Exercises for pharmacy students for a training period in a hospital pharmacy abroad

December 2004

University of Kuopio
University of Helsinki

Name ________________________________
Table of contents

Practical tips for filling in this exercise book ................................................................. 3

1. Aims and objectives for your training, getting to know your working environment and work unit ................................................................................................................. 4

2. Medicines and other products of the hospital pharmacy ........................................... 9

3. Drug treatment ......................................................................................................... 13

4. Clinical pharmacy / Ward pharmacy ........................................................................ 15

5. Medicines information and the use of information sources ..................................... 20

6. Aseptic compounding / drug production ................................................................... 25

7. Quality assurance and quality control ..................................................................... 28

8. Clinical trials and pharmacy-conducted research ..................................................... 30

9. Conduct of hospital pharmacy and personnel management .................................... 32

10. Analysis of learning ................................................................................................. 34
PRACTICAL TIPS FOR FILLING IN THIS EXERCISE BOOK

The aim of this exercise book is to

- help you get the most out of your training period in professional manner
- help you understand the different functions and services provided by the hospital pharmacy
- help you use different sources of drug information and initiate you into the concept of clinical pharmacy in hospital practice
- help you gain knowledge and practical tools for your future professional career

This exercise book covers the most important functions of the hospital pharmacy, from dispensing to drug production, from quality assurance to clinical pharmacy. It has been translated and modified from the Finnish equivalent “Tehtäviä sairaala-apteekkipätevyyttä varten”, written by pharmaceutical leader Harri Ovaskainen (Association of Finnish Pharmacists), hospital pharmacist, M.Sc. (Pharm) Merja Nylander, Ph.D. (Pharm) Susanna Saano (University of Kuopio) and M.Sc. (Pharm) Johanna Salimäki (University of Helsinki) in year 2002. The English translation was made by Johanna Salimäki in year 2004.

You may use the table of contents to create a schedule for your training together with your supervisor. Because the functions of hospital pharmacies may differ between countries, you may not be able to participate and get experience in every activity presented in this exercise book. However, try to fill in as many of the exercises as possible. You may use either English or Finnish when filling in this book.

When your training period is reaching its end, have a discussion with your supervisor about your training (exercise 1.3). Discuss with him/her how you reached the goals you set in the beginning of the training, what were your experiences like from the different areas of hospital pharmacy work, how did you adjust to different working culture and language, etc. In the exercise 10.1. we have asked you to evaluate your training as a learning process and bring out positive/negative aspects of training in a hospital pharmacy abroad.

Familiarize yourself with the exercises in this book already in the beginning of your training and show these exercises to your supervisor and the chief pharmacist. You should not leave the exercises to the last week of your training! Do not hesitate to ask for assistance from pharmacy staff to help you with these exercises. Hopefully these exercises will also serve as base for fruitful discussions about hospital pharmacy practices in between countries.

Please return this exercise book to your teaching unit at the University after your training period has passed. The book will be returned to you after it has been checked.

Good luck for your training!
1. AIMS AND OBJECTIVES FOR YOUR TRAINING, GETTING TO KNOW YOUR WORKING ENVIRONMENT AND WORK UNIT

This chapter aims to set goals for your training period, and follow how these goals have been reached in the middle and at the end of your training. Exercises in this chapter also help you to get a wider picture about the functions and services of the hospital pharmacy.

Exercise 1.1. Training objectives

a) What are your aims and training objectives for your training period? What do you wish to learn? What was your motivation for choosing to do a part of your practical training in another country and in a hospital pharmacy?

b) Ask your supervisor to create a rough training schedule for your training. Discuss the goals and objectives of your training with him/her.
Exercise 1.2. Mid-assessment
Have a discussion with your supervisor when half of your training period has passed. How has your training started? What goals have been reached so far? What areas still need to be emphasized? Set new goals for the rest of your training.

