

# Improving Patient Safety and Healthcare Quality in the 21<sup>st</sup> Century—Competencies Required of Future Medical Laboratory Science Practitioners

SUSAN MORRIS, CATHERINE N. OTTO, KAREN GOLEMBOSKI

## LEARNING OBJECTIVES

1. Describe the IOM competencies practitioners need in order to deliver quality healthcare.
2. Identify methods to integrate evidence-based medicine for improving healthcare safety into the MLS curricula.
3. Describe exercises to employ in MLS curricula to develop problem-solving skills required for participation in quality improvement projects.
4. Identify key aspects of delivering patient-centered care to include in MLS curricula.

## ABSTRACT

Healthcare quality has yet to meet the aims of the Institute of Medicine (IOM) with respect to safety, effectiveness, patient-centeredness, efficiency, timeliness and equity. No professional curricula adequately prepare future healthcare practitioners—including medical laboratory science professionals—with all competencies necessary to deliver quality healthcare. Practicing evidence-based medicine, focusing on quality improvement, using information technology, delivering patient-centered care and working as part of interdisciplinary teams are identified by the IOM as the five core competencies that every healthcare practitioner needs to effectively provide healthcare. Medical laboratory science educators need to incorporate patient safety concepts into the curricula and include assignments to develop the IOM competencies in order to adequately prepare future practitioners to effectively practice medical laboratory science in the healthcare system of the 21<sup>st</sup> century.

**ABBREVIATIONS:** IOM - Institute of Medicine, MLS - Medical Laboratory Science/Scientist, MLT - Medical Laboratory Technician, NAACLS - National Accrediting Agency for Clinical Laboratory Sciences, POC - Point of Care, RN - Registered Nurse

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*Susan Morris, MPH, MLS(ASCP)<sup>CM</sup>, St. Luke's Magic Valley Medical Center, Twin Falls, ID*

*Catherine N. Otto, PhD, MLS(ASCP)<sup>CM</sup>SH(ASCP)<sup>CM</sup>DLM(ASCP)<sup>CM</sup>, Salisbury University, Medical Laboratory Science Program, Salisbury, MD*

*Karen Golemboski, Ph.D., MLS(ASCP)<sup>CM</sup>, Bellarmine University, Medical Laboratory Science Department, Louisville KY*

*Address for Correspondence: Susan Morris, MPH, MLS(ASCP)<sup>CM</sup>, St. Luke's Magic Valley Medical Center, 801 Pole Line Rd, Twin Falls, ID, 208-814-1095, susanm@slhs.org*

## INTRODUCTION

Although it has been more than ten years since the Institute of Medicine (IOM) published *To Err is Human*<sup>1</sup> and *Crossing the Quality Chasm*,<sup>2</sup> patients continue to be unintentionally harmed at alarming rates by the disconnected healthcare services that are intended to help them. We have yet to fully achieve the IOM's six quality aims for healthcare; that is, healthcare services should be safe, effective, patient-centered, timely, efficient, and equitable.

The IOM convened a Health Professions Education Summit in 2002 to identify strategies for incorporating the appropriate skills to prepare practitioners to close the gaps in our delivery of care, improving healthcare quality and patient safety. Five competencies were identified as necessary for all future practitioners to be

able to deliver quality healthcare: practicing evidence-based medicine; employing quality improvement methodologies; using appropriate information technology; delivering patient-centered care; and working as part of an interdisciplinary team.<sup>3</sup> Currently, all health professionals, including medical laboratory professionals, are insufficiently prepared during their clinical training to master these competencies necessary to achieve quality healthcare.<sup>3</sup>

These additional competencies must be added to healthcare education curricula to adequately prepare professionals to function effectively in a reformed healthcare system that is focused on enhancing quality and safety. Until all healthcare professionals are educated to integrate these core competencies into practice, there is little chance that the healthcare system will achieve the quality aims.

Although significant efforts have been made across healthcare in general to address each of the six IOM aims for quality, a survey of NAACLS MLS program directors in 2010 indicated that existing medical laboratory science curricula have not yet fully incorporated the IOM aims.<sup>4</sup> In order to prepare future medical laboratory science practitioners to competently evaluate and improve medical laboratory services in the practice setting, the IOM quality aims and IOM core competencies need to be integrated into MLS and MLT curricula. These IOM quality aims could be discussed throughout the curriculum in discipline-specific courses or taught in a separate course (e.g., laboratory management); however, it would be most effective to employ methods to develop skills in the core competencies throughout the curriculum to most effectively integrate IOM quality aims into clinical practice.

#### **IOM Quality Aim: Safe Healthcare**

Healthcare safety was the domain most likely to be included in MLS curricula; however, in most cases this was limited to aspects of patient identification and analytic accuracy which directly impacted patient care resulting in misdiagnosis or repeat testing.<sup>4</sup> Expanding students' understanding of patient safety to include other pre-analytic and post-analytic sources of patient harm will provide a valuable foundation for developing quality improvement programs in their future work settings. Once students can identify pre-analytic and

post-analytic sources of patient harm, faculty can incorporate quality improvement case studies in which evidence from the literature is used as a foundation for the improvement practice. This technique will develop students' skills in evaluating the literature, examining quality improvement data, and making recommendations for improvements; all of these are skills necessary to practice evidence-based medicine.

