

Fitting it all in: integration of 12 cross-cutting themes into a School of Medicine curriculum

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Abstract

Changing demographic, social, economic and technological trends have impacted the expectations of the Academic Health Center in preparing physicians to serve the needs of the American society, resulting in revisions to current curricula. In addition to the traditional basic sciences and clinical disciplines, accredited medical schools are required to provide curriculum exposure in behavioral health, communication skills, diversity and cultural awareness, ethics, evidence-based medicine, geriatrics, integrative medicine, pain management, palliative care, public health, socio-economic dynamics, and domestic violence. These themes are considered 'cross-cutting' since it is recognized these important curricular components apply across all years of medical school. In this article, the authors describe a strategic model developed at the University of New Mexico School of Medicine (UNMSOM) to integrate horizontally and vertically 12 cross-cutting themes as an evolving interdisciplinary curriculum reform process. These areas were defined through a combination of internal self-study, external requirements, and student and faculty interest. In the early stage of use of this model at UNMSOM, the authors describe the new cross-cutting themes that have been integrated. Minimal disruption and a spirit of cooperation and acceptance have characterized the curricular change that has been required. Preliminary assessment indicates that the program has been successful.

Introduction

Changing demographic, social, economic and technological trends have impacted the expectations of the Academic Health Center in preparing physicians to serve the needs of the American society. Lifestyle changes and the medical consequences of common societal problems have affected the disease patterns in the USA as mirrored in increases in chronic diseases; as well as cancer, suicide, addiction, domestic violence, and obesity. In a society that is aging and growing more culturally diverse, health-care needs have shifted dramatically into chronic illness, and end-of-life care management (Institute of Medicine 2003).

In order to prepare physicians to serve these changing needs, medical schools must revise their curricula. In addition to the traditional basic sciences and clinical disciplines, accredited medical schools are required to provide curriculum exposure in behavioral health, communication skills, diversity and cultural awareness, ethics, evidence-based medicine, geriatrics, integrative medicine, pain management, palliative care, public health, socio-economic dynamics, and domestic violence (Institute of Medicine 2001; LCME 2004). These themes are considered 'cross-cutting' since they are important components of the medical school curriculum that apply across all years.

In this article, we describe a strategy developed at the University of New Mexico School of Medicine (UNMSOM) to integrate horizontally and vertically 12 cross-cutting themes as an evolving interdisciplinary curriculum reform

Practice points

- Cross-cutting themes have relevance and need emphasis throughout the medical curriculum.
- Cross-cutting themes are effectively taught through horizontal and vertical integration.
- Cross-cutting themes curricula should be designed by local experts with reference to the core competencies, to avoid duplication and facilitate acceptance.
- Modifications may be made to existing resources such as problem-based learning, lectures, panels, and student performance assessment.
- Ongoing institutional support is essential and is maintained by proving evidence through assessment of curricular content, student performance and satisfaction.

process (Table 1). A review of the literature revealed no publications that addressed integrating all of these interdisciplinary themes into an existing medical school curriculum.

Methods – UNMSOM approach to cross-cutting themes curricula

Impetus to integrate

At UNMSOM, the 4-year curriculum is divided into three phases. Phase I lasts approximately 21 months and includes

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Table 1. UNMSOM cross-cutting themes.

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| Behavioral and mental health |
| Clinical skills |
| Communication skills |
| Cultural competency and diversity |
| Ethics and professionalism |
| Evidence-based medicine |
| Geriatrics |
| Integrative medicine |
| Knowledge management |
| Pain management |
| Palliative care |
| Population health |

Table 2. Abbreviated pain curriculum..

