satisfactions with community pharmacy services.

Survey	Method and survey sample, (year)	Main outcomes
<b>ESTONIA</b> Tammaru TM, et al., (2003) (64)	On-the-spot questionnaire to the convenience sample of pharmacy customers in South-Estonia (n=87) (2001).	90% of respondents were satisfied with general <sup>a</sup> services and 83% with intervention <sup>b</sup> services.
Villako P, et al., (2007) (103)	On-the-spot questionnaire to the convenience sample of pharmacy customers in Estonia (n=1979) (2003).	Only general <sup>a</sup> services were evaluated. Wide selection of medicines (60%), professional help in selecting right medicine (37%) and professional consultation by pharmacist were described more often and could be seen as factors influencing patient satisfaction with community pharmacy services.
Raal A., et al., (2009) (135)	On-the-spot questionnaire to the convenience sample of pharmacy customers in Tallinn (n=1820) (2005–2006).	General <sup>a</sup> and intervention <sup>b</sup> services were evaluated. Approximately 60% of respondents were satisfied with general services, 67% with counselling of prescription and 74% with counselling of OTC medicines.
<b>FINLAND</b> Airaksinen M, et al., (1995) (136)	Postal questionnaire to the target population in Finland (n=856) (1988).	Only general <sup>a</sup> services were evaluated. Finns were very satisfied with services provided at the pharmacy. Problems emphasised were long waiting time (56%), lack of privacy (53%) and insufficient time to discuss the problems with pharmacist (33%).
Kansanaho H, et al., (2002) (137)	Telephone survey of randomly selected general population (n=200) (1996).	General <sup>a</sup> and intervention <sup>b</sup> services were evaluated. Of survey participants 31% described improvement in their medical behaviour after counselling at pharmacy. Pharmacists tended to be more active in counselling on prescription medicines.
<b>ICELAND</b> Morgall Traulsen J, et al., (2002) (127)	Focus group interview with participants from urban (3 groups) and rural area (4 groups) (1997).	Mainly general aspects of services were discussed (the role of pharmacist in health care focused on providing drug information). The pharmacist was not regarded as a specialist with considerable influence or authority in health care. In addition criticism was made with regard to the dispensing of medicines and quality of information given.

Survey	Method and survey sample, (year)	Main outcomes
<b>THE NETHERLANDS</b> Simoens S, et al., (2009) (91)	Postal questionnaire to random sample of Flemish pharmacy customers purchasing OTC medicines (n=358) (2008).	Intervention <sup>b</sup> services were evaluated. More than 75% of survey participants were satisfied with information provided by pharmacist towards health condition and use of OTC medicines.
<b>THE NETHERLANDS</b> Pronk MCM, et al., (2003) (68)	Convenience sample of general population questionnaires distributed at Dutch community pharmacies (n=28) before (n=6341) and after (n=5199) test and 12 month after intervention (n=2034) (1999–2001).	General <sup>a</sup> services were evaluated and survey participants were satisfied with waiting time, helpfulness of the pharmacist and different aspects of providing drug information. The problems were lack of privacy (17%), long waiting time (9%) and busy pharmacy staff (7%).
<b>UNITED KINGDOM</b> Tinelli M, et al., (2009) (69)	Cross-sectional survey with self-completed questionnaire of the patient waiting for doctor's appointment (n=224).	Extended service <sup>c</sup> was evaluated and traditional drug dispensing role of pharmacist was compared with extended role of pharmacist as drug prescriber and dispenser. Survey participants preferred their current services, however younger respondents were more keen towards combined service.
<b>SPAIN</b> Gastelluritia MA, et al., (2006) (129)	On-the-spot questionnaire to the convenience sample of pharmacy customers in San Sebastian Spain (n=61) (2004).	General <sup>a</sup> services were evaluated and overall satisfaction with pharmacy services was high. The most frequently described factors for satisfaction were medicine available at pharmacy, counselling towards self-treatment and use of medicines.
<b>PORTUGAL</b> Cavaco AM, et al., (2005) (130)	Semi-structured interview among public of Lisbon area (n=15) and rural area (n=10) (2001).	General <sup>a</sup> services were evaluated. Low expectations level towards community pharmacy services, including extended services was determined.