#### **IOM Quality Aim: Effective Healthcare**

Improving effectiveness of laboratory testing is vital, particularly as newer tests are added to the laboratory test menu and healthcare costs increase. Decreasing the overuse, underuse and misuse of laboratory testing is the primary focus of improving the effectiveness of laboratory testing.<sup>5</sup> Effectiveness is assessed with evidence, such as that reported in peer-reviewed literature, clinical research studies, clinical practice guidelines, and quality improvement protocols. Although generating and applying evidence is a skill most likely to be developed in a graduate program, the ability to read and interpret scientific literature is included in NAACLS curriculum guidelines.<sup>6</sup> To prepare MLS students to participate in the evaluation of testing protocols and practice guidelines, MLS curricula need to include instruction in evaluation of laboratory testing algorithms for specific disease conditions, development of skills in literature review and evaluation, and examination of the strength and applicability of published research and quality improvement study findings. Case studies and simulations of interactions between clinicians and MLS will enhance critical thinking skills to prepare Medical Laboratory Science graduates to practice evidence-based medicine and work in interdisciplinary teams.

#### **IOM Quality Aim: Patient-centered Healthcare**

Laboratory services should be designed in ways that respect and optimize the experience of care for patients and their families. Focusing on patient-centered laboratory care generates significant developmental opportunities for future medical laboratory practitioners.<sup>7</sup> A new relationship of shared decision-making between patients and healthcare providers is needed, with more attention to patient values, preferences, and cultural backgrounds. It is necessary for laboratory professionals to interact with patients and families, listen to their concerns, and answer their questions. Cultural competence and consultative skills

need to be incorporated into the Medical Laboratory Science curriculum. Medical laboratory scientists are the most appropriate healthcare practitioners to instruct patients on proper preparation for specimen collection and they are the most appropriate healthcare practitioners to consult with clinicians about test specimen requirements and information.

#### **IOM Quality Aim: Timely Healthcare**

Although medical laboratorians have been examining test turn-around-time for decades, MLS and MLT curricula need to include discussions of meaningful opportunities to improve the *timeliness* of laboratory services, particularly in the early steps of the pre-analytic and last steps of the post-analytic phases of the total testing process. Students should understand that implementing methods that decrease the time from ordering the laboratory test to its receipt in the laboratory and the time from test completion to action taken on the patient's behalf will make significant impact on patient care.<sup>7</sup> Case studies and problem-based learning are techniques in which students can discover the consequences of untimely laboratory testing services on patient outcomes. Assignments which require collaboration with other healthcare students will provide medical laboratory students opportunities to develop skills in communicating information about laboratory testing with other healthcare practitioners. Collaborative experiences will also allow students to gain an understanding of the needs of other healthcare practitioners for medical laboratory information.

#### **IOM Quality Aim: Efficient Healthcare**

Because timeliness in healthcare is closely linked to efficiency of healthcare, content in laboratory management curriculum should address the impact of enhancing the efficiency of laboratory testing services, i.e., addressing deficiencies in the testing process, such as reducing mislabeled, unlabeled and lost specimens; improving specimen integrity; and reducing missed and multiple specimen collections.<sup>7</sup> Emphasis should also be placed on the impact of laboratory services on the efficiency of patient care, from the perspective both of the patient and of other members of the healthcare team. Inefficiencies that impact other healthcare providers can delay subsequent care intended for the patient, such as scheduling radiology procedures and other therapies such as blood transfusions, chemotherapy and antimicrobial infusions. Case studies

and projects that focus on problem-based learning, particularly if these types of learning experiences can be incorporated into the curriculum in an interdisciplinary format, will prepare medical laboratory science practitioners to examine and improve the total testing process from the perspective of the patient.

#### **IOM Quality Aim: Equitable Healthcare**

Enhanced communication skills will improve the *equity* of laboratory testing services by providing educational and consultative services for patients. These services may be delivered equitably by providing educational materials in the appropriate language and reading level and offering translation services to patients. Teaching future practitioners to educate patients on proper preparation for specimen collection, preparation and care for venipuncture sites, and the purpose of the laboratory tests are all part of the MLS scope of practice.<sup>7</sup> Patients want to understand the timeline of the testing cycle and how to interpret results. For instance, patients should always be told approximately when their physicians will have the results of their tests, and encouraged to call if they do not receive a timely report. Communication, both written and verbal, and assessment of patient understanding (using a technique called Teach Back<sup>8</sup>) should be emphasized in the Medical Laboratory Science curriculum in order to promote patient-centered care.