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| <ul style="list-style-type: none"> • Basic pain anatomy and physiology. • Definition of pain. • JCAHO recommendations on pain management. • Assessment of pain in adults, children and special populations, e.g. elderly and impaired. • Management of post-operative and emergency acute pain. • How chronic pain syndromes may arise and be managed. • Pharmacological and non-pharmacological pain prophylaxis and management. • Legal and ethical implications of pain management. <p>Objectives</p> <p>Phase 1 – Describe and draw acute pain pathways from periphery to CNS and the modulating feedback pathways.</p> <p>Phase 2 – Describe appropriate assessment tools for pain in adults, school age children, pre-school children and the non-verbal.</p> <p>Phase 3 – Complete a simulator program of management of acute pain.</p> <p>Assessment</p> <ul style="list-style-type: none"> • Written examination/Multiple choice in University of New Mexico format. • OSCE/Standardized patient in Student Progress Assessment. • Simulator-checklist |
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organ system blocks, clinical skills, research and clinical experience in community primary care settings. Phase II lasts 12 months and includes seven required clerkships (Family and Community Medicine, Internal Medicine, Neurology, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Surgery). Phase III (fourth year) includes four required clinical rotations and four electives. Throughout the curriculum, clinical learning is integrated with emphasis on the state's rural, Hispanic, and American Indian populations' health needs. Recent publications from the American Association of Medical Colleges (AAMC) and Accreditation Council of Graduate Medical Education (ACGME) have outlined objectives and competencies for medical students and residents related to cross-cutting issues (ACGME 1999; Medical School Objectives Writing Group 1999). In 2002, at the direction of the Education Council (our curriculum committee), a subcommittee was formed to develop specific objectives in each of the six core competencies areas listed by the ACGME that would be relevant across all phases of our undergraduate medical curriculum. However, these objectives did not specifically address cross-cutting themes.

The impetus to incorporate cross-cutting themes into the UNMSOM curriculum included professional societies and accrediting agencies, student input and request, and faculty interest. First, the Liaison Committee on Medical Education (LCME) directly influences the content and standards adopted for medical school curricula and has included many required cross-cutting themes areas for medical students' education. Among these are end-of-life care, geriatrics, medical consequences of societal problems such as violence and abuse, cultural competence, gender and cultural biases, and medical ethics and human values (LCME 2004). The 2003 LCME accreditation visit for UNMSOM accompanied

by 18 months of self-study highlighted areas and created a climate of interest to integrate cross-cutting themes into the curriculum.

Second, the annual medical student AAMC Graduation Questionnaire also assesses the adequacy of instruction of cross-cutting themes, and provides a report for each institution with comparable national data each year. Our AAMC reports identified cross-cutting themes deficiencies in our curriculum.

Finally, in 2002 and 2003, two UNMSOM education retreats demonstrated broad support for more inclusion of these topics into the curriculum. Prior to each retreat, faculty and students were surveyed for topics to be addressed at the retreat and for perceived weaknesses in the current curriculum. In addition, literature on each of the cross-cutting themes was distributed to each person attending the retreat. At each retreat, we allotted extensive time for small group discussions of the cross-cutting themes, identifying 12 themes to be integrated into the current curriculum (Table 2). The Spring 2003 retreat issued two strong recommendations: (1) the creation of cross-cutting themes task forces, which would provide curricular recommendations by Fall 2003 and (2) development of an action plan to revise our Perspectives in Medicine (PIM) seminars, a series of seminars throughout medical school addressing

Table 3. Abbreviated competency: Medical knowledge, integration and critical reasoning, Phase I (integration of cross-cutting themes in bold).

1. Describe and apply the fundamental scientific principles necessary for the practice of medicine.
 - a. Demonstrate knowledge of the basics of anatomy, histology, biochemistry, immunology, microbiology, pathology, physiology and pharmacokinetics to include:
 - basic pain anatomy and physiology: **Pain**;
 - physiology of aging: **Geriatrics**.
2. Identify and discuss the behavioral and population aspects of health, especially as these relate to patient care and preventive medicine.
 - a. Describe cultural influences on health and health-related behaviors: **Culture and diversity**.
3. Apply skills necessary for effective problem solving in the clinical and community setting, including hypothesis generation and hypothesis testing.
 - a. Demonstrate skills of behavioral evaluation and the mental status examination: **Behavioral health**.

issues of professionalism, to incorporate cross-cutting themes such as ethics, palliative care, integrative medicine and cultural competence.

