PRONTO System: integration between doctors and pharmacists in the basic health care

Mauro Marcelo Mattos, Luciana Pereira de Araújo, Maria Eduarda Demmer, Shaiane Mafra Casa, Eric Boeing, Jonathan Rodrigues Ev, João Magnani, Simone Erbs da Costa, Marcio Michelluzzi, Caíque Reinhold, Rogério Mello Vanti, Jacques Robert Heckmann

Development and Technology Transference Lab, Computer System Department, University of Blumenau
Blumenau, SC, Brasil

mattos@furb.br, lpa@furb.br, medemmer@gmail.com, shaimafra@gmail.com, ericbenck@gmail.com, jonathanrodriguesev@gmail.com, jogamabnu@gmail.com, si.gen@terra.com.br, marciomichelluzzi@gmail.com, caiquereinhold@gmail.com, rmvanti@gmail.com, jrh@furb.br

Abstract - *This paper present a PRONTO system that is a management public health system deployment at Blumenau city. This system integrate the functionalities need to provide the assistant to the patients. In this paper we related the experience during the deployment with relation to integration between doctors and pharmacists. This integration is need because the doctors prescribe drugs and the pharmacists dispense them. Until this moment, it was made 25,191 prescriptions using PRONTO system in a total 28 units that use this system..*

Keywords: Health care; prescription; PRONTO system.

1   Introduction

The PRONTO System is a health care system developed in Blumenau city with goal to integrate the primary health care and secondary health care of the city [1]. Blumenau provides the public health care existing at Brazil. This system called "Sistemas Único de Saúde" (SUS), in English Health Unique System offers free health services to citizens, like medical consults, pharmacy, dental appointment, dispensing drugs, health proceedings and other [1,2]. This system was created with Brazilian Constitution at 1988 and has the goal to allow the free health care for all citizen [3,1].

Even though the name, in begin, the SUS was not computerized and the health care was not centralized [1,4]. Each Brazilian city has your system that can be computerized or not, and the same patient can have many health records [5]. This is possible because when the patient goes to other unity health care he/she does not bring his health record is created another health record for him.

This lack of centralization causes loss for health proceedings and for the health patient himself [4]. An example is when the patient go to doctor and the doctor make a prescription. In the next medical consultation, the doctor does not know if the patient took off the drugs at the pharmacy because the pharmacy do not has this information. And because the doctor did not communicate with the pharmacists. This is dangerous because the doctor can continue the treatment thinking that the patient took off the drug, but in really he did not took.

With the PRONTO System, the services provided by SUS are centralized and unified. The medical consultation, the pharmacy and other services are integrated and each one can see what the patient do and where the patient go in the PRONTO.

This paper presents the relationship between doctors and pharmacists through the PRONTO System from an experience report that occurs in Blumenau city. This paper follows. The related works section presents and discusses about other paper related to this. The PRONTO System section presents the system and its functionalities. The experience report section describes the used system by the health professionals and real patients in the unity health centers with focus between doctors and pharmacists. Finally, the discussion section present the results obtained with the experience and discusses about the results in a widespread case.

2   Related Works

In this section we present some paper related with our research.

Rigby et al. [6] relate about collaboration between doctors and pharmacists. They say that the relation between them during a prescription is important because the pharmacist works with the drugs and they know the benefits of each one, and in times, they know about the drugs more than doctors. Then, for the authors, the pharmacists should participate of medical consultations and help to make the prescriptions. This collaboration could be made by a system and the result for the patient will be most efficient.

Teixeira [4] describes the decentralization of SUS services and points the losses caused by this decentralization. For author the professional's health should communicate to study the patient case and solve a collaborative way his problems. Teixeira comment that the computerization each health unit made your system and the information is not centralized. For author, the decentralization services delayed healing problem of patient.

Lehmann et al. [7] discusses about the patient information shared among the health professionals. Although the patients knew that their information it were shared and they knew that is provide relevant information to treatment, some patient did not agree with this shared information. Other side, related to shared information with the pharmacists, the most patient agree with this shared. It is possible because the patient has more contact with the pharmacists and they know the pharmacists role because they dispense the drugs for them.

