

# Functional medicine cabinet for the simulation studio at Lahti University of Applied Sciences

A functional thesis

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Lahden ammattikorkeakoulu  
Hoitotyön koulutusohjelma

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Käytännöllinen lääkekaappi Lahden  
Ammattikorkeakoulun  
simulaatiostudioon

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VIRTANEN, ESSI:

Toiminnallinen opinnäytetyö

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Tämän toiminnallisen opinnäytetyön tavoitteena oli luoda entistä autenttisempi simulaatioympäristö Lahden ammattikorkeakoulun Sosiaali- ja terveysalan laitokselle päivittämällä simulaatiostudion olemassa olevan lääkekaapin sisältö. Tarkoituksena oli tehdä lääkekaappi mahdollisimman tutuksi opiskelijoille, koska tulevaisuudessa he tulevat työskentelemään työharjoitteluissa ja työelämässä sen kanssa.

Lahden ammattikorkeakoulun lääkehoidon opettaja antoi idean tälle opinnäytetyölle. Olemassa oleva lääkekaappi tarvitsi päivitystä, sillä se oli täytetty kuluneilla lääkepakkauksilla sekä vanhoilla infuusiopulloilla, joiden kylkeen oli merkattu etiketillä sisältö.

Jotta lääkekaapin sisältöä päästiin päivittämään, uusia lääkepakkauksia piti kerätä. Tämä tehtiin yhteistyössä paikallisen sairaalan kanssa. Sairaalasta annettiin projektia varten tyhjiä lääkepakkauksia, jotka olisivat menneet kierrätykseen muussa tapauksessa.

Läakelista kaappiin tarvittavista lääkkeistä koottiin simulaatioharjoituksista, jotka saatiin Lahden ammattikorkeakoulun simulaatio-opettajilta. Lista perustui opettajien aikaisemmissa simulaatioharjoituksissa käyttämiin lääkkeisiin. Seuraavaksi lääkepakkaukset jaoteltiin lääkeryhmittäin ja tarpeettomat lääkepakkaukset poistettiin. Suurin osa alkuperäisestä sisällöstä korvattiin kerätyillä aidoilla lääkepakkauksilla.

Työn tulos on päivitetty lääkekaappi simulaatiostudiossa, joka on yleisilmeeltään siisti ja järjestetty. Lääkepakkaukset järjestettiin tilavasti hyllyille, jotta niiden käyttö olisi helpompaa tulevissa simulaatioissa.

Asiasanat: lääkehoito, simulaatio-opetus, hoitotyö, lääkekaappi

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ABSTRACT

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The aim of this functional thesis was to create a more authentic simulation environment for the faculty of social and health care at Lahti University of Applied Sciences by updating the contents of the already existing medicine cabinet in the simulation studio. The purpose was to enable the nursing students to familiarize themselves with a medicine cabinet that would be as close as possible to the cabinets found in clinical placements and future work places.

A pharmacology teacher in Lahti University of Applied Sciences gave the idea for this thesis project. The existing medicine cabinet in the simulation studio needed updating. It was mostly filled with a few worn-out medicine packages and old infusion bottles with various stickers on them to show what medicine it contains. To update the contents of the existing medicine cabinet, new medicine packages were gathered. This was done in cooperation with a local hospital. They provided multiple medicine packages and containers, which had been emptied and were going to be recycled before they were put aside for this thesis project.

A list of needed medicines was compiled from the teaching materials i.e. patient cases used in simulation education provided by the simulation teachers at Lahti University of Applied Sciences. After the gathering process the medicine packages were sorted into medicine groups and elimination of unnecessary medicine packages was carried out. Most of the original content of the medicine cabinet in simulation studio was replaced with actual gathered packages.

The outcome was clean and organized. Medicine packages were placed spaciouly into the medicine cabinet in order to enable an easier access and use during simulation classes.

Key words: pharmacotherapy, simulation education, nursing, medicine cabinet

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## GLOSSARY

**Medical treatment** is a regimen of medicine that doctor has prescribed to a patient to treat a disease or symptoms. The regimen is implemented by a medicine administrator. (National Supervisory Authority for Welfare and Health 2008.)

**Medicine administrator** is a healthcare professional that has a permission to administer the doses of medicine that the doctor has prescribed. (Lehtomäki 2011; Finnish Medicines Agency 2012.)

**Medicine cabinet** is made for medicine storing to be clear and safe. Medicines should be stored in organized cabinets so that usually there are different places for antibiotics, narcotics, oral suspensions and medicines that require a cool storing. Medicines that need to be protected from light can usually be placed in a normal medicine cabinet. Medicine cabinets should also be protected from moist. (Vartiainen & Vesterbacka 2014.)

**Patient safety** refers to policies and practices to ensure the safety of care and the patient is protected from harm. Most common threats to patient safety are drug errors, equipment malfunctions and operational problems, as well as the harmful methods of treatment. (Kinnunen & Helovuori 2014.)

**Simulation** practice mimics reality. Successful simulation builds a bridge between the abstract and the concrete, facilitate learning and improve the real time performance. The simulation can be used to practice very unlikely situations where the model is ready when it really matters. (Blomgren 2015.)

## 1 INTRODUCTION

This functional thesis is about improving nursing students' learning environment in Lahti University of Applied Sciences. Lately the faculty of Social and Health Care has a renewed simulation studio. The renovation was done in 2014. At that time the content of the simulation studio's medicine cabinet wasn't updated but was kept the same. Previously in the simulations the school used lagenulas with labels on the side. This doesn't teach the students the real nature of medicine distribution but rather an illusion of intravenous based medicine treatment in most patient cases.

The aim of our thesis is to update the content of that specific cabinet to create an even more authentic learning environment for simulations and bring more orally ingested medicines to replace intravenous dominant medicine selection. The purpose of this project is to improve patient safety by firstly improving nursing students' clinical skills such as medicine recognition and distribution skills.

