ADVISORY COMMITTEE ON INTERDISCIPLINARY, COMMUNITY-BASED LINKAGES (ACICBL)

CONTINUING EDUCATION, PROFESSIONAL DEVELOPMENT, AND LIFELONG LEARNING FOR THE 21ST CENTURY HEALTH CARE WORKFORCE

11th Annual Report to the
Secretary of Health and Human Services
and the U.S. Congress

The views expressed in this report are solely those of the Advisory Committee on Interdisciplinary, Community-Based Linkages, and do not represent the perspectives of the Health Resources and Services Administration nor the United States Government.

Continuing Education, Professional Development, and Lifelong Learning for the 21st Century Health Care Workforce

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Advisory Committee on Interdisciplinary, Community-Based Linkages (ACICBL)

Mission

The Advisory Committee on Interdisciplinary, Community-Based Linkages (ACICBL) provides advice and recommendations to the Secretary of the Department of Health and Human Services (Secretary) concerning policy, program development, and other matters of significance related to interdisciplinary, community-based training grant programs authorized under sections 750-759, Title VII, Part D of the Public Health Service (PHS) Act, as amended by the Affordable Care Act. As amended, Part D of Title VII of the PHS Act includes the following sections/programs:

750 – General Provisions

751 – Area Health Education Centers

752 – Continuing Education Support for Health Professionals Serving in Underserved Communities

753 – Education and Training Related to Geriatrics

754 – Quentin N. Burdick Program for Rural Interdisciplinary Training

755 – Allied Health and Other Disciplines

756 – Mental and Behavioral Health Education and Training Grants

757 – Advisory Committee on Interdisciplinary, Community-Based Linkages

759 – Program for Education and Training in Pain Care

The ACICBL prepares an annual report describing its activities conducted during the fiscal year, including findings and recommendations made to enhance these Title VII programs. This annual report is submitted to the Secretary of the United States Department of Health and Human Services and ranking members of the Senate Committee on Health, Education, Labor, and Pensions, and the House of Representatives Committee on Energy and Commerce. In addition, the ACICBL: (a) develops, publishes, and implements performance measures for programs under this part; (b) develops and publishes guidelines for longitudinal evaluations (as described in section 761 (d)(2) of the PHS Act) for programs under this part; and (c) recommends appropriation levels for programs under this part.

Report Development Process

The ACICBL's annual report includes findings and recommendations focusing on a select topic that encompasses a particular aspect of interprofessional education and training for healthcare providers covered in sections 750-759, Title VII, Part D of the PHS Act. This annual report is prepared by the ACICBL after conducting an independent search of published literature on the selected annual topic, hearing testimony from experts in various areas relevant to that topic, and engaging in dialogue with each other, utilizing individual expertise and experiences in this area.

ACICBL Members

Jane Hamel-Lambert, PhD, MBA (Chair)
Director
Appalachian Rural Health Institute
Associate Professor
Department of Family Medicine
Ohio University
College of Osteopathic Medicine
Athens, Ohio
Program: Rural Health

Robert J. Alpino, MIA
Administrative (Center) Director
Eastern Virginia Area Health Education Center
Norfolk, Virginia
Program: Area Health Education Centers

Helen M. Fernandez, MD, MPH
Associate Professor/Program Director
Geriatrics Fellowship
Mount Sinai School of Medicine
New York, New York
Program: Geriatric Education Centers

David R. Garr, MD
Executive Director
South Carolina AHEC Consortium
Associate Dean for Community Medicine
Professor of Family Medicine
Medical University of South Carolina
Charlestown, South Carolina
Program: Area Health Education Centers

Patricia A. Hageman, PT, PhD
Professor, Physical Therapy Education, SAHP
University of Nebraska Medical Center
Omaha, Nebraska
Program: Geriatric Education Centers

Beth D. Jarrett, DPM
Associate Professor, Department of
Biomechanics and Orthopedic Diseases
Dr. Wm. M. Scholl College of Podiatric
Medicine at Rosalind Franklin University
North Chicago, Illinois
Program: Podiatric Medicine

Linda J. Kanzleiter, MPsSc, DEd
Associate Program Director
Pennsylvania-Delaware
Area Health Education Center
Pennsylvania State University
College of Medicine
Hershey, Pennsylvania
Program: Area Health Education Centers

Susan Kwan, MPH
Executive Director
Zoobiquity Research Initiative
David Geffen School of Medicine
University of California, Los Angeles
Los Angeles, California
Program: Geriatric Education Centers

Barbara N. Logan, PhD, MA, MSN
Professor Emeritus, College of Health,
Education, and Human Development
Clemson University
Clemson, South Carolina
Program: Rural Health

Carmen L. Morano
Associate Professor
Sliberman School Social Work at
Hunter College
City University of New York
New York, NY
Program: Social Work

James C. Norton, PhD
Associate Dean for Educational Engagement
University of Kentucky, College of Medicine
Lexington, Kentucky
Program: Area Health Education Centers

David H. Perrin, PhD, ATC
Provost/Executive Vice Chancellor for Academic
Affairs
Office of the Provost
The University of NC at Greensboro
Greensboro, North Carolina
Program: Allied Health

Elyse A. Perweiler, RN, MA, MPP
Director, NJ Area Health Education Center
Associate Director, NJ Geriatric Education Center
The University of Medicine and Dentistry of New Jersey School of Osteopathic Medicine
Stratford, New Jersey
Program: Geriatric Education Centers

Sandra Y. Pope, MSW
Associate Director
West Virginia Area Health Education Centers Program
Charleston, West Virginia
Program: Area Health Education Centers

Linda J. Redford, RN, PhD
Director
Central Plains Geriatric Education Center
University of Kansas Medical Center
Kansas City, Kansas
Program: Rural Health

Cecilia Rokusek, EdD, RD
Executive Director for Education, Planning & Research
Nova Southeastern University
Fort Lauderdale, Florida
Program: Allied Health

Ronald H. Rozensky, PhD, ABPP
Professor and Associate Dean
International Programs, Department of Clinical and Health Psychology
College of Public Health & Health Professions
University of Florida
Gainesville, Florida
Program: Graduate Psychology

Steven R. Shelton, MBS, PA-C
Assistant Vice President,
Community Outreach
Executive Director of East Texas AHEC
The University of Texas Medical Branch
Galveston, Texas
Program: Area Health Education Centers

Jay H. Shubrook Jr., DO, FACOFP, FAAFP
Associate Professor, Family Medicine
Heritage College of Osteopathic Medicine
Ohio University
Athens, Ohio
Program: Rural Health

Carl M. Toney, PA
Member, Advisory Committee
Maine Statewide AHEC Network
Charter Member & Past President
Association of Clinicians for the Underserved
Scarborough, Maine
Program: Vulnerable Populations

Laurie Wylie, MA, RN, SNP
Executive Director
Western Washington
Area Health Education Center
Seattle, Washington
Program: Area Health Education Centers

Federal Staff Support

Joan Weiss, PhD, RN, CRNP
Designated Federal Official
Director, Division of Public Health and Interdisciplinary Education
Bureau of Health Professions
Health Resources and Services Administration
Department of Health and Human Services
Rockville, Maryland

Norma J. Hatot, CAPTAIN
United States Public Health Service
Senior Nurse Consultant
Division of Public Health and Interdisciplinary Education
Bureau of Health Professions
Health Resources and Services Administration
Department of Health and Human Services
Rockville, Maryland