Exercise 1.3. Appraisal (at the end of your training period)
Ask your supervisor to give you an appraisal of your training on a separate sheet (attach a copy of the appraisal in this book). How did you reach the goals you set in the beginning of your training? Write down your comments here (see also exercise 10.2. for further analysis of what you have learned and experienced during your training period).
Exercise 1.4. Familiarize yourself with the functions of the hospital and the pharmacy department. Interview the chief pharmacist or your supervisor and answer the following questions.

a) The hospital organization: Who/which are the clients or customers of the hospital pharmacy? Do you dispense medicines somewhere else except to the hospital wards? Are some medicines dispensed directly to patients?

b) Describe the hospital environment (number of beds, number of wards, specialities)

c) Which legislation guides the functions of the hospital pharmacy? What are the responsibilities and duties of the chief pharmacist?
d) What services does the pharmacy department in your teaching hospital offer? Are there any special services provided by the pharmacy (e.g. automated dispensing service, running of anticoagulation clinics or other clinics, etc)?

e) Which stakeholders does the pharmacy department have collaboration with (e.g. drug formulary committees, local practice guidelines committees etc)? What is the role of the pharmacist in these committees?
f) The hospital pharmacy staff: How many pharmacists and other staff work in the hospital pharmacy? What are the job descriptions of the different professional groups? Are the pharmacists specialised in certain areas or do they rotate in different areas of work within the pharmacy department?

g) What are the opening hours of the pharmacy department? How do the wards get urgent medicines when the pharmacy is closed?
2. MEDICINES AND OTHER PRODUCTS OF THE HOSPITAL PHARMACY

This chapter aims to initiate you into the selection of products dispensed by the hospital pharmacy.

Exercise 2.1.

a) Why is a drug formulary (peruslääkevalikoima) used in the hospitals? Who makes the decision and by which criteria which drugs are formulary and which are non-formulary? What kind of protocol is needed for prescribing and dispensing a non-formulary drug?

b) Radiopharmaceuticals: Is there a radiopharmacy unit in your training hospital? Describe its services and functions briefly.
c) What is meant by unlicenced / named-patient drugs (erityislupavalmiste)? How are those purchased and dispensed to patients? Describe briefly.

d) List here three most used unlicenced / named-patient drugs and indications for their use.

e) Infusion fluids: List here three most used infusion fluids. Describe the differences in their use briefly.
f) Hemodialysis and hemofiltration: Familiarize yourself with the dialysis fluids. What is meant by hemodialysis and hemofiltration?

g) TPN: What is meant by total parenteral nutrition (TPN)? How is the content (electrolytes, etc) of the TPN determined for each patient?
g) Choose two antimicrobials in the form of injection or infusion. In which category of antimicrobials do they belong to? How are they reconstituted before administering to patients and what is the route of administration? Are they compatible with other antimicrobial drugs?
3. DRUG TREATMENT

This chapter aims to initiate you into the treatment of either a) a cancer or b) an infectious disease, and deep vein thrombosis

Exercise 3.1. Choose a) a cancer OR b) an infectious disease, in the treatment of which drugs are administered intravenously (i.v.). Find out which formulary drugs are used for this disease and fill in the following table.

DISEASE:____________________________________________

<table>
<thead>
<tr>
<th>DRUG</th>
<th>DOSE, DURATION OF TREATMENT</th>
<th>MOST COMMON ADVERSE EFFECTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Exercise 3.2. Are there local treatment guidelines for this disease? If so, review briefly here. If not, find out other sources of treatment guidelines for this disease and review.

Exercise 3.3. Which low-molecular-weight heparins are formulary in your training hospital? How is deep vein thrombosis treated with these and other medicines. Write down the treatment guidelines.
4. CLINICAL PHARMACY / WARD PHARMACY

This chapter aims to initiate you into the concept of clinical pharmacy or pharmaceutical care in hospital setting, and into the services pharmacists provide on wards?

Exercise 4.1.

a) Describe in which way medicines are ordered and dispensed to patients on wards and by whom.

b) What kind of instructions has the pharmacy department given considering handling and reconstituting medicines on wards?

c) How often does the pharmacist check the ward stock of drugs? What is the situation related to the controlled drugs?
Exercise 4.2. Clinical pharmacy services

a) Some clinical pharmacy activities are listed below. Which of these activities do the clinical pharmacists of your training hospital participate in?