Therefore, shortly after the 2003 retreat, the committee at UNMSOM responsible for curriculum management appointed a sub-committee (Cross-Cutting Themes Committee) consisting of all chairs of the cross-cutting task forces to (a) review the current curriculum for integration of cross-cutting objectives, content, and skills and (b) develop curricula based on the 2002 ACGME Objectives model.

Strategy for integration of cross-cutting themes

Through consensus, the content expert chairs of each of the cross-cutting task forces formulated a process strategy with the following identifiable products:

- development of 4-year curricula with objectives for each of the 12 cross-cutting themes;
- creation of a non-overlapping master list of topics with bibliography of references;
- integration of master topics into UNMSOM core objectives document;
- review of current curricular content for each cross-cutting theme;
- development of specific plans for progressive integration of developmentally appropriate objectives throughout Phases I–III, starting with the highest priority objectives;
- development of assessment appropriate to the content and methods of each cross-cutting theme.

Content-specific curriculum development

We utilized a standardized format to create our recommended curriculum. The format includes an outline of overall goals and objectives for a 4-year curriculum, individual goals and objectives for each curricular phase, and assessment tools. Table 2 illustrates this format for the Pain Curriculum. We created a master list of all cross-cutting

themes, and reduced redundancy and overlap, by creating a priority list within each theme topic and including a bibliography of references for each cross-cutting theme.

Following the completion of the standardized curricula, we integrated these documents into the School of Medicine's desired 'Six Core Competencies' based on ACGME competencies. The committee then reviewed the cross-cutting theme curriculum for gaps and redundancy, and produced a final document integrating the 12 cross-cutting themes (Table 3).

Identification of current gaps

In order to develop an implementation plan, we identified a process to identify current gaps. Our initial literature review indicated that institutions collected data regarding the content of their curriculum by two main methods: self-reporting (via faculty interview, report, or questionnaire responses) or by extracting information from an established curricular data source. When an institution could access a curricular data system, results were more complete and not dependent on response rates (Quill et al. 2003).

Our cross-cutting themes task force also used these two means to identify where the topics of interest were currently covered. First, course directors and other curricular leaders received questionnaires asking them to indicate on a grid which of the cross-cutting themes were present in their curricular area. Second, we queried our curriculum database MEDS (Medical Education Database System) for content codes correlating with the identified cross-cutting themes. Neither method attempted to evaluate quality of teaching and learning, simply its presence in the curriculum.

Validating MEDS query

We compared the questionnaire responses to the MEDS query responses for Phases I and II. Content estimations by questionnaire were regularly problematic, due to potential over- or underestimation of topic coverage, since individual

respondents gave their perceived impressions of the degree of coverage. In 50% of cases, there was concordance between the questionnaire and database results. In 7% of cases, we noted that faculty was 'shortchanging' where the issues were covered in their areas. In 43% of cases, the faculty identified coverage of cross-cutting themes, but this was not reflected in the MEDS query results. In this last group, we reasoned that the organizer had personal knowledge of theme coverage in portions of their content block, but either learning objectives were absent from MEDS or did not include mention of a cross-cutting theme.

Implementation plan

Once the current gaps were verified, we presented a detailed consolidated implementation plan for Phases I–III to the Integrating Group, our educational committee at the University of New Mexico responsible for integration of curriculum and curricular changes (Table 3). For the first year of implementation in Phase I, we asked each cross-cutting themes group to identify three priority objectives and each Phase I course director to incorporate three cross-cutting objectives into their course.

Results

After implementation of the addition of the cross-cutting themes into the current curriculum, we then assessed whether this resulted in any impact on our students.

Assessment

We implemented an assessment plan for the new curriculum which involved three different approaches: (1) annual review and trends seen in the curricular content using the Medical Education Database System (MEDS), (2) assessment of student satisfaction with the integrated cross-cutting issues content, and (3) student performance on components of cross-cutting issues.

Annual assessment of curricular content: What was included in the curriculum?