Lou Coccodrilli, MPH, RPh
Chief, Area Health Education Centers Branch
Division of Public Health and Interdisciplinary Education
Bureau of Health Professions
Health Resources and Services Administration
Department of Health and Human Services
Rockville, Maryland

Patrick Stephens
Technical Writer
Division of Public Health and Interdisciplinary Education
Bureau of Health Professions
Health Resources and Services Administration
Department of Health and Human Services
Rockville, Maryland

Chairperson's Acknowledgements

The Advisory Committee on Interdisciplinary, Community-Based Linkages (ACICBL) provides advice and recommendations to the Secretary of Health and Human Services (Secretary) concerning policy, program development, and other matters of significance as authorized under 42 U.S.C. 294f, section 756(d) of the Public Health Service Act (PHS), as amended. The ACICBL is governed by the Federal Advisory Committee Act (FACA), Public Law 92-463, as amended (5 U.S.C. Appendix 2), which sets forth standards for the formation and use of advisory committees, and Public Law 111-148, the Patient Protection and Affordable Care Act of 2010, Title V – Health Care Workforce, Subtitle B – Innovations in the Health Care Workforce, section 5103.

Each year, the ACICBL selects a topic concerning a major issue within the healthcare delivery system that is relevant to the mission of the Bureau of Health Professions (BHPr) Title VII – Part D, Interdisciplinary Community-Based Linkages programs. After the ACICBL analyzes the selected topic, it develops recommendations to the Secretary concerning policy and program development. This year, the ACICBL examined *Continuing Education, Professional Development, and Lifelong Learning for the 21st Century Health Care Workforce*.

This report is the culmination of the efforts of many individuals who provided their expertise to the ACICBL during three required formal meetings: the first as a scheduled conference call on December 1, 2010; the second held in Rockville, Maryland on January 27 and 28, 2011; and the third held in Bethesda, Maryland on February 24 and 25, 2011. As noted throughout the report, experts informed the ACICBL and provided their knowledge and consultation on a broad array of issues concerning continuing education and professional development. ACICBL members had an opportunity to listen to presenters' expert testimony and discuss these issues with them. The ACICBL expresses appreciation to all presenters for their time and knowledgeable expertise.

Finally, this report has benefited from the capable assistance of federal staff from the Health Resources and Services Administration, Bureau of Health Professions, Division of Public Health and Interdisciplinary Education: Dr. Joan Weiss, Designated Federal Official, Director, Division of Public Health and Interdisciplinary Education; Mr. Lou Coccodrilli, Chief, Area Health Education Centers Branch; CAPT Norma J. Hatot, Senior Nurse Consultant, United States Public Health Service; and Mr. Patrick Stephens, Technical Writer, Division of Public Health and Interdisciplinary Education. The ACICBL appreciates the hard work and dedication of these individuals in producing this report.

Sincerely,

Jane Hamel-Lambert, PhD, MBA, Chair
Advisory Committee on Interdisciplinary, Community-Based Linkages
Associate Director, Appalachian Rural Health Institute
Ohio University

Continuing Education, Professional Development, and Lifelong Learning for the 21st Century Health Care Workforce

Executive Summary

During the 20th Century, continuing education was regarded as a mainstay in the ongoing development of a health care professional after graduation. Commonly delivered through lectures that mirrored pre-service professional education experiences, health professionals listened to experts in health care education impart knowledge with the ultimate goal of changing practice behavior and improving patient health outcomes. At the start of the 21st Century, however, escalating health care costs and the growing gap between health care evidence and practice prompted close scrutiny of health professions education as one contributing solution for improving the health care delivery system. A prelude to this scrutiny began with the Institute of Medicine (IOM) report *Crossing the Quality Chasm* (2001), which uncovered issues affecting patient safety and quality of care such as excess costs, redundancy, and loss of care continuity. To address these issues, the IOM issued a subsequent report on *Health Professions Education: A Bridge to Quality* (2003) to examine the competencies that were necessary to transform education and enhance patient safety and quality of care. This report recommended the integration of five core competencies into health professions education: provide patient-centered care, work in interdisciplinary teams, employ evidence-based practice, apply quality improvement, and utilize informatics (i.e., information technology). Overall, both reports conveyed a summative message that our nation must transform all aspects of health care education and professional development.

Recently, a review of health care education and professional development has focused on continuing education, as evidenced by the Macy Foundation (Macy) report on *Continuing Education in the Health Professions* (2008), the IOM report on *Redesigning Continuing Education in the Health Professions* (2010), and the Macy report on *Lifelong Learning in Medicine and Nursing* (2010). These reports examined whether continuing education changed practice behavior and improved patient health outcomes. In addition, the reports fueled a growing recognition that continuing education is but one component of continuing professional development—a multi-faceted approach to the acquisition and application of knowledge during the practice life of a health care professional.

Health care professionals are overwhelmed by a proliferation of clinical information, resulting in a gap between available evidence-based clinical information and actual practice (Davis, 2011). Almost a decade ago, the IOM observed that an average of 17 years elapse between the discovery of a new treatment to the integration of that treatment into routine practice (IOM, 2003; Balas, as cited in IOM, 2003). Clinical information must be disseminated in a timely manner, using new and innovative ways, to enable health professionals to keep pace with the rapid development of evidence-based information. The challenge is great because 10,000 to 15,000 scientific articles are published annually (Holmboe, 2011).

This ACICBL report on *Continuing Education, Professional Development, and Lifelong Learning for the 21st Century Health Care Workforce* will examine the evolution of post-degree health professions education from a continuing education perspective, traditionally consisting of discipline-specific lectures, to a broad, multifaceted concept of continuing professional development. Continuing professional development encompasses all forms of professional education, from the day a provider enters clinical practice and continuing as a provider acquires further knowledge and skills throughout their entire practice career. Together, pre-practice clinical education and continuing professional development comprise the lifelong learning of a health care professional. Lifelong learning involves the ability to resolve issues through inquiry, resource identification, and independent/continual assessment of one's own learning needs (Macy, 2008). Ensuring that continuing professional development is readily available throughout the practice life of a health care professional requires a system that (a) expands collaborative partnerships for continuing professional development, (b) ensures health professionals effectively use technology to access current evidence-based health information for the improvement of patient safety and point-of-care learning, and (c) emphasizes effective program design and evaluation to link continuing professional development to practice behaviors and improved patient outcomes.

The Department of Health and Human Services, Health Resources and Services Administration (HRSA), Bureau of Health Professions (BHPR), is well-positioned to advance the vision for continuing education, professional development, and lifelong learning for the 21st Century health care workforce. This report includes targeted and actionable recommendations that address flaws in our current continuing education processes and promotes the vision that evidence-based practice, much like patient care, depends upon evidence-based education.

Recommendations

The ACICBL recommends that the United States Department of Health and Human Services (DHHS) implement the following recommendations to help improve continuing education, promote professional development, and develop lifelong learning programs that serve to advance achievement of the five core competencies contained in the IOM report *Health Professions Education: A Bridge to Quality*: provide patient-centered care, work in interdisciplinary teams, employ evidence-based practice, apply quality improvement, and utilize informatics.

1. Congress and HRSA should expand support for continuing professional development and lifelong learning activities within Title VII, Part D programs through activities such as collaborative partnerships with foundations and other agencies.