Theory of a functional medicine cabinet is presented in this thesis. Questions such as what does a functional medicine cabinet look like from inside, how is it organized and what special requirements some medicines have and how they should be assessed and dealt with. Also the necessity of functional medicine cabinet during nursing school is presented and how this affects nursing students in the future. Third major section in this project was to understand the theory of simulation in nursing degree and how could the learning in such environment be improved.

Cooperation with a partner has given us the required information concerning the necessity of updated medicine cabinet. The subject was offered to our group as project which we took as a subject to thesis process.

## 2 NEED AND BACKGROUND

### 2.1 Description of cooperative partner and partnership

This thesis was commissioned by the Lahti University of Applied Sciences. We applied for permission for the thesis process when the topic was given to us by our group's tutor teacher (Oksanen 2015). Cooperative partners during thesis process were teachers who teach in simulation studio and a simulation instructor. The progress of the work was discussed with the supervisor by e-mail and in arranged meetings. The project was conducted primarily to the client with the need to update the contents of the medicine cabinet, which is located in the simulation studio.

### 2.2 Need and background

At the beginning of 2014, the Faculty of Social and Healthcare opened the renovated simulation studio, which was reported on the school website (Lahti University of Applied Sciences 2014b). Old simulation space was demolished in its entirety. The result was a redesigned simulation studio, which offers a diverse and authentic learning environment. However, the contents of the medicine cabinet were not renewed. Old lagenulas were left there, all of which are similar in appearance and separable only with handwritten labels on their side.

Based on study Verkko-opetuksen tietotekniikkaa, conducted by Räsänen(2004, 5-7),he cites Ropo (1999), it can be said that an effective learning environment guides students in finding and forming their own goals and objectives, is sufficiently complex and authentic and is able to provide challenges and problems that the student finds important and worthy solving.

Simulation practice is a practical teaching method, which is commonly used in nursing schools. In Lahti University of Applied Sciences the curriculum for pharmacological starts during the first year of studies on



course Basics of Medicine 2 and involved all lectures throughout the programme (Lahti University of Applied Sciences 2016).

### 3 AIM AND PURPOSE

#### 3.1 Aim

Referring to Vilkkka and Airaksinen's (Vilkkka & Airaksinen 2003, 41-43) work a functional thesis should be creating something new to field of study and develops professional culture. The outcome of our thesis is an updated medicine cabinet in simulation studio that creates more authentic environment for students.

The aim of this functional thesis from the point of cooperative partner is to improve the simulation environment by updating the content of medicine the cabinet.

The aim of this functional thesis for the members of the group with Vilkkka and Airaksinen's words (Vilkkka & Airaksinen 2003, 16-17) is to teach project management process, which includes making a precise plan, certain operational conditions and objectives and schedules working and last teamwork.

#### 3.2 Purpose

We believe this project to be a significant development for Lahti University of Applied Sciences and especially for the nursing degree. Development means advanced learning environment for students, where medicine distribution is more challenging and will help deepen the knowledge of most common medicines and also their recognition. Long term purpose for this project is to improve patient safety by improving nurses' medicine knowledge and distribution skills during nursing school. In addition, this serves as a tool for teachers to assess the students' learning outcomes especially on the field of clinical skills.

This project consists of the following objectives: 1) find out what is a functional medicine cabinet and what regulations it involves 2) improve pharmaceutical care by improving learning environment in simulation

studio with real medicine packages 3) improve students' medicine knowledge over medicine packages and distribution 4) offer ideas for future development.

## 4 LEARNING PHARMACOTHERAPY IN A SIMULATION ENVIRONMENT IN NURSING STUDIES

### 4.1 Pharmacotherapy and requirements in nursing

Pharmacotherapy is one part of nursing profession. It can be an independent part of treatment or a part of some other form of care. Pharmacotherapy is based on collaboration with patient, physician, and other staff involving the pharmacotherapy. Implementing pharmacotherapy is more than just the correct way of writing, medical calculations and implementation of pharmacological treatment. Nurses should be able to do decisions in a changing environment. Nurse should know basics of anatomy, physiology and pharmacology while working as a nurse but the main responsibility of pharmacotherapy should be on attending physician. Nurses implement the pharmacotherapy plan accordingly to attending physician's prescriptions. (Veräjänkorva, Huupponen, Huupponen, Kaukkila & Torniainen 2010, 16.)

There are rules and regulations to follow in pharmacotherapy. Without direct orders and rules to the healthcare staff, everyone could implement harmful pharmacotherapy. For example, Turvallinen lääkehoito –guide. It is a nationwide tool for promoting patient safety in Finland. The reasons for making the guide were too wide range of implementations of pharmacotherapy, inadequate guiding in units, and the know-how of healthcare personnel. The purpose of the guide is to unify the principles of implementing pharmacotherapy, to clarify the division of responsibilities, and determine the minimum requirements for safe pharmacotherapy. Nurses' level of knowledge is regularly tested to guarantee their competence. After passing pharmacological treatment test, nurses are permitted a license to implement pharmacological treatment. Nurses must have a written permission to implement pharmacotherapy. (Hitonen 2013, 26.)

Pharmacotherapy is a versatile and demanding field of work. The purpose of medical treatment and medicines is to cure illnesses and to prevent

them, to relieve symptoms, to stop the progression of illnesses and to prevent complications caused by illnesses. The main part of patient safety is correctly implemented, effective, safe, economic and appropriate pharmacotherapy. Pharmacotherapy can be more versatile nowadays, enabled by developing technology and pharmacology. Pharmacological possibilities have grown and people use more medicines nowadays because of more new and effective medicines are created and new routes and ways of administration. Also new forms increase possibilities to use medicines. While medicine consumption has been increasing, people have to start focusing more on their side effects and disadvantages. (Ministry of Social Affairs and Health 2006, 11-13.)

