SELECTING OR WRITING REQUIREMENTS FOR A PHARMACY INFORMATION management system (PIMS) presents significant challenges and requires considerable insight, particularly for those in the midst of the initial confusion caused by a newly automated medication-use process. To address the majority of operational transformations driven by supporting medication management systems, the PIMS must be able to communicate and exchange data accurately, effectively, consistently, and multi-directionally with other medication systems, as well as non-medication systems, and, more importantly, be able to use the information that has been exchanged.

Traditional pharmacy systems that have focused on and isolated the transcription, preparation, and distribution phases of the medication-use process are now being looked upon as the hub for communicating meaningful information outside the pharmacy domain. The next-generation pharmacy information management systems must distance themselves from previous requirements for integration and interfacing and move towards system interoperability, allowing for real-time sharing of information across the medication-use cycle. They must move beyond system analysts and or pharmacists maintaining and managing dictionary tables and medication information, and require the real-time transmission of drug knowledge from expert resources directly into the application with little or no manipulation.

Capturing the services, tasks, or functions a pharmacy information management system is required to perform within the framework of today’s complex medication-use process calls for broader insight into how information may be shared outside the pharmacy realm. The sequence and extent of interactions between systems and providers necessary to deliver these services or functions have greater implications than previously performed with PIMS. This will require the pharmacy analyst to develop use cases that go beyond the traditional acute care and hospital pharmacy settings to adequately represent the pharmacy management system functional requirements necessary in today’s environment.

Although the focus of this article is on functional requirements, it is important for pharmacy leaders to articulate and develop use cases for non-functional requirements, particularly when direct patient care becomes more dependent on these systems. Some important non-functional requirements to consider when evaluating a pharmacy information management system include:

- System availability
- Allowance for maintainability and enhancements
- Recovery from failure
- Reliability
- Response time
- Throughput

To maintain the integrity of the medication-use cycle, the PIMS must effectively use and communicate information in real time from and to supporting medication- and patient care-related systems. This will facilitate the following core medication-use functions:

- Order management and communication
- Order verification, confirmation, and fulfillment
- Preparation, distribution, and inventory control, storage, and security
- Administration
- Intervention and monitoring

**Order Management and Communication**

Pharmacy information management systems must provide greater functionality than the standalone medication order management systems used today. PIMS must permit multidirectional real-time sharing of order processing infor-
PIMS must tightly integrate medication order management with enterprise-wide process tracking systems, allowing upstream or downstream providers to access information regarding the status of their order.

Order Verification, Confirmation, and Fulfillment

The PIMS should support multiple verifications of an order(s) by more than one type of user or multiple users of the same type. Order verification and confirmation would include the process by which the pharmacist confirms the appropriateness of an ordered medication, including any alerts or patient-specific information such as tests, procedures, and labs. Although the alerting systems in future PIMS may play a secondary role, customers must be attentive to how the system manages these alerts to minimize needless communication. The system must effectively use upstream alerts to avoid redundant warnings and must be able to communicate necessary information regarding alert reconciliations to the provider and nurse. The system must allow the user to defer verification or modification and facilitate communication with the physician or nurse regarding the verification status. These communications must be reconcilable in the PIMS.

The system should allow the pharmacist the ability to fulfill an order with the necessary components to deliver an “administrate-able” dose without altering the integrity of the order or requiring additional communication with the ordering provider. The fulfillment process should be transparent to the ordering process and avoid any additional transcription. The pharmacist must have the ability to edit the provider’s medication order during verification and fulfillment, with or without requiring the provider’s signature. Customers should require considerable flexibility within the verification process to address state board of pharmacy or specific institutional policies pertaining to changing components of a medication order and required signing.

Preparation, Distribution, and Inventory Control, Storage, and Security

Once an order has been verified, confirmed, and fulfilled with the appropriate components for preparation, the PIMS must communicate requirements to the supporting medication preparation and dispensing systems that will preserve medication integrity and security. Such systems include automated dispensing cabinets, robotic IV automation devices, and automated packaging systems. These systems must work collectively, prioritizing the daily drug preparation and fulfillment processes and can utilize bar code technology at each step to enhance efficiency and dispensing accuracy. They must provide the flexibility to support a number of delivery approaches, focusing on just-in-time, patient-specific distribution and avoiding functionality that promotes unordered drugs on the patient care units.

The PIMS must support systems such as automated dispensing cabinets and storage and retrieval systems that automate and manage inventory throughout the receiving, storage, retrieval, and distribution process. Requirements should include:

- Real-time, on-hand inventory information at the time of patient-specific medication ordering and/or verification and fulfillment
- Inventory control across multiple facilities
- The ability to automate wholesale medication-ordering processes
- Automated workflow in the distribution process with sequenced orders that guide staff through emergency, high-priority, routine, and batch order fulfillment

Administration

Pharmacy information management systems play a significant role in the drug administration and documentation processes. These systems need to act as an intermediary between ordering and medication administration systems by translating what has been ordered into a bar code-enabled, “administrate-able” dose on an electronic “to do” list. Proper documentation of and/or scanning these doses should
fulfill the electronic medication administration record (EMAR). The EMAR needs to be a continuous document that includes medications administered across all levels and episodes of care within all areas of the organization. It must also be capable of linking with the organization’s billing and financial-services systems to improve compliance with billing regulations. The PIMS must provide a means to reconcile doses from medication administration systems and the order fulfillment and preparation processes with the pharmacy’s inventory management systems. Customers seeking a PIMS must be assured the system is able to connect ordering and administration systems, including smart pump systems, allowing for real-time communication between systems in multiple directions. Imagine the pharmacy system being able to recognize when to prepare and send another continuous medication infusion without a nurse or member of the pharmacy intervening. The PIMS must be able to send specific medication administration instructions directly to an infusion device to deliver a particular medicine over a specified period of time. These types of requirements reemphasize the need for future PIMS to not only communicate information, but to also use information from other administration-related systems.

**Intervention and Monitoring**

Pharmacy information management systems must incorporate functionality to support the documentation and monitoring of pharmacists’ clinical interventions as well as adverse drug reaction or event reporting. Although most customers expect these systems to allow for data mining and extraction, many fail to recognize the importance of allowing users or managers to develop and run queries spontaneously without dramatically effecting system performance. The ability for pharmacy managers and users to run ad hoc or planned detailed reports helps identify trends in intervention acceptance, time spent on clinical activities, and drug costs avoided. The PIMS must provide pharmacy managers with key financial data to quantify and to improve their clinical programs and staff. Other features customers should require include:

- Electronic notification or alerting to appropriate care giver(s) of interventions, adverse drug reactions, and/or medication errors
- Ability to electronically reconcile or share follow-up information of ongoing monitoring of patients’ clinical events
- Real-time management reporting and trending capabilities that can be exported and graphed
- The ability to support mobile solutions
- Integrated in-depth drug information

**Conclusion**

Requirements for the development or purchase of pharmacy information management systems should focus on their capability of sharing and using information across the medication use cycle and the patient’s continuum of care. These systems must support interoperability and standardization, and enable multidirectional communication amongst all professionals involved in the medication-use process.

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**Reference**

   www.abbeyassociates.com/Medication%20System%20Integration.htm

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