<sup>a</sup> General services – pharmacy location, organisation of service at pharmacy, attitudes of pharmacy staff towards communication and counselling of patients.

<sup>b</sup> Intervention services – description of particular services (for example counselling of prescription or OTC medicines, self-treatment).

<sup>c</sup> Extended services – advanced, specialised, pharmaceutical care or disease management services.

## **SUMMARY IN ESTONIAN**

### **Jaemüügiapteekide areng Eestis – avalik ja erialane arvamus 1993–2006**

#### **Sissejuhatus**

Viimase kahekümne aasta jooksul on Eesti tervishoiusüsteemis toimunud märkimisväärsed muutused – tsentraalselt juhitud ning riiklikult finantseeritud tervishoiukorraldus pidi ümber orienteeruma turumajandusele. 1990-l käivitati uus tervishoiukulude hüvitamise süsteem ja hakati arendama esmatasandi tervishoiusüsteemi (22).

Muutused Eesti farmaatsiasüsteemis algasid erialaseadusandluse väljatöötamise, seadusandlike institutsioonide loomise ja uue ravimihindade kompenseerimise süsteemi käivitamisega (23). Jaemüügiapteegid erastati ning alates 1996 a. võib lisaks proviisorile apteegi omanikuks olla ka farmaatsia-alast kõrgharidust mitteomav inimene (24, 25). Sarnaselt teistele post-sotsialistlikele riikidele (26) muutis Eesti apteegisüsteemi liberaliseerimine apteekide avalikku kuvandit pigem äri- kui tervishoiuasutuse suunas.

Eesti astumisega Euroopa Liitu (EL) oli vajalik kohandada rahvuslik farmaatsiaseadusandlus EL vastava seadusandlusega, k.a. Euroopa Komisjoni rahvatervist ning ühisturgu puudutavad otsused. Kuna EL seadused reguleerivad peamiselt ravimite kvaliteedi, tõhususe ja ohutuse nõudeid, tuli jaemüügiapteekide puudutav seadusandlus kaasajastada riiklikul tasandil (27).

Sama-aegselt üleminekuperioodiga Eesti tervishoiusüsteemis toimusid märkimisväärsed muutused ka farmaatsiaerialal – ravimile orienteeritud käsitlus asendus patsiendikeskse lähenemisega (28, 29). Ravimite valmistamine apteekides vähenes ning valmisravimite alane nõustamine suurenes. Võrreldes nõukogude perioodiga muutus ravimite valik tunduvalt mitmekesisemaks. Nii patsiendid kui arstid vajasisid nõustamist, et leida sobivaim ravimpreparaat.

Täna Eestis kehtiva farmaatsiaseadusandluse kohaselt on reguleeritud nõuded apteegiruumidele, seal töötavatele inimestele ja apteegis müüdavatele kaupadele (ravimid), kuid puuduvad eeskirjad apteegiteenuse kvaliteedi tagamiseks ja arendamiseks. Erialaorganisatsioonide poolt teostatud üksikud katsed apteegiteenuse kvaliteedi parandamiseks ei ole olnud piisavad, et juurutada uuendusi igapäevapraktikasse. Samuti ei ole Eesti proviisoritel olnud piisavalt võimalusi osalemiseks rahvusvahelistes projektides, mille eesmärgiks on olnud apteegiteenuse arendamine (30–32).

