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Eriksson, Tommy; Strobel Wallin, Frida; Henricson, Karin; Lundin, Anna; Petersson, Jesper

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*Total number of authors:*

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LUND UNIVERSITY

PO Box 117  
221 00 Lund  
+46 46-222 00 00

## ApoLänk decreases patient medication discrepancies at discharge: initial experience from a Swedish bedside pharmacy service.

Tommy Eriksson\*, Assoc Prof, MSc Pharm, PhD, Apoteket Farmaci AB, Stockholm

Frida Strobel Wallin, MSc Pharm, Hospital Pharmacy, Skåne University Hospital in Malmö.

Karin Henricson, MSc Pharm, PhD, Hospital Pharmacy, Skåne University Hospital in Malmö.

Anna Lundin, MD, Department of Neurology, Skåne University Hospital in Malmö.

Jesper Petersson, MD, Assoc Prof, MD, PhD, Department of Neurology, Skåne University Hospital in Malmö.

\*Corresponding author Department of Clinical Pharmacology, Lund University, Box 188, 221 00 Lund, Sweden. tommy.eriksson@med.lu.se

### ***Impact of the research findings on daily pharmacy or clinical practice***

- This bedside dispensing service, in which a pharmacist have access to both pharmacy and health-care (hospital) records, identified discrepancies in prescriptions on discharge of patients from hospital.
- The identified discrepancies were solved by communication with the patient and the medical staff.
- The service is almost cost neutral and reduces discrepancies that has the potential to cause patient harm.

### ***Abstract***

#### *Objective*

The purpose was to develop a working model so that the dispensing pharmacist, patient and medical staff can work together to identify, solve and prevent problems associated with discharge prescriptions.

#### *Method*

A routine was developed for pharmacist, patient and medical staff communication, and for dispensing drugs at bedside. Hospital medication lists and prescriptions from the pharmacy and health-care databases were simultaneously assessed. The study was carried out in two neurologic wards in a Swedish University Hospital.

### *Results*

Major shortcomings were identified in the coordination of pharmacy and health-care records and in the patient's ability to take responsibility for their medication at discharge. Discussion with the patient and staff allowed discrepancies in communication and documentation to be corrected. Cooperation between the pharmacist and the nurses was perceived as being very positive and important.

### *Conclusion*

The Apolänk service was appreciated by nurses, almost cost neutral and reduces discrepancies that have the potential to cause patient harm

### **Key words**

Sweden, Clinical pharmacy services, Discharge, Dispensing, Medication errors, medication reconciliation

## Introduction

If a patient is to obtain the benefits of his medication safely, several requirements must be met: the drug must be correctly selected and dispensed, the relevant information must be clearly communicated to the patient, and the patient must have access to and take the medication appropriately during the entire period of treatment. However, this is not often the case, and lessons learned from hundreds of organizations have demonstrated that poor communication of medical information in the transition of patients between care facilities has caused up to 50% of all medication errors in hospitals and up to 20% of drug-related harm [1].

The supply of medications can be made safer and more efficient if the appropriate interventions are introduced on the ward before the patient is discharged from hospital to home or to another form of care. ApoLänk is a system that was designed at Apoteket AB (a state owned Swedish Pharmacy company) with the main aims of saving time for health-care providers, increasing patient safety and security, and answering patients' questions before they leave hospital. This is the first scientific assessment of ApoLänk.

In Sweden, as in other European countries, pharmacies and health-care providers do not share access to the same information about patients' prescriptions. Pharmacies in Sweden can access information from two databases containing all electronic prescriptions and all prescriptions that have been dispensed by any Swedish pharmacy in the past 15 months, respectively.

Doctors normally only have access to the prescriptions and medicine lists they have compiled for their own health records. The patient provides the information on current prescriptions for both pharmacies and health-care providers. The documentation and communication of medication lists when patients are transferred between different levels of care is traditionally

poor, with resultant errors and clinical consequences.[2-10] In Sweden, the National Board of Health and Welfare states that "good communication with the patient, which causes the patient to become involved in and can influence their care and treatment, is a fundamental requirement of all health care"[11].

To our knowledge, there is to date no project examining how ApoLänk or similar systems can be used to study the health-care and pharmacy records, or how this information can be synchronized to improve medication use by patients.

