

An Electronic Prescription System, Enhancement of Safety and Quality of Traditional Prescription System

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Abstract— Electronic prescription system is an important part of the nation's push to enhance the safety and quality of the prescription process. E-prescription allows providers in the ambulatory care setting to send prescriptions electronically to the pharmacy and can be a stand-alone system or part of an integrated electronic health record system. The methodology for this study followed the basic principles of a systematic review. A total of 47 sources were referenced. Results of this research study suggest that e-prescription reduces prescription errors, increases efficiency, and helps to save on health care costs. However, there have been significant barriers to implementation including cost, lack of provider support, patient privacy, system errors, and legal issues. Electronic prescription system is a way for prescribe-rs (health care providers legally allowed to write prescriptions) to send your prescriptions electronically and directly to your pharmacy. Electronic prescription system can save your money, time, and help keep you safe.

Keywords—e-prescription system, legal issues, cost saving, prescription, safety, privacy, ambulatory care.

I. INTRODUCTION

Electronic Prescription Service system (EPS) is the online-based electronic generation and filling of a medical prescription, taking the place of paper and faxed prescriptions. E-prescribing allows a physician, pharmacist, nurse practitioner, or physician assistant to electronically transmit a new prescription. It outlines the ability to send error-free, accurate, and understandable prescriptions electronically from the health care provider to the pharmacy. E-prescribing is meant to reduce the risks associated with traditional prescription script writing. It is also one of the major reasons for the push for electronic medical records.

The EPS enables prescribers - such as general practices and practice nurses - to send prescriptions electronically to a dispenser (such as a pharmacy) of the patient's choice. This makes the prescribing and dispensing process more efficient and convenient for patients and staff.

A. Scope and objectives

The main objective of the project is to provide a web application to generating a complete active medication list

incorporating electronic data received from applicable drug plan(s) if available, selecting medications, printing prescriptions, and electronically transmitting prescriptions.

EPS is a powerful tool for safely and efficiently managing their patient's medications. Compared to paper-based prescribing where handwritten prescriptions is eliminated, decreasing the risk of medication errors while simultaneously decreasing risks related to liability, e-prescribing can also enhance patient safety and medication compliance, improve prescribing accuracy and efficiency.

- Prescriptions can be processed more efficiently.
- Greater control on the prescription.
- Less time consumption while dealing with prescription queries.

II. SYSTEM ANALYSIS

E-prescribing allows a physician, pharmacist, nurse practitioner, or physician assistant to electronically transmit a new prescription. It outlines the ability to send error-free, accurate, and understandable prescriptions electronically from the health care provider to the pharmacy. E-prescribing is meant to reduce the risks associated with traditional prescription script writing. It is also one of the major reasons for the push for electronic medical records.

A. Existing System

In the existing system a prescription is handwritten on pre-printed prescription forms that are assembled into pads. In some cases, a prescription may be transmitted from the physician to the pharmacist orally by telephone.

Drawbacks of the Existing System

- Poor Understanding of the handwriting.
- Miss-Match of the Drugs.
- There may be no stock of drug in market, which is generally not known by physician.

B. Proposed System

The proposed system overcome the drawbacks of the existing system by providing the electronic generation of prescription which enhance patient safety and medication compliance, improve prescribing accuracy and efficiency.

Advantages of the proposed system.

- Improving patient safety and quality of care.
- Reducing time spent on phone calls and call-backs to pharmacies.
- Reducing time spent faxing prescriptions to pharmacies.
- Automating the prescription renewal request and authorization process.
- Increasing patient convenience and medication compliance.

III. SYSTEM REQUIREMENT SPECIFICATIONS

A. Hardware Specifications

TABLE I. MINIMUM HARDWARE REQUIREMENTS

Processor	Dual Core 2.0GHz
RAM	1GB DDR2
Hard disk	320GB
Monitor	LCD, Color

B. Software Specifications

TABLE II. MINIMUM SOFTWARE REQUIREMENTS

Operating System	Windows XP
Technology	ASP
Database	SQL server 2010
Scripting Language	Java Script
Coding Language	C#
IDE	Microsoft Visual Studio-2010
Server	IIS Server 7.0

IV. SYSTEM DESIGN

The system design is a concept that gives design of the system. The system design should be done in a manner where design should fulfill the needs the user. The system design should also include the aspects, flexibility, security and complexity of the system. The system design must be designed in the way which can solve the existing problem of the system and also solution to the problems which may occur in the future. The main focus of the system design is to implement the system in detail. Therefore system design is a process of defining and developing system to satisfy the user requirement.

