# Descriptive Analysis of Level of Implementation in Allied Health Educational Institutions of IOM Recommended Core Competencies

James D. Blagg, PhD, FASAHP
Dean, School of Radiologic Sciences, Director BS in Health Science Program, Professor, Health Sciences
Massachusetts College of Pharmacy and Health Sciences
Boston, Massachusetts, United States

## ABSTRACT

A signal report of the Institute of Medicine (IOM) in 2003 stated that profound changes were needed in how health systems are designed, and postulated that such redesign could not take place without properly preparing health care professionals to take on this task. It established a set of core competencies (competence in patient-centered care, interdisciplinary teaming, evidence-based practice, quality improvement, and informatics) that future professionals should possess. The current study was conducted to determine the extent to which these core competencies have been incorporated into curricula by colleges/schools of allied health. A survey was e-mailed to 112 institutional representatives of the member institutions of the Association of Schools of Allied Health Professions for completion online. Thirty (26.8%) responded, and results were tabulated by Zoomerang software. Results indicated high desire to integrate the competencies and moderate to strong success in doing so. Most often, the competencies were included via integration throughout the curriculum, and rarely in standalone courses. This curriculum integrative approach makes sense, in the opinion of the author, as it has students apply the recommended competencies in concert with each other to various areas of content and scenarios rather than applying each in isolation within single standalone courses.

## INTRODUCTION

In 2003, the Institute of Medicine (IOM) released a report that it hoped would produce profound changes in how health care systems are designed.[1] The report postulated that such a redesign could not take place without properly preparing health care professionals to take on this task. It recommended to programs and institutions engaged in the education of health professionals an overarching vision for the preparation of future health care professionals. It also established a set of core competencies that these professionals should possess, regardless of discipline.

### Vision

The vision established by the IOM report was "All health professionals should be educated to deliver patient-centered care as members of an interdisciplinary team, emphasizing evidence-based practice, quality improvement approaches, and informatics." The IOM proposed that all health professionals possess five core competencies in order to achieve its mission. The IOM competencies quoted in its report were:

- *Provide patient-centered care* -- identify, respect, and care about patients' differences, values, preferences, and expressed needs; relieve pain and suffering; coordinate continuous care; listen to, clearly inform, communicate with, and educate patients; share decision making and management; and continuously advocate disease prevention, wellness, and promotion of healthy lifestyles, including a focus on population health.
- *Work in interdisciplinary teams* – cooperate, collaborate, communicate, and integrate care in teams to ensure that care is continuous and reliable.

- *Employ evidence-based practice* – integrate best research with clinical expertise and patient values for optimum care, and participate in learning and research activities to the extent feasible.
- *Apply quality improvement* – identify errors and hazards in care; understand and implement basic safety design principles, such as standardization and simplification; continually understand and measure quality of care in terms of structure, process, and outcomes in relation to patient and community needs; design and test interventions to change processes and systems of care, with the objective of improving quality.
- *Utilize informatics* – communicate, manage knowledge, mitigate error, and support decision making using information technology.[1]

The Committee on the Roles of Academic Health Centers in the 21st Century was simultaneously concerned about the changes taking place in the health care environment.[2] Its vision centered on similar recommendations to those of the IOM report. It proposed that academic health centers take the lead in reforming the content and methods of educating health professionals. Its report hoped to encourage and enable deans of various professional schools and leaders across disciplines to remove internal barriers to interprofessional education, ensure that teaching environments model team-based care and use of information technology, and demonstrate how to improve health for populations and communities. It further recommended that external agencies should provide support for demonstration projects to test and evaluate organizational structures and team approaches designed to improve health and prevent disease.[2]

**Purpose**
The purpose of this current study was to determine the extent to which colleges/schools of allied health have incorporated the IOM core competencies into their curricula in order to set a baseline to measure progress forward, and, hopefully, stimulate renewed discussion of the importance of meeting the vision established by IOM.