#### **Developing Competence in Practicing Evidence-based Medicine**

Students need to develop skills in the use and application of evidence-based medicine. Scenarios should be created to practice participation on an interdisciplinary team. For example, as the laboratory representative on a sepsis team, students can make other team members aware of the latest evidence regarding laboratory tests for early indicators of sepsis that would allow for earlier intervention and better survival rates for patients. The student could share and interpret the latest research findings for potential incorporation into an organizational protocol. Students could also propose testing protocols and participate in research activities where possible. Presenting these skills in the context of evidence-based medicine and practicing participation on interdisciplinary teams will prepare MLS practitioners to participate in a healthcare system which is increasingly focused on the use of proven team strategies to achieve improved outcomes.<sup>9</sup>

### Developing Competence in Employing Quality Improvement Methodologies

Quality control within a single test system demonstrates the reliability of the results produced by that test system. Process quality measures help to identify processes which negatively impact the quality and safety of healthcare, leading to undesirable patient outcomes. The processes and systems that laboratories use to produce and deliver test results to other members of the healthcare team are designed to be consistent, accurate, and timely; however, no design is perfect. Students need to understand how to analyze outcomes to determine if they meet benchmarks, such as turn-around times for critical test results or error rates in specimen processing. It is essential that medical laboratory professionals be taught to continually evaluate quality of care in terms of structure, process, and outcomes in relation to patient and community needs.<sup>10</sup> Medical laboratory education programs should include skill-building exercises needed to perform basic process problem solving, including identifying root causes of delays or errors, and strategies to reduce the chances of future errors. Laboratory professionals should understand basic safety design principles, such as standardization and simplification, so that they can include these features in process improvement processes and methodologies.<sup>7</sup> They also need to understand the basic principles of “plan – do – study – act”, to test and refine proposed process improvements.<sup>11</sup>

### Competence in Using Information Technology

Informatics is an integral part of current medical laboratory science practice due to the advanced technology of laboratory testing systems, and the use of information technology to manage and communicate test results and prevent errors. The current direction of healthcare informatics is to become more patient-centered and transparent. In the past, patients were encouraged to leave healthcare decisions to their physicians; today, patients are increasingly likely to seek out health information on their own, and are consequently more informed (or more misinformed!) about their health. Laboratory professionals can provide information and reliable resources for patients to learn more about their laboratory tests.

Students need to learn basic principles of new integrated electronic health record systems, assess how these types of systems enhance patient understanding of their

laboratory information, and facilitate patients' access to and interpretation of their own test results through these electronic systems. Enhanced patient access to results, as well as direct access testing,<sup>12</sup> will increase opportunities for laboratory professionals to design laboratory reports and consultative sessions that are more patient-centered.

### Competence in Delivering Patient Centered Care

Patient-centered care has become a critical component of the delivery of safe healthcare, and communicating with patients is one major component of delivering patient-centered care. Though opportunities for direct MLS-patient interactions have been limited, there is a growing need for electronic dissemination of information and consultation with both patients and other healthcare providers. To fully participate in delivering health care that meets all six IOM aims, educational preparation of medical laboratory scientists needs to include experiences targeted to develop communication and consultative skills using problem-based scenarios and simulation exercises.

Delivering patient-centered care also includes the delivery of care that meets each patient's goals, tailored to their cultural, social, and physical needs. Although the medical laboratory scientist with an advanced practice degree, such as the Doctorate in Clinical Laboratory Science, is more likely to consult with physicians and other health care professionals regarding the prognostic value of testing related to improved patient outcomes, the curriculum for medical laboratory scientists should include a foundation in the use of laboratory information in clinical decision supports and how medical decisions impact the lives of individual patients.<sup>13</sup>

### Competence in Working as Part of an Interdisciplinary Team

Challenges such as workforce shortages and lack of support from leadership have further compromised teamwork among healthcare professionals. From the patient-centric view, however, interprofessional teamwork is considered essential for seamless, high quality healthcare.<sup>3,13</sup> MLS education programs should emphasize communication and conflict resolution skills, as well as respect for other healthcare professionals and their scopes of practice. Incorporation of inter-professional education, however, will almost certainly

require the initiative of MLS educators, since programs already underway for other healthcare professionals have not included laboratory professionals (e.g., laboratory practitioners are not represented in the Interprofessional Education Collaborative, which is comprised of the American Association of Colleges of Pharmacy, the Association of American Medical Colleges, the American Association of Colleges of Nursing, the American Dental Education Association, the American Association of Colleges of Osteopathic Medicine, and the Association of Schools of Public Health).<sup>13</sup> A foundation in communication skills will be particularly important as Medical Laboratory Scientists expand their clinical roles as individuals with Doctorates in Clinical Laboratory Science.

## CONCLUSION

A decade after publication of *A Bridge to Quality* the problems leading to unintended harm of patients in the healthcare delivery process have not been solved. Professional education for laboratory practitioners today includes few specifics directed at the IOM aims or core competencies that could contribute to safer care. Most educators acknowledge that the medical laboratory science curriculum is overflowing. However, by integrating patient safety concepts and crafting assignments to develop the Institute of Medicine Core Competencies, future practitioners will be better prepared to effectively practice medical laboratory science in the healthcare system of the 21<sup>st</sup> century in ways that will help keep patients safe from harm.

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