2. HRSA should initiate efforts to identify a mechanism, by the end of fiscal year 2013, that will build capacity in Title VII, Part D programs to increase faculty members' knowledge and abilities in the application of distance learning and e-learning technologies. These technologies can be utilized in the ongoing development of interprofessional education, training, and continuing professional development programs.

3. HRSA should convene public-private partners, representative leadership of Title VII, Part D programs, and other stakeholders by no later than the end of fiscal year 2014, to develop recommendations and an action plan for the evaluation of interprofessional competencies attained through continuing professional development and lifelong learning, including the collection, development, refinement, standardization, implementation, and dissemination of innovative methods for evaluation.

Discussion

History of Continuing Education

To know the history of continuing education (CE) in the health professions is to understand its present state. Florence Nightingale, who encouraged nurses to continue learning, may have been the first advocate for CE (Gallagher, as cited in IOM, 2010). Such advocacy, coupled with limited educational opportunities, prompted establishment of the first U.S. course in nursing CE in 1894. As nursing progressed from the late 19th to the mid-20th Century, continuing post-graduate education for nurses often consisted of on-the-job experience in a specialty such as orthopedics or tuberculosis, as opposed to theory-based course instruction. By 1960, federal funding enabled universities to begin offering short-term CE courses. Nurses attended these courses because hospitals had available monies, and nurses required training in new technological therapies in units such as coronary care. By the late 1990s, more than one-third of the U.S. states required nurses to earn CE credits for re-licensure (Stein, 1998). At the current time, all states require CE as a condition for nursing license renewal.

In pharmacy, the American Association of Colleges of Pharmacy and the American Pharmaceutical Association established a task force for CE in 1975. The task force compiled principles and policies for CE programs, and stipulated that professional competency is dependent upon (a) current knowledge in pharmacy, and (b) adequate and appropriate performance consistent with professional knowledge and procedures ("The Continuing Competence," 1975).

In psychology, consumer activism in the 1960s spawned formation in the 1970s of a Continuing Education Committee by the American Psychological Association (APA). This committee defined CE core values and purposes, and established an early foundation for CE to ensure consumer welfare. As a result, CE was introduced into the APA Ethics Code. In the mid-1970s, the Association of State Psychology Boards began to encourage members to include CE requirements for license renewal. By the 1990s, efforts to nationalize CE included a study of mandatory CE, a task force on developing CE regulations, and a review of the APA approval system for CE providers. This approval system currently regulates nearly 900 APA-approved CE providers. The Association of State and Provincial Psychology Boards, the association of psychology licensing boards for the U.S. and Canada, now includes mandatory CE in its model licensing act. Consistent with the evidence-based movement in health care, professional psychology has embarked on researching the practicing professional's attitude towards CE (i.e., who takes what course, why, and when), the effectiveness of various learning environments and methods, and the impact of CE on practice. Today, lifelong learning in psychology is increasingly linked to the inclusion of ongoing competencies over the course of professional development (Neimeyer & Taylor, 2010).

For physicians, continuing medical education (CME) began after World War I, when medical faculties became aware that practitioners required educational updates about the latest advances in medicine. However, after World War II and throughout the 1950s, medical faculty began to concentrate on residency programs instead of CME; in addition, studies revealed that

pharmaceutical sales representatives were a resource for new knowledge and information. These study results ushered in a new and controversial evolution in CME, linking pharmaceutical companies with CME for physicians, a relationship that has persisted from the 1950s until recent years (IOM 2010; Arky, 2007). To monitor and mitigate potential conflicts of interest, the American Medical Association and state medical societies began to regulate CME, and currently providers of CME are regulated by national accrediting organizations such as the Accreditation Council for Continuing Medical Education (ACCME) and the Association for Hospital Medical Education. Despite such efforts, accreditation organizations, CME providers, and pharmaceutical companies continue to collaborate on the delivery of CME programming (IOM, 2010).

Strategies to Strengthen Health Professional Education

During the past decade, accreditation organizations, institutes, and foundations have increasingly focused on competencies and criteria to strengthen the standards for health professional education, including CE. In 2001, the Accreditation Council for Graduate Medical Education (ACGME) issued requirements for addressing four new competencies for physician training: practice-based learning and improvement, systems-based practice, professionalism, and interpersonal and communication skills (Kokemueller & Osguthorpe, 2007). In 2003, the IOM expanded this concept to "all programs and institutions engaged in the education of health professionals" by listing five core competencies: provide patient-centered care, work in interdisciplinary teams, employ evidence-based practice, apply quality improvement, and utilize informatics (IOM, 2003). In 2006, the ACCME expanded CME criteria to include: improving professional practice, gathering data for program-based analysis, and separating CME from commercial activities to restrict the degree of collaboration between physicians, CME providers, and pharmaceutical companies (Kokemueller & Osguthorpe, 2007). These variances in educational goals, with numerous organizations endorsing a range of educational competencies, create an overall lack of consistency that could potentially undermine efforts to align health care education goals with health care practice goals to improve performance and patient care.

Prior to a discussion of testimony presented to the ACICBL, it is important to provide a definition of terms. The following table provides a sample of learning activities that go beyond traditional lectures or conferences.

Definition of Terms	
Audit	Measurement of a health care professional's clinical performance, obtained from observation, patients, or records/databases. Results subsequently offered as a feedback to the professional (Mazmanian, 2011; IOM, 2010).
Academic Detailing	Visitation to a health care professional by another knowledgeable and credible health care professional, who provides materials and/or advice on practice-related matters (IOM, 2010; Doyne et al., 2004).

Definition of Terms	
Learning Portfolios	Web-based or hard-copy documentation of professional learning from clinical or educational activities. Some web-based portfolios include interactive milestones that inform professionals or others of their learning progress (IOM, 2010).
Opinion Leaders	Professionals who are well regarded by peers for their clinical expertise and interpersonal skills (IOM, 2010).
Point-of-Care Learning	Learning generated by a clinical encounter between a health care professional and patient (i.e., in person, by phone, through email or video) in which the professional provides an answer, during the encounter or shortly thereafter, by conducting a research of biomedical literature or other sources (Macy, 2010).
Virtual Patients	Computer-based programs that simulate real-life clinical patient scenarios and allow professionals to learn from their diagnostic and therapeutic decisions (Ruiz, 2011; Huang, Reynolds, & Candler, 2007).

To determine how CE, professional development, and lifelong learning can strengthen health professions education, the ACICBL heard testimony from nationally recognized experts in the fields of health professions education, medicine, psychology, public health, accreditation, and credentialing. Dr. Paul Mazmanian began with educational outcomes, describing an evaluation system containing seven progressive levels of impact: participation, satisfaction, learning, competence, performance, patient health, and community health. He stated that, presently, CE does a good job in measuring a health care professional's participation, satisfaction, and learning; however, it neither measures the educational impact on a professional's competence and performance nor the resulting impact on patient health and community health (Mazmanian, 2011). This concurred with testimony by Dr. Candice Chen that CE should ideally evaluate both individual patient health outcomes as well as the health outcomes of patient populations with similar health problems. Dr. Chen also stressed that effective care must address health disparities in communities and provide quality of care that is accessible (Chen, 2011). In testimony before the ACICBL, Dr. Ronald Cervero stated that CE delivered through a traditional lecture format, and CE credits provided merely for attendance, must undergo a transformation to a practice/evidence-based learning and performance-based evaluation system. He added that the impact of CE can be strengthened by incorporating (a) a high-quality needs assessment, (b) ongoing feedback, (c) an interactive format with multiple media and educational methods, and (d) the inclusion of information that is contextually relevant to the professional's practice. In addition, it is helpful to include professionals within the same practice setting, who can reinforce the knowledge of their colleagues, and provide mutual support in the workplace to encourage positive practice behavior changes (Cervero, 2011; AHRQ, 2007).