### **Aim of the study**

The purpose of this project was to develop a working model based on ApoLänk so that the dispensing pharmacist, patient and medical staff can work together to identify, solve and prevent problems associated with discharge prescriptions.

### **Methods**

#### *Settings and organisation*

This descriptive study was conducted in two wards of the Department of Neurology, Skåne University Hospital (SUS) in Malmö during May to December 2010. A clinical pharmacy project based on the Lund Integrated Medicine Management (LIMM) model was simultaneously conducted for stroke patients [10]. In the LIMM model, the patients' medications were reconciled with pharmacy and health-care records by a clinical pharmacist at admission and reviewed continuously during hospitalization. At discharge, the physician prepared written discharge information that included a medication report (changes made during hospital stay and the reason for it) and a current medication list, and communicated this orally to the patient. This information was also sent to the next level of care on the same

day [7]. A nurse delivered seven days' supply of all the patient's medicines, without patient-pharmacist contact.

### *ApoLänk procedures*

The stroke patients included in the L IMM-model was offered to have new and current medications dispensed by a pharmacist on the ward before discharge. The procedure was similar to normal community pharmacy procedures but the pharmacist also had access to hospital health care records and patient medication use during hospital stay:

- Cognitive clear patients were asked if they would like ApoLänk services.
- Possible current prescriptions were identified from the standard pharmacy records (national electronic prescriptions and pharmacy dispensing databases) and the hospital electronic health-care record.
- Discrepancies between this records and the use stated by the patient, including past use and changes during hospital stay were discussed with the patient and medical staff.
- An agreement on what to dispense was reached between pharmacist, patient and medical staff.
- Medicines were delivered to the bedside; payment, supported by a mobile pharmacy computer with a cash machine and a printer for labels, was also handled at the bedside.
- The patient received additional information about the use of medicines, prescription changes and current dosages. Non-current electronic prescriptions were discussed and withdrawn from the database.

### *Identification of discrepancies*

Any uncertainties or problems identified during dispensing or discussion were resolved by contacting the responsible nurse, or the physician if required. In-depth problem inventories were conducted during the period September 27 to December 23.

#### *Attitudes of nurses to the service*

A simple questionnaire was distributed to nurses on the wards eight weeks after the end of the project. The questionnaire contained five open and three closed questions for the nurses to indicate how valuable the ApoLänk service had been and how it affected their time utilisation.

## **Results**

#### *Dispensing medications*

Of the 75 patients receiving the ApoLänk service, 32 were included in the in-depth problem inventory. These 32 patients represent about 7% of the patients who were discharged during the period. Case reports, case analyses and more detailed results is available from the corresponding author. The average patient age was 82 years, 66% were women, and 167 prescriptions were dispensed (mean 5.2, range 2-14 per patient). The time required for the pharmacist to carry out the ApoLänk procedure ranged from 15 to 80 (mean 36) minutes per patient. The L IMM discharge information sheet [11] was written for 81% of the study patients but was only available for 38% at the time of dispensing. Additional information was given to 50% of the patients by the ApoLänk pharmacist and non-current prescriptions were withdrawn for 25% (range, 2-21 prescriptions/patient).

#### *Inventory of discrepancies*

Discrepancies in drug treatment, identified for 17 (53%) patients (Table 1), were mainly caused by confusion between current medications in the hospital records and prescriptions to

be dispensed and used after discharge. Discrepancies in drug treatment were detected for 7 of 12 patients for whom discharge information was available.

### *Nurse attitudes*

Of 30 nurses receiving the questionnaire, 15 responded (Table 2). Most found the service valuable and indicated that it facilitated their work. Thirteen said they saved 12.5 to 60 (mean 30) minutes/patient as a consequence. Of the 14 who stated why the service was good, many mentioned time saving, accurate patient information, the opportunity to ask questions, and the expert advice on medications from the pharmacist. Two nurses did not think there was a need for the service and stated that they did it well themselves.

