Organizational and Functional Requirements for EMAR Selection

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THE ELECTRONIC MEDICATION ADMINISTRATION RECORD (EMAR) IS AN important tool for reducing errors in the medication-use process. When evaluating a vendor's suite of electronic medication-use solutions, customers often become so immersed in the ordering and administration systems that they overlook important business and functional requirements of the EMAR. Customers should evaluate the EMAR within the context of these important functions:

- Enterprise-application integration
- Documentation and display capabilities
- Therapeutic assessment, treatment, and monitoring

Enterprise-Application Integration

Of all the electronic tools currently involved in the medication-use process, the EMAR is the one most likely to be utilized by virtually every member of the health-care team. Because of its diverse use, flexible and configurable views are a requirement, but most important, so is enterprise-application integration (EAI). EAI makes it possible to automatically and seamlessly share real-time data and business processes throughout the organization, and can help health-care organizations automate the way different systems share and update data. With EAI, organizations can align disparate applications and obtain the full value of those applications across the entire organization.

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Existing stand-alone medication-management systems will not be able to contend with the majority of the operational changes driven by CPOE and EHR initiatives. CPOE systems must allow pharmacy applications to provide an electronic validation of medication orders in real time, and they must supply the data streams necessary for medication administration and updates to the EMAR. In addition, the EMAR needs to be a continuous document that includes medications administered across all levels and episodes of care within all facilities of the organization. With these things in mind, customers seeking an EMAR should look for a sole solution that can be clearly and concisely integrated with the organization's primary order-entry and pharmacy systems, as well as automated dispensing cabinets, bar code point-of-care medication-administration systems, infusion pumps, or other medication-documentation applications. The EMAR must also be capable of linking with the organization's billing and financial-services systems to improve compliance with billing regulations.

Documentation and Display

Today's patients often receive as many as 50 to 60 different medications or formulations over the course of a single inpatient stay. Given the potentially vast amount of information contained in an EMAR, careful consideration should be given to how administered medications will be displayed. A tabular view of medications administered over time will most likely offer the greatest degree of acceptance and flexibility for all health-care disciplines. Organizations should require that their EMAR solution enable clinicians to configure administered-medication views, via user-defined preference settings, of specified periods of time or continuous views. The application should also allow for the configuration of institutional or facility-specific default views to drive standardization across the enterprise, thereby reducing the chance for variations that could lead to the misinterpretation of information.

The EMAR must be able to reflect what has been administered, as well as what is in the process of being administered (i.e. continuous or intermittent medication infusions). Be sure to pay close attention to how your prospective EMAR solution displays IV infusions running over 12 to 24 hours, as they are often administered in an oncology practice. The EMAR must be able to be configured as both a dynamic and static administration record.

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Screen real estate is always a concern. The display of numerous administrations—often via a multitude of routes and methods—must be concisely and meaningfully engineered and presented to the viewer. The EMAR should allow a clinician to roll up the total dose of the same medication and dosage form given via the same route. This functionality recovers precious screen space for administered medications from orders that are frequently modified at the dose, frequency, or schedule level. The detail of how each dose contributes to the total dose for a specified period of time should be avail-

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able for display. Administered medications rolled up over time must be presented with a visual queue, reminding clinicians that the total dose displayed is the sum of more than one administration event. In selecting an EMAR solution, look for one that avoids using error-prone abbreviations, symbols, and dose designations, as detailed in safety and regulatory requirements.

Details of the administration event must be comprehensive and capture all the components of the order record, including where the medication was given and any order comments. The EMAR should capture the name of the clinician who started and completed any infusions. Medications delivered using a diluent should be displayed as a single component with the diluent displayed in the order detail as part of the order's dispense record. The total fluid administered should be rolled up with other IV solutions as part of a fluid or intake and output application.

The most difficult challenge software vendors and designers face when developing an EMAR is the display of multi-ingredient IV infusions, nutrition, and medications, and cumulative doses created from various medication formulations. Customers seeking an EMAR should look for functionality that treats multi-ingredient medications as a single entry and as individual components. The client should be able to customize the EMAR to distribute or group the individual components to meet their practice requirements. For example, when administering an infusion of normal saline with 1 g of calcium gluconate, the clinician should require that the EMAR reflect the medication administered and each component of the infusion, in order to track how much fluid and calcium the patient has received over time. When acetaminophen with codeine is administered, the EMAR should reflect both the number of tablets administered as well as the total dose of acetaminophen and codeine in relationship to other medications containing acetaminophen and codeine.

Other display considerations for the EMAR should include the ability to dwell or right click to view more details and the use of bold text, colors, symbols, and shading to differentiate key pieces of medication information.

Online Resources:

California HealthCare Foundation, Addressing Medication Errors in Hospitals: A Framework for Developing a Plan:
www.chcf.org/documents/hospitals/addressingmederrorsframework.pdf

For a comprehensive list of EMAR vendors, visit PP&P's online resource guide at www.pppmag.com/directory.php.

Therapeutic assessment, treatment, and monitoring

EMAR offers health-care organizations a great opportunity to combine important medication-administration information with other pertinent clinical data. Aggregating subsets of clinical information, particularly lab and vital-sign information, in the context of administered medications provides clinicians a powerful tool for assessment, treatment, and monitoring.

These clinical views or records should be configurable at the organizational level and, to some extent, at the individual-user level providing careful consideration is given to training and education on the data elements displayed. The provision for trending through the use of graphs and other visual tools should be incorporated within the EMAR application. The tool should have the ability to indicate multiple results on one graph, utilizing different scales. Aggregates of medications should be configurable at the individual drug level, as well as at the pharmacological- and therapeutic-class level.

Conclusion

Customers looking for an EMAR solution are often preoccupied with the front-end ordering and back-end administration applications, and thus fail to meet important organizational and functional requirements for medication documentation. When determining specifications for an EMAR, customers should establish that the application could be integrated into the organization's electronic health care record and medication-management initiatives. The administered-medication displays must be configurable, dynamic as well as static, meet all regulatory and safety requirements, and adequately address the various nuances of multi-ingredient medications. Finally, the administered medication information must be configurable to aggregate with other results and findings, including lab and vital-sign information, to provide specialty views for therapeutic monitoring, treatment, and assessment. P&P

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