Three Clerkship Knowledge Integration and Assessment Project

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Background Information & Goals of Project

The goal of the Three Clerkship Knowledge Integration and Assessment Project is to develop a renewable question bank of clinically relevant vignettes to create examinations that test application of knowledge and integration of information across the three disciplines of Family and Community Medicine, Internal Medicine, and Psychiatry. These examinations are designed to (1) assess knowledge in the three core clerkships and (2) assess integration and retention of knowledge across clerkships.

The core clerkships have not consistently assessed knowledge with written examinations; clerkships that do use examinations have worked independently to develop predominantly short-answer and essay examinations. Although the new curriculum has strong foundations in the principle of integration (as does the practice of medicine), the core clerkships have not yet developed integrated methods of assessment and evaluation. We aim to promote integration of clinical material by incorporating shared case vignettes (with clerkship-specific stems) in the final examinations for the three clerkships.

The quality of these in-house (locally written) examinations in medical schools is often below the level of the National Board of Medical Examiners (NBME) standards. (Jozefowicz et al. "The quality of in-house medical school examinations." Acad Med. 2002;77(2):156-161.) However, training in NBME test writing principles, as we have done on a trial basis in the psychiatry and internal medicine clerkships, along with monitoring of questions, can produce significant improvements in the quality of questions. While standardized NBME ("shelf") exams are available for all three disciplines, there are not suitable as evaluation tools in our curriculum. For a given discipline they do not emphasize or limit themselves to our stated clerkship objectives. Furthermore, they do not employ the shared vignette structure that offers insight into the integration of learning over the third year.

We will use multiple choice question (MCQ) examinations for summative assessment of knowledge at the end of the three clerkships; 10-20% of the questions on each examination will be shared. Clerkship-specific questions can be used in individual student evaluations. However, the results of integrative/shared questions will initially be used only to follow aggregate trends in the class because students have different clerkship sequences.

We will rotate questions to maintain examination security without altering the overall level of difficulty or content of the examination from block to block. The sustainability of
the MCQ examination depends upon having a large number of high quality questions and periodic question generation. To ensure that the questions are reliable and valid we will also need to carefully evaluate the examinations in an ongoing fashion. We will ask faculty members both within and outside of each discipline to evaluate the questions for content and fairness. We will also solicit the feedback from students completing the rotation and the examination, in the form of exit interviews and/or sessions in which the test and its answers are reviewed and discussed (thereby making the test taking process itself an educational experience).

**Below are some of the questions we hope to answer with shared examination vignettes:**

1. **For a given patient/scenario, are students more adept in one aspect of the patients care than another?** Given the same patient with myocardial infarction, do the students have mastery of the appropriate cardiac medications but fail to recognize the patients obvious depression? The same case scenario presented in two or three of the examinations allows us to assess the students ability to master the concept relevant to that discipline.

2. **Does the context of the learning environment (which clerkship and which site) affect knowledge?** Does the same patient with chest pain in the emergency room on the internal medicine examination prompt a different evaluation and treatment plan than the same patient in the office on the FCM examination? Do students at one site learn EKG interpretation better than students at another site?

3. **Is knowledge retained across clerkships?** When presented with the same patient with fever, headache, and neck pain on all three clerkship exams, is lumbar puncture consistently identified as the most important test? Or does this knowledge extinguish? Is the application of knowledge a function of the timing or sequence of clerkships? Shared/similar questions will allow assessment of students mastery of shared objectives, e.g., chest pain in FCM and Medicine or depression in FCM and Psychiatry.

Our hope is that this pilot project will enhance the entire third year curriculum by:

1. providing an objective standardized measure of individual student knowledge both overall and in specific content areas
2. demonstrating the aggregate knowledge of the entire block cohort or class, revealing strengths and weakness of the curriculum
3. examining the way students integrate and retain knowledge as they progress through the clinical core
4. establish a model of collaborative assessment among the core clerkships

With increased feedback and information on student performance, changes and innovations in the three clerkships can be guided by data and quantifiable results. These results will be applied to the improvement of both individual clerkships and their interdisciplinary teaching programs. This project is an extension of the integrated design and assessment that has been successfully established in the preclinical curriculum. The
success of this pilot project may lead to collaboration with any other core clerkships that express interest; the clerkships would then work together in training faculty and promoting more (and improved) integrative assessment strategies that span the third year.

In the long-term, these questions which assess integrative skills and knowledge over the course of the third year may be of interest to educators at other institutions. We could make our question bank available to others who undertake this same curricular design and seek an evaluation method.

**Plan for Measurement & Documentation of Project Efficacy and Outcome**

Review of exam results on clerkship-specific and shared questions will guide improvements in the course content and methods of instruction in the clerkships. The identification of areas of improvement will also focus feedback solicited from the students, who can expand on identified deficits and provide input on how to improve instruction in these areas.

Qualitative (e.g., description of the types of questions, descriptions of student feedback) or quantitative (e.g., concordance on same scenario) results pertaining to integrative curriculum design and evaluation will be submitted for publication in the peer-reviewed journal (pending CHR approval). To our knowledge this type of project has not been discussed in the medical student education literature.

We request Academy funding for the following coordinated activities:

1. **Development of a high-quality question bank.** Test writing sessions will include faculty from all three departments. A large collection (e.g., 200+) of high-quality questions will be needed.

2. **Faculty development.** Key faculty in the three departments will develop faculty training sessions and periodic test writing sessions. A common test writing curriculum and format will enhance the quality of the examinations. In addition, these sessions will inform the faculty of the clerkship objectives and engage them in developing assessment tools for the students they supervise on the wards and in the clinics.

3. **Inter-department quality control of specific test questions.** Members of the three departments will review & edit each others test questions to ensure quality of test question writing. This quality control will probably be enhanced by the acquaintance but not detailed familiarity with content in other departments.

4. **Exam creation.** The three faculty members will coordinate the formulation of different exams (and integrated questions) for each block.

5. **Monitoring of the exam results.** Members of the three departments will oversee a statistical review of exam questions, monitor answer frequencies, and suggest changes to calibrate the exams to the most appropriate level of difficulty.

6. **Analysis of student feedback & institution of curricular changes.** Student meetings will be conducted to solicit specific feedback about the exam and
suggestions for clerkship changes; this feedback will guide curriculum improvements.

**Plan for continuation of project at the end of the funding cycle**

Much of the time and expense will be at the onset as one-time needs of establishing this project. Within one years time these initial steps will be completed and the program will have been piloted with at least five different blocks during in the upcoming academic year. After one year it is hoped that the inter-disciplinary MCQ examination will be an established part of the clerkships, and that initial data will have been collected and analyzed. To maintain the question bank we will continue to conduct question-writing sessions and design new examinations. However, we foresee far less faculty time commitment once this program is established, and therefore, do not anticipate additional funding needs at that time.

The department chairs of psychiatry, family and community medicine, and internal medicine have advocated for written examinations in each clerkship and are supportive of this project. It is recognized that significant faculty time and effort is needed to establish this important aspect of the curriculum. In the absence of external funding, clerkship exams may still be created, or standardized tests may be used, but it is unlikely that there will be sufficient resources or time for collaboration in developing this integrated assessment project or expanding it to include the other third year clerkships.

For further information, please contact:

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