**METHODS**
To determine the extent to which the IOM core competencies have been incorporated into curricula by colleges/schools of allied health, a survey was e-mailed to the 112 institutional representatives of the member academic institutions of the Association of Schools of Allied Health Professions (ASAHP). ASAHP was chartered in 1967 as a not-for-profit organization for allied health administrators, educators, and others concerned with critical issues affecting allied health education. It has 112 academic institution members, 2 professional association members, and 200 individual members. The institutional representatives were selected as the population of this survey as each is the lead administrator of the institution's allied health unit and thus best able to accurately respond on behalf of the entire unit. The e-mail distribution list was provided by ASAHP staff after approval by the ASAHP Board.

Survey items were formulated using IOM language to define each of the IOM recommended competencies. The items asked the extent to which each competency was present in the school of allied health curriculum; the extent of desire to include it; and if included, how. The specific survey items and their rating scales are included in Tables 1-5 to follow. The "extent of inclusion" and "desired extent of inclusion" items used a five-point Likert scale with "1" indicating "not at all" and "5" indicating "to a great extent." The scale for "how included" used a three point scale with "1" indicating "standalone course," "2" indicating "topic within course(s)", and "3" indicating "integrated throughout the curriculum." The survey was reviewed by not only the ASAHP Board of Directors, but by the Institutional Review Board (IRB) of the author's institution and deemed valid for the study. No reliability test was conducted.

Demographic items were included to determine the type of setting of the allied health school (academic health center: private or public, without academic health center: private or public), and the region most descriptive of the location of the allied health school. A cover letter was written stating the purpose of the study, to request completion of the survey, and to notify subjects that the results would be presented and/or published. Once approval was attained from both ASAHP and the IRB, the survey was loaded into Zoomerang software, a link to the survey embedded in the cover letter, and the cover letter and survey link e-mailed. The first e-mailing produced 22 responses (N=112). A second e-mailing two weeks later produced an additional eight (8) responses, for a total of 30 and an overall response rate of 26.8%. At an ASAHP national meeting several weeks later, the author queried deans about the low rate of response and was told that ASAHP deans had been "bombarded" by several surveys at the same time.

**REVIEW OF THE LITERATURE**
**IOM-related Literature Review**
An online Medline and CINAHL search of publications from 2003 to 2008 was conducted to determine whether any previous studies had reported on the level of implementation of the 2003 IOM report competences in allied health colleges/schools. Only

one article was located specific to implementing recommendations of this report into allied health education. A commentary by James Cawley shortly after publication of the report stated that while noble in its intent and praiseworthy in its ambition the report offered a set of tasks and proposed advances that were daunting and unlikely to be attained soon. His premise was that recommendations to modify curricula are often difficult to implement when they are made from within the profession itself and even more so when they come from an outside body.[3] Thomas and Davies supported this concept.[4] In an ethnographic study of curriculum development and implementation groups, they found that though nurse education appears to be dominated by policies and guidelines produced by state agencies, teachers operating at institutional and classroom levels determined the content of student nurses" curriculum.

With the 2003 IOM report as background, the Robert Wood Johnson Foundation launched a national initiative to develop, test, and disseminate competences for Quality and Safety of Education for Nurses. As a result, representatives from key nursing organizations and physician leaders in quality and safety education identified six core competencies that all pre-licensure nursing students need to master to provide high quality, safe nursing care. The competencies included patient-centered care; teamwork and collaboration; evidence-based practice; informatics, quality improvement; and safety.[5] These competencies are identical to those of the IOM recommendations, with the addition of safety as a competency. The Quality and Safety Education for Nurses project team conducted a survey to 572 nursing program leaders to assess current levels of integration of these competencies in pre-licensure nursing curriculum.[6] In the views of the 195 respondents, there is a relatively high rate (95%) of adoption of the core competencies across nursing curricula. Twenty-three percent of respondents also reported they would like to include more content related to evidence-based practice, and 38% wanted more on quality improvement and informatics. Only 4 to 11% reported a need to do more with patient-centered care, teamwork and collaboration, and safety.