## **Discussion**

This pilot project demonstrates large gaps in the coordination of various prescription lists which limits the patient's ability to take responsibility for their medication on discharge. This problem is not unique to the studied wards or, indeed, to Sweden. We believe that health-care providers do not adequately communicate to the patient that they can influence their own care and treatment. This is because health-care providers do not have the systems in place, or the legal right, to check the prescriptions relevant for each patient and to eliminate those that are out of date. In this study the clinical pharmacist performed LMM-medication reconciliation at admission which identifies as a mean 1.7 discrepancies per patient and also solves discrepancies since doctors correct 93% of suggested changes [9]. At discharge the physician should prepare written discharge information including a medication report (changes in medication therapy and reason for this) and a list of the current medications and discuss this with the patient. This study shows discrepancies in this last link. In Sweden, this problem can currently only be resolved by pharmacists who work in a pharmacy and therefore can delete



prescriptions in the pharmacy records on behalf of the patient, and also have access to all the prescriptions from health-care records.

Our research group have previously shown that Medication Report at discharge produced by a physician reduce drug-related problems and the risk of clinical consequences and subsequent health-care contact by 50% [2,3]. However the use and the quality of the medication reconciliation at discharge is low [7] but improves significantly with lower error rates when a pharmacist is involved in the process [5,6,8]. In general there are few studies on medication reconciliation and in a recent systematic review only seven studies were identified and included [4]. According to recent studies specific activities and electronic health care records do not automatically reduce the occurrence of medication discrepancies in the patient transfer [11] and the use of specific developed tools are low [7,12]. In our present study we used a pharmacist with access to pharmacy and health-care records as a gatekeeper to identify and correct discrepancies at discharge. Based on the time spent by the pharmacist and saved by the nurses, ApoLänk appears to be almost cost-neutral. It also prevents at least one extra pharmacy visit and reduces the patient's medication-related problems, thus providing health benefits.

There is currently a medication-based patient safety focus in Sweden [14] with proposals for constitutional amendments [15], including the availability of written discharge information at discharge containing an accurate medication list and a medication report. In our study, written discharge information was produced for 26 of 32 patients but was available for only 12 when the pharmacist dispensed the drugs. For seven of these 12, there was at least one error in the medication list that required correction before the patient went home. These quality shortcomings have recently been confirmed in a study from SUS Lund [7], and indicate that

there should be a designated responsible professional whose focus is to ensure that discharge information is available and that the patient understands their medication regimen, as provided by the ApoLänk service.

A movement to instigate a national database of all prescriptions is currently under discussion in Sweden; this should be available to all those involved in the care of patients. However, communication with the patient to sort out potential misunderstandings is an additional essential component.

## **Conclusion**

Many problems were identified by a pharmacist systematically reconciling patients' records from the pharmacy databases and the inpatient medication lists. Many of these were resolved by dialogue with the patient before discharge. The nurses reported that the service was valuable and time-saving, and that it facilitated their work. This pilot study provides important information for further study on how patient communication can be developed to provide safer, more efficient, patient-centred health care.

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## Tables

**Table 1.** Identified medication discrepancies for discharge patients receiving the ApoLänk service

Patient	Discrepancies
1	Not all prescriptions issued; old prescriptions that were not to be repeated issued; old prescriptions with non-current strengths or dosages repeated; patient not clear about which prescriptions are relevant.
6	Errors in the discharge information.
7	Not all prescriptions issued; prescription with wrong dosage (new prescription not issued at discharge).

9	Errors in the discharge information; patient did not understand that oestrogens had been deleted.
11	No medication report in the discharge information; errors in medication list.
12	Errors in the discharge information.
15	Errors in Apodos (multidose system list).
16	Incorrect dosage on printed prescription.
17	Errors in the discharge information; dosage of the issued prescription did not match that in the medication list in the discharge information.
20	Errors in the medication list.
22	Major dosage changes; medication in the patient's home with the wrong dosage; incorrect medication list.
23	Inconsistency between medication list and issued prescriptions.
24	Inadequate discharge information.
26	Unclear which prescriptions were current.
27	Incomplete medication list.
29	Problems concerning current medication list and prescriptions.
32	Incorrect dosage in the prescription compared with current medication list; no new prescription issued.

**Table 2:** Nurses' attitudes to the ApoLänk service

Statement	Fully agree	Largely agree	Partly agree	Do not agree at all	Do not know
It is valuable to me in my work that the pharmacist gives discharged patients advice on their medicines at the bedside	12	1	1	1	0
It is valuable to me in my work that the pharmacy delivers drugs to the patients' bedsides at discharge.	10	2	1	2	0
This pharmacy service makes it easier for me when the patient is discharged from the ward.	12	0	1	1	1