

# Bedside computer - How modern technology can improve the process of patient treatment and care in hospitals

## Introduction

When we think about modern technology in hospitals we often picture complicated diagnostic machinery helping us to determine what is going on inside the human body. But we often forget that simply putting a computer next to the patient's bed can greatly improve the process of treatment.

## Existing situation

With the development of modern ICT there is really no more reason why medical data shouldn't be available anywhere the medical staff and the patient need it.

We know that a large portion of activity in hospitals takes place by the patient's bed, but it is there that information is scarce - information we know is available in hospital information systems. On the other hand, hospital staff determining the patient's condition during treatment administers medicine and providing care still writes down information on paper and later inputs that information into the hospital information system.

Since the majority of the treatment and care process takes place by the patient's bed, it would make sense that information about it should be recorded in hospital information systems and that all relevant data from information systems could be accessed on the spot, not only by hospital staff but also by the patient, in suitable form.

## Bedside computer

The bedside computer allows the physician, hospital staff and the patient access to information when and where they need it. With the help of the bedside computer we can

monitor the treatment process, we can offer the patient and their family information about their medical treatment - treatment history, further treatment and the prospects. A few solutions of this kind are described below.

## Electronic therapy sheet

While on the rounds and while visiting patients in hospital, physicians check the patient's condition and determine further treatment. In

order to do this, they need information such as the patient's current medical condition, treatment history up to this moment, what medication has been administered and how the patient has reacted to therapy, lab results and results of other diagnostic procedures. Treatment information is mostly still recorded on a paper "therapy sheet".

With the introduction of the new electronic therapy sheet connected to the hospital information system wirelessly hospital staff can view information in a familiar, organized

Picture 1. Electronic Therapy Sheet

Pacijent 1	Datum sprejema: 30.03.2008	Datum rojstva: 12.12.1970	Kritični dejavniki:
	Ura sprejema: 10:00	Teža: 66 kg	Znane na prenos:
	30.03.08	31.03.08	01.04.08
ARHONJAN J. J. g 1 viala iv 8h	14 22	→	→
ASPIRIN 100 mg 1 TAB po os 1x d)	19	→	→
EUSMID 40 mg 1 TAB po os 1x d) 2 TAB po os 1x 2x po jeli (1+1+2)	19	→	→
MARIVARIN tablete 3 3 TAB po os 1x d) (3-4-5)	6	→	→
FLUCICLOX 50 mg 3 viala iv	12 18 24	→	→
DIURETIC 25 mg 1 oml 2 kratki samo po 12h	11	/ex	

format, and at the same time the data is stored in the hospital information system. Thus the physician gains access to all information needed to determine further treatment, and at the same time he or she can record any changes in treatment on the spot.

## Using the PDA and barcode system to monitor activities involving the patient

The use of PDAs equipped with barcode scanners allows access to data on issued medication, used materials and procedures carried out on the patient, both by the patient's bed and in the operating theater. Using PDAs with built-in barcode scanners, hospital staff can quickly and accurately record all events occurring in the course of the patient's treatment, as well as track use of medication and materials. This allows us to track the use of material and medicine and services provided to the individual patient.

Picture 2. PDA with barcode scanner



Data capture takes place by the patient's bedside. First the healthcare provider identifies themselves to the PDA and provides information about the working environment where the event is taking place. The patient's barcode printed on a wristband identifies the patient and their hospital record. Then the barcode scan is used to record the procedures and services rendered and medication and material used. The data is collected in the PDA device and transferred into the hospital system once the PDA is placed on the mount connected to the computer and the data transfer engaged. In the hospital system all data is stored into

the record containing information about the patient and his hospital treatment, and this data is then available for future analysis. The link to the material tracking system automatically transmits data about the medication and materials used in connection with the patient. This way material tracking system is always up-to-date in terms of inventories, helping to reduce the volume of inventories and decrease costs.



Picture 3. Wristband with barcode

## Electronic patient record, clinical pathways and data analyses

Electronic collection of medical data by the patient's bed and any place where medical treatment and care take place, helps us build an electronic patient record. More detailed and updated electronic patient records allow additional expert and business analyses of the patient's treatment.

If we have a computerized clinical pathway for treatment of a particular disease afflicting the patient, we can find out at any point of treatment at what stage of the clinical pathway the patient currently is, which procedures have already been carried out, which procedures are still pending and how much treatment has deviated from the guidelines. This information helps both the medical staff administering treatment and providing patient care, and the patient themselves. By analyzing the patient treatment data medical staff can determine the quality of their healthcare provision, as well as find where things can still be improved. The gathered data about services, treatment and material used in connection with the patient can also be used to determine the actual cost of treatment.

## The patient's insight into treatment

At the moment, the hospitalized patient has poor access to medical data about their medical treatment, even though they are the owner of this data. While medical staff do provide information about their condition and treatment, the time constraints imposed on the doctor or the patient's emotional condition prevent this information from being adequately transferred to the patient. It would be much better if a patient could use a bedside computer to access this information and absorb them at their own pace. For this purpose we would need a customized overview of the patient's medical treatment which would be adapted to the patient. The patient would also need to review the future treatment procedure, as it is psychologically better for the patient to know what they can expect. In addition, other relevant information could be provided to the patient in this manner, which might be of interest to them but would take too long for hospital staff to explain in person. The selection of information available to the patient could thus be much broader, and the patient could customize the information to suit their level of interest. Like the patient, other authorized persons could also be given access to information about medical treatment, for example family members who can currently only obtain such information over the phone or by visiting the hospital.

## Summary

Existing computer technology has opened up new possibilities to improve medical treatment of patients in hospitals. With the help of the bedside computer we are bringing information to the place where it is most needed. Working procedures which electronically record medical data as they are created help us build electronic patient records. The data collected in this manner allows us to perform expert and business analyses, pinpointing areas we can improve. This allows us to give the patient and their family access to information about their treatment, and it also improves the quality of treatment as experienced by the patient themselves.

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