Senine teave apteegi osa kohta post-sotsialistlikus tervishoiusüsteemis on minimaalne. Samuti on informatsiooni ebapiisavalt post-sotsialistlike riikide apteekides osutatavate teenuste kohta ja seda nii ühiskondlikust kui ka erialaspetsialistide vaatevinklist lähtuvalt (26, 33–34). Samas on tervishoiusüsteemis, kus pannakes rõhku just esmatasandimeditsiinile, väga oluline proviisori patsientide medikamentoosset ravi nõustav ja jälgiv roll.



Käesolev doktoriväitekirj selgitas apteegiteenuse arengut aastatel 1993–2006, kasutades nii avalikku kui ka erialaspetsialistide (proviisorite) arvamust. Avalik arvamus oli aluseks apteekide ühiskondliku kuvandi ja apteegis toimuva käsimüügiravimite- ning iseravimisealase nõustamise hindamisel. Proviisorite arvamust vaadeldi apteegis osutatavate lisateenuste ja apteegis toimuva ravimihutuse tagamise selgitamiseks.

## **Töö eesmärgid**

Käesoleva doktoriväitekirja eesmärgiks oli määrata ja hinnata jaemüügiapteekide ja seal töötavate proviisorite osa Eesti esmatasandi tervishoiusüsteemis ning pakkuda soovitusi edaspidiseks arenguks.

Doktoriväitekirja konkreetset eesmärgid olid järgmised:

1. hinnata muutusi apteegikülastajate rahulolus apteegis pakutavate teenuste osas aastatel 1993–2005;
2. selgitada apteegikülastajate teadlikkust käsimüügiravimite ning iseravimise osas ja hinnata nende kogemusi ja ootusi seoses eelpoolnimetatud valdkondade nõustamisega apteegis;
3. hinnata ja võrrelda Eesti ja Põhjamaade apteekides avastatud retseptivigade põhjusi ja esinemissagedust ning vaadelda nimetatud riikide proviisorite erialast tegevust identifitseeritud retseptivigade lahendamisel;
4. selgitada Eesti proviisorite arvamusi apteegis pakutavate lisateenuste osas taimsete preparaate näite põhjal.

## **Uuritavad ja kasutatud meetodid**

Apteegis pakutavate teenuste kvaliteedi süstemaatiliseks hindamiseks kasutati erinevaid meetodeid. Küsitlusuuringuga selgitati tavainimeste rahulolu apteegiteenustega üldiselt, keskendudes täpsemalt käsimüügiravimite- ja iseravimisealasele nõustamisele ning proviisorite arvamusi taimsete preparaatide nõustamisest jaemüügiapteegis. Vaatlusuuringut kasutati proviisorite erialase tegevuse selgitamiseks retseptivigade avastamisel ja lahendamisel. Ülevaateartiklis kirjeldati üleminekuperioodi Eesti tervishoiusüsteemis ja farmaatsiasektoris, andes täpsema selgituse apteegiteenustest, farmaatsiaharidusest ja farmaatsiaeriala arengust Eestis.

Uuring I teostati postiküsitlusena ning uuringu valimi moodustasid stratifitseeritud juhuvalimi alusel 20–69 aastased Tartu linna elanikud. 1993 a. postitati küsimustik 711 ja 2005 a. 990 Tartu elanikule ning täidetult saadi tagasi 448 (63%) küsimustikku 1993 a. ja 386 (39%) 2005 a. Uuringu instrumendina kasutatud küsimustiku algvariant pärines Soome Ravimiametist. Nii 1993 a. kui ka 2005 a. kohandati küsimustikku vastavalt Eesti oludele. 1993 a. kasutatud küsimustik sisaldas 40 ja 2005 a. kasutatud küsimustik 21 küsimust.