MEDS is a curricular content map database developed at UNMSOM. It links objectives for components of the curriculum to an expanded and adapted US medical licensure examination outline based on a specific numbering system referred to as 'content index numbers' (CINS). Through CINS, the database is able to provide information on how, when, where, how much and by whom specific curricular content occurs in each of the three phases of the UNMSOM curriculum. To date, we have created baseline data for the first year of implementation for the cross-cutting themes as a result of the Cross-Cutting sub-committee working closely with block chairs and curriculum leaders to enhance the curriculum. For example, in

reviewing Palliative Care content in 2004–2005, the database confirmed six lectures, two tutorial cases, a panel discussion and orientation to death/dying in one clerkship. In addition, it identified a five session, bi-weekly elective in the PIM series focused on Palliative Care entitled 'Care Beyond Cure.' We will use these data to compare progress in cross-cutting curriculum implementation in 2005–2006 and in subsequent years.

Assessment of student satisfaction with cross-cutting issues content in the curriculum: Are students happy with the changes in the curriculum?

Students completed evaluations regarding their satisfaction with the quality and quantity of the cross-cutting issues content. Using a five-point Likert scale (1 = poor training or no exposure to 5 = excellent training or extensive training), they rated the quality and quantity of teaching in the 12 areas included as the cross-cutting themes as well as four sub-topics associated with special populations for a total of 16 subtopics. In our most recent Phase III report, 13 of 16 cross-cutting sub-topic areas were rated at a 3.0 or higher on quality of training, and 10 of 16 sub-topic areas were rated at a 3.0 or higher on quantity of training. For future years, we will specifically target those areas with lower student satisfaction.

In addition, in the fourth year, all graduating senior medical students in the USA are asked to complete the AAMC Graduation Questionnaire. Each medical school receives a school-specific and national report from these data each year. In this questionnaire, graduating students rate their preparation and the amount of training they received in medical school on basic science and clinical content in the curriculum including cross-cutting issues topics. For example, in 2005 UNMSOM graduates rated 14 items on the amount of instruction in population and public health provided in the curriculum. They were asked to select appropriate amount of instruction, adequate amount of instruction or excessive amount of instruction for each item. The percentage of students who selected ratings of appropriate amount of instruction ranged from a low of 42.3% for UNMSOM students compared to 56.5% for students nationally for occupational medicine. In women's health, 96.2% of UNMSOM students indicated that they received appropriate instruction as compared to 82.1% nationally. Of the remaining 12 population health items, 70–85% of the University of New Mexico students rated receiving an appropriate amount of instruction.

These findings reassure us about the appropriate amount of instruction associated with most of the cross-cutting issues, and ratings provide direction on topics that need more attention. There has been improvement in the quality of education for several topics, but these findings also support the need to increase the quantity of training associated with some cross-cutting topics.

Assessment of student performance on components of cross-cutting issues content: How are students scoring when assessed on performance examinations in cross-cutting issues?

In Phase I and Phase II of the curriculum, the students' mastery of skills and knowledge are assessed through multiple choice and essay examination, and simulated clinical encounters. There are six examinations that include content from six cross-cutting issues in the Phase I preclinical curriculum. In these examinations, 85–90% of the students met the minimum performance standards for clinical skills components on each examination. In the Phase II curriculum, there are three Objective Structured Clinical Examinations (OSCE), each with five cases during the year. These examinations also include content from six cross-cutting issues. While 67–94% of students met the minimum performance standards on each case on each OSCE examination involving geriatric patient cases that include clinical and communication skills, most students met the overall minimum performance standards of 70% or better for the overall OSCE examination.

We also monitor our students' performance through the US national licensure examinations given to students while in medical school: USMLE (United States Medical Licensing Examination) Step 1 and Step 2 clinical skills and Step 2 knowledge examinations. The USMLE Step 1 examination assesses basic science knowledge. In 2005, the UNMSOM students' Behavioral Sciences sub-scores were within the 95% confidence limits of the national mean.

Through a multiple case standardized patient examination, the USMLE Step 2 introduced a clinical skills component focusing on clinical and communication skills. USMLE Step 2 reports only provide pass or fail scores and all UNMSOM students in the Class of 2005 passed this examination on first taking.