IOM also released reports that provided recommendations specific to desired curriculum content in schools of public health.[7-8] The recommendations were to include in school of public health curricula content in communication, community-based participatory research, cultural competence, ethics, genomics, global health, informatics, and law/policy. A baseline assessment of the level of implementation of these recommendations was conducted via an online survey of all 33 accredited US schools of public health. Though not directly related to the current study, this article was reviewed to demonstrate that, contrary to Cawley's concern that external recommendations are difficult to implement, findings of this baseline assessment indicated that seventy percent of accredited schools of public health were implementing specific changes in response to the IOM recommendations.[9]

### Competency Literature Review
A second online Medline and CINAHL search of publications from 2003 to 2008 was conducted to determine the level of implementation of each of the IOM competencies within curricula by not using the IOM report as a search descriptor. Instead, each competency "title" was used as a descriptor search term. Only one of the identified publications referenced the IOM report.

### Patient-Centered Care
Only one study was found that dealt with patient-centered care. It determined that community experiential learning opportunities culminating in service learning activities provided Doctor of Physical Therapy Students with knowledge and skills that enhanced their understanding of patient-centered care in the context of the patient's environment in the community, at home, with family, and individually.[10]

### Interdisciplinary Teams
Two key studies were found that addressed preparing students to work in interdisciplinary teams via interprofessional education. The first study was a systematic review of the literature. It identified and reviewed the strongest evaluations of interprofessional education and came to the conclusion that evidence to support the proposition that learning together will help practitioners and agencies work better together remains limited and thinly spread.[11] The second disagreed. It pointed out that the work of IOM and others has clearly demonstrated that when healthcare professionals understand each others' roles and are able to communicate and work effectively together, patients are more likely to receive safe, quality care.[12]

### Evidence-Based Practice
The state of evidence-based practice in nursing and selected allied health professions was reported in 2007.[13] This review of the literature revealed varying stages of growth of evidence-based practice among these disciplines, as noted below. The obstacles to evidence-based practice included competing job tasks, the need for additional education, and prevalent attitudes and behaviors toward research among practitioners. It was postulated that the integration into nursing practice is a more involved endeavor than most independent health care professionals face as evidence-based practitioners due to the need to obtain support from supervisors and buy-in from coworkers to introduce changed procedures. The professional associations of athletic training have worked to introduce the concepts of evidence-based practice to all certified athletic trainers and students.

Evidence-based practice is emerging as a dominant force in the practice of audiology, but its penetration into health education and promotion is in its infancy. Occupational therapy has been strong in its development of bibliographic databases and evidence-based tools. The growing emphasis on integration into physical therapy is evidenced by an ever-expanding research agenda and acknowledgement of the importance of evidence-based practice. Physician assistant programs continue to implement evidence-based practice courses and activities into their curricula. Respiratory care has had a history of embracing evidence-based practice since the 1970s. It is an emerging area in speech-language pathology.

### Quality Improvement
No studies were identified that addressed integrating quality improvement into allied health curricula. A systematic review of the literature of the effectiveness of teaching quality improvement to clinicians concluded that most published quality improvement curricula apply sound adult learning principles and demonstrate improvement in learners' knowledge or confidence to perform quality improvement.[14]

### Informatics
No studies were identified that addressed the level of integration of informatics into allied health curricula. Studies were identified, however, for nursing and medicine. An analysis of qualitative data from a national survey of baccalaureate nursing education programs found that nursing programs (n = 266) put greater emphasis on computer literacy skills than on informatics literacy skills, that 16% of the programs had no plans for expansion of learning opportunities, and that the majority of schools reported a lack of qualified faculty, resources, and clinical environments supportive of advanced information management.[15] A 2006 survey to determine the degree to which the Association of American Medical College's Medical School Objectives Project medical informatics competences had been incorporated into medical school curricula found that of 70 respondents 88% indicated that there had been an overall strategy to integrate medical informatics into the curriculum. However, only a few schools taught and assessed the medical informatics objectives that required interaction with health information.[16]