When implementing pharmacotherapy, there are always questions about ethics (Veräjänkorva et al. 2010, 90-91). Health care should cherish ethical values such as human dignity and justice and self-determination. The latter mentioned baselines are also in the legislation. (Suhonen, Puro & Leino-Kilpi 2006.)

#### 4.1.1 Safe pharmacotherapy

In patient safety, one aspect concerns safe pharmacotherapy. It is important to perceive the importance of adequate medicine distribution. Greater part of serious harm can be prevented if the disadvantages and dangers of high-risk medicines are identified and purpose of use is planned properly. Pharmacotherapy in units should contain multiple safety mechanisms to avoid mistreatment. (National Institute for Health and Welfare 2015, 16-17.)

Path to safe pharmacotherapy goes through unit's medication treatment plan. This means when a medication treatment plan is prepared and/or updated, used medicines as well as patients specific needs are taken into account. When assessing which medicines should be acquired to storage, there has to be clear vision that the unit has all the required basic medicines named by Finnish Medicines Agency's regulation (Finnish Medicines Agency 2012, 10). Also the assortment of demanded medicines

should be defined by experts and be equivalent to the needs of the operational unit. (National Institute for Health and Welfare 2015, 16-18.)

Other aspect of safe pharmacotherapy is to perceive the responsibilities of healthcare professionals and staying within range of responsibility. Regional agencies together with National Supervisory Authority for Welfare and Health monitor healthcare professional's professional activity. In Finland physicians prescribe medicines but since the 1st of July 2010 Registered Nurses were granted a restricted permission to medicine prescription. For those interested there is an additional education. The prescriber of the medicine must provide sufficient information on its purpose and use for the patient. The prescriber is obligated to keep accountancy of the narcotics, alcohol regulations and the pro auctore - prescriptions. Same data is documented in both accounting and prescription to prevent drug abuse. Furthermore, diagnosis, actions and treatment have to be documented into accounting. (National Supervisory Authority for Welfare and Health 2008.)

#### 4.1.2 Medical treatment plan

Implementation of pharmacotherapy in units should be based on the medical treatment plan. Medical treatment plan is a part of quality and patient safety plan that is defined in healthcare act 8 §. The medical treatment plan should be verified at least once a year and it should be updated whenever statutes, functions or circumstances change. The management of the unit is responsible that the medical plan is up-to-date. (National Institute for Health and Welfare 2015, 12.)

There are big differences in standards of pharmacotherapy. The plan covers the whole pharmacological process. Medical treatment plans are unique strategic tools for improving safe pharmacotherapy; different units require different medical treatment plans accordingly to their expertise. (Hitonen 2013, 26.)

Medical treatment plan helps to define and manage contents and modes of actions in pharmacotherapy. It also helps ensuring and maintaining quality and safety while implementing pharmacotherapy. Medical treatment plan is the main part of orientation considering everyone participating in pharmacotherapy. New employees and also students are orientated to the contents of the medical treatment plan as the work or the practical training starts. Requirements of employees' pharmacotherapy skills should be defined in the plan. Responsibilities, obligations and division of labor are determined according to the information in unit's medical treatment plan. (Ministry of Social Affairs and Health 2006; National Institute for Health and Welfare 2015, 12&14.)

#### 4.2 Learning pharmacotherapy in nursing studies

Studies of pharmacology are defined in a curriculum as well as every part of the studies. Curriculum is updated regularly, so the content may be different depending on which year person starts studying. European objectives for nursing programme affect the formation of curriculums in Finnish Universities of Applied Sciences. Structure of the studies is made cohesive to aim easier international mobility. Cohesive curriculums also aim to make exchange studies easier to implement and provides a smooth transition into working life even between different countries. In Lahti University of Applied Sciences the curriculum contains both the European Qualifications Framework and the National Qualifications Framework. (Lahti University of Applied Sciences 2014a.)

The structure of the curriculum consists of basic studies, professional studies, clinical trainings, thesis and complementary professional studies. Curriculum consists of different modules that are from 15 to 30 European Credit Transfer and Accumulation System (ECTS). One ECTS is supposed to be 27 hours of work. Pharmacotherapy is presented in many different modules. From the beginning of the studies, students are taught to implement safe pharmacotherapy. The aim of pharmacology studies is

to give good and strong basis of the pharmacological knowledge for the students. (Lahti University of Applied Sciences 2014a.)

One module, Basics of Nursing, is about treating patients professionally. Learning aseptic work and basics of safe implementation of pharmacotherapy are objectives of this module. This module also helps students to find professional identity and learn about personal weaknesses and strengths. Clinical training of this module aims to good basic care and professional interaction with patients and their family. Pharmacotherapy is implemented by the possibilities of the training place and the skills and courage of the student. During the studies, students are supposed to fill a medication passport with the supervisor. The medication passport is made according to the regulations of pharmacotherapy skills. Passport ensures the learning of pharmacotherapy. By using the medication passport, students and supervising teachers know what the students have and haven't learned during the previous clinical placements. By looking the medication passport teachers and supervisors know where the student stands in pharmacological hand skills. (Lahti University of Applied Sciences 2014a; Medical passport.)

Medical calculations are part of pharmacological studies during the modules. The medical calculation test consist of medical calculations of which every calculation has to be carried out flawlessly. If a mistake occurs the whole test has to be redone until passed flawlessly. (Lahti University of Applied Sciences 2014a.)

The study modules also consist of skills labs, which are about practicing practical nursing skills. Before skills lab students are supposed to do a pre-task for learning the theory. Students can start practicing nursing skills in safe school environment under supervision. For example blood tests and measuring blood glucose level could be topics in skills labs. (Lahti University of Applied Sciences 2014a.)