As noted, CE credits have traditionally been based upon classroom or coursework time, with drastic variation in credit requirements across disciplines and from one state to another. Reports and literature in the past decade have started to address the limitations of traditional CE. For

instance, in 2003 the IOM commented that advances in health care are occurring at too rapid a pace for any one provider to remain current, stating that "providing relevant information in an accessible format at the point of care" may offer a solution to this dilemma. The use of virtual patients for CE evaluation and credit requirements is one way to implement practice- and evidence-based learning, as well as performance-based evaluation, through the use of technology. In testimony before the ACICBL, Dr. Jorge Ruiz explained that current technology permits the use of virtual patients to test a health professional's competence and performance. Further CE evaluation, and its impact on patient and community health, may be available through chart audits, direct observation, or patient surveys (Ruiz, 2011). This supports Dr. Mazmanian's testimony that an effective educational evaluation process measures both the competence/performance of a health care professional and the outcomes of patients within the community (Mazmanian, 2011).

Presently, CE curricular design issues include types of media, educational techniques, and number of exposures. Research is inconclusive as to whether enough evidence exists to determine the type of curricular design or the amount of CE that is needed to have a positive impact on a health professional's competence or performance (AHRQ, 2007; IOM, 2010). Clearly, more refined assessment and evaluation tools are needed to determine the optimal type of curricular design to convey clinical knowledge that develops and demonstrates clinician performance in achieving the five IOM competencies. In testimony before the ACICBL, Dr. Eric Holmboe stated that multiple and non-redundant assessment methods, involving community-based training and simulation, can provide effective CE evaluation. He commented that the key to competency is not the amount of time in practice, but repeated exposure to a clinical issue or procedure that reinforces/improves professional competency.

Learning is more challenging than ever for the health care professional because of the plethora of published literature and electronic information that exists, combined with the fact that new knowledge is emerging at an accelerating pace. Upon entering practice, the health care professional experiences increased demands that reduce the time available for learning and assessment, and over time the professional's knowledge of emerging evidence-based practice and professional competence may deteriorate. Until now, greater emphasis has been placed on pre-practice education, which generally ranges from 5 to 15 years, yet the practice life of a health care professional can range from 35 to 40 years. Because of this, it is apparent that a full transformation is needed to emphasize CE, professional development, and lifelong learning throughout the practice life of a health care professional (Holmboe, 2011).

System Redesign for Continuing Professional Development

In 2008, the Macy Foundation issued a report on *Continuing Education in the Health Professions*, which recommended (a) the establishment of a national interprofessional Continuing Education Institute (CEI), and (b) that the IOM convene a committee to examine development of a CEI. Short- and long-term learning must be examined, and different techniques must be assessed to determine best practices for CE and professional development (Arky, 2007). In response to the Macy Foundation, the IOM issued a report in 2010 on *Redesigning Continuing Education in the Health Professions*, defining lifelong learning as "…a continuum, from elementary and secondary education to undergraduate and graduate education, lasting through the end of one's career." The report also noted that CE delivery mainly focused

on discipline-specific lectures and conferences, and though innovations in delivery have developed (e.g., webinars), measurement of competencies acquired and provision of credits for innovative learning activities have lagged behind (IOM, 2010). CE must be restructured to offer formal credits for interprofessional learning activities and incorporated as part of a greater and learner-driven concept known as Continuing Professional Development (CPD). CPD encompasses didactic learning as well as other modalities such as point-of-care learning and opinion leaders.

Subsequently, a 2010 Macy report on *Lifelong Learning in Medicine and Nursing* continued this theme with the endorsement of CE and lifelong learning. The report stated that acronyms such as CME approached CE from a discipline-specific perspective—not the interprofessional perspective that is so vital in today's health care system. The report defined lifelong learning as a voluntary acquisition of knowledge from life experience and education that reflects the values and behaviors of a health care professional. The Macy report also noted that CE experienced the same challenging health education issues noted in the 2003 IOM report on health professions education: demographic shifts in patient population creating a lack of cultural competence in health care delivery, an exponential increase of knowledge, and a complex health care system. Additionally, the report advocated alternatives to traditional CE such as academic detailing and audits of clinical performance (Macy, 2010).

As a result, there is a clear movement to change the *nature* of CE to ensure continuing competence and lifelong learning throughout the practice life of a health care professional. Ensuring continuing competence involves incorporating the five core competencies of the 2003 IOM report on *Health Professions Education: A Bridge to Quality* into CE and CPD because the incentives, strategies, and outcomes of health education are currently not adequately aligned to improve practice behavior and patient health outcomes (Mazmanian, 2011). The development and dissemination of accurate assessments that measure the impact of acquired competencies on professional knowledge and patient care will help to ensure both the effectiveness and value of CE and its contribution to CPD. The ongoing and continuous nature of CPD requires technology to keep pace with the rapid growth of evidence-based knowledge and to provide the flexibility for CPD to fit into a practitioner's busy schedule. This requires the ability of faculty to impart knowledge, with the aid of technology, across distance and disciplines.

The emphasis on CPD, applied within interprofessional practice, will create and reinforce a team synergy of common attitudes, values, and behaviors greater than the sum of each professional's knowledge (Frenk, 2010). A 2011 report on *Core Competencies for Interprofessional Collaborative Practice* stated that health care professionals must recognize the limits of their professional expertise within our nation's complex health care system, and collaborate with other health care professionals to provide quality patient-centered care. This patient-centered and team-based care is enhanced by participating in CPD and demonstrating the five IOM core competencies in practice (IPEC, 2011). With an aging population and a corresponding increase in chronic health conditions, it is paramount to improve health care efficiencies and assess interprofessional competencies as part of CPD and lifelong learning. In addition, aligning CPD and lifelong learning with the five IOM core competencies will assist health care teams in acquiring the information needed to provide the best care possible to the patients they serve.

Recommendations with Rationale

The ACICBL recommends implementation of the following recommendations to help improve continuing education, promote professional development, and develop lifelong learning programs. These programs would serve to advance achievement of the five core competencies contained in the IOM report *Health Professions Education: A Bridge to Quality*: provide patient-centered care, work in interdisciplinary teams, employ evidence-based practice, apply quality improvement, and utilize informatics.

Recommendation 1

Congress and HRSA should expand support for continuing professional development and lifelong learning activities within Title VII, Part D programs through activities such as collaborative partnerships with foundations and other agencies.

Rationale for Recommendation 1

In the report *Health Professions Education: A Bridge to Quality* (2003), the IOM recommended a set of five core competencies to address the health care challenges in the 21st Century. Seven years later, the IOM report on *Redesigning Continuing Education in the Health Professions* (2010) determined that traditional CE does not adequately facilitate the acquisition of these competencies by health care professionals. Therefore, our nation must establish a system of effective CE, *incorporating the principles of CPD*, to ensure that health care professionals can actively acquire and employ the five core competencies in their practices (Cervero, 2011). The ACICBL believes that utilizing CE, CPD, and lifelong learning methods to educate health care professionals about these five core competencies will be crucial to ensuring that the health care workforce will be adequately prepared to practice in the evolving 21st Century health care system.

