

Is LabWizard a Logical Extension of the Electronic Patient Record?

G.A. EDWARDS

Decision support tools are already playing an important role in clinical laboratories. With appropriate leadership from the clinical laboratory community, these systems will provide significant input to, and become extensions of, electronic health records (EHRs). Clinical laboratories must drive this process – successful engagement with the EHR development community requires effective professional input. The future will in part be determined by the answers to the following questions.

Should clinical laboratories provide a comprehensive consultative and interpretative service?

Yes. Evidence confirms the effectiveness of interpretative reporting in influencing clinicians' use of tests, and therefore in supporting improved patient outcomes. The team at Massachusetts General Hospital has shown that the work-up of disorders of coagulation is improved by specialist interpretation (M. Laposata, personal communication). In Australia, as elsewhere, compliance with diabetes monitoring protocols is known to be as low as 10-15%. Through patient-specific reporting, clinical laboratories can target areas of poor compliance, such as diabetes, to support improved use of pathology tests and ultimately improve clinical outcomes.

A recent study of interpretative commenting practices (1) found poor consistency in interpretative comments, with many judged clinically inappropriate. I believe the poor quality of many interpretative comments reported by largely reflects the clinical laboratories' expectations of their own role – which is to focus on analytical rather than clinical processes. Clinical pathologists should be re-focussing their roles towards that of partner in routine clinical care, with an assumption that every request for laboratory testing is a consultation. At very least, the response should include the provision of an informed, patient-specific, specialist pathologist *opinion* with every clinical pathology report.

Work needs to be done to establish new benchmarks for reporting. Notions such as 'normal' and 'abnormal' are irrelevant with a patient-specific (rather than result-centred) approach, should be abandoned. Similarly, we should not be excluding reports from interpretation if they contain 'simple' or 'routine' tests – again the patient focus renders this concept redundant.

Do clinicians want better feedback and interpretation by the laboratory?

Yes. As Dr Mike Laposata observes (2) clinicians are demanding more feedback – including interpretation of test results – from the laboratory. Any remaining reticence by the laboratory – concerned that doctors may be offended or otherwise antagonistic to a pathologist's opinion – can be dispelled. Primary care physicians are eager for all available support for ensuring best outcomes for their patients. Equally, hospital specialists have an ongoing need for their residents, medical students and nurse practitioners to be educated about test results and guided in the appropriate selection criteria for test ordering. With a collaborative approach, clinical pathologists can support the capture and deployment of their specialist colleagues' knowledge through patient-specific interpretative reporting.

Will decision support systems support comprehensive interpretation in clinical laboratories?

Yes – if the appropriate technology is employed. Automation in clinical laboratories has enabled breathtaking changes in the handling and analysis of patient specimens. One consequence has been the creation of large, highly automated 'factories' with extensive test menus and rapid turnaround times. In some countries, clinical pathologists still play an active role in interpretation and consultation regarding clinical pathology test results. However laboratory automation by necessity limits the volume of patient reports that can be manually processed by a clinical pathologist.

Conventional 'rules' technologies found in most LIS systems are NOT sufficient for patient-specific opinion-based reporting. Laboratories need to invest in new decision support technologies that allow a comprehensive interpretative service while not impeding the high throughput of automated laboratories. If decision support tools are to be effective in supporting clinical interpretation, they must be acceptable to the clinical pathologist charged with their supervision. In particular, the system must be sufficiently sophisticated to support meaningful, patient-specific interpretation, addressing all of the available lab and clinical data available to the pathologist. As well, the process of knowledge capture and deployment, as well as the validation and verification of the final patient reports, need to be under the direct control of the clinical lab experts. Importantly, since medical knowledge and specialist opinion continue to evolve over time, the systems' content must be capable of on-going maintenance at low cost.

Medical Director, Pacific Knowledge Systems, Sydney, Australia

One such solution is the LabWizard system (www.pks.com.au). LabWizard is a commercial software application – based upon RippleDown Rules (RDR) – that has been deployed in a number of Australian laboratories. LabWizard exploits RDR's capacity for sophisticated knowledge capture in a number of modules used by clinical pathologists and senior laboratory technical staff. All rules and comments are constructed from the clinical lab experts' desktops, with an intuitive application that does not need supervision by IT experts or programmers with knowledge engineering skills. LabWizard has been used to construct a wide range of knowledge-based projects for interpretation of clinical laboratory tests. Examples include diabetes and lipid results, thyroid function, fertility and other endocrinology, iron studies, hepatitis and other viral serologies, full blood counts, electrolytes and renal function, liver function tests. Clinicians have responded enthusiastically to the improved service offered by the laboratory. Most general practitioners surveyed believe that better interpretative comments assist their decision making and is improving patient outcomes. Doctors are also responding by improving their test ordering. For example microalbumin test ordering in diabetics has increased by up to 45% (Edwards, G et al. Unpublished data).

Will LabWizard be incorporated into electronic patient records?

Maybe. RippleDown Rules, the underlying know-

ledge acquisition methodology that underpins LabWizard, is well suited to a range of applications, including clinical decision support embedded in electronic health record architectures. Development of prototypes is already underway.

The pathology-specific implementation of RippleDown Rules, LabWizard, will also be an important component of these systems – *if* clinical laboratories demonstrate their commitment to improved interpretation. Clinical experts will use technologies such as LabWizard to build more effective clinical decision support tools, for example to support electronic test ordering and implementation of best practice protocols for clinical care units.

Clinical pathologists and laboratory experts must be seen as key stakeholders in this process – engaging with their clinical colleagues in a collaborative and proactive effort. This will ensure for the profession a central role in designing and implementing decision support systems, and helping shape the future health of their communities through better support for clinical decision making.

Literature

1. Lim EM, Sikaris KA, Gill J, Calleja J, Hickman PE, Beilby J, Vasikaran SD. Quality Assessment of Interpretative Commenting in Clinical Chemistry. *Clin Chem* 2004; 50: 632 - 637.
2. Laposata M. Patient-specific Narrative Interpretations of Complex Clinical Laboratory Evaluations: Who Is Competent to Provide Them? *Clin Chem* 2004; 50: 471 - 472.