Uuringus II küsitleti apteegikülastajaid 31 jaemüügiapteegis ja patsiente ühes perearstikeskuses kaheksas erinevas Eesti maakonnas 2003 a. Küsimustikud jaotati järgmiselt: 436 suurtes linnades, 300 väikestes linnades ning 150 maal. Apteekides kutsuti uuringus osalema kõiki apteegikülastajaid, kes käisid uuringuperioodil apteegis. Neil oli võimalus täita küsimustik kohapeal või tagastada see nädala jooksul. Kaheksasaja kaheksakümne kuuest küsimustikust saadi tagasi 727 ehk 82%. Uuringu instrumendina kasutati eelnevalt Eestis väljatöötatud küsimustikku (64), mida vastavalt käesoleva uuringu eesmärkidele täiendati. Küsimustik sisaldas 20 valikvastustega küsimust.

Uuringus III postitati küsimustik juhuvaliku teel leitud pooltele 2005 a. tegevusluba omanud apteekidele Eestis (n=154), täidetult tagastati 120 küsimustikku, vastanute protsent oli 78. Iga uuringus osalenud apteek sai ühe küsimustiku palvega, et selle peaks täitma proviisor või farmatseut, kes tegeleb igapäevaselt taimsete preparaatide nõustamisega. Uuringu instrumendi väljatöötamisel lähtuti USA-s kasutatud küsimustikust (150), mida kohandati vastavalt Eesti oludele.

Uuringus IV teostati proviisorite retseptivigade avastamise ja lahendamise alast tegevust hindav vaatlusuuring neljas Eesti jaemüügiapteegis 2006 a. Kõigis apteekides teostas vaatluse sõltumatu uurija, fikseerides proviisori tegevuse retseptivea avastamise ja lahendamise osas iga probleemi kohta eraldi. Retseptivigade fikseerimiseks kasutati uuringu protokoll, mis oli algselt välja töötatud USA-s ja kohandatud Põhjamaades kasutamiseks (86, 148). Enne uuringu teostamist Eestis teostati lisaks veel uuringu protokoll vastavusse viimine Eesti oludega. Eesti uuringu andmeid võrreldi Norra ja Rootsi analoogsete uuringute tulemustega.

Uuringus V kasutati ülevaateartikli kirjutamiseks informatsiooni kolmest erinevast allikast: Eesti tervishoiu muutusi ja arengut kirjeldavad uuringud, Eesti farmaatsiapraktikat käsitlevad uuringud ja teave erialaorganisatsioonidelt (Eesti Apteekrite Liit, Eesti Akadeemiline Farmaatsia Selts) ning riiklikelt institutsioonidelt (EV Sotsiaalministeerium, Ravimiamet, Tartu Ülikooli farmaatsia instituut). Publitseeritud inglisekeelsete artiklite (1992–2009) otsimiseks kasutati andmebaase *PubMed*, *Medline*, *EMBASE* ja *Science Direct*. Farmaatsiapraktikat puudutavatele küsimustele vastuste leidmiseks teostati uuring Eestis ilmuvates eriaala-ajakirjades Eesti Rohuteadlane, Apteeker, Perearst ja Eesti Arst.

Uuringuandmete statistiliseks analüüsiks kasutati programmi SPSS (*Statistical Package for the Social Sciences* (v. 11,0, Chicago, IL).

## **Tulemused**

### ***Tavainimeste hulgas teostatud uuringud***

#### ***Uuring I Tartu elanike rahulolu apteegiteenusega 1993–2005***

Võrreldes 1993 a. oli apteegiteenus 2005 a. muutunud paremini kättesaadavaks ning patsiendikeskemaks, apteeke kirjeldati kui kaasaegse sisseseadega tervishoiuasutusi. Apteegikülastajad tundsid enam huvi ravimiinfo erinevate

aspektide vastu. Usaldus proviisori, kui olulise ravimiinfo allika vastu oli kaheistkümnelt uuringuaasta jooksul säilinud muutumatuna. Tartu elanikud ootasid apteegist pigem traditsioonilist teenust (retsepti- ja käsümüügiravimite ning iseravimise nõustamine) ning ei pööranud olulist tähelepanu lisateenustele. Muijal maailmas levinud krooniliste haigete medikamentoosse ravi tulemuslikkuse jälgimist Eesti proviisorite poolt oskasid soovida vähesed uuringus osalenud. Ravimite müümist väljaspool apteeki ei pooldanud veidi alla poole küsitletutest. Hoolimata positiivsetest muutustest leidsid uuringus osalejad, et tulevikus peaksid proviisorid arendama oma suhtlemisioskust patsiendiga, samuti olema mitmekülgsemad ravimiinformatsiooni edastamisel ning pakkuma konkreetse patsiendi keskset nõustamist.