Expanding support for CPD and lifelong learning activities should involve collaborative partnerships with public and private stakeholders such as: (a) agencies within DHHS; (b) foundations involved with health care policy; (c) universities, medical schools, nonprofits; and (d) other federal, state, and local agencies. These partnerships would leverage collective resources and position Title VII, Part D programs to serve as effective vehicles for aligning CE, CPD, and lifelong learning in the health professions with the five core competencies emphasized in the 2003 and 2010 IOM reports. These programs are well positioned to develop/expand CE and CPD because they have a long history of providing training to students and CE to practicing health care professionals, as well as establishing collaborative partnerships with foundations and other agencies. Title VII, Part D programs are legislatively mandated to collaborate with two or more disciplines, and possess the capacity to provide CE and CPD in an interdisciplinary/ interprofessional environment. In addition, the delivery of CE and the dissemination of evidence-based health information contribute to the core mission of Title VII, Part D programs. This educational content equips health care providers with the knowledge and skills to deliver high-quality, culturally-competent, evidence-based, and patient-centered care.

Because the content addressed in CE programs is subject to continual change and development, it is imperative that CE delivery continue to become more versatile in its approach and

methodology, enabling CE to be an active and contributing component to CPD. Providing CE and CPD interprofessionally, and fostering activities such as collaborative partnerships with foundations and other agencies, establishes an environment where quality improvement can be applied and informatics can be utilized.

Increasingly, grantees funded through Title VII, Part D programs are transitioning from traditional lecture-based formats to interactive web-based courses, real-time videoconferencing, educationally-oriented clinical consultations, and quality improvement practice projects involving interprofessional teams. Title VII, Part D programs have the potential to assume a leadership role in building capacity and infrastructure to develop innovative education models that address the five competencies contained in the IOM report.

Recommendation 2

HRSA should initiate efforts to identify a mechanism, by the end of fiscal year 2013, that will build capacity in Title VII, Part D programs to increase faculty members' knowledge and abilities in the application of distance learning and e-learning technologies. These technologies can be utilized in the ongoing development of interprofessional education, training, and continuing professional development programs.

Rationale for Recommendation 2

The ACICBL recognizes that multiple factors impact the availability and skills of professionals to provide quality health care services in a team-based, interprofessional environment. This is supported by the documented shortage of health professionals from multiple disciplines across the health care workforce (IOM, 2008) and limited training opportunities for interprofessional team practice that exist in health professions' curricula (IOM, 2003; IOM, 2010; Mezey et al., 2010; Reuben et al., 2003). The lack of reimbursement for team-based collaborative care is another deterrent for real-time experiential learning for health professions students and other health care professionals in the collaborative process of care coordination and interprofessional, team-based care.

Practice realities necessitate innovative, accessible strategies for teaching and learning. Distance or e-learning can provide all health care professionals, regardless of practice configuration or geographic locale, access to innovative learning environments where they can attain competencies that will help them contribute as more effective members of interprofessional health care teams. Enhanced CE opportunities that employ e-learning ensure a wider dissemination of current information, affording health professionals the option to access educational content at their convenience (for more information on e-learning, refer to the Appendix).

The body of health care knowledge continues to grow exponentially, and traditional approaches to curricula provide limited opportunities for inclusion of additional content. The continuous and rapid development of critical and specialized knowledge makes it imperative to provide information to all health care professionals in real time (Davis, 2011). This requires that faculty find ways to identify current research findings and protocols that inform evidence-based practice, and utilize creative ways to disseminate information across distances that are adaptive to the

varying schedules of health care professionals. The ACICBL believes that e-learning technologies can make this information readily available in a cost-effective and efficient manner.

Recommendation two supports building upon the developed and broad spectrum of e-learning technologies to strengthen the capacity of Title VII, Part D programs to keep pace with rapid advances in clinical knowledge. Improving the application of distance learning technology for both education and CE courses throughout the entire network of partners for Title VII, Part D programs requires an infrastructure that can leverage successful local, regional, and national e-learning models and disseminate those models to all partners.

Increasing demands on practitioners' time and pressure for increased productivity require the use of technology to provide health care professionals with CE, CPD, and lifelong learning opportunities that can be accessed at will (Mazmanian, Davis, & Galbraith, 2009). To meet this imperative, faculty must be knowledgeable about and have the capacity to develop new curricula and educational products utilizing a variety of e-learning platforms, because existing evidence demonstrates the effective use of innovative models of e-learning technologies (Ruiz, 2011). Web-based and lab-based multimedia models of e-learning, such as virtual patients, have the potential to improve both access to and the quality of lifelong professional and interprofessional education and training (Fernandez, Parker, Kalus, Miller, & Compton, 2007; Issenberg et al., 1999; Ruiz, Mintzer, & Leipzeg, 2006).

Overcoming structural and resource barriers to the development of e-learning modalities is directly related to: (a) faculty time, knowledge, and expertise in developing/utilizing various e-learning modalities; (b) cost; (c) institutional infrastructure; and (d) availability of on-site technical assistance and mentoring. These critical components are needed to support faculty in the development and application of e-learning strategies for inclusion in curricula, CE programs, and production of enduring materials such as self-directed, web-based modules for education and training.

Linking competencies and demonstration of competency attainment to course objectives and accreditation standards is a critical factor for institutions as well as faculty and students. Implementation of e-learning modalities for delivery of curriculum content ensures a level of fidelity. For example, web-based learning portfolios provide opportunities for both learning and evaluation, enabling health care professionals to document ongoing professional growth throughout their careers (Heyer et al., 2003; Plaza, Draugalis, Slack, Skrepnek, & Sauer, 2007).

Because e-learning requires not only a different way of presenting knowledge but also new technological skills, many faculty members are neither knowledgeable nor prepared to apply these new instructional technologies to training and education. While universities are expanding their Information Technology and Instructional Technology/Informatics staff, building capacity within existing health professions faculty is critical. Technology skills are highly variable among faculty and across health care disciplines, and great variability also exists in the institutional resources available to teach/assist faculty in applying/incorporating e-learning modalities in curricula.

Distance and e-learning technologies provide better capacity to manage the ongoing/exponential growth of clinical knowledge as well as the ability to disseminate knowledge interprofessionally

across distances in real time, regardless of practice configuration or setting. To employ the full potential of distance and e-learning technologies for efficient/effective learning, support must exist within Title VII, Part D programs to assist faculty in obtaining the knowledge/expertise to utilize these technologies as they evolve/improve in their capacity/adaptability. This will ensure that health care professionals have opportunities to acquire the five core competencies contained in *Health Professions Education: A Bridge to Quality* (IOM, 2003) as well as prepare professionals to demonstrate these competencies in practice (IOM, 2010).

Recommendation 3

HRSA should convene public-private partners, representative leadership of Title VII, Part D programs, and other stakeholders by no later than the end of fiscal year 2014, to develop recommendations and an action plan for the evaluation of interprofessional competencies attained through continuing professional development and lifelong learning, including the collection, development, refinement, standardization, implementation, and dissemination of innovative methods for evaluation.

Rationale for Recommendation 3

Many assessment methods and models have been developed for evaluating the effect of CE, but few are utilized consistently and most have not been adopted across teams of health care professionals such as physicians, nurses, physical therapists, and pharmacists. This highlights the need to: (a) compile an inventory of existing methods and models; (b) design a plan to determine the most effective approaches for measuring the outcomes of CE, CPD, and lifelong learning activities; and (c) develop strategies for creating new interprofessional models.