### RESULTS
The survey items pertaining to the level of implementation of the recommended core competencies, and the number and corresponding percent responding to each item choice, are presented in Tables 1-5. Results related to core competency "patient-centered care" are presented in Table 1 (next page). This competency was defined in the survey as identifying and responding to patient differences, values, preferences; sharing decision making with patients; and advocating disease prevention, wellness and promotion of healthy lifestyles. Combining the two highest possible scores of 4 and 5, with 5 indicating "to a great extent," 97% of respondents indicated inclusion of patient-centered care in institutional curricula, with a slightly lower number (93%) indicating desire for inclusion. In most institutions (85%) responding, patient centered care was integrated throughout the curriculum. In 12% of the institutions, it was a topic within a course or courses. In only 4% of the institutions, patient centered care was included as a standalone course.

Results related to core competency "interdisciplinary teaming" are presented in Table 2 (next page). This competency was defined in the survey as learning teaming skills of cooperation, collaboration, and communication for integration of care across disciplines to ensure care is continuous and reliable. Responses were more scattered for this competency. Twenty-eight percent (28%) of responding institutions (N=8) indicated that content related to interdisciplinary teaming was included in their allied health school/college curricula to a great extent (score of 5), with 31% (N=9) assigning a score of 4 and 21% (N=6) assigning a score of 3. Results suggested a high desire to include this content with 57% indicating a great extent of desire and another 39% assigning a score of 4. Of those who had included interdisciplinary teaming in their curricula, 72% had integrated the content throughout, and 21% as a topic within a course. Only 7% had included it as a standalone course.

**Table 1: Responses to Survey of Level of Implementation of Core Competency Patient-Centered Care**

| Items | Response | Percent |
|---|---|---|
| Extent of inclusion of patient-centered care | | |
| 1    Not at all | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 1 | 3 |
| 4 | 11 | 38 |
| 5    To a great extent | 17 | 50 |
| **Total** | **29** | **100** |
| Extent of desire to include patient-centered care | | |
| 1    Not at all | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 2 | 7 |
| 4 | 4 | 14 |
| 5    To a great extent | 23 | 79 |
| **Total** | **29** | **100** |
| When patient-centered care is included, it is offered as | | |
| 1    Standalone course | 1 | 4 |
| 2    Topic within course(s) | 3 | 12 |
| 3    Integrated throughout the curriculum | 22 | 84 |
| **Total** | **26** | **100** |

**Table 2:  Responses to Survey of Level of Implementation of Core Competency Interdisciplinary Teaming**

| Items | Response | Percent |
|---|---|---|
| Extent of inclusion of interdisciplinary teaming | | |
| 1    Not at all | 0 | 0 |
| 2 | 6 | 21 |
| 3 | 6 | 21 |
| 4 | 9 | 31 |
| 5    To a great extent | 8 | 28 |
| **Total** | **29** | **100** |
| Extent of desire to include interdisciplinary teaming | | |
| 1    Not at all | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 1 | 4 |
| 4 | 11 | 39 |
| 5    To a great extent | 16 | 57 |
| **Total** | **28** | **100** |
| When interdisciplinary teaming is included, it is offered as | | |
| 1    Standalone course | 2 | 7 |
| 2    Topic within course(s) | 6 | 21 |
| 3    Integrated throughout the curriculum | 21 | 72 |
| **Total** | **29** | **100** |

Results related to core competency "evidence-based practice" are presented in Table 3. This competency was defined in the survey as integrating best research with clinical expertise and patient values for optimum care, participating in learning and research activities to the extent possible. The respondents had a high extent of desire to include evidence-based practice in their curricula, with 83% indicating "to a great extent." Indeed, 48% responded a "great extent" of inclusion, with another 45%

indicating a high level of inclusion (score of 4). When included in curricula, 79% indicated it was integrated throughout the curriculum, 17% that it was included as a topic within a course, with only 3% noting the existence of a standalone course.

