Abstract—HealthCare system is a powerful integration framework / solution for the retrieval, storage and interchange of personal healthcare related data of the individuals that helps Hospitals and Health Care networks. The proposed system provides flexible framework for the complete delivery of healthcare services. HealthCare framework will provide electronic prescription (eRx) service to healthcare providers and consumers like doctors, chemists and patients. eRx provides options for the doctors to prescribe, modify, order, print and track the status of prescriptions and capture/update patient’s allergies. eRx shall provide options for the patients to subscribe to HealthCare system/framework, view, order and track the status of prescriptions and capture/update their allergies. eRx also provides options for the chemists to view ordered prescriptions for processing. It provides notification services to doctors, patients and chemists.

Keywords—HealthCare Framework, Electronic Prescription (eRX), Personal Unique Identification number(PUID), Unique Prescription Identification number(UPID).

I. INTRODUCTION

HealthCare system, is the organization of people, institutions, and resources that deliver health care services to meet the health needs of target populations. With the increase in the demand for the maintenance of patients records there is a requirement for a better maintenance system. With HealthCare system/framework, hospitals can efficiently connect all their information systems. HealthCare system/framework can help systems achieve quality improvement with a focus on improving patient care and clinical outcomes at a reduced cost.

HealthCare system/framework is a cloud based Software as a Service (SaaS), which can be adopted by health care providers/ health care enterprises and Patients. The framework will provide secure remote access to HealthCare Providers (HCP), HealthCare Enterprises (HCE) and patients.

“HealthCare system mission is to provide a patient centric solution”.

eRx is one of the modules of HealthCare system/framework which will automate legacy paper based prescription to electronic prescription (eRx). It provides web based portals/dashboards to Healthcare Providers (HCP) / HealthCare Enterprises (HCE) and patients to get connected with the framework. In HealthCare system there is an admin portal which helps to manage healthcare system related activities, create and manage subscriber accounts. HealthCare framework cloud will provide eRx module to handle prescriptions, patient’s allergies, notifications and placing orders.

II. LITERATURE SURVEY

A. Patient Demographics

Patient Demographics contain all the basic demographic information about an individual or patient. It contains basic information like Patient name, date of birth, blood group, address, phone number, gender, doctor’s information, social security number like Adhara card, voter ID, etc. Patient Demographic also contains Guarantors or emergency contact information, Health insurance information. Patient Demographic sheets also known as face sheet are distributed to patients when
they visit physician’s office for treatment. Before the services are rendered by doctor, it is necessary to ensure that patient demographic sheets are filled in by the patients. This process ensures that all necessary patient’s demographic information are gathered accurately which would facilitate in timely reimbursement of physicians charges.

Whenever a patient visits any doctor, the doctor can view patient demographics through Personal Unique Identification number (PUID) number of the patient.

B. Electronic Medical Record (EMR)

Electronic medical record (EMR) systems, defined as "an electronic record of health-related information on an individual that can be created, gathered, managed, and consulted by authorized clinicians and staff within one health care organization", have the potential to provide substantial benefits to physicians, clinic practices, and health care organizations. These systems can facilitate workflow and improve the quality of patient care and patient safety.

Through EMR, physicians can access to patient information such as, access to new and past test results with multiple care settings, diagnosis, allergies, lab results and medications.

C. Allergies

Allergy occurs when a person’s immune system reacts to substances in the environment that are harmless for most of the people. These substances are known as allergens and are found in house dust mites, pets, pollen, insects, moulds, foods and some medicines. Patient allergies can be categorized into food, drug and general allergies. Some patients may have allergies when they consume food which contains lactose, peanuts, eggs, soya etc. Some patients may be allergic to some drugs which contain Anticonvulsants, Insulin, Penicillin and drugs related to antibiotics. Some patients may have general allergies like asthma, allergy due to dust etc.

D. Health Level 7 (HL7)

Health Level-7 or HL-7 is a set of international standards used to transfer of clinical and administrative data between software applications used by different healthcare providers. These standards focus on the application layer, which is "layer 7" in the ISO model. Hospitals and other health care organizations may have different computer systems used for billing to patient records tracking. All of these systems should communicate with each other when they receive new information or when they wish to retrieve information.

E. Health Insurance Portability and Accountability Act (HIPAA)

HIPAA is the single most significant legislation affecting the health care industry since the creation of the Medicare and Medicaid programs in 1965. HIPAA affects all individuals, providers, payers and related entities involved in health care.

Office of HIPAA Compliance (OHC) is responsible for the successful implementation by Department of Health Care Services (DHCS) for all of the final rules of HIPAA. HIPAA does the following:

- Provides the ability to transfer and continue health insurance coverage for millions of American workers and their families when they change or lose their jobs;
- Reduces health care fraud and abuse;
- Mandates industry-wide standards for health care information on electronic billing and other processes; and Requires the protection and confidential handling of protected health information.