The most creative and challenging phase of the life cycle is system design. The term design describes a final system and the process by which it is developed. It refers to the technical specifications that will be applied in implementations of the system. The importance of software design can be stated in a single word "Quality". Design provides us with representations of software that can be assessed for quality. Design is the only way where we can accurately translate user requirements into a complete software product or system.

Modules Description

A. Administrator

He is the main user of the application who is responsible for managing the website and registering of the doctors & pharmacist and view details of the drugs which is specified to the patients by the doctor.

B. Doctor

Doctor searches through the database of patient records by using patient-specific information such as first and last name, date of birth, current address etc. Once the correct patient file has been accessed, the prescriber reviews the current medical information and uploads or updates new prescription information to the medical file.

C. Pharmacist

This module is generally the medical store people who enter the tablets with the required information so that it can be specified by the doctor.

D. Registration

In this model Prescriber & Pharmacist have to register first, then only they can to access the data base.

V. METHODOLOGY USED

A. Symmetric Cryptography

In symmetric cryptography sender and receiver both use same key for encryption and decryption process. This key is known as secret key. This secret key is shared between sender and receiver. Stream ciphers and block cipher are two types of symmetric key algorithms. Stream ciphers produce one output element for several input elements at a time. Block ciphers produce a block of elements at a time. There are several symmetric algorithms, such as Blow fish, DES, AES etc.

An example of symmetric cryptographic mechanism is the following

$$\text{Encrypting message: } E_k(M) = C \quad (1)$$

$$\text{Decrypting message: } D_k(C) = M \quad (2)$$

Here plain text message (un encrypted) is defined as M. The plain text message M is encrypted by E_k (E is the symmetric encryption and k is the secret key of the encrypted message) and C is defined as encrypted message (cipher text). Then the cipher text message C is decrypted by the receiver using the same secret key k and the receiver receives the original message C.

A serious problem of symmetric key cryptography system is key management over insecure communication channels. In symmetric systems it is necessary to send the key through secure channel or key must be encrypted. The key management problem is fully solved by public key cryptographic systems.

B. Asymmetric Cryptography

Message sender and receiver use different keys for message encryption and decryption process in asymmetric key cryptography system. Here one key is used as private key and it is kept private which is only known to the owner of the key. Another key is used as public key and it is stored in a register or other accessible file. Public key cryptography is also applied for key management and signature

applications: keys exchange for symmetric cryptography and digital signature.

Mailbox analogy is an example of public key cryptography. Mail box is used as a public key where anyone can throw letter in to mail box. Only mailbox owner is the only person who has the mailbox key (private key) and only he/ she can open the mailbox and get the letter with this key.

Encrypting message:

$$E_{\text{PuK}}(M) = C \quad (3)$$

Decrypting message:

$$D_{\text{PrK}}(C) = D_{\text{PrK}}(E_{\text{PuK}}(M)) = M \quad (4)$$

Sender uses receiver public key (PuK) to encrypt the message as $E_{\text{PuK}}(M)$ and then sends the encrypted message to the receiver. When receiver receives the message, she/he uses her private key (PrK) to decrypt it as $D_{\text{PrK}}(E_{\text{PuK}}(M))$. Since only receiver knows her private key, no other receiver can decrypt the message.

VI. CONCLUSION

Electronic Prescription Services are thought to improve quality of care; computerized provider order entry (CPOE) systems are believed to reduce medication errors. Yet, research suggests that implementation of new technologies revises existing social technical systems and introduces non-predicted and unintended consequences, including the generation of new types of errors. The proposed system narrates development and implementation of a CPOE system—specifically a home-grown, e-prescribing system—in a community-based, integrated health care system. It describes the strategies used and lessons learned that enabled successful adoption: buy-in starts at the top of the organization; ongoing communication is key; a team-oriented culture is critical to success; iterative implementation is a useful strategy; ongoing and readily accessible training is necessary; involvement of clinicians achieves buy-in and contributes to ongoing improvements; and work flow redesign is an integral facet of implementation. These strategies and lessons were used to minimize unintended consequences and to maximize the potential of e-prescribing technology to improve medication safety.

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