Managing and Analyzing EHR Pharmacy Data in the Hospital Setting

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As technology continues to evolve in medicine the way medical data are handled has also evolved over time. Pharmacy data are a vital component in the electronic health record (EHR) database and can have a direct impact on care quality and patient safety. From the pharmacy-related information presented by the patient during office visits up to the information entered by the provider and sent to the pharmacy, pharmacy data play an important role in providing quality healthcare to patients. This article provides an overview of EHR pharmacy data, the workflow and special features, and the challenges of maintaining high quality and accurate pharmacy data in the hospital setting.

Use of Pharmacy Data

Pharmacy data are an important component of clinical data used for direct patient care, including the right medicine for the right patient, at the right time, at the right dose. Thus, it has significant impact on quality of care and patient safety. Pharmacy data are also used for non-direct patient care, such as supporting immunization registries to track patient vaccination information, prescription drug monitoring programs to track controlled substance prescriptions, and health information exchange databases tracking and sharing patient information between different healthcare providers. Pharmacy data, as a Big Data concept, also supports research to track trends and the effectiveness of drugs—for example, using data to monitor a flu vaccine and to identify whether it is a good match for the common influenza strains circulating in a specific season.

There are many different users who benefit from the safe use of drugs and maintenance of EHR pharmacy data. Patients are central users, along with ad hoc users in the management of medications such as clinical pharmacists, physicians, nurses, and additional members of the healthcare team. Other users—such as researchers, policy makers, and quality improvement managers—use pharmacy data for non-direct patient care. In addition, pharmacy data analysts, data managers, and health IT technicians also interact with EHR pharmacy data. Health information and informatics management (HIIM) professionals who work in the hospital setting are also playing a key role in managing and analyzing EHR pharmacy data.

Types of EHR Pharmacy Data

Patient allergy and medication history are two major types of EHR pharmacy data. They are critical to patient safety and data quality.

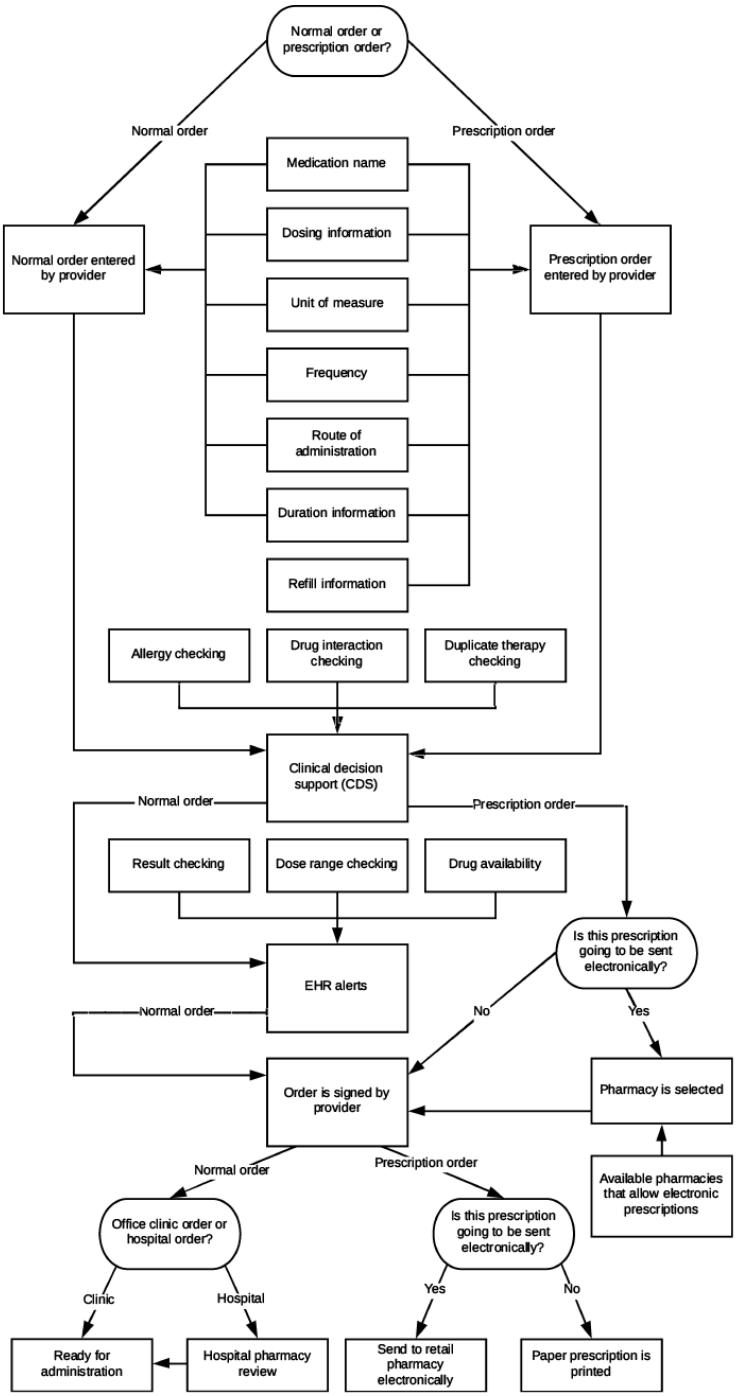
Patient allergy data are documented during an office visit. When the patient first arrives, the allergy information is entered into the electronic tablet by the patient at check-in, or into the EHR system by clinical staff. The EHR system has pre-built medication allergy interaction information to allow for allergy interaction checking to occur when new patient medication orders are entered into the system.