#### *Uuring II Eesti apteegikülastajate teadlikkus kergematest haigustest ja käsümüügiravimitest*

Tavainimeste teadlikkus kergemate haiguste ja käsümüügiravimite osas erines märgatavalt. Kui esimesel juhul hindasid oma teadlikkust piisavaks veidi enam kui pooled vastanutest, siis teisel juhul oli pea võrdselt kolmandik neid, kes pidasid endid piisavalt teadlikeks, kui ka neid, kes käsümüügiravimitest ei teadnud või ei soovinudki teada. Eesti elanikud suhtusid kergemate haiguste ravimisse vastutustundlikult, kasutades enamasti kas koduseid raviviise või käsümüügiravimeid. Kui pooled vastanutest olid apteegist saanud nõustamisega käsümüügiravimite ja iseravimise osas alati rahul, siis teine pool küsitletutest sai soovitud teenindamise osaliseks mitte igal külastuskorral. Uuringus osalejad huvitusid kõigest ravimiinfo aspektidest. Käsümüügiravimite osas peeti olulisteks infoallikateks nii proviisorit kui ka perearsti.

#### ***Proviisorite hulgas teostatud uuringud***

##### *Uuring III Eesti proviisorite enesehinnang oma pädevusele taimsete preparaatide osas – tulemused ülemineküühiiskonna tervishoiusüsteemist*

Apteeki külastati nii taimsete preparaatide kohta info saamiseks kui ka nende ostmiseks. Uuringus osalenud proviisorite ja farmatseutide arvates oli peamiseks taimsete preparaatide ostmise põhjuseks nende ohutus, aga ka vastavad reklaamid ja apteegist saadud soovitus. Uuringus osalenute enesehinnang oma erialastele teadmiste taimsete preparaatide alaseks nõustamiseks oli märkimisväärselt kõrge. Samas tunnistas vaid kolmandik vastajatest, et neil ei ole esinenud probleeme taimsete preparaatide alase nõustamisega. Vajakajäämist peamiste põhjustena märgiti ebapiisavaid erialaseid teadmisi, ebakorrektset teavet taimse preparaadi pakendil ja apteegikülastaja vähest teadlikkust nimetatud valdkonnas.

##### *Uuring IV Ühtse uuringuprotokolli kasutamine retseptivigade hindamisel Eestis, Norras ja Rootsis*

Uuringus vaadeldi apteegis avastatud retseptivigade sisu ja esinemissagedust Eestis, Norras ja Rootsis. Identifitseeritavad probleemid jagati kolme gruppi: formaalsed või tehnilised vead, patsiendi tervist ohustavad vead ning ravimi

kättesaadavusega seotud probleemid. Uuringus analüüsiti ainult neid retsepte, kus retseptivea selgitamiseks ja selle lahendamiseks oli vajalik kontakteeruda ravimi ordineerijaga. Kõigis kolmes riigis kasutatud uuringuprotokoll sobis erinevat tüüpi retseptidel (käsitsi kirjutatud, trükitud ja elektroonilised) olevate vigade hindamiseks. Samuti võimaldas kasutatud uuringuprotokoll leida nii formaalseid vigu kui ka kliiniliselt olulisi retseptivigu. Enim leiti formaalseid retseptivigu Eestis, mida võib otseselt seostada suure käsitsikirjutatud retseptide osakaaluga. Samas oli aga vale ravimit või vale näidustusega ravimit sagedamini ordineeritud Rootsis, kus esmatasandi meditsiinis on valdavalt kasutusel elektroonilised retseptid. Puudulik teave ravimi manustamise ja kasutamise kohta esines sagedamini Norra ja Rootsi ravimiretseptidel ning ravimi tugevuse ja ravimvormiga oli kõige enam eksitud Eestis.