Health care delivery issues are inherently multidimensional, and the evaluation of knowledge, competencies, and performance must involve relevant interprofessional disciplines. CE models are derived from the expertise of such professionals as clinicians, educators, and social/educational psychologists (Davis et al., 2003). Dissemination of evidence-based knowledge/processes is essential to promote positive learning outcomes within the interprofessional community as well as improved health outcomes for patients within communities (O'Neil & Addrizzo-Harris, 2009; Davis et al., 2003; Campbell, Parboosingh, Gondocz, Babitskaya, & Pham, 1999).

Currently, assessment strategies for CPD are inconsistent across disciplines, practitioners, care settings, and behaviors. To date, there is no singularly effective method for assessing the performance of a health professional (O'Neil & Addrizzo-Harris, 2009). Effective CPD requires the assessment of learning needs, and should engage interprofessional practitioners in learning activities that enable them to modify their behavior within the practice setting. Measuring these changes requires evaluations to monitor impact on the practitioners' knowledge base and practice behavior as well as to measure patient outcomes resulting from changes in practice. These types of evaluations can be implemented interprofessionally, and changes in knowledge, skills, and systems should be associated with the expected outcome of the behavior change prior to implementation (O'Neil & Addrizzo-Harris, 2009).

Equally important to promoting best practices when assessing changes in practitioners' practice behavior and patient outcomes is ensuring that practice conditions are conducive to the reinforcement of change, and that continuous monitoring occurs to enable the achievement of performance standards (Davis et al., 2003). Health systems should demonstrate commitment to lifelong learning and practice improvement dependent on competency-based credentialing, requiring the demonstration of specific competencies to obtain/maintain privileges as presently seen in many hospitals (Moore, Green, & Gallis, 2009). These opportunities include assessment of how new clinical knowledge (a) could be applied in care delivery settings, and (b) is incorporated into practice with professional interaction and feedback.

Performance guidelines/criteria must be systematically established and contribute to learner motivation (Moore et al., 2009). The most effective learning strategies actively involve the professional, introducing new concepts through multiple methods and exposure (Davis et al., 2003). Reliable instruments have been developed that allow for assessment of health professionals through multisource feedback by peers, referring physicians, and coworkers to address clinical competence, collaboration, professionalism, and communication (Lockyer, Violato, Fidler, & Alakija, 2009; Foster, Johnson, Nelson, & Batalden, 2007). Assessment models can include self-assessment to address a broad range of competencies, supporting continuous quality improvement through modifications in health care systems (Brennan et al., 2004). However, there is a wide variability between a professional's self-assessment of their performance and their peer group's assessment of that same performance (Davis et al., 2006). Therefore, new self-assessment models must be developed. This could include a structured process for "facilitated self-reflection," utilizing tools such as learning portfolios that document practice-based learning/improvement activities and address learning objectives/general competencies for interprofessional practice. These new assessment models must be designed for use in the context of CPD and lifelong learning (Davis et al., 2006; Dornan, Carroll & Parboosingh, 2002).

Research is needed to increase the capacity of organizations to evaluate their own quality improvement efforts and to measure their impact on interprofessional teams and innovations to deliver high-quality/cost-efficient patient care, with an emphasis on social responsibility (Foster et al., 2007). Examples include incorporating clinical data into performance measures after learning activities to indicate if the activity has led to improved practice outcomes (Moore et al., 2009; Campbell et al., 1999). Additionally, further research is needed to determine indicators, within competencies, for practice behavior that promotes better patient outcomes (Holmboe et al., 2008; Turchin et al., 2008). Several models are currently available, such as the Maintenance of Certification program from the American Board of Internal Medicine (ABIM). ABIM has developed practice improvement modules that stimulate awareness of intended practice, and provide suggestions for improvement across different settings (Brennan et al., 2004). Recently, a report on *Core Competencies for Interprofessional Collaborative Practice* endorsed the IOM competencies and the development of learning objectives, based upon the five competencies, for pre-licensure learning activities (IPEC, 2011). This same approach could be applied to models for CE, CPD, and lifelong learning activities.

With the availability of a wide range of methods that have been developed across multiple disciplines and professions, it is essential to disseminate current successful models to promote

effective and systematic CPD and lifelong learning. Equally important, the adoption of assessment methods and models to complement traditional professional competency assessments should be encouraged, thereby enabling all practitioners to take an active role in identifying and meeting their own learning needs. This would greatly enhance the capacity for continuous quality improvement across interprofessional settings.

Compiling an inventory of methods and models, designing a plan to evaluate learning initiatives, and developing strategies to create interprofessional models will align the evaluation of CE, CPD, and lifelong learning with the five core competencies contained in *Health Professions Education: A Bridge to Quality* (IOM, 2003). Aligning evaluation criteria for CE, CPD, and lifelong learning with these five competencies will contribute to building a more effective, efficient, and relevant CE system and ensure that health care professionals are fully equipped to demonstrate these competencies in practice (IOM, 2010).

Summary of Recommendations

In 2010, the IOM report on *Redesigning Continuing Education in the Health Professions* noted that CE within the health care professions was fragmented, with each specialty serving its own discipline. Our nation's CE system must become more integrated, interprofessional, and cohesive to meet the health care demands of the 21st Century. CE must be integrated into the CPD and lifelong learning of a health care professional by adapting to the rapid growth of clinical knowledge as well as the varying settings, schedules, and practice configurations of today's health care professional. CPD and lifelong learning, acquired during the practice life of a health care professional, provides a methodology that stresses the continual acquisition and application of knowledge *after* pre-practice medical education, reducing the variability that exists in post-graduate CE today (Arky, 2007).

The ACICBL asserts that the first step in addressing fragmentation is to align CPD and lifelong learning to focus on the five core competencies contained within *Health Professions Education: A Bridge to Quality:* provide patient-centered care, work in interdisciplinary teams, employ evidence-based practice, apply quality improvement, and utilize informatics (IOM, 2003). Concentrating on the five IOM competencies provides a cohesive foundation for the implementation of all CE, CPD, and lifelong learning activities for health care professionals within the capacity and mission of Title VII, Part D programs. Furthermore, the ACICBL's *recommendation one* is to expand support for CPD and lifelong learning activities within Title VII, Part D programs through activities such as collaborative partnerships with foundations and other agencies.

Effective CE, CPD, and lifelong learning must utilize technology-based educational tools, such as e-learning, to disseminate evidence-based knowledge in real time and to accommodate the varying schedules and settings of today's health care professional. Faculty must have the knowledge and expertise to utilize these continually evolving technologies in the most efficient and effective way possible. The ACICBL believes that *recommendation two* will support the improvement of faculty skills and application of learning technologies, to maximize information dissemination and assist health care professionals in enhancing their knowledge and abilities through CPD/lifelong learning as defined by the IOM's five guiding competencies.

The IOM report on *Redesigning Continuing Education in the Health Professions* also observed that the majority of CE providers could neither evaluate the effectiveness of instruction nor determine if health professionals could demonstrate acquired competencies in their practice (IOM, 2010). Therefore, *recommendation three* addresses the ACICBL's belief that an action plan must be developed to evaluate interprofessional competencies as attained through CPD and lifelong learning and defined by the IOM's five core competencies.

