EXPERIENCES OF INTERPROFESSIONAL IMPLEMENTATION OF A HEALTHCARE MATRIX

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The Taiwan Joint Commission on Hospital Accreditation endorsed the Institute of Medicine (IOM) dimensions of health care quality as safe, timely, effective, efficient, equitable, and patient-centered. The Taiwan Association of Medical Education has also adopted the Accreditation Council for Graduate Medical Education (ACGME) outcome project and core competencies for Taiwan physicians in training. These schemes focus on patient care, medical knowledge and skills, interpersonal and communication skills, professionalism, system-based practice and practice-based learning and improvement. Bingham (2004) described a *Healthcare Matrix* that links to the ACGME Core Competencies and the IOM Dimensions of Quality as a tool to improve health care. The matrix provides a blueprint to help residents learn the core competencies in patient care, and to help the faculty to link mastery of the competencies with improvements in quality of care. However, the "six-by-six" framework was too complicated to fill in. Furthermore, the translation of the IOM aims and ACGME core competencies into the Chinese language seemed incoherent and difficult to remember. We simplified the matrix by merging some columns of the original *Healthcare Matrix*, and reduced the 6×6 form into a 4×5 framework. The matrix was applied in case conferences, mortality and morbidity conferences, combined meetings and nursing quality assurance meetings in different departments. This format organizes the presentation and discussion, highlighting strengths or deficiencies in key aspects of patient care. With interprofessional collaboration, the matrix has been used in the departments of Plastic Surgery, and Nursing and Performance Management in our hospital. The achievements are encouraging. The *Taiwan Edition Healthcare Matrix* is worthy of consideration, having been used in a Mandarin-speaking region of Asia.

Key Words: core competencies, *Healthcare Matrix*, quality assurance, resident training
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Clinicians have a multitude of new techniques and technology that have altered and improved our ability to treat patients. However, the environment characterized by rapid organizational change, information overload, and increasing public expectations is driving clinicians to think about health care quality improvement. The Accreditation Council for Graduate Medical Education (ACGME) of the US described six core competencies of residents, namely patient care, medical knowledge and skills, interpersonal and communication skills, professionalism, system-based practice and practice-based learning and improvement [1]. The concept of these competencies allowed the introduction of clinical education schemes. The Taiwan Association of Medical Education has adopted the ACGME

outcome project and core competencies for Taiwan physicians in training [2].

At the same time, the assessment of medical practice is rapidly evolving. Health care providers are now confronted with an increasing demand to ensure delivery of and improve quality of care of their patients. In 2001, the Institute of Medicine (IOM) released a report, "Crossing the quality chasm: A new health system for the 21st century". The IOM Dimensions of Quality described a health care system that was safe, timely, effective, efficient, equitable, and patient-centered [3]. The Taiwan Joint Commission on Hospital Accreditation started the "Taiwan Quality Indicator Project" (TQIP) to ensure high caliber health care professionals can lay the groundwork for assuring good health care quality. This TQIP recognized the IOM Dimensions of Quality as the goal of quality improvement [4].

In 2004, Bingham et al [5] described a *Healthcare Matrix* that links to the ACGME Core Competencies and the IOM Dimensions of Quality as a tool to improve health care. The matrix provides a blueprint to help residents learn the core competences in patient care, and to help the faculty to link mastery of the competencies with improvements in quality of care. The matrix serves not only residents but also nursing caregivers, allied health professionals and teaching faculty [6,7].

Sharing information about quality of care is necessary to stimulate the providers' efforts to improve the quality of the health service [8]. The senior author (Professor Lai) encountered the *Healthcare Matrix* at the Association of Medical Education in Europe (AMEE) 2007 annual meeting in Trondheim, Norway. He took the matrix back and encouraged junior staff to use this tool. We have now applied the *Healthcare Matrix* in case conferences, mortality and morbidity conferences, combined meetings and nursing quality assurance (QA) meetings in different departments. Here, we present our preliminary experience of interprofessional implementation of the *Healthcare Matrix*.

METHODS

How we do it

The action team was organized with core members to facilitate the implementation of the *Healthcare Matrix*, including physicians, health care managers, nurses, residents and medical students. Translation from the

original matrix was performed. Thorough discussions took place among the action team to reach a consensus for introducing the *Healthcare Matrix* into our health care system. The concepts and tables of the *Healthcare Matrix* were first used in the morbidity and mortality conference of the Plastic Surgery department in December 2007, and then introduced to the General Internal Medicine Training Center and the Department of General Surgery.

Residents reviewed the patients' clinical course to identify whether the aims of the IOM Quality Improvement were reached. Then, the audience convened to discuss these findings according to the framework of the *Healthcare Matrix*. Failure or inadequacy in specific dimensions implied the associated core competencies needed to be improved. The supervising attending physician made comments on the competencies "Professionalism" and "Practice-based learning and improvement".