Baysari et al. [8] realized a study about the need alerts during drugs dispensation at pharmacies about intolerance and allergy that patient have. The authors perceive that the dispenser receive an excess of alerts that need analyzed to know if it is important or no. Then, the dispensers started to not read the alerts. In the study, the authors conclude that the use of alerts on a system must be done carefully so they are not fired irrelevant way leading to not reading the relevant information.

The papers present are related to this because they discuss the relation among health professionals, with focus in pharmacists and doctors. The differential of this paper is that we applied the research in real environment and we obtained a positive point with the information integration. We do not promote the direct collaboration among the professionals but in indirectly way they collaborate one with other.

3   PRONTO System

The PRONTO system was developed through agreement between Blumenau City Hall and University of Blumenau (FURB) by Development and Technology Transference Lab (LDTT). The PRONTO is a public health management system that allow to take decisions supported by updated information while that enables the service optimization processes to citizen [5,9].

The PRONTO integrate and computerize the public health, initially at Blumenau city [5,10]. Although the PRONTO architecture allow it deployment in other cities.

The system is developed from weekly meetings that involve system users, managers, system analysts and designers with intent to available the functionalities need to public health network at SUS in Blumenau [10].

The system also aims to reduce the quantity of care in units and hospitals with secondary and high complexity [1]. The system is divided in modules to facility the access by professionals that use it. These modules are: administrative, treatment, pharmacy, stock, management, health community agent and center for testing and counseling [1]. Each module is visible according profile user and it is possible configure what buttons will be enabled or no inside each one.

The doctor, for example, has allowed accessing the treatment module to make his medical consultations. In his screen, the doctor sees a list with patients that are in treatment line. Then, the doctor call a patient, make the evolution in his electronic health record, make the prescription, see the drugs that the patient took off in the pharmacy and all functionalities necessaries. Otherwise, the pharmacist has allowed to access the pharmacy module. In this module he can dispense drugs for the patient.

The PRONTO prescriptions has a barcode, then if the patient goes in a SUS pharmacy with a PRONTO prescription, the pharmacists write the barcode in PRONTO system and the dispense screen is filled. With this, the pharmacist can see better what the drugs the patient need than the manual prescription. Also, all dispersions were registered in the system, i.e., a patient cannot get the same drugs before duration these drugs write in the prescription.

IDENTIFICAÇÃO DO EMITENTE

43471557201400000021   RECEITA

Unidade: UNIDADE TREINAMENTO 1
Telefone: 47 33210000
Usuário: ADMINISTRADOR DE SISTEMA

MEDICAMENTOS DO SUS

1. PARACETAMOL 500MG COMPRIMIDO.........................30 unidades
   Take one after wake up

2. ACIDO ACETILSALICILICO 100 MG COMPRIMIDO..............60 unidades
   Take two pils for day after lunch

Figure 1 – Part of normal prescription by PRONTO

A sample of PRONTO prescription can be viewed in Figure 1. All prescription has a list with drugs. For each drug have a amount of pill and what time this amount will be last. Normally, the time corresponds to 30 days. The PRONTO generate four prescription kinds: normal, type A, type B, controlled and antibiotic. These are the kinds that SUS offers and are differentiated by time validation and drug types.

The PRONTO implements a unique health record, i.e., each patient has just one electronic health record in network. Thus, all professionals that use PRONTO can see what the treatment patient and all things that the patient through PRONTO. For reply the data patient to all health units we implement a replication networks. Each unit has one server

that replies the data patient for other units. Thus, each unit has the same data. In Figure 2 it is possible see this structure related to the electronic health record.

Figure 2 – Electronic health record architecture

4 Experience Report

The PRONTO development started in August 2011 and in June 2012 was installed in a health unit to be tested. In this health unit, the PRONTO already has been used to medical consultations.

The PRONTO was installed by deployment team of university. This team follows the health professionals during two weeks to help with the system use. Initially, the professionals had difficulties that were clear with the use. Related to the patients, some like the system and other do not. The good side of the system is the integration among the health services and the data integration. Other hand, some patients see the control of actions patient like some bad. This control implies that a patient just can take off drug at pharmacy if he did not get yet. And if the patient lack of a medical consultation, the system add a lack for this patient. And with this information the health professional can have a control of patient activities.

In the first health unit the system was tested and approved. Then, one year later, the PRONTO was installed in public pharmacies, in total nine pharmacies. Initially we have much confusion in the pharmacy because each patient has to register on the system to then take off his drugs. And, if the patient has already got the drug, he did not take off again.