To ensure that the health care workforce is adequately prepared to practice within the health care system of the 21st Century, our CE system must transform to prioritize (a) flexible learning modalities, (b) learner-driven curricula, and (c) interprofessional learning activities that position us to capitalize on the promise of technological innovation and the rapid expansion of knowledge. The ACICBL believes that this transformative vision for CE, CPD, and lifelong learning will equip health care professionals with the knowledge and skills to deliver high-quality, culturally-competent, evidence-based, and patient-centered care.

References

Agency for Healthcare Research and Quality (AHRQ). (2007). *Effectiveness of continuing medical education* (Publication No. 07-E006). Retrieved from http://www.ahrq.gov/clinic/tp/cmetp.htm

Akl, E.A., Mustafa, R., Slomka, T., Alawneh, A., Vedavalli, A., & Schunemann, H.J. (2008). An educational game for teaching clinical practice guidelines to internal medicine residents: development, feasibility and acceptability. *BMC Medical Education, 8*(50). doi:10.1186/1472-6920-8-50

Arky, R.A. (2007). Abe Flexner, Where are you? We need you! *Transactions of the American Clinical and Climatological Association*, 118, 89–96.

Atreja, A., Mehta, N.B., Jain, A.K., Harris, C.M., Ishwaran, H., Avital, M., & Fishleder, A.J. (2008). Satisfaction with web-based training in an integrated healthcare delivery network: do age, education, computer skills and attitudes matter? *BMC Medical Education, 8*(48). doi: 10.1186/1472-6920-8-48

Bolle, S.R., Larsen, F., Hagen, O., & Gilbert, M. (2009). Video conferencing versus telephone calls for team work across hospitals: a qualitative study on simulated emergencies. *BMC Emergency Medicine, 9*(22). doi: 10.1186/1471-227X-9-22

Brennan, T.A., Horwitz, R.I., Duffy, F.D., Cassel, C.K., Goode, L.D., & Lipner, R.S. (2004). The role of physician specialty board certification status in the quality movement. *JAMA, 292*(9), 1038–1043.

Campbell, C., Parboosingh, J., Gondocz, T., Babitskaya, G., & Pham, B. (1999). Study of the factors influencing the stimulus to learning recorded by physicians keeping a learning portfolio. *The Journal of Continuing Education in the Health Professions, 19*(1), 16–24.

Cervero, R.M. (2011, January). *Lifespan professional development through practice-based education*. Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Rockville, MD.

Chen, C. (2011, January). *Educating health professionals for a transforming health care system*. Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Rockville, MD.

Davis, D. (2011, February). *Continuing education in the health professions: Research and practice considerations.* Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Bethesda, MD.

Davis, D., Evans, M., Jadad, A., Perrier, L., Rath, D., Ryan D., . . . Zwarenstein, M. (2003). The case for knowledge translation: shortening the journey from evidence to effect. *BMJ, 327*(7405), 33–35.

Davis, D.A., Mazmanian, P.E., Fordis, M., Harrison, R.V., Thrope, K.E., & Perrier, L. (2006). Accuracy of physician self-assessment compared with observed measures of competence: A systematic review. *Journal of the American Medical Association, 296*(9), 1094–1102.

Dornan, T., Carroll, C., & Parboosingh, J. (2002). An electronic learning portfolio for reflective continuing professional development. *Medical Education, 36*(8), 767–769.

Doyne, E.O., Alfaro, M.P., Siegel, R.M., Atherton, H.D., Schoettker, P.J., Bernier, J.B., & Kotagal, U.R. (2004). A randomized controlled trial to change antibiotic prescribing patterns in a community. *Archives of Pediatrics and Adolescent Medicine, 158*(6), 577–583.

Fernandez, R., Parker, D., Kalus, J.S., Miller, D., & Compton, S. (2007). Instructional design and assessment using a human patient simulation mannequin to teach interdisciplinary team skills to pharmacy students. *American Journal of Pharmaceutical Education, 71*(3), Article 51.

Foster, T.C., Johnson, J.K., Nelson, E.C., & Batalden, P.B. (2007). Using the Malcolm Baldrige framework to understand high-performing clinical microsystems. *Quality & Safety in Health Care, 16*(5), 334–341.

Frenk, J. (2010). *20th century medical education and training will not work in the 21st century*. (Lancet Commission Report). Retrieved from http://www.eurekalert.org/pub_releases/2010-11/l-2cm112910.php

Huang, G., Reynolds, R., & Candler, C. (2007). Virtual patient simulation at U.S. and Canadian medical schools. *Academic Medicine, 82*(5), 446–451.

Hyer, K., Skinner, J.H, Kane, R.L., Howe, J.L., Whitelaw, N., Wilson, N., . . .Fulmer, T. (2003). Using scripted video to assess interdisciplinary team effectiveness training outcomes. *Gerontology & Geriatrics Education, 24*(2), 75–91.

Holmboe, E.S. (2011, February). *Assessment of the practicing physician: Challenges and opportunities*. Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Bethesda, MD.

Holmboe, E.S., Wang, Y., Meehan, T.P., Tate, J.P., Ho, S. Starkey, K.S., & Lipner, R.S. (2008). Association between maintenance of certification examination scores and quality of care for medicare beneficiaries. *Archives of Internal Medicine, 168(13),* 1396–1403.

Huddlestone, J., & Pike, J. (2008). Seven key decision factors for selecting e-learning. *Cognition, Technology & Work, 10*(3), 237–247. doi: 10.1007/s10111-007-0102-z

Institute of Medicine, Committee on Planning a Continuing Health Care Professional Education Institute. (2010). *Redesigning continuing education in the health professions*. Washington, DC. The National Academies Press. Retrieved from http://www.nap.edu/catalog.php?record_id=12704#toc

Institute of Medicine, Committee on the Future Health Care Workforce for Older Americans. (2008). *Retooling for an aging America: Building the health care workforce*. Washington, DC: The National Academies Press.

Institute of Medicine, Committee on the Health Professions Education Summit. (2003). *Health professions education: A bridge to quality*. Washington, DC. The National Academies Press. Retrieved from http://iom.edu/Reports/2003/Health-Professions-Education-A-Bridge-to-Quality.aspx

Institute of Medicine, Committee on the Quality of Health Care in America. (2001). *Crossing the quality chasm: A new health system for the 21st century*. Washington, DC: The National Academies Press.

Interprofessional Education Collaborative (IPEC). (2011). *Core competencies for interprofessional collaborative practice: Report of an expert panel.* Washington, D.C. Interprofessional Education Collaborative. Retrieved from http://www.aacn.nche.edu/education/pdf/IPECReport.pdf

Issenberg, S.B., McGaghie, W.C., Hart, I.R., Mayer, J.W., Felner, J.M., Petrusa, E.R., . . .Ewy, G.A. (1999). Simulation technology for health care professional skills training and assessment. *The Journal of the American Medical Association, 282*(9), 861–866.