<table>
<thead>
<tr>
<th>Activity</th>
<th>yes</th>
<th>no</th>
</tr>
</thead>
<tbody>
<tr>
<td>recording drug histories</td>
<td></td>
<td></td>
</tr>
<tr>
<td>counselling patients during their stay or when they are discharged</td>
<td></td>
<td></td>
</tr>
<tr>
<td>clinical checking of the patients’ drug regimens (for interactions, contraindications, etc)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>conducting full medical reviews</td>
<td></td>
<td></td>
</tr>
<tr>
<td>participation in ward rounds</td>
<td></td>
<td></td>
</tr>
<tr>
<td>influencing treatment decisions</td>
<td></td>
<td></td>
</tr>
<tr>
<td>monitoring treatment outcomes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>ensuring rational use of drugs</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b) Describe the above mentioned or other clinical pharmacy / ward pharmacy activities in your training hospital. Are clinical pharmacy services provided by all pharmacists or only by specially trained clinical pharmacists? Were you involved in these activities?
c) Select one case where you and/or your supervisor had a positive impact on a patient’s drug treatment. Describe the case (patient’s details, past medical history, presenting complaint, current medication, laboratory values), your findings and recommendations to the doctor, and the outcomes.

d) Therapeutic drug monitoring: Do the clinical pharmacists request laboratory tests to be taken from patients (e.g. serum electrolytes when the patient is on diuretics)? Are there pharmacy guidelines for laboratory test requests (how often should the blood levels of digoxin, lithium, potassium etc. be checked)?
e) Do the pharmacists give calculation-based dosage advice to doctors, e.g. on gentamycin, according to patient’s clinical status (e.g. kidney function) and blood medicine levels? Give an example.

f) How are pharmacists’ recommendations on patients’ drug treatment or other pharmacist-initiated interventions documented?

g) Cost-effectiveness: Pharmacist in hospitals may ensure that the use of drugs is not only safe and effective, but also cost-effective. Do the pharmacists in your training hospital promote cost-effective use of drugs, and how?
h) Liaison with other professional groups: Write down a few of your notes about the pharmacists’ liaison with doctors and nurses.

**Exercise 4.3. Medication errors**

How are medication errors (e.g. dose omission, extra dose, wrong drug, wrong dose, wrong route, wrong patient) due to be documented on wards?
5. MEDICINES INFORMATION AND THE USE OF INFORMATION SOURCES

This chapter aims to initiate you into the different sources of medicines information and answering different kind of enquiries.

Exercise 5.1. Drug interactions

a) Which do you consider the first line sources for handling enquiries about drug interactions?

b) Use these sources (more than one) and write down your answer if a doctor would ask you whether he or she can prescribe ibuprofen for a patient who is on warfarin.

c) What possible background data do you need before answering and why?
Exercise 5.2. Enquiries - test exercises

These questions are designed to help you gain experience in answering queries from different types of enquirer needing different types of answer, and using a full range of information sources.

a) What health precautions are necessary for a visit to India in 1 months time?

b) Can octreotide be given by the subcutaneous route to reduce excessive ileostomy output? If so, at what dose?

c) Can indomethasin cause retinal pigmentation?

d) What are the side-effects of amiodarone?

e) When KCl (potassium chloride) is given peripherally, what is the highest recommended concentration and rate of infusion?
f) May metoclopramide and haloperidol injections be safely mixed in the same syringe prior to i.m. injection?

g) May cefuroxime and metronidazole be safely mixed in the same i.v. infusion?

h) Is it safe to breast feed whilst taking ranitidine?

i) Which antipsychotic drug can be suggested for an alcoholic patient?

**Exercise 5.3. Patient counselling**

Medicines for HIV and tuberculosis are often dispensed directly to patients from the hospital pharmacy. Choose either one of these two infectious diseases and find out what is the most commonly used drug combination for this disease. Write down the relevant information about how to take these drugs (the information you would give to the patient when counselling).
Exercise 5.6. Information produced by the drug information unit

a) Write down a few enquiries which were presented at the drug information unit of the hospital pharmacy while your training period. How were these queries answered and where was the information obtained from?