After we test in one health unit and pharmacies we began deploy the PRONTO in other health unity. For each new unit had training in a laboratory at university with the health professionals to learn about PRONTO System. Next, the deployment team follows the professionals at unit during the treatments.

After three deployment years we have 28 health units integrated using the PRONTO. This represents two regions of the city and about 38% of all health units at Blumenau. These units are basic health care unit, general ambulatory, polyclinic, advice testing center (in Portuguese CTA) and university hospital (secondary treatment). All these units are integrated, i.e., if the patient goes in one unit, the other units can see what this patient did and where he went (this visualization is controlled by user profile).

With this integration, some doctors began to see the drugs that the patient uses through the system. This is amazing because some patient does not remember the drug name that uses and was other doctor that prescribes it. Then, the doctor can prescribe new drugs or just renew the last prescription by the system.

Initially, the doctor could view the drugs withdraw at the pharmacy but do not see the last prescriptions. This occurs because the system was deployed in parts, and some units do not have the system to make the prescription. But, just with the visualization of withdraw drugs; the doctors had a better information about the patient. The screen that represent the withdraw drugs can be viewed in Figure 3.

Figure 3 – Drugs get in the pharmacy

This screen is divided in columns that provide information about the drugs withdraw by the patient in a SUS pharmacy. During the visits in the health units, we observe that the most important information is how many days to complete treatment. This information is important because the doctor can know if the patient gets the drug in the pharmacy and the data. Therefore, he can know if the drug is taking effect as expected.

With the use system, the doctors feel the need to prescript drugs that are external to SUS. In other words, the SUS offers for free some drugs that are more used by citizen. And these drugs normally are generics. The doctors can prescribe drugs who did not exist in SUS and who need buy in a pharmacy. Initially, for this kind of drug, the doctor has been prescribing in a manual form. For solve this impropriety we developed a prescription without SUS drugs. Thus, if the doctor wants prescribe drugs external SUS he can. This prescription is made on white field and is printed like the other prescriptions.

4.1 About Numbers

Until November 2014, the PRONTO System generated 25,191 prescriptions, and of these prescriptions 12,262 were for different patients.

Related to kind prescription the Table 1 relates the kind prescription and the amount prescript of this kind. This shows

that the most of prescriptions are normal. This is acceptable because the normal prescription offers the common drugs like aspirin and *paracetamol*. Drugs to treat headache, stomach ache and other common diseases. Type A and type B prescription are less frequent because this prescription offers the drugs more dangerous and are most controlled than normal. And this kind prescription need a number provided by national health surveillance agency (ANVISA), i.e., the doctor must have the prescription in a specific form and, if he want, can prescript by PRONTO too for registered in the system.

Table 1. Prescriptions by kind

Kind	Amount
Normal	16,853
Type A	3
Type B	602
Controlled	3,102
Antibiotic	4,631
Total	25,191

Analyzing the PRONTO prescriptions we observed that 4,137 prescriptions do not have drugs SUS, i.e., this prescriptions offers just drugs who need buy at a common pharmacy. This information was taken looking at the prescriptions that had only the field of external drugs SUS filled.

5   Discussions

With the computerizing of the health network Blumenau was possible integrate the services provided by doctors with the pharmacists' services. The most important service integrated was the prescriptions. With this integration the pharmacists can read and controlled better the dispensing drugs because the prescriptions are digitalized. The pharmacists can see how much drugs the patient took off at pharmacy and what drugs he use. Also, the pharmacists have a access to history of dispensations made to patient and can control if the patient already have the drug.

In other side, with the computerizing, the doctors have the integration of electronic health record patient, prescriptions and can see what drugs the patients withdrew from the SUS pharmacy. This information helps the doctors to control the treatment used to care the patient.

Although the experience, it is possible conclude that with computerizing and the integration of health services, the professionals health can control better the treatment patient because they have information of all units that the patient went. They can see the problems that occur with the patient and see the drugs that he takes, even without the need to give this information.

With future works, we will continue deploy the PRONTO System at Blumenau city, and next, we will pretend deploy in other regions to integrate many cities with the same system. Thus, the same electronic health record could be viewed by professional health of many cities.

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