Medical knowledge is a main theme in few modules. Students learn how the medicines work in a human body during these courses. Pharmacology studies are provided in English and in Finnish in Lahti University of Applied Sciences. Finnish students are encouraged to do pharmacology studies in Finnish even though they are studying in English degree program. (Lahti University of Applied Sciences 2014a.)

In pharmacology studies, students learn about pharmacokinetics and pharmacodynamics. Pharmacokinetics as a subject teaches absorption, and distribution of medicines along with medicine metabolism and excretion of the body. Pharmacodynamics teaches how different medicines affect in human body, organs, cells and molecules. Pharmacodynamics contains also the interactions and side effects of medicines. During pharmacological studies, students learn the theory of safe implementation of pharmacotherapy. Skills such as asepticism, medicine distribution and patient safety are main concepts. (Lahti University of Applied Sciences 2014a; Duodecim.)

#### 4.3 Learning pharmacotherapy in simulation environment

Simulation from the learning aspect is all about imitating the reality. "Simulation education is a bridge between classroom learning and real-life clinical experience" (Society for Simulation in Healthcare 2016). The simulation studio was built for this purpose. Students are introduced to their case which is given to them before the simulation and usually contains and pre-task about the given topic. The cases are decided and crafted beforehand by teachers to fit their module. Proper planning of the cases helps student to empathize the situation as if it was real. The performance is recorded by cameras and microphones and it can be viewed and observed in another room where teachers and fellow students evaluate their work in real-time. After the case comes the debriefing part, which is very important in terms of learning. The case is discussed together with the operating and observing groups: was the case handled properly and what can be improved in the future. Other students evaluate

it along with the teachers. Everyone learns from simulation cases, even though they weren't in operating group during a case. In simulation studio students learn skills such as team work, co-operation, communication skills, and leadership in safe environment. (Nordic Simulators 2016.)

One main part of simulation learning is pharmacotherapy. "The freedom to make mistakes and to learn from them" (Society for Simulation in Healthcare). This means that students can make mistakes in safe environment without risking actual lives. Furthermore, people learn by doing mistakes. (Society for Simulation in Healthcare 2016.)

## 5 FUNCTIONAL MEDICINE CABINET IN THE SIMULATION STUDIO

### 5.1 Contents of a medicine cabinet

In the hospital environment the medicine cabinet or medication storage room all have pharmaceutical products that are considered to be the essential medicines, which the unit or ward uses the most in medical treatment. The essential medicines should meet the requirements of each ward and they need to be controlled. Choosing the essential medicines is based on scientific research and national clinical guidelines. Professionals from different fields who also are familiar with the guidelines shall together with the hospital pharmacy discuss the essential medication needed. (Finnish Medicines Agency 6/2012.)

For this thesis project a list of “essential” medicines was compiled using teaching materials provided by the simulation teachers (Appendices 1 & 2). The materials were patient cases used in simulation education in different modules of the Lahti University of Applied Sciences’ nursing programme. The list included a wide range of medicines administered orally, intravenously, subcutaneously and through inhalation. Narcotics were also included in the list. Empty medicine packages and containers were to be collected according to this list thus creating medicine cabinet with a selection of essential medicines for the simulation studio in Lahti University of Applied Sciences.

### 5.2 Storing of pharmaceutical products

#### 5.2.1 Storing choices

If storing medication at home or in a facility the safety aspect should always be considered. The storage should have adequate spaces for storing and it should be aseptic in every way. Cleaning the space should be easy. (Tokola 2010, 35.) All medication should be kept in a locked place, be it the medicine cabinet or a separate room assigned only for

managing the medication: storing, distributing, diluting etc. However, a medicine cabinet should never contain anything more than the medication. (Nurminen 2009, 24.) It should also be noted that health care units should only store medicines that are needed in implementing pharmacotherapy (Taam-Ukkonen & Saano 2010, 49).

Narcotics should be placed in a separate locked cabinet away from other medication (Taam-Ukkonen & Saano 2010, 47). The cabinet should also include an exclusive form for every narcotic medicine package where the person administering it shall document the important information including the name of the prescribing doctor, the name of the administrator and also the date and the time, when the drug was administered. The amount administered must also be documented. (Nurminen 2012, 115.)

Medicines used internally and externally among with injection solutions and inhalation medicines should be kept separately in alphabetical order (Tokola 2010, 38). They can also be shelved according to disease types i.e. cardiac diseases, respiratory diseases or eye diseases. And medicines with a same name or similar packaging should be stored separately. (Taam-Ukkonen & Saano 2010, 49.) The medicines that are not usable anymore or need to be returned to the pharmacy should also be separated from other medicines. Antineoplastic agents or other medicines that have special instructions or considerations should be stored in a separate place with clear markings. (Tokola 2010, 38.)

### 5.2.2 Storing conditions

When arranging the storing in the medication room or cabinet, it should be considered that the storing unit is a dry place and that the medication can be stored in a way where they are covered from daylight. The temperature in the storing room in a health care facility should always be at a temperature between +15 to +25 degrees Celsius and it should be measured on a regular basis. (Tokola 2010, 38-39.) It's recommended that it should be a daily task in a health care facility (Taam-Ukkonen & Saano 2010, 47). The medication should also be kept in their original packaging,

since they enable a longer shelf life for the medication. There should not be any markings on the package other than the day it was opened.

(Tokola 2010, 39-40; Nurminen 2009, 24-25.)

There are different temperature regulations for every medication and they should be followed. The storing temperatures can be found on the packaging (Nurminen 2009, 21). Possible storing temperatures are as presented in Table 1.

