

An LIS supports quality initiatives

By Ginger Wooster

Quality continues to be a hot topic. Why? For starters, the regulations require it, and it makes good economic sense. Most of all, patients deserve it. Savvy managers recognize the synergy between quality and efficiency. While quality is not unique to the lab and while laboratorians have been documenting quality for years, since the Institute of Medicine (IOM) study in 1999 there has been a huge push for healthcare organizations to implement quality systems for patient care. How can a laboratory information system (LIS) help streamline and standardize quality management for a lab facility today, recognizing that standardized reporting formats for IOM data are continuing to evolve? What impacts quality in the lab? Everything! Where do we begin? What do we measure?

Each lab is unique in its workflow, so each must decide which indicators are appropriate. Regulatory agencies suggest that key indicators are those which:

- reflect activities critical to patient outcomes;
- affect a large proportion of patients;
- were problematic in the past;
- have the ability to compare to an appropriate benchmark; and
- are consistent with the scope of care.

Most lab errors are not due to analytical issues. A well-educated and well-trained staff, improvements in analyzers and equipment, and automation of routine manual tasks have all contributed to better analytical process. Focus on problem areas where improvement will create the greatest return. Computerized provider order entry and electronic medical records will help in the pre- and post-analytical phases as well.

Where does the lab's LIS fit in? The LIS is a quality-indicator toolbox, able to capture a goldmine of information. Combining data mining along with decision-support algorithms, an LIS can easily be configured to reduce the chances of introducing errors and to automatically generate quality reports on a pre-defined schedule. Once the query is established and scheduled to run, the query search results can be exported to another application, such as Excel, to further "massage" the data. Most lab systems contain the functionality needed to capture the following examples — and while not all will apply to every facility, some good ideas can be gleaned.

Pre-analytical quality

How is the lab currently quantifying patient identification issues? Some facilities have created a lab-order option called "Patient Issue" with a pre-defined pick list to report the reason for the problem (incorrect/incomplete wristband, missing wristband, refused, out of room for procedure, and so on). First, decide whether to make this a reportable order. A query can then be scheduled to pull all of the patient-issue orders with their "results" for a given time period. Over time, the query can be further filtered by draw location, order location, or phlebotomist in order to observe patterns.

Similarly, cancelled orders may be monitored. This multitask query can encompass four indicators at once: patient identification, test-order accuracy, specimen acceptability, and specimen labeling — or individual queries for each can be configured. Create a lab-order option called "Cancel" with a pre-defined pick list for resulting (wrong patient, incorrect specimen, mislabeled specimen,

wrong test ordered, quantity not sufficient, hemolyzed, clotted, and so forth). Again, decide if this will be a reportable order. As in the patient issue above, create the query in the LIS to pull all of this information and then further filter by location, provider, phlebotomist, and any other pertinent categories.

Alternative tools found in the LIS would be the cancelled-orders log or a query configured to capture hemolysis, icterus, and lipemia flags from the analyzers. Workflow at some facilities might suggest capturing the above information in the LIS using comments rather than test results. If so, simply set the query to pull all comments filtered by key words. For labs with less control over specimen procurement, this pre-analytical information is instrumental to identify those clients who may benefit from additional customer service and support.

True analytical errors are becoming less prevalent, but this does not mean there are no analytical indicators to monitor. Critical values are easy to review in most LISs. One method is to configure the LIS to alert the technologist of a critical value so appropriate follow-up action can be taken according to the protocols of the facility. Another is to configure the LIS to prevent the approval of a critical value until the follow-up action is documented in the LIS. A query can also be configured to pull all critical values on a daily, per shift, weekly, or monthly schedule for supervisory review. This query can be configured to include all pertinent comments, documenting the correct attention to protocol. The supervisor may also choose to add a bulk comment that the values in the query have been reviewed. This same process may also be used to monitor and review all abnormal patient results as well as quality-control (QC) outliers.

Turnaround time (TAT) information is also valuable. Since the LIS tracks the time the order was drawn, received, and reported, reports can be generated to see if TAT criteria are being met and, if not, to help identify where improvements are needed. Most lab systems can organize and present this information in a statistical format. Multiple TAT reports within the LIS can be defined and customized to narrow the data based on the needs of the facility. For example, a TAT for cardiac markers to the emergency department can be isolated from all other tests, and segmented further by shift. The statistical data can also be segmented by process to show TAT from order to draw, receipt to delivery, delivery to review, and so forth, further drilling down to find the source of the TAT failure, if needed.

Some lab information systems contain decision-support algorithms, which can be configured to alert the technologists of absurd results during the review process. Reportable values can be identified for each analyte. Values outside of those limits will be flagged, and appropriate corrective action (e.g., reruns, dilutions, and others) can be automatically suggested to the technologist.

QC from order to result is also easily monitored in the LIS. Ordering QC can be configured automatically to ensure QC is performed as indicated. Many systems can also be configured to prevent patient-result approval if QC has not been ordered and/or approved within a certain time period. Levey-Jennings charts are easily reviewed in the LIS, with corrective-action documentation noted behind all outlier points. Support the "green" movement

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and save paper by using electronic documentation of supervisor and medical director review of QC in the LIS. Several labs use the QC functionality of the LIS to monitor temperatures and ambient conditions in the lab — an area often is “overlooked” by busy staff. Use the LIS to order the set temperature QC automatically so it is on the tech’s daily to-do list.

Consider creating a maintenance “family” in the LIS. Each instrument can be a patient, and the daily, weekly, and monthly maintenance tasks can be standing lab orders with easy drop-down pick lists to “result” completion of the tasks. Monthly queries of the entire list of maintenance orders can be configured so, at a glance, all documentation is there for review.

Infection control has always been an important issue, even more so now that Centers for Medicare and Medicaid Services is not reimbursing for expenses related to hospital-acquired infections. The LIS can query positive cultures, and filters can be defined to isolate the locations of patients with positive cultures, drilling down to the organism, unit, room, and bed number, if needed. The ability of the LIS to “slice and dice” the microbiology data is very instrumental in identifying potential contaminated areas in the facility. Another LIS microbiology tool is to identify patterns of contaminated blood cultures. A query can be defined to capture all blood-culture orders with “contaminated” in the result. This data can then be filtered by floor, unit, and phlebotomist to discover where preventive or corrective action might be needed.

Post-analytical quality

Even with the best process controls in place, an occasional pa-

tient report will be sent in error. Monitoring amended reports is another LIS tool. The amended-report log will show details of who, what, and when. More specific queries can be configured as needed to quantify and drill down to see recurring patterns based on reporting tech, ordering provider, analyzer issues, and other factors. Misdirected reports are often the result of a provider error at order entry and may be difficult to capture prior to sending the final result. As these issues are identified, entering a “macro” or “canned” comment in the LIS will allow these issues to be monitored and quantified by creating a query to capture the comment. Using canned comments will standardize the text, making it easy to define the filter criteria for the comment. Once again, the query can further be filtered to see if there are recurring patterns by ordering location or personnel.

These examples are but a few of the many options available. Choosing which indicators to monitor is the most difficult step. Once the indicators are established and the queries created in the LIS, the latter can be scheduled to automatically run at a predetermined time. An LIS is a tremendous tool for gathering and reporting information, but all the best information in the world does no good unless someone — a lab pro, for example — reviews the information and takes action. □

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