How we revised the Healthcare Matrix to a Taiwan Edition

The *Healthcare Matrix* is a unique and creative system. It enables us to bring important competencies directly into the educational program [5]. However, the original "six-by-six" framework was too complicated to fill in. Furthermore, the translation of the IOM aims and ACGME core competencies into the Chinese language seemed incoherent and were difficult to remember. Therefore, with the consent of the original author, we simplified the matrix by merging some columns of the original *Healthcare Matrix* [5–7]. By merging the items "timely, efficient and effectively" into one column and "professionalism and practice-based learning and improvement" into one row, we reduced the 6×6 form into a 4×5 framework. In addition, some of the Chinese characters, including "安, 權, 達, 人" (which mean very safe, equitable, reaching the goal and human, respectively) and "知, 行, 合, 醫" (which mean knowledge, behavior should be, gathering and medical professional, respectively) were added to the first line of the matrix to hint at the attributes of these columns and rows (Table). These Chinese characters were put together like old Chinese four-word idioms. By mimicking the pronunciation of Chinese idioms, these items in the matrix could be easily remembered. We used the new form to evaluate the quality of patient care and to identify aspects of routine patient care that needed to be reconsidered.

Table. Taiwan Edition Healthcare Matrix

	安 SAFE (Injury or potential for injury)	權 EQUITABLE (Gender, ethnicity, race, SEC)	達 TIMELY & EFFECTIVE & EFFICIENT	人 PATIENT-CENTERED
病人照護 PATIENT CARE (Overall assessment) Yes/No	Yes/No	Yes/No	Yes/No	Yes/No
知 MEDICAL KNOWLEDGE AND SKILLS (What must we know?)				
行 INTERPERSONAL AND COMMUNICATION SKILLS (What must we say?)				
合 SYSTEM-BASED PRACTICE (What is the process?) (On whom do we depend?) (Who depends on us?)				
醫 PROFESSIONALISM & PRACTICE-BASED LEARNING AND IMPROVEMENT (How must we behave?) (What have we learned?) (What will we improve?)				

Revised from ©2004 Bingham et al [5] and Quinn et al [7].

How we evaluated the outcomes

During the mortality and morbidity conference, feedback was collected from the residents and medical students. Questionnaires were used to collect feedback from all participants of the meeting.

How we applied the matrix to hospital accreditation

A large number of documents need to be reviewed and prepared for the accreditation. Moreover, no medical center health care provider can escape from the tedious hospital accreditation standards. One member of staff in the Performance Management department used the matrix to evaluate the regulation of New Taiwan Medical Center Accreditation. She read the provisions of the accreditation and put them into the cells that fit the IOM aims. The accreditation provisions were changed into a structured matrix table, which could be easily used in the mortality and morbidity conferences, combined meetings or medical ethics meetings.

We tried to take advantage of the *Healthcare Matrix* to improve the quality of patient care in our hospital.

RESULTS

The matrix-based mortality and morbidity conference has taken place eight times since December 2007. In the conference, the *Healthcare Matrix* was used to improve the quality of health care service and clinical education. Comments from the users are listed below.

Feedback from physicians

Our staff all agreed that the matrix provided a holistic view of patient care and allowed a systematic approach to clinical analysis. Organized retrospective review was done for the patients. The structured matrix stimulated trainees to reflect with clear direction, and provided a framework for analyzing care in small "chunks" of the individual cells. Cross-boundary

department-wide and system-wide collaboration was possible in the matrix-based meeting.

Feedback from trainees (residents and medical students)

The organized table was sensitive to problems encountered with patient care. Residents and medical students could identify what needed to be improved based on real patient practice experiences. Approaches to determine the priority for problem solving could also be learned during the conference.

Feedback from the plastic surgery nurses

A team of nurses provided 24-hour care of the patients. The nursing shift reports primarily depended on the individual nurse's thought processes. Thus, awareness of a specific problem in patients might be limited. The *Healthcare Matrix* provided a holistic view of patient care. It stimulated cross-departmental collaboration, considering patients' safety and medical ethical concerns. Nurses could learn the entire cycle of the patient-care process rather than just one or two discrete steps within the disease treatment procedures.

Feedback from the administration management department

The Department of Health in Taiwan has been developing a new hospital accreditation system since 2005. "Hospital Accreditation" focused on medical quality and service quality while "Teaching Hospital Accreditation" focused on intern and resident training. We found that the *Taiwan Edition Healthcare Matrix* was a very useful tool that fulfilled the requirements of accreditation. According to our analysis, 86% of the provisions of the Taiwan Medical Center Accreditation were correlated to the *Healthcare Matrix* tables. This provided evidence-based improvement through real patient analysis and active problem solving. The *Healthcare Matrix* application significantly decreased the paperwork demands on health care providers. This also offers a great advantage for merging medical practices and managerial implementation.