**Table 1: Storing temperatures of medicines (Taam-Ukkonen & Saano 2010, 48).**

Room temperature	+15 to +25 °C
Cool	+8 to +15 °C
Cold/Refrigerator	+2 to +8 °C
Freezer	below -15 °C

Storing in room temperature is suitable for most medicines but if a medicine meant for room temperature is wrongly stored in a refrigerator might it cause the medicine to be ineffective or have a slower reaction (Saano & Taam-Ukkonen 2010, 48). The refrigeration also has a big effect on liquid medication unsuitable for cold temperatures because of the moisture. It can possibly cause the liquids to granulate or lose their original viscosity. Medication that is specifically meant to be stored in a refrigerator can't tolerate temperature changes well. (Laakso 2012.) Also if a medicine is not allowed to freeze it should be mentioned on the packaging (Nurminen 2012, 115). If the proper storing conditions for a medicine are not met then it's not the medical company's responsibility if the quality of the medication is decreased or the medication is not usable. (Taam-Ukkonen & Saano 2010, 47.)

### 5.2.3 Preservability of pharmaceutical products

Medication's ability to withstand the possible physical, chemical and microbiological changes it is facing during transport, storing or use, describes the medication's shelf life (Taam-Ukkonen & Saano 2010, 47). Medical companies mark their packages with an expiration or "use before" date, which means that the medicines should stay usable till the marked date if stored and handled properly according to the guidelines and

recommendations from the company. After the given date the medical company's responsibility of the medicine is void (Tokola 2010, 40).

Opening a new medicine package requires the person opening it to mark the package with an opening date and time. After the opening people administrating the medicine should always be aware of the quality of the medicine by checking it before every use (Tokola 2010, 40).

### 5.3 Medicine packaging and patient information leaflets

According to the Finnish Medicines Agency's (2010) regulation 1/2010 "Lääkevalmisteiden myyntipäälyysmerkinnät ja pakkausseloste" the medicine packages should be marked properly that they are easy to read and understandable for every user. Finnish Medicines Agency's regulation 1/2009 also states that the text on the packaging should be at least in Finnish and in Swedish. There can also be markings in Latin for example when describing the product's composition information. The packages can have illustrations on them but the design and size cannot make reading of the package markings difficult or affect the consumer in marketing sense. Illustrations or pictures that ease the consumer's administering process are allowed (Finnish Medicines Agency 1/2010).

The following information must also be marked on the packaging if not possible on the outside then on the inside of the packaging; the name of the product along with its strength, pharmaceutical form and active ingredients. The composition of the medicine is mentioned by marking the exact amounts of active ingredients and if necessary the excipients in the medicine. Dosage information must be given if an over-the-counter medication. The package size must also be marked (Finnish Medicines Agency 1/2010). Intended consumer e.g. a child or an adult must also be indicated on the package according to the European Commission's 2009 revision of guideline Directive 2001/83/EC.

The package should also have information about the administering of the medication and how it should be consumed. Warnings that are necessary

must be clearly marked. The expiration date and preservation information should also be included. Batch number and the Nordic product number (VNR) must be found on the packaging. The seller and manufacturer along with the market author number need to be indicated (Finnish Medicines Agency 1/2010).

The packaging must also include a patient information leaflet if all necessary information is not presented on the packaging itself. It contains all the information needed for the consumer about the medical product and all the information in it is based on research. The leaflets are approved by Finnish Medicines Agency so they can be considered as very trustworthy sources of information. It must be written both in Finnish and Swedish and the language must be understandable for a layperson (Finnish Medicines Agency 1/2010).

## 6 EXECUTION OF THE MEDICINE CABINET PLAN

### 6.1 The start

This project started in February 2015. The topic was given to us by a pharmacology teacher Heli Oksanen from Lahti University of Applied Sciences, who was also our tutor teacher at the time. She told us the school had the need to update the content of the medicine cabinet in simulation studio and also reorganize it and asked if we wanted to take on this project(Oksanen 2015).

Our former simulation experiences of pharmacotherapy section in simulations were poor. The medicine cabinet's content was chaotic as mentioned. The containers, vials and other medicine packages were old and outdated and rather well misplaced when put back to cabinet. Working with medicines was an ordeal.



*Picture 1. The medicine cabinet in simulation studio in the faculty of Social and Health care at Lahti University of Applied Sciences before enhancements. 2016.*



## 6.2 Data collection and theory section

We didn't have knowledge over functional medicine cabinet so obvious start was to study sections such as 1) functional medicine cabinet and its regulations 2) simulation practice in nursing degree 3) safe pharmacotherapy and finally 4) pharmacotherapy studies in nursing school. By studying these subjects we were able to begin work and we would soon to come understand what the functional medicine cabinet is. Theory section started to come along and we were planning to give a presentation in February. Unfortunately we had gotten off the course and written slightly off the topic. For our project this meant that we had to postpone the presentation and rewrite the theory sections and furthermore demarcate entities.

## 6.3 Collection of the medicine packages

Medicine packages were collected from Päijät-Häme Central Hospital accordingly to a medicine list (Appendices 1 & 2). We were previously given all the simulation cases that the teachers had students to practice by mentor, which she had acquired from other teachers. From the cases we were able to create a medicine list with Microsoft Excel and organize the list into alphabetical order (Appendices 1 & 2). This list was then given to few wards so that they could donate empty and used medicine packages which would've otherwise been thrown out. The packages were made sure they were empty before they were handed over. Unfortunately we weren't able to gather all the required medicine packages on the list and this would cause trouble later on, such as some lagenulas had to be left in the medicine cabinet because a replacement couldn't be found.

#### 6.4 Emptying and cleaning

We emptied an unused medicine cabinet at the school, which was located in a different classroom. All the content that was emptied was put into a basket. We moved the unused cabinet into the simulation studio so that there would be enough capacity to hold all the medicines required in simulations. Next we emptied the existing medicine cabinet in the simulation studio and all the medicine packages were poured on the floor. We sorted them using the method mentioned earlier. Both medicine cabinets were cleaned and disinfected.