**Table 3: Responses to Survey of Level of Implementation of Core Competency Evidence-Based Practice**

| Items | Response | Percent |
|---|---|---|
| Extent of inclusion of evidence-based practice | | |
|    1   Not at all | 0 | 0 |
|    2 | 0 | 0 |
|    3 | 2 | 7 |
|    4 | 13 | 45 |
|    5   To a great extent | 14 | 48 |
|       **Total** | **29** | **100** |
| Extent of desire to include evidence-based practice | | |
|    1   Not at all | 0 | 0 |
|    2 | 0 | 0 |
|    3 | 0 | 0 |
|    4 | 5 | 17 |
|    5   To a great extent | 24 | 83 |
|       **Total** | **29** | **100** |
| When evidence-based practice is included, it is offered as | | |
|    1   Standalone course | 1 | 3 |
|    2   Topic within course(s) | 5 | 18 |
|    3   Integrated throughout the curriculum | 23 | 79 |
|       **Total** | **29** | **100** |

Results related to core competency "quality improvement" are presented in Table 4. This competency was defined in the survey as identifying errors and hazards in care, understanding and implementing basic safety design principles, and designing and testing interventions to change processes and systems of care with the objective of improving quality. As with patient-centered care, the extent of inclusion of quality improvement in the curricula of responding allied health units was not as extensive as that of patient-centered care and evidence-based practice. Only 31% of responding institutions indicated quality improvement was included to a great extent with only another 38% indicating a high, but more moderate, level of inclusion (score of 4). The extent of desire to include it, however, was high with 48% indicating a great extent of desire and another 48% indicating a high, but more moderate desire. When it was included in curricula, in 66% of responding institutions it was integrated throughout the curriculum, 34% included it as a topic within a course, with no institution including it as a standalone course.

**Table 4: Responses to Survey of Level of Implementation of Core Competency Quality Improvement**

| Items | Response | Percent |
|---|---|---|
| Extent of inclusion of quality improvement | | |
| 1   Not at all | 0 | 0 |
| 2 | 2 | 7 |
| 3 | 8 | 28 |
| 4 | 10 | 34 |
| 5   To a great extent | 9 | 31 |
| **Total** | **29** | **100** |
| Extent of desire to include quality improvement | | |
| 1   Not at all | 0 | 0 |
| 2 | 0 | 0 |
| 3 | 1 | 4 |
| 4 | 14 | 48 |
| 5   To a great extent | 14 | 48 |
| **Total** | **29** | **100** |
| When quality improvement is included, it is offered as | | |
| 1   Standalone course | 0 | 0 |
| 2   Topic within course(s) | 10 | 34 |
| 3   Integrated throughout the curriculum | 19 | 66 |
| **Total** | **29** | **100** |

Results related to core competency "informatics" are presented in Table 5. In the survey, this competency was defined as communicating, managing knowledge, mitigating error, and supporting decision making using information technology. A high desire to include informatics in allied health curricula was expressed by respondents with 43% indicating a great extent of desire, and an additional 43% indicating a high, but more moderate desire. Yet the distribution of level of inclusion was the broadest of the five competencies. Only 21% indicated inclusion to a great extent with another 25% indicating a high, but more moderate level of inclusion (score of 4). A medium level (score of 3) of inclusion was indicated by 36% and a low level (score of 2) by 18%. All institutions had some level of inclusion. Interestingly, informatics, of all the competencies, had the highest level of inclusion (14%) as a standalone course. In 43% of the institutions, it was integrated throughout the curriculum and in 43% it was a topic within a course.