<table>
<thead>
<tr>
<th>Query/enquirer</th>
<th>Answer</th>
<th>Source of information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
b) Does the drug information unit produce and provide any written information or educational material for doctors or nurses? How about lectures etc.?
6. ASEPTIC COMPOUNDING / DRUG PRODUCTION

This chapter aims to initiate you into drug production and other functions of the manufacturing unit of the hospital pharmacy.

Exercise 6.1. Describe the premises in the production unit used for (you can use drawings to illustrate)

a) cytotoxic reconstitution

b) producing total parenteral nutrition (TPN)

c) producing intravenous drugs

d) preparing creams and ointments

e) preparing eye drops
Exercise 6.2. What steps of quality assurance (QA) are needed to ensure the cleanness and quality of the aseptic premises? How about the control of the employees involved in the drug production?

Exercise 6.3. Which steps of action are needed before accepting pharmaceutical raw materials for production use and why?

Exercise 6.4. Are control tests carried out on finished products? Describe the procedure of control tests on one product.
Exercise 6.5. Write a short essay about your experiences in drug production.
7. QUALITY ASSURANCE AND QUALITY CONTROL

This chapter aims to initiate you into the concept of quality assurance and quality control in hospital pharmacy setting

Exercise 7.1. Write down a few of your notes about how the quality assurance (QA) has been implemented in the pharmacy department.

Exercise 7.2. Returned medicines
What are the standard operation procedures (SOP’s) for medicines, which are returned from wards to the dispensary?
Exercise 7.3. Product defects
What actions will be taken by the pharmacy department in case of:

a) a nurse has found an insect in an infusion bottle

b) a patient has found a wrong product information leaflet (PIL) in the medicine container

Exercise 7.4. Dispensing errors
How are dispensing errors dealt with and documented?
8. CLINICAL TRIALS AND PHARMACY-CONDUCTED RESEARCH

This chapter aims to initiate you into the clinical trials carried out in your training hospital and into possible pharmacy-conducted research projects.

Exercise 8.1. How many clinical trials are ongoing in your training hospital? What diseases do they relate to and what phase are these trials in?

Exercise 8.2. What is the role of the pharmacy department in these trials? How does the investigational drug end up to the patient from the medical company? Use drawing to illustrate.
Exercise 8.3. Are there any practical research projects conducted by the pharmacy department in your training hospital? Describe briefly.
9. CONDUCT OF HOSPITAL PHARMACY AND PERSONNEL MANAGEMENT

Exercise 9.1. What are the main economic indicators of the hospital pharmacy (turnover, purchased products, expired drugs, dispensed products, volume of drug production, etc.)?

Exercise 9.2. By which criteria is the appropriate number of staff defined in the hospital pharmacy?

Exercise 9.3. How has the internal and external communication been organised? Are there ways to improve communication within the staff? Write down a few of your notes and suggestions.
Exercise 9.4. Which methods are used to increase motivation of the staff? Which methods do you think could be used? Provide arguments for your suggestions.

Exercise 9.5. List here qualities of a good chief pharmacist / employee? How can you as a member of a team affect the working climate?
10. ANALYSIS OF LEARNING

**Exercise 10.1. Training as a learning process**

Write an essay about “Training in a hospital pharmacy abroad” at the end of your training. How has this training period affected your views about pharmacy as a profession and your future plans? What do you consider to be the most important things you have learned? Comparison between a hospital pharmacy and a community pharmacy, list positive / negative aspects (with arguments).
Työkirja on palautettu ___ / ____ 200 __

Tarkastaminen
farmakologian ja toksikologian laitos
hyväksytty □ tehtävä korjauksia, täydennyksiä □
__________________________________________ __ _ / ___ 200 __

farmasian teknologian ja biofarmasian laitos
hyväksytty □ tehtävä korjauksia, täydennyksiä □
__________________________________________ __ _ / ___ 200 __

sosiaalifarmasian laitos
hyväksytty □ tehtävä korjauksia, täydennyksiä □
__________________________________________ __ _ / ___ 200 __

Korjaukset / täydennykset on tehtävä hyväksytysti ennen työkirjan hyväksymistä:
sivuilla: ________________________________ merkityt kohdat.

Työ opiski! työkirjan asiasisältö hyväksytty ____ / ____ 200 __
__________________________________________