First we listed and organized all the medicines that were used in previous simulation cases and then the medicines that were extra. Next we listed and sorted all the extra packages that were already in the medicine cabinet. We added those extra medicine packages to the list if they passed our sorting criteria. The idea was to create a learning environment that would also be challenging enough for the students so some spare packages were added. Also the teachers have now more material for their cases with an authentic medicine cabinet.

*Pictures 2 and 3. Old (left) and the new (right) medicine cabinets emptied and cleaned. 2016.*





*Pictures 4 and 5. Medicines cabinet's content emptied on the floor of simulation studio. 2016.*

## 6.5 Sorting collected medicine packages

From the medicines packages that we were able to require, we had to come up with functional filtering to find out which packages to spare and which to throw out. Solution here was to 1) gather medicine packages which were on the medicine list 2) gather medicine packages that had a container, carton package and leaflet inside 3) make sure that the containers were empty of any actual medicines. Elimination process wiped out many packages including 1) packages that had had pills in a blister foil because the foil isn't reusable 2) whole package missing one of the following: container, leaflet or carton package.



*Picture 6. Group member sorting gathered medicines outside the simulation studio. 2016.*

## 6.6 Organizing the medicine packages to the medicine cabinet

After sorting, eliminating and listing the packages we finally got to update the content of the medicine cabinet. We organized the medicines to the shelves accordingly to our theory: in alphabetical order from left to right and top to bottom. Also we stored the medicines as advised in the theory section earlier.

In the right side medicine cabinet we put inhalable medicines, orally ingestible medicines, narcotics into locked narcotics box inside the cabinet and finally organized the fluids to the cart and removed the administration instruments to a separate place. In the left side medicine cabinet we put intravenous medication and antibiotics along with subcutaneous medication like insulin and anticoagulants.

The idea was that the taller right side cabinet suited better for medicine distribution and the left side cabinet works as chilled cabinet and storage for those lesser used medicines. Also the functionality is better when a student works on flat surface like the given cart when diluting fluids. Distribution of pills still happens on the flat surface in the right side cabinet. This makes it easier for teachers to evaluate student's work when they're visible.

## 6.7 Removed content

Altogether we removed one basketful of lagenulas, other vials with questionable labels and out dated medicine packages which had been same for years now. For example we had two totally different paracetamol medicine packages; the older one had expired in 2001. These lagenulas are placed in school's storage just in case some of the packages disappear or get torn. We don't recommend using them and suggest looking into alternative options such improving the medicine cabinets' content in future projects.



*Picture 7. Basketful of removed content from the medicine cabinet of the simulation studio. 2016. Picture 8. Removed content from the medicine cabinet.*

## 6.8 Outcome

The outcome looks nice, tidy and organized medicine cabinet like one would think of medicine cabinet in hospital's ward. Packages are real medicine cans instead of lagenulas and everything is in place. We labeled the shelves inside with labeling machine so that medicine gorups are presented clear and visible. Updated learning environment gives students' a challenge worth solving and teaches problem solving.



*Picture 9. Left side medicine cabinet, which contains intravenous, subcutaneous, insulin and antibiotics. Organized cabinet. 2016.*



*Picture 10. Right side medicine cabinet, which contains narcotics, orally ingestible and inhalable medicines. Organized cabinet. 2016.*



## 7 DATA COLLECTION PROCESS

Table 2: Description of the data collection.

Database	Search term	Search results/ Reference amount	Sources selected
Cinahl	Medicine cabinet	5/0	We wanted full text and peer reviews as source. Only 3 sources were left when used quotation marks. After reading abstract there was one source left, which was dated back to 1995. We couldn't use the sources.
Melinda	"Medicine cabinet"	2/0	None of these sources suited our subject. Also when leaving out the quotation marks there were only 5 sources left of which we could use none.
Medic	Lääkehoito AND potilasturvallisuus	14/2	Inkinen, R., Volmanen, P. & Hakoinen, S. 2015. Turvallinen lääkehoito - Opas lääkehoitosuunnitelman tekemiseen sosiaali- ja terveydenhuollossa. Terveyden ja hyvinvoinnin laitos. Guide.  Sneck, S. 2016. Sairaanhoidajien lääkehoidon osaaminen ja osaamisen varmistaminen. University of Oulu. Dissertation.

Melinda	Lääkekaappi	3/0	Only one source was suitable for our subject but it had to be loaned so we decided not to use it.
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### 7.1 Other search methods

According to Vilkka, H. and Airaksinen, T. data collection should base to a study question: what kind of information is needed to support functional thesis and why this information is necessary for success? (Vilkka & Airaksinen 2003, 39-41)

Data collection wasn't efficient in the beginning. Search engines such as Google and Masto-Finna were used primarily to find out what kind of information was available for this subject. Researches, studies and dissertations were examined in this process. Unfortunate result was that adequate information was hard to find from topics such as proper medicine cabinet and regulations of medicine cabinet.

Reliable sources are important for success. Previous information retrieval skills during clinical practices had taught us to search reliable information from Social and Health Ministry's webpage. Naturally most data collection was done from national organizations with good assurance over their information and which are led by government's Social and Health Ministry.

Later we used proper databases and found the exact same sources that were used in this thesis, such as "Turvallinen lääkehoito - Opas lääkehoitosuunnitelman tekemiseen sosiaali- ja terveydenhuollossa." This guidebook is the basis of the knowledge presented in this thesis.

## 8 ASSESSMENT

### 8.1 Authors' assessment of the medicine cabinets

Current medicine cabinets' contents have now visible similarities with the ones we have seen on hospital wards. The cabinet is now practically organized and the packages are placed next to each other rather than hiding them behind each other. When opening the cabinet, time isn't wasted for wondering the order of the packages. There are stickers to indicate different places for different medicine forms. Intravenous and intramuscular medicine packages are in one cabinet and the packages of orally administered medicines are in the other one along with antibiotics and inhalators. Because we cleaned the cabinet before putting the new content in the cabinets they look more proper and well cared for.