_____

**Table 5:  Responses to Survey of Level of Implementation of Core Competency Informatics**

| Items | Response | Percent |
|---|---|---|
| Extent of inclusion of informatics | | |
| 1    Not at all | 0 | 0 |
| 2 | 5 | 18 |
| 3 | 10 | 36 |
| 4 | 7 | 25 |
| 5    To a great extent | 6 | 21 |
| **Total** | **28** | **100** |
| Extent of desire to include informatics | | |
| 1    Not at all | 0 | 0 |
| 2 | 2 | 7 |
| 3 | 2 | 7 |
| 4 | 12 | 43 |
| 5    To a great extent | 12 | 43 |
| **Total** | **28** | **100** |
| When quality informatics is included, it is offered as | | |
| 1    Standalone course | 4 | 14 |
| 2    Topic within course(s) | 12 | 43 |
| 3    Integrated throughout the curriculum | 12 | 43 |
| **Total** | **28** | **100** |

Responses to school type and location are presented in Table 6. The majority (45%) of the respondents were from academic health centers of public colleges or universities, with the second most prevalent (24%) type of setting also public colleges or universities but without an academic health center. Seventeen percent (17%) were from private colleges or universities without an academic health center, and 14% from private colleges and universities with academic health centers. The majority of the U.S. institutions of the respondents were located in the Midwest (43%), with 37% located in the Southeast, 13% in the Northeast, and 7% in the Southwest. The respondents seemed balanced in type of institution and region of location. ASAHP has few institutional members from the Northwest and Southwest so those results were as expected. Crosstabs were run in Zoomerang, and no differences in results were noted by school type and location.

**Table 6: Responses to School Type and Location**

| Items | Response | Percent |
|---|---|---|
| Please indicate below the description most accurate of the setting of your allied health school. | | |
| Academic Health Center of a public college or university | 13 | 45 |
| Academic Health Center of a private college or university | 4 | 14 |
| Public college or university without an Academic Health Center | 7 | 24 |
| Private college or university without an Academic Health Center | 5 | 17 |
| **Total** | **29** | **100** |
| Please indicate below the region most descriptive of the location of your allied health school. | | |
| Northeast U.S. | 4 | 13 |
| Northwest U.S. | 0 | 0 |
| Southeast U.S. | 11 | 37 |
| Southwest U.S. | 2 | 7 |
| Midwest U.S. | 13 | 43 |
| **Total** | **30** | **100** |

**DISCUSSION AND CONCLUSIONS**

There are three limitations to this study. First, the response rate of 26.8% makes it difficult to generalize results beyond the 30 institutions that responded. Second, though IOM language was used to develop the survey items, this does not ensure construct validity. Third, ASAHP is not the entire universe of allied health educational institutions. It is comprised almost entirely of institutions that offer baccalaureate and post baccalaureate programs, and not all institutions offering programs at this level are members of ASAHP. A number of allied health units are housed in community colleges.

In the 30 institutions that responded to the survey, there was high desire to integrate the IOM competencies into allied health curricula and moderate to strong success in doing so. As indicated in Tables 1-5, the extent of desire for inclusion, combining those that indicated scores of four and five, was highest for evidence-based practice (100%) followed in decreasing order by 96% for interdisciplinary teaming and for quality improvement, 93% for patient-centered care, and 86% for informatics. The extent of actual inclusion was highest for patient centered care (97%) followed by evidence-based practice (93%), quality improvement (65%), interdisciplinary teaming (59%), and informatics (46%).

The inclusion of IOM competences has made good progress in the areas of patient centered care, evidence-based practice, quality improvement, and interdisciplinary teaming despite the difficulty expected by Cawley and Thomas and Davies as expressed in the literature review.[3-4] Informatics, though desired to a great extent, is lagging in inclusion. This may be due to the diversity of disciplines housed in allied health schools/colleges, with the nature of the work of some disciplines needing high levels of integration of informatics into practice, e.g., health information management and physician assistant, and others, like radiography, needing low levels of integration. It may also be due, as reported in a recent nursing survey, that a given discipline may lack qualified faculty, resources and appropriate clinical environments to support inclusion of informatics.[15]

When content addressing the competencies was included in the allied heath curricula of the respondents, it was rarely offered in a standalone course. Sometimes it was offered as a topic within a course or courses, but most often it was offered via integration throughout the curriculum. Informatics seemed the exception, with 14% of responding institutions indicating standalone courses in informatics, 43% presenting it as topics within courses, and 43% as integration throughout the curriculum.