F. National Drug Code (NDC)

National Drug Code is a product identifier used for identification of drugs. NDC is a unique 10 digit number with 3 segments. It is a universal product identifier for human drugs. The code is present on all nonprescription and prescription medication packages. The 3 segments of the NDC identify the labeler, the product, and the commercial package size.
For example, the NDC for a 100-count bottle of Prozac 20 mg is 0777-3105-02. The first segment of numbers identifies the labeler. In this case, the labeler code "00777" is for Dista Products Company, the labeler of Prozac. The second segment, the product code, identifies the specific strength, dosage form (i.e, capsule, tablet, liquid) and formulation of a drug for a specific manufacturer. In our case, "3105" identifies that this dosage form is a capsule. The third segment is the package code, and it identifies package sizes and types. Our example shows that the package code "02" for this bottle of Prozac identifies that 100 capsules are in the bottle. The FDA maintains a searchable database of all NDC codes.

III. ELECTRONIC PRESCRIPTION

Electronic Prescription (eRx) is a proposed service that is used in HealthCare system for health care providers like doctors, chemists and patients. The eRx of each patient will be stored in cloud and these prescriptions can be viewed, modified and updated by the doctors, patients and chemists using unique prescription identification number.

The doctors, patients and chemists must have already been registered through healthcare framework and they should get valid credentials to sign in to the healthcare system. With their valid userid and password they can get access to eRx cloud services. Whenever they needed they can retrieve the eRx by giving its UPN number. They can retrieve, modify, update and view the eRx of the patients easily.

Through eRx doctors can able to prescribe medicines, modify old eRx, order medicines through online, print eRx if needed and track the status of prescriptions. Doctors can also capture/ update patient’s allergies.

eRx provides options for patients to subscribe to HealthCare system/framework, view their prescriptions, order for medicines through online or offline and track the status of prescriptions. Patients can also update their allergies in eRx.

eRx also provides options for the chemists to view ordered prescriptions for processing. It provides notification services to doctors, patients and chemists. Fig 2. shows the overall functionalities of eRx in HealthCare system.
IV. SYSTEM MODULES

There are three main modules that come in HealthCare System. These modules have different functionalities in eRx cloud services. The three main modules of healthcare system are:

A. Doctor Portal

Doctor portal is an interface provided by HealthCare system to perform healthcare services and access healthcare information or records of the patients. eRx is one of the healthcare services provided in the doctor’s portal for serving patients. The doctors can prescribe, modify, remove or repeat medications to patients through eRx. They get notification from patients and chemists when the prescribed medicine is not available in the market and get notification from patients when the patient gets side effects after consuming the prescribed medicines. They can also update allergies related to patients and can order prescribed medicines through online by selecting chemist of his preference or patient preference. Through eRx the doctors can capture allergies during consultation or modify allergies when notification regarding the side effects caused by the prescribed drugs.
A. Patient Portal

Patient portal is an interface provided by HealthCare System for patients to get benefits of healthcare services by subscribed healthcare providers like doctors and chemists. eRx is one of the healthcare services provided for the patient portal through which the patients can get connected with doctors and chemists by notifying doctors regarding side effects caused due to prescribed medications and unavailability of the prescribed medicines. Patients can also able to place order for medicines through online and also through offline.

Through eRx patients can subscribe with healthcare framework. Such users are called as H360 Patients. Patients who are not subscribed through this framework are treated as public. Patients should register through healthcare framework by giving their basic information like name, dob, blood group, address etc. They should also mention about their allergies. When they get registered, they will receive H360 unique ID and password through which they can be able to access their eRx. Patients can view all prescriptions prescribed to them by various doctors. They can also view status of ordered prescriptions and also view notification from doctors when doctors change the drugs due to some reasons like unavailability of drugs, drugs being banned and when drugs causes some side effects.

Fig 4. Functionalities of Patient Portal

B. Chemist Portal

Chemist portal is an interface provided by HealthCare System for chemists to render healthcare services to patients by processing the ordered prescriptions placed by either doctor or patients. They process orders placed by doctor or patients through online. They also process offline orders for patients by using Unique Prescription Number or through Healthcare Unique ID of the patients.

Chemists can able to notify the doctors and patients about the unavailability of the drugs. They get notifications when the doctors modify the eRx as per the notifications received from the patients. They can also view refill prescription only after it is approved by doctors. Chemists can view the eRx based on the authentication provided by the patients or the online orders. They can update the status of the eRx after processing them.

Fig 4. Functionalities of Chemist Portal
V. HIGH LEVEL ARCHITECTURE

The Electronic Prescription (eRx) high level architecture of the HealthCare framework is shown in Fig 5. In this architecture the whole functionality of all the portals in Healthcare System has been showed.

![Fig 5. eRx High Level Architecture](image)

VI. ADVANTAGES OF ELECTRONIC PRESCRIPTION

- Ease maintenance of patient records.
- Patient records are Secured and some of their information can be made as public.
- Patient records are not specific to any geographical area, hence it can be accessed from anywhere.
- All prescriptions have an Unique Prescription Identification number (UPID), hence patients prescriptions are not interchanged with others.

VII. CONCLUSION

HealthCare system is a powerful integration framework / solution for the retrieval, storage and interchange of personal healthcare related data that helps Hospitals and Healthcare networks achieve the mission critical connectivity and coordination needed to compete in today's Healthcare environment and to transform health care data into actionable information. The proposed system shall provide a flexible framework for the complete delivery of healthcare services.

VIII. ACKNOWLEDGMENT

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