It's the learning benefit for the students to practice with organized medicine cabinet. The pleasant learning environment gives students a challenge with the gathered medicine packages and an organized environment keeps the simulation from becoming too overwhelming. In reality the true results of the work will be seen in the future, when the new cabinet has had more use.

### 8.2 Authors' assessment of the thesis process

It was really hard for us to begin with the process. We didn't have enough knowledge where to start. Our process has been going on for over a year. We started slowly and we didn't have that much motivation for pushing the process forward. We knew that to perceive the continuum of the process we had to do a lot of scheduling. When the process finally got on the right tracks we managed to carry it out swiftly. We gathered information about thesis process from internet and from other students that had already passed the thesis process. When we figured out where to start and what to do, we the topics that we wrote independently. The rest we wrote together. We arranged meetings together every once in a while to ensure that everyone is on the same page with the process.

At first, all of us had the same role in a group and were lacking a leader but at some point, one of the group member took the leading role. This made writing process more efficient. A schedule began to form for the project.

When the deadline was closing in, things started to accumulate and some of us were busy with work or practical training. The functional part was implemented exactly as planned. We gathered new medicine packages, and as planned, instead of obtaining a new cabinet we used an existing one. The result was as good as we hoped it to be. The medicine cabinet turned out clean and well organized.

**Table 3: SWOT-analysis on the thesis process.**

<b>SWOT-analysis</b>	
<b>STRENGTHS</b>	<b>WEAKNESSES</b>
Interest towards the topic, motivation for graduation	Lack of motivation towards writing process, lack of information, occasionally poor communication
<b>OPPORTUNITIES</b>	<b>THREATS</b>
Help of the teachers, advice from other students	Stretching of the schedule, deformation of the topic

We created a table of our strengths, weaknesses, opportunities and threats. This table is called SWOT-analysis, which is an effective way to identify these four factors (Nursing management 2007). Doing a part of assessment of the thesis process by SWOT-analysis, we needed to think the process as an ensemble. This analysis is a simple tool for planning and rethinking the whole process. Usually the analysis is done before the process starts, but we wanted to add this and also bring our features into this assessment. Our strengths were the interesting topic and our motivation for graduating as soon as possible. We were very excited about

the topic from the beginning. Our weaknesses were lack of motivation towards writing process, which felt almost impossible at times. Also lack of information of the process was our weakness and brought problems from the start. The communication was occasionally poor between the group and the teacher and also inside the group. Our opportunity was the help from teachers and also from other students. We listed stretching of the schedule and deformation of the topic as our threats.

### 8.3 Teacher's assessment of the final outcome

*The authors of this thesis have familiarized themselves well with guidelines and instructions concerning storing of medication and have followed this guideline in their development project. The authors have worked hard gathering original medicine packages from the hospital. Original packages make the medicine more authentic. The result of this development project "Functional medicine cabinet for the simulation studio at Lahti University of Applied Sciences" is to be user-friendly. The medications are placed spaciouly enough on the shelves, which enables easier access to them in pharmacotherapy done during simulation. Putting I.V and tablet-form medications into separate cabinets seems to be a functional solution. The overall outlook of the cabinets is clean. A sticker on the edge of the medicine shelf indicating the name of the medicine would have made it easier to keep the cabinets organized in the future. The authors have worked in good cooperation with the teachers who teach pharmacotherapy in the simulation studio during the whole project.*

(Feedback from a simulation teacher 2016, translated by the authors)

## 9 DELIBERATION

### 9.1 Achieved objectives

Our group's focus was on promoting patient safety by creating even more authentic learning environment for nursing students in Lahti University of Applied sciences. This included gathering several medicine packages from local hospital to changes the old and worn-out medicine packages in simulation studio. The overall purpose was to improve nursing students' clinical skills, especially in fields of patient safety, asepticism, pharmacotherapy and pain treatment. According to book of Eriksson, E. et al., these three fields are important for more than 96% of respondents. (Eriksson, Korhonen, Merasto & Moisio 2015, 27-30.)

We believe that in the group all the members agreed from the beginning what was being developed here. The outcome was so authentic that we actually thought we were staring a medicine cabinet taken from a hospital. We managed to improve previously mentioned fields by intervening grievances that we had had from our previous simulation practices. Furthermore, cooperative partners have assessed the outcome as long-needed reform and believe that it will help future students to improve their skills that lead to patient safety.

### 9.2 Demarcations

This subject that we chose for our thesis was great because a lot of information was available considering pharmacotherapy. This meant that we had to demarcate some topics from this project otherwise the thesis would have become too extensive. We focused on medicine recognition and medicine distribution skills. This meant that medicine administration tools, filling the medicine packages with placebo pills or purchasing a new medicine cabinet weren't included in our thesis project.

We went in the wrong direction with this thesis several times: we didn't allocate the data to the simulation environment in the beginning and wrote

about pharmacotherapy and medical plan on hospital wards instead. This set our project off-course several time since simulation is a mimic of hospital environment and the difference between these two wasn't always clear. So allocating information to simulation environment was a challenge that we overcame by demarcating hospital environment from the work. Focusing on the contents of the medicine cabinet, we were able to make imaginary walls of the cabinet for our work.

### 9.3 Professional development

We needed to study and understand the general concepts in nursing to be able to begin the writing process. Many studies and factual texts were examined to gain understanding over given topic. This meant inevitable growth as a health care professional, especially in fields of patient safety, pharmacotherapy and teamwork.

Quoting Vilkka, H. and Airaksinen, T., part of the thesis process is to learn to combine theoretical knowledge and professional practice, be able to reflect different theories critically and develop professional culture (Vilkka & Airaksinen 2003). All members of our group have practiced in clinical placements and therefore have previous experience about medicine cabinets. We had to compromise during this process over what is necessary for successful simulation and what you cannot practice and engage in the simulation. Not all practice requiring situation can be simulated in safe environment, so we had to draw the line on how authentic the environment could be done. Also we think that we were able to intervene harmful passive learning, that the students would actually observe their learning environment and internalize the bad examples.

