Cutting Edge Models for Healthcare Professions Education and Clinical Research

ELIZABETH KENIMER LEIBACH

Among the significant benefits of editing the *Clinical Laboratory Science* supplemental education issue is the opportunity to reflect on education practices evolving in direct response to the changing goals, values, and practices emerging in our healthcare delivery system. The articles in the *2012 Education Supplement* are well-developed examples of innovative applications of simulations resulting in educational outcomes enhancement and resources reduction that address changing practices in healthcare delivery. As you digest the practice descriptions, methods, and applications presented hereafter, consider the implications of these educational practices through the lens of major healthcare delivery change drivers like computerization and informatics. Also, consider implications for the laboratory medicine manufacturing and larger healthcare professions education sectors.

To help focus your analysis, look back to the *2011 Education Supplement* in which two questions were posed in the introductory comments:

> "(1) Can we as medical laboratory professionals, demonstrate the value of our services and information unequivocally, in data-driven terms, in language understood by the emerging value-based healthcare system providers and consumers? (2) What is laboratory medicine clinical research and what needs to be investigated?"[1]
>
> The answers to these questions will determine the value of our services, specifically, "how well they support positive medical outcomes and the extent to which they favorably influence medical decision-making."[1]

To address the first question, consider the evidence for value of the practices described in the following articles all of which relate to aspects of simulation utility in the heuristics of technical instruction. Some address student instruction while others address clinical instructor preparation. Well-designed educational studies were implemented and evaluated that yielded evidence to support many educational constructs, for instance, learning transfer, active learning, and critical thinking to name a few. Evidence from these studies provides not only a foundation for continuing research in these areas, but also a model for uptake by other healthcare professions. Medical laboratory science (MLS) educators lead in knowledge base development in technical education, and through studies like those reported here, provide "proof of concept" evidence for the utility of innovative educational concepts that capitalize on the strengths of and opportunities afforded by digitization and computerization. Performance of these types of studies is the very definition of "evidence-based practice" in education that convince MLS educators of the merits of alternative instructional approaches that reduce costs and yield comparative or better learning outcomes. Yet, the reach of these reports goes beyond MLS. Other health professions, becoming increasingly more technologically based, look to the literature for not only technological interpretation but also instructional guidance.

In consideration of the second question, turn your thoughts to the larger healthcare delivery system and ask: with what clinical research skills are MLS educators to endue their students? Gauging the answer by the goals of enhancement of positive medical outcomes and utility in medical decision-making, it can be suggested that lessons learned in the accumulation of MLS education evidence supporting value can be applied to the larger healthcare delivery environment. Consider how digitization can be applied in MLS practice. Certainly there are applications for employee training. But are there applications for automated digitized cell morphology screening that might replace the gram stain or expand the use of automated manual differentials in prescribed situations? In our manufacturing sector, perhaps value could be gained by development of internet-based instrument operation and/or troubleshooting. If these informatics-based technologies

were available, costs in training students and technical service specialists could be reduced significantly while increasing market penetration. Participation in health information networks would be enhanced, as well, assuming the adoption of information standards in the technology design. Perhaps a novel technology application like this could even serve as the basis of efficient laboratory networks which could, with the development of and compliance with evidence-based ordering algorithms and practice guidelines, reduce costs, decrease healthcare disparities, increase health outcomes, and enhance the value of laboratory information in medical decision-making.

The distillation is that our efforts in clinically-relevant research as MLS educators have far-reaching ramifications. Situated perfectly to develop these types of technology-based research programs, MLS educators should seize the opportunity for collaboration with hardware and software technology and informatics vendors as well as other healthcare professions in doing what we do best, that is, understanding, developing, interpreting, and teaching healthcare technology applications. And the most important connection to be made is the evidence-based linkage of health and patient outcomes to laboratory information through analysis of delivery system-oriented care paths relative to test utilization.

When viewed through the lens of computerization and informatics, the *2012 Education Supplement* serves to inspire a larger thinking frame as we strive to thread our evidence-based research constructs through our broad and deep scope of practice. And remember, laboratory testing the way we experience it today may expand and extend to other modalities, as well, thus extending the scope of practice even further. Just this week (October 15, 2012), the development of a biodegradable biosensor produced from silicon, magnesium, and spider silk was introduced at the annual Optical Society (OSA) meeting in Rochester, New York. Information may be found at http://www.medicalnewstoday.com/releases/251442.php. The potential for use of this technology in non-invasive therapies is obvious, but for laboratory medicine, the ramifications for non-invasive testing are even greater. Pondering the downstream applications of these type discoveries underscores the need for expansion of our skills in technology, computerization, and informatics, understanding that there are no more qualified professionals than we to interface between these technological advances and their healthcare applications.

It remains the professional responsibility of MLS to analyze, interpret, and communicate laboratory information regardless of the production method.

The last point to be made is that the responsibility for the vision rests with MLS educators. The articles in this year's *Supplement* are inspirational, indeed. Trusting in the continuation of this innovative trend, I look forward to future reports and further expansion of the vision!

REFERENCES:

1. Leibach, EK. Building research through MLS curricula. Clin Lab Sci. 2011;24(4 Suppl:45-46.