### ***Ülevaateartikkel***

*Uuring V Farmatseutiline hool Eesti jaemüügiapteegis – praktika ja teadusuuringud*

Ülevaateartiklis on kirjeldatud muutusi nii Eesti tervishoiusüsteemis kui ka farmaatsiasektoris. Eesti apteegid pakuvad järgmisi teenuseid: retsepti- ja käsimüügiravimite alane nõustamine, ravimite geneeriline asendamine, ravimite valmistamine, iseravimise ja taimsete preparaatide alane nõustamine. Lisateenuste osas apteegikülastajad suurt huvi üles ei näidanud. Hoolimata apteegiteenuste muutumisest patsiendikeskemaks ning proviisorite suurenenud aktiivsusest patsientide nõustamisel vajaksid senisest enam tähelepanu teatud ravimiinfo osad nagu näiteks ravimite koos- ja kõrvaltoimed. Apteegiteenus peaks olema senisest enam integreeritud üldisse tervishoiusüsteemi. Tihedam koostöö arstide jt. tervishoiutöötajatega tagaks patsientidele senisest tõhusama ravi.

Ülevaateartiklis kirjeldatakse samuti farmaatsiahariduse võimalusi Eestis ning vaadeldakse erialaorganisatsioonide tegevust.

## **Järeldused**

Doktoriväitekirjas kajastatud uuringud annavad esmakordselt süstemaatilise ülevaate jaemüügiapteekide ja proviisorite osast Eesti tervishoiusüsteemis ning apteegiteenuste arengust viimase 15–20 aasta jooksul. Kirjeldatud tulemused baseeruvad nii avalikul kui ka erialasel arvamusel apteegis pakutavate teenuste kohta. Lähtuvalt väitekirjas seatud konkreetsetest eesmärkidest on võimalik teha järgmised järeldused.

1. Jaemüügiapteegid on oluline kuid alahinnatud osa tervishoiusüsteemist.
2. Perioodil 1993–2005 paranes nii apteegiteenuse kättesaadavus kui ka kvaliteet. Apteekide kirjeldati kui kaasaegseid tervishoiuasutusi, kus pakuti patsiendikeskset ravimitealast nõustamist. Eesti apteekides pakuti enamasti traditsioonilisi apteegiteenuseid nagu retsepti- ja käsimüügiravimite alane nõustamine ning iseravimise nõustamine kergemate haiguste korral.

3. Eesti jaemüügiapteekides töötavaid proviisoreid peeti usaldusväärseks teabeallikaks ravimite ja kergemate haiguste nõustamise osas. Siiski ei olnud kõik apteegikülastajad alati rahul apteegis pakutud teenuse kvaliteediga. Rahulolematus võis olla osaliselt seotud apteegist saadud ebapiisava ravimiinformatsiooniga (näiteks ravimi koos- ja kõrvaltoimete kohta). Lisaks ootasid apteegikülastajad tulevikus senisest enam konkreetsele patsiendile suunatud teenust.
4. Sarnaselt oma Põhjamaade kolleegidega avastasid ja lahendasid Eesti proviisorid oma igapäevatöös ravimireseptidega seotud probleeme ja takistasid sellega ravimi ebasoovitavate ja patsiendi elu ohustavate toimete ilmumist.
5. Taimsete preparaatide nõustamine on Eesti proviisorite igapäevatöö osa. Siiski võib tõendus põhise informatsiooni puudumine mõnikord takistada patsiendile piisava teabe pakkumist nimetatud preparaatide osas.
6. Avalikkuse ootused apteegis pakutavate lisateenuste osas olid erinevad, kuid üldiselt siiski mitte eriti kõrged. Vähe osati soovida ravimite korrektse kasutamise ja ravi tõhususe jälgimist proviisori poolt. Eelneva kogemuse puudumise tõttu ei näe Eesti patsiendid apteeki kohana, kus võiks toimuda patsientide ravimite kasutamise jälgimine, mis omakorda parandaks oluliselt medikamentoosse ravi kvaliteeti.