Just Colleges. The Complete College Portal. (2011). *E-learning glossary Omaha NE.* Retrieved from http://local.justcolleges.com/e_Learning_Glossary_Omaha_NE-r1350760-Omaha_NE.html

Kee, F., Owen, T., & Leathem, R. (2007). *Offering a prognosis in lung cancer: When is a team of experts an expert team?* Journal of Epidemiology and Community Health, 61:308–313. doi: 10.1136/jech.2005.044917

Klock, C., & Gomes, R.P. (2008). Web conferencing systems: Skype and MSN in telepathology. *Diagnostic Pathology, (3),* Supplement:S13. doi: 10.1186/1746-1596-3-S1-S13

Kokemueller, P., & Osguthorpe, J.D. (2007). Trends and developments in continuing medical education. *Otolaryngologic Clinics of North America*, 40, 1331–1335. doi: 10.1016/j.otc.2007.08.003

Lockyer, J.M., Violato, C., Fidler, H., & Alakija, P. (2009). The assessment of pathologists/laboratory medicine physicians through a multisource feedback tool. *Archives of Pathology & Laboratory Medicine, 133*(8), 1301–1308.

Macy Foundation. (2008). *Continuing education in the health professions: Improving healthcare through lifelong learning* [Monograph]. Conference sponsored by the Josiah Macy, Jr. Foundation, Southhampton, Bermuda. (2007, November). Retrieved from http://www.macyfoundation.org/docs/macy_pubs/pub_ContEd_inHealthProf.pdf

Macy Foundation. (2010). *Lifelong learning in medicine and nursing. Final conference report*. Association of American Medical Colleges, American Association of Colleges in Nursing. Funded by the Josiah Macy, Jr. Foundation. Retrieved from http://www.aacn.nche.edu/education/pdf/MacyReport.pdf

Maiers, M.J., Westrom, K.K., Legendre, C.G., & Bronfort, G. (2010). Integrative care for the management of low back pain: use of a clinical care pathway. *BMC Health Services Research*, 10:298. doi: 10.1186/1472-6963-10-298

Mazmanian, P.E. (2011, January). *The incomplete science of outcomes assessment*. Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Rockville, MD.

Mazmanian, P.E., Davis, D.A., & Galbraith, R. (2009). Continuing medical education effect on clinical outcomes: effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest, 135,* Supplement 3, 49S–55S.

Mezey, M., Mitty, E., Cortes, T., Burger, S., Clark, E., & McCallion, P. (2010). A competency-based approach to educating and training the eldercare workforce. *Generations, 34*(4), 53–60.

Moore, D.E., Green, J.S., & Gallis, H.A. (2009). Achieving desired results and improved outcomes: Integrating planning and assessment throughout learning activities. *The Journal of Continuing Education in the Health Professions, 29*(1), 1–15.

Neimeyer, G.J., & Taylor, J.M. (2010). In J.C. Norcross, G.R. VandenBos, and D.K. Freedheim (Eds.), *History of psychotherapy: Continuity and change, second edition*. Washington, D.C.: APA Publications.

O'Neil, K.M., & Addrizzo-Harris, D.J. (2009). Continuing medical education effect on physician knowledge application and psychomotor skills: Effectiveness of continuing medical education: American College of Chest Physicians Evidence-Based Educational Guidelines. *Chest, 135,* Supplement 3, 37S–41S.

Plaza, C.M., Draugalis, J.R., Slack, M.K., Skrepnek, G.H., & Sauer, K.A. (2007). Use of reflective portfolios in health sciences education. *American Journal of Pharmaceutical Education, 71*(2), 34.

Reuben, D.B., Yee, M.N., Cole, K.D., Waite, M.S., Nichols, L.O., Benjamin, B.A. . . .Frank, J.C. (2003). Organizational issues in establishing geriatrics interdisciplinary team training. *Gerontology & Geriatrics Education, 24*(2), 13–34.

Ruiz, J.C. (2011, February). *Virtual patients in continuing education.* Presented at the meeting of the Advisory Committee on Interdisciplinary, Community-Based Linkages, Bethesda, MD.

Ruiz, J.G., Mintzer, M.J., & Leipzig, R.M. (2006). The impact of E-learning in medical education. *Academic Medicine: Journal of the Association of American Medical Colleges 81*(3), 207–212.

Segars, W.P., Mahesh, M., Beck, T.J., Frey, E.C., & Tsui, B.M.W. (2008). Realistic CT simulation using the 4D XCAT phantom. *Medical Physics, 35*(8), 3800–3808. doi: 10.1118/1.2955743

Sinusas, K. (2009). Internet point of care learning at a community hospital. *Journal of Continuing Education in the Health Professions, 29*(1), 39–43.

Stein, A.M. (1998). History of continuing nursing education in the United States. *The Journal of Continuing Education in Nursing, 29*(6), 245-252.

The Continuing Competence of Pharmacists. Final report–AACP/APhA Task Force on Continuing Competence in Pharmacy. (1975). *Journal of the American Pharmacists Association, 15*(8), 432-437, 457.

Tokunaga, J., Takamura, N., Ogata, K., Yoshida, H., Setoguchi, N., Matsuoka, T., . . . Sato, K. (2010). Vital sign monitoring using human patient simulators at pharmacy schools in Japan. *American Journal of Pharmaceutical Education, 74*(7). Article 132.

Turchin A., Shubina M., Chodos, A.H., Einbinder, J.S., & Pendergrass, M.L. (2008). Effect of board certification on antihypertensive treatment intensification in patients with Diabetes Mellitus. *Circulation, 117*(5), 623–628.

Wagner, D.P., Roskos, S., DeMuth, R., & Mavis, B. (2010). Development and evaluation of a health record online submission tool (HOST). *Medical Education Online, 15*. doi: 10.3402/meo.v15i0.5350

Appendix: What is e-Learning?

Collectively, e-learning denotes training delivered electronically, using technology such as web-based systems, computers, or other communication software/hardware. It can be synchronous, asynchronous, or blended in construct; instructor-led or self-study in format. E-learning can allow continuing education to take place at the time and discretion of a health care professional (Huddlestone and Pike, 2008; Just Colleges, 2011).

Here are some general e-learning categories. Keep in mind that any e-learning activity could encompass more than one category, e.g., web-based course can include multimedia.

Multimedia can include video or audio scripts, as well as computer animation. One could adapt a multimedia interactive tool for continuing education, for example, and design an e-learning module that would engage two health care teams in answering evidence-based, clinical practice questions (Akl et al., 2008).

Virtual patients are computer-based programs simulating real-life clinical scenarios. For instance, health care providers can prescribe medication, monitor vital signs, or perform other procedures on a virtual patient without the risks associated with a human patient (Tokunaga et al., 2010). Other virtual patients can mimic the form and structure of human organs, complete with variances, i.e., size, normal vs. abnormal (Segars, Mahesh, Beck, Frey, & Tsui, 2008).

Web-based learning can be instructor-led or self-paced. Web courses through an instructor can offer distance e-learning to an interprofessional group of health care providers (Atreja et al., 2008). Web-based point-of-care learning is self-paced and prompted by a clinical question, using the Internet to identify an evidence-based answer and demonstrate its application in clinical practice (Sinusas, 2009). Other self-paced learning could include web-based training for completing electronic health records (EHRs), featuring prompts that assist the professional in completing standardized and comprehensive EHRs (Wagner, Roskos, DeMuth, & Mavis, 2010).

Video or web conferences could provide education to rural areas, or to interprofessional groups dispersed throughout a geographic region. Video conferencing may enable emergency physicians in rural areas to learn new care techniques from specialists, thereby reducing the need to transfer patients to urban trauma centers (Bolle, Larsen, Hagen, & Gilbert, 2009). Web conferencing can allow an instructor to teach from one location as health care professionals learn from another location(s), using technologies such as Microsoft Live Messenger and Skype (Klock & Gomes, 2008).