This curriculum integrative approach makes sense, in the opinion of the author, as it has students apply the recommended competencies in concert with each other to various areas of content and scenarios rather than applying each in isolation within single standalone courses. Usually this was done in discipline-specific courses, but ideally the education for gain of these competences would be integrated also across disciplines to promote the interprofessional educational aspects recommended by IOM. If health care professionals are to "cooperate, collaborate, communicate, and integrate care in teams to ensure that care is continuous and reliable," they should practice these skills across disciplines while students.[1]

Despite the limitations of this study, the information it provides is important as it highlights that there has been a recognizable effort within the responding institutions to include in their curricula content recommended by IOM. This suggests that the IOM report has had impact upon education of future allied health professionals, just as did the similar Robert Wood Johnson initiative for the education of nurses, and as did the IOM public health initiative for education of public health professionals.[1,6-8] The results of the current study add to the knowledge base available to the responding ASAHP institutions about progress toward the IOM recommendations. Due to the study limitations, the information should not be considered as a baseline, but rather as the results of a pilot study that informs future research in this area. This future research should use a broader sample of schools of allied health, including not only four-year institutions within and outside ASAHP but also community colleges.

**References**

1. Greiner AC, Knebel E, editors. *Health professions education: A bridge to quality*. Washington, DC: National Academies Press; 2003.
2. Kohn LT. *Academic health centers: Leading change in the 21st century*. Washington, D.C.: National Academies Press; 2004.
3. Cawley JF. A commentary on the IOM report health professions education: A bridge to quality. *JAAPA*. 2004; 17(1):15.
4. Thomas E, Davies B. Nurse teachers' knowledge in curriculum planning and implementation. *Nurse Educ Today*. 2006; 26:572-577.
5. Bargagliotti LA, Lancaster J. Quality and safety education in nursing: More than new wine in old skins. *Nurs Outlook*. 2007; 55(3):156-158.
6. Smith EL, Cronenwett L, Sherwood G. Current assessments of quality and safety education in nursing. *Nurs Outlook*. 2007; 55(3):132-137.

7.  Committee on Assuring the Health of the Public in the 21st Century. Institute of Medicine. *The future of the public's health in the 21st century*. Washington, DC: National Academies Press; 2002.

8.  Committee on Educating Public Health Professionals for the 21st Century. Institute of Medicine. *Who will keep the public healthy? Educating professionals for the 21st century*. Washington DC: National Academies Press; 2003.

9.  Shortell SM, Weist EM, Sow MK, Foster A, Tahir R. Implementing the institute of medicine's recommended curriculum content is schools of public health: A baseline assessment. *Am J Public Health*. 2004; 94(10):1671-1674.

10. O'Neil ME, Rubertone PP, Villanueva AM. Community experiential learning opportunities in the Drexel University Professional Doctor of Physical Therapy Program. *JOPTE*. 2007; 21(2):66-72.

11. Hammick M, Freeth D, Koppel I, Reeves S, Barr H. A best evidence systematic review of interprofessional education: BEME guide no. 9. *Med Teach*. 2007; 29(8):735-751.

12. Barnsteiner JH, Disch JM, Hall L, Mayer D, Moore SM. Promoting interprofessional education. *Nurs Outlook*. 2007; 55:144-150.

13. Kronenfeld M, Stephenson P. Review for librarians of evidence-based practice in nursing and the allied health professions in the United States. *J Med Libr Assoc*. 2007; 95(4):394-407.

14. Boonyasai RT, Windish DM, Chakraborti C, Feldman LS, Rubin HR, Bass EB. Effectiveness of teaching quality improvement to clinicians: A systematic review. *JAMA*. 2007; 298(9):1023-1037.

15. McNeil BJ, Elfrink V, Beyea SC, Pierce ST, Bickford C. Computer literacy study: Report on qualitative findings. *J Prof Nurs*. 2005; 22:52-59.

16. McGowan JJ, Passiment M, Hoffman HM. Educating medical students as competent users of health information technologies: The MSOP data. *Med Inform*. 2007; 12(2):1414-1418.