## Tulevikusuunad

Jaemüügiapteekide tõhusamaks integreerimiseks tervishoiusüsteemi ja apteegiteenuste jätkuva arengu tagamiseks tuleb arvestada järgnevaga.

1. *Ravimipoliitika*: ravimipoliitikaga tegelejad ning riiklikud institutsioonid peavad senisest enam tunnustama apteegiteenuse olulisust esmasandi tervishoiusüsteemis. Proviisorite erialaste teadmiste tutvustamiseks teistele tervishoiuspetsialistidele tuleb korraldada ühisüritusi ja töötubasid.
2. *Farmaatsiahariduses*: tulevaste proviisorite erialaste teadmiste suurendamiseks ja kaasajastamiseks tuleb tõhustada kliinilise farmaatsia ja farmatseutilise hoole õpet, taotleda lisafinantseeringuid rahvusvaheliste kursuste korraldamiseks nimetatud valdkonnas, parandada täiendkoolituse võimalusi.
3. *Teadustöös farmaatsiapraktika valdkonnas*: tuleb kasutada erinevaid uuringumeetodeid (näit. kvalitatiivsed meetodid, pseudo-kliendi uuringud) ja uuringuteemasid, et selgitada toimunud muutusi ja vajadusi vastava valdkonna edaspidiseks arenguks tulevikus. Sotsiaalfarmaatsia edasine arendamine ja jätkusuutlikkuse tagamine Tartu Ülikoolis peab olema kindlasti seotud uute spetsialistide kaasamisega vastava valdkonna õppe-ja teadustöösse.
4. *Õppeasutuste, erialaorganisatsioonide ja riiklike institutsioonide tegevuses*: apteegiteenuste kvaliteedi ühtlustamiseks ja parandamiseks tuleb välja töötada vastavad standardid, mis hetkel Eestis puuduvad.

5. *Õppeasutuste, erialaorganisatsioonide ja riiklike institutsioonide tegevuses:* avalikkuse vähese huvi ja piiratud ressursside tõttu proviisorite koolitamiseks ning apteegitöö ümberkorraldamiseks on hetkel enneaegne plaanida uusi lisateenuseid Eesti apteekides. Apteegiteenuste arengu lähiperspektiive silmas pidades tuleb arvestada avalikkuse suurenunud huviga ravimiinformatsiooni vastu ning sellest lähtuvalt kaasajastada traditsioonilisi apteegiteenuseid, rakendades farmatseutilise hoole põhimõtteid.

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In particular I would like to acknowledge the following persons:

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- Professor Peep Veski from the University of Tartu and PhD Simon Bell from the University of Eastern Finland, the supervisors of my thesis. Prof. Veski has been supportive in developing the field of social pharmacy, which was a new area in the beginning of the 2000's. His general comments on the thesis have been very valuable.
- The collaborative project with Dr. Bell concerning counselling of patients with mental health problems started some years before the writing of the thesis. Dr. Bell has been an experienced and dedicated supervisor, sharing his knowledge in performing surveys, working out survey instruments, presenting the results, and writing the scientific papers. His guidance has given me both theoretical knowledge and practical experience, which have increased my self-confidence as a researcher in social pharmacy.
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## **PUBLICATIONS**

# CURRICULUM VITAE

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### Education

1976–1987 Viljandi Secondary School No 4

1987–1992 University of Tartu, Faculty of Medicine, pharmacy

1992–1994 University of Tartu, Faculty of Medicine,  
Department of Pharmacy, master studies