Medication history data are addressed during a regular office visit. This is the list of medications that the patient is currently on or has previously been on. The list of available medications, the amount of the medication, the frequency that the medications are to be taken, and the route of administration are all chosen from pre-built lists in the EHR system. Some of the EHR platforms also allow for external medication history to be reviewed by the clinical staff. External medication history is information pulled into the EHR from outside sources such as retail pharmacies. Reviewing the external medication history can help with the quality of the information entered into the EHR in cases where the patient may not know the exact name of the medications they take.

Workflow and Management of EHR Pharmacy Data

A new medication goes through multiple steps before it becomes useful in the EHR system. It involves the processes of decision-making, data entry, clinical decision support, and verifications (see Figure 1 below).

Figure 1: Workflow of EHR Pharmacy Data



Medication orders can be either given in the physician's office or in the hospital, or filled at a retail pharmacy. Once the patient has seen the provider, new medication orders might be entered into the EHR system for medications to be given while the patient is in the office.

Providers enter the medication order by checking the information from pre-built lists in EHR databases. This information includes the medication name, dosing information, unit of measure, frequency, route of administration, duration information, and refill information (if it is a prescription order). The maintenance and updates of these databases is normally done by systems

analysts. The documentation of the medication administration can be entered into the system manually or through a barcode scanning process where the National Drug Code (NDC) is checked in the system.

The medication order then flows through the EHR into the clinical decision support process. In order to help prevent a medication error from occurring, allergy checking, drug interaction checking, and duplicate therapy checking are completed. The data required to support the clinical decision support checking is maintained in the system databases by the systems analysts.

For the purpose of ensuring patient safety and preventing delays in patient care, alerts are built into the EHR by the system analysts. Examples of the alerts include result checking, where the EHR checks lab values when ordering medications in order to ensure the medication is appropriate and safe, dose range checking when an order outside of the maximum range occurs based upon defined criteria such as patient age or weight, and drug availability alerts for notifying the provider that the ordered medication may not be available from the pharmacy.

The prescription order can be sent electronically (e-prescribing) to a pharmacy directly from the point of care. Available pharmacies, insurance formulary information, and patient medication updates are maintained in the EHR system. E-prescribing is replacing handwritten pharmacy orders to improve data accuracy, increase patient safety, and increase quality of care.

Challenges of Managing EHR Pharmacy Data

Maintaining quality and pertinent pharmacy data are often challenged by many factors, such as skilled personnel needed, time constraints, regulation compliance, and protecting confidentiality of patient health information.

Making sure the pharmacy data are up to date and maintained has its challenges. Keeping the pharmacy knowledge database updated requires skilled staff like pharmacists and pharmacy technicians as well as non-pharmacy personnel such as data analysts. The pharmacy staff are ensuring that newly added information to the database is correct and relevant for the practice. Once the pharmacy staff has validated this block of information, the data analyst is given permission to bring in the updated pharmacy information to the database. This process requires personnel with a high-level working knowledge of both pharmacies and systems.

The aforementioned process can also be very time-consuming. Due to the rapid changes in critical drug information (drug-drug interactions, drug-allergy alerts, etc.), it is essential to keep the pharmacy database up to date. After validation, these data are usually, without exception, placed in a testing environment for pharmacy staff to test its effect on the system. This can reveal defects within the information or validate its usability. If defects are detected during testing, the information must be augmented or withdrawn to ensure no ill effects on system stability. If no defects are seen during testing, the information can then be placed into an active working environment (sometimes called production). The process of moving this information from the research phase to the active working environment can take weeks, and by then sometimes new information is already available to be imported—therefore, this is an iterative process.

This pharmacy information is regulated by the US Food and Drug Administration (FDA), a branch of the US Department of Health and Human Services. The FDA provides guidance and regulations on the usability of pharmacy information within the EHR. This is usually the responsibility of the EHR vendor to ensure these regulations are being followed, but it would serve users well to verify with the EHR provider to ensure compliance. Due to the electronic nature of EHRs and the fact that more information is available online than ever before, maintaining patient information confidentiality and securing the pharmacy database is also a challenge.

EHR pharmacy data are growing constantly and are never static except when a user chooses to make use of it at a specific point. It is essential that all health information management and provider professionals involved in the process consider this to be a living database, and regularly make contributions to sustaining it.

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