Also we were able to gain most of the traits required in thesis process, such as planning ahead, understanding the requirements imposed to work and operating conditions. Scheduling caused our group effort and we managed to be late on our own timetable. This skill we have to practice more since punctuality is required in future work.

#### 9.4 Development ideas

To preserve the updated condition, we recommend the Lahti University of Applied Sciences to name a person, at the Faculty of Social and Health Care that is responsible for the medicine packages and another person that takes care of the medicine administration tools. These pointed members of staff should check out their responsibilities perhaps twice a month or frequently if seen useful. We have attached a medicine list of the content of both cabinets; chilled cabinet and orally ingestible medicines' cabinet. This helps the person who is responsible for the cabinets to reorganize their contents.

We demarcated administration tools from our functional thesis but came across maladministration, which should be tackled in the future. The administration tools were placed in several different places including the medicine cabinet. Furthermore, we found out that no one is fully responsible for the medicine cabinets' content nor the administration tools. In conclusion it would be recommended to point a member for this job so that one person is responsible for the adequacy of the materials in the future.

Perhaps in the future Lahti University of Applied Sciences could have a proper medicine storage room similar to the ones found in professional health care settings. The storage room could have bigger medicine cabinets and more space for students to work in. It would be possible for students to practice their clinical skills more by themselves and in simulation situations. Distributing and diluting medications would be more authentic that way.



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## APPENDICES

### Appendix 1: The right-side cabinet

<b>Lääkkeen nimi</b>	<b>Lääkkeen vahvuus</b>	<b>Pakettien määrä</b>
<b>Antibiootit</b>		
Amorion	500 mg	1
Doximycin	100 mg	2
Doximycin	150 mg	2
Nitrofur-C	75 mg	1
<b>Hengitysläkkeet</b>		
Atrovent	0,25 mg/ml	1
BricanylTurbuhaler	0,5 mg/dos	1
Ipramol	0,5 mg/2,5mg per 2,5 ml	1
PulmicortTurbuhaler	Placebo	1
SeretideEvohaler	25/250 mikrog	1
SymbicortTurbuhaler	60 annosta	1
VentolineEvohaler	0,1 mg annos/dos	1
<b>Per os</b>		
Arcoxia	60 mg	1
Baklofen Merck NM	25 mg	1
Burana	600 mg	1
Calcichew D3	500 mg/10 mikrog	1
Calcichew	500 mg	1
Dexametason	1,5 mg	1
Digoxin	0,25 mg	1
Dinit	1,25 mg/ dos	2
Disperin	50 mg	1
Dolmed	5 mg	1
Dilzem	90 mg	1
Ebixa	20 mg	1
Felden	10 mg	1
Finasterid Orion	5 mg	1
Furesis	20 mg	1
Furesis	40 mg	1
Ibumetin	400 mg	1
Imovane	7,5 mg	1
Kardopal	100 mg/ 25 mg	2
Kalcipos-D	1,3 g	1
Kaleorid	1 g	1
Litalgin	500 mg/ 5 mg	1
Linatil	20 mg	1
Marevan	3 mg	1
Marevan	5 mg	1
Melatonin	3 mg	1
Metohexal	47,5 mg	1
Metohexal	95 mg	1
Miloride	5 mg	1
Minisun	25 mikrog	2
Nexium	20 mg	1
Nitrosid	10 mg	1
Opamox	15 mg	1

Orisantin	200 mg/ 25 mg	1
Ormox	10 mg	1
Ormox	20 mg	2
Pamol	500 mg	1
PanadolExtend	665 mg	1
Paratabs	500 mg	2
Paratabs	1 g	2
Prednisolon	40 mg	1
Prednison	5 mg	1
Primaspan	100 mg	1
Primaspan	250 mg	1
Somac	40 mg	1
Tenox	20 mg	2
Thyroxin	0,1 mg	1
Thyroxin	0,25 mg	2
Topiramate Orion	25 mg	1
Tramadin	50 mg	1
Trexan	10 mg	1
Trineurin B	250 mg	1
Triptyl	10 mg	1
Zyvoxid	600 mg	1
<b>N-lääkkeet</b>		
Morphin	20 mg/ml	4
Oxanest	10 mg/ml	1
Oxynorm	5 mg	1
Oxynorm	10 mg/ml	1
<b>Muut</b>		
Diapam	2 mg/ml	1
Levolac	670 mg/ml	1

## Appendix 2: The left-side cabinet

<b>Lääkkeen nimi</b>	<b>Lääkkeen vahvuus</b>	<b>Pakettien määrä</b>
<b>Insuliini/subcutis</b>		
FlexPen		1
Klexane	20 mg	1
Klexane	40 mg	1
Klexane	60 mg	1
Klexane	100 mg	1
<b>Muut</b>		
Actilyse	50 mg	1
Adenocor	3 mg/ml	1
Cefuroxim	1,5 g	2
Ceftriaxon MIP Pharma	2 g	1
Invanz	1 g	1
Furesis	10 mg/ml	1
Kakoisrokote	1 dos/ 5 ml	1
Kabikinase	1 500 000 ie/ky	1
Losec	40 mg	1
Meropenem Hosnia	1 g	1
Oradexon	5 mg/ml	2
ParacetamolActavis	10 mg/ml	3
Piperacillin	4 g/ 0,5 g	1
Solomet Depot	40 mg/ml	2
Solu-cortef	250 mg	2
Solu-medrol	125 mg	3
Solvant	1 dos/5 ml	1
Somac	40 mg	5
Stamaril	26,3 mg	1
Stamaril	1 dos/ 0,5 ml	1
Xylocain	10 mg/ml	2
Zinacef	1,5 g	2