1994 Master of Pharmacy (*MSc pharm*)

2008–2010 University of Tartu, Faculty of Medicine,  
Department of pharmacy, PhD studies

### Professional employment

1992–2004 University of Tartu, Department of Pharmacy, Chair of Pharmacognosy and Pharmaceutical Management, assistant

1997–2002 State Agency of Medicines, chief specialist

2004–... University of Tartu, Department of Pharmacy, senior assistant of social pharmacy

### Scientific work

1994–2002 research in pharmacognosy and phytochemistry.

Since 2002 the research is connected with social pharmacy and include the following topics:

- theoretical social pharmacy studies,
- the impact of pharmacy policy changes to community pharmacy practice,
- the quality of services provided at community pharmacy,
- assurance of drug safety at community pharmacy,
- the role of community pharmacists in the treatment of patients with chronic conditions.

Since 2004 participation at international and national conferences, more than 30 presentations.

Selected survey results have been published in international peer reviewed journals (13). Co-author of theoretical social pharmacy text book will be published in 2011.

**List of publications during last five years:**

1. Volmer D, Lilja J, Hamilton D, Bell JS, Veski P. Self-reported competence of Estonian community pharmacists in relation to herbal products: findings from a health-system in transition. *Phytother Res*, 2010 Aug 23 [Epub ahead of print] DOI 10.1002/ptr.3266.
2. Aaltonen SE, Laine NP, Volmer D, Gharat MS, Muceniece R, Vitola A, Foulon V, Desplenter FA, Airaksinen MS, Chen TF, Bell JS. Barriers to medication counselling for people with mental health disorders: A six country study. *Pharmacy Practice* 2010; 8(2):122–131.
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10. Volmer D, Lilja J, Hamilton D. How well informed are pharmacy customers in Estonia about minor illnesses and over-the-counter medicines. *Medicina (Kaunas)* 2007;1:70–78.
11. Volmer D; Lilja J, Reijonen P, Larsson S, Hamilton D. How pharmacy students assess video-vignettes illustrating customers requesting over-the-counter medicines. *Dosis* 2005;4:287–298.

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## Haridus

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1987–1992 Tartu Ülikool, Arstiteaduskond, farmaatsia eriala

1992–1994 Tartu Ülikool, Arstiteaduskond, Farmaatsia instituut, magistrantuur

1994 Farmaatsiamagister (*MSc Pharm*)

2008–2010 Tartu Ülikool, Arstiteaduskond, Farmaatsia instituut, doktorantuur

## Teenistus

1992–2004 Tartu Ülikool, Arstiteaduskond, Farmaatsia instituut,  
farmakognoosia ja farmaatsia korralduse õppetool, assistent

1997–2002 Ravimiamet, peaspetsialist

2004–... Tartu Ülikool, Arstiteaduskond, Farmaatsia instituut,  
sotsiaalfarmaatsia vanemassistent

## Teadustöö

1994–2002 Teadustöö farmakognoosias ja fütokeemias.

Alates 2004. a. on teadustöö seotud sotsiaalfarmaatsiaga ja hõlmab järgmisi teemasid:

- teoreetilise sotsiaalfarmaatsia uuringud,
- ravimipoliitika muutuste mõju apteegipraktikale,
- apteegiteenuste kvaliteet,
- ravimiohutuse tagamine jaemüügiapteegis,
- proviisori roll krooniliselt haigete patsientide ravis.

Alates 2004. a. osalemine kodu- ja välismaistel (teadus)konverentsidel, enam kui 30 ettekannet. Uuringute tulemused on avaldatud eelretsenseeritavates rahvusvahelistes ajakirjades (13). Teoreetilise sotsiaalfarmaatsia õpiku kaasautor, ilmub 2011.

### **Viimase viie aasta publikatsioonid:**

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