DISCUSSION

The mission of the Association for Health Care Quality of Taiwan [9] is to organize health care quality professionals from all levels of health care institutions and to promote QA activities in Taiwan. The QA system was established to work collaboratively among government departments, health care providers, consumers and professional societies [9]. The QA activities in Taiwan are integrated into the health care delivery system and the national health insurance system. However, the problems that exist in the Taiwan QA system [9] include: (1) A lack of an acceptable definition of QA of Chinese or oriental origins, (2) Shortage of quality professionals, (3) Incomplete QA monitoring system, and (4) Tedious hospital accreditation standards. The *Taiwan Edition Healthcare Matrix* offers one solution to this situation. The Chinese characters "安, 權, 達, 人" and "知, 行, 合, 醫" are added to the tables to help health care providers understand, remember and practice the matrix. Furthermore, the matrix was found to be a very useful tool that fulfilled the requirements of accreditation. The matrix tables are very practical documents covering quality of patient care and clinical education. When dealing with the provisions of hospital accreditation, the *Healthcare Matrix* application significantly decreased the paperwork demands placed on the health care providers.

Quality improvement literature usually conceptualizes two principal dimensions of quality in health care, "technical quality" and "service quality" [10]. Technical quality refers to the clinical knowledge and is largely related to the health care providers [11]. Medical knowledge increases four-fold during a medical professional's lifetime [12]. Therefore, continuing medical education of physicians is mandatory for maintaining up-to-date knowledge of the accumulated information. The need for continuous learning as part of a doctor's professional career is evident [13]. However, it is impossible to be an expert in everything. The key is for clinicians to convene and learn from each another. However, the delivery of health care services in today's care delivery system does not provide for a coordinated effort among different specialties [14]. By using the *Healthcare Matrix*, cross-departmental collaboration was strengthened through multi-perspective dialogue, communication and reflection.

Case conferences and patient presentations by residents are critical components of all resident training. However, the unstructured and nonstandardized processes rely on academic tradition and individual resident initiatives. Furthermore, there is no regulation requesting organized retrospective review in cases of patient morbidity or mortality. Quinn et al [7] reported

a study that used the *Healthcare Matrix* to offer medical students and residents insight into patient issues. The matrix changed the way that conferences were held because they included all competencies in the discussion. When these medical students and residents are taught the tools and methods of quality improvement, they can learn to lead the improvement in patient care [7]. Furthermore, the matrix helped to identify flaws in the *system*, rather than faults of *individuals* who work in the system [5]. This is a key trait of effective quality improvement tools. Both the residents and faculties could consider problem solving and clinical judgment through discussion, role modeling and feedback.

Successful functioning depended not only on the doctor but on the performance of the whole team [13]. The QA nursing conference was more focused on an "inspection-based" approach. In the hospital, nurses work in turns, because the traditional organization of nursing care tends to be based on task allocation, and individual nurses became responsible for specific tasks within the care process. Inspectors were appointed to check and remove any defects or problems that might be occurring [15]. The *Taiwan Edition Healthcare Matrix* should allow greater improvements in the quality of care if the health care providers can identify possible problems in their patients in advance and prevent problems from happening. The improvements in patient care in nursing were able to timely and effectively improve patient safety and patient satisfaction [16].

The health industry contains many dynamic environments in which many interrelated elements affect behavior and performance. Recurrent disturbances are often due to faulty work habits that, because everyone shares them, are invisible to the participants [17]. Under the *Healthcare Matrix* framework, the six major aims of the IOM are reviewed for the specific patient. If a quality gap is noted, the ACGME core competencies of the health care providers will be checked, in an attempt to explain what led to a failure in the care of the patient. This format organizes the presentation and discussion, highlighting strengths or weaknesses in specific aspects of patient care [6,7].

One of the basic principles of quality improvement is "if you can't measure it, you can't improve it" [8]. We need reliable and valid quality indicators to enable improvements in the delivery of health care. The matrix guides residents/nurses to scrutinize their patients through every facet of the IOM aims and ACGME competencies, thus identifying opportunities

for improvement [5]. The matrix covers quality of patient care and of clinical education. With interprofessional collaborative efforts, the matrix has been introduced into the departments of Plastic Surgery, Nursing and Performance Management in our hospital. The achievements are particularly encouraging. The *Taiwan Edition Healthcare Matrix* is worthy of consideration, having been used in a Mandarin-speaking region of Asia.

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