Discussion

We have described a method for the simultaneous integration of multiple cross-cutting themes throughout all 4 years of medical school training. Adding new themes is often difficult because curricular and faculty time is finite. The integration of topics has advantages. It may not require loss of previous curricular content since the principles of a new topic can be interwoven into the teaching of current topics instead of wholesale replacement of them. This approach may also lead to greater commitment of teachers to the process of change (Bland et al. 2000).

Based on a literature review, previous strategies used to integrate individual cross-cutting themes into a full 4-year curriculum generally followed five steps: needs assessment, identification of advocates, development of methodology, enactment of plan, and assessment of integration. A formal needs assessment estimates the value of the proposed cross-cutting themes content relative to the costs of implementation.

Identification of a leader who is responsible for assembling a team, delegating responsibilities and soliciting the support of stakeholders in the current curriculum is essential (Bland et al. 2000). Models from other institutions for appropriate development and integration of content within a 4-year medical school curriculum may be beneficial, and their experience can often save duplication of effort (Laidlaw et al. 2002; Merl et al. 2000). Curricular changes sometimes are developed *de novo* from expert panels, the literature or research-based suggestions (Turner & Weiner 2002). Whole curricula and recommendations are available from other institutions' web sites such as the IASP pain curriculum (IASP 2000). Most commonly, new material is added either as a single module spanning a defined period or a number of defined periods over the years of education (Dogra 2001; Lowitt 2002; Watt-Watson et al. 2004). Rarely is new material interwoven through the 4 years of training and when approached in this manner, new material is limited to introduction of a single topic at a time (Laidlaw et al. 2002). Integration of new themes relies on minimizing disruption of an institution's structure and may follow previously successful patterns of change. Identification of likely points of cooperation and wide dissemination of plans prepares others for changes and allows contribution of ideas. Face to face meetings with leaders and organizers who teach are time consuming but more effective for gaining support (Bland et al. 2000). To measure success and identify future targets for improvement, evaluation of outcomes including integration of the topics is necessary. Programs have used surveys of faculty satisfaction, and student satisfaction and knowledge.

Because we are interested in integration of the cross-cutting themes throughout the curriculum, we were also interested in other evaluation models. Harden provides an 11-step conceptual framework for evaluating the degree to which integration occurs within a medical education, and his 'integration ladder' seems applicable to current and future use with cross-cutting themes integration (Harden 2000). The model proceeds from isolation at the non-integrated end of the continuum to trans-disciplinary integration. The ladder is hierarchical. As a curriculum achieves more integration, Harden theorizes that the curriculum relies less on disciplines and departments for curricular teaching and to a greater degree on cross-disciplinary and cross-departmental curricular planning and oversight. The complexity of curriculum integration is acknowledged. Harden suggests that organizations with greater degrees of integration will have features such as communication and joint planning among faculty across disciplines, attend to the sequencing of teaching, agree on objectives and the details and emphasis in content and methods of assessment.

The strengths of the UNMSOM approach included early identification of the topics to be integrated with support from a needs assessment of students and faculty and an inventory and map of the existing curriculum. Led by a motivated leader, a small committee developed a final product within a specified time frame. Using collaborative work and bi-weekly meetings, committee members shared strategies including attention to better educational practices, and reduced their duplication of

efforts within the curriculum. Working together enabled the development of a practical model with attainable aims.

Limitations include a lack of an accepted and robust approach to compare the value of the content that was compressed or reduced to the value of the added content. Continued motivation of the cross-cutting themes leaders/advocates beyond the initial design of a curriculum and incremental introduction of new content may prove challenging. In our model, each cross-cutting themes leader must have the support of his or her departmental chair to maintain and continue to update and implement the curriculum. Additional training of faculty members, less familiar with the new content is another ongoing challenge. The described process relies on continuous review and effort on the part of faculty and students, a process highly dependent on personal motivation and commitment.

Assessment of students' knowledge, skills and behaviors is evolving and requires additional effort from the same faculty who developed and implemented the content for the cross-cutting themes. Some faculty members have implemented this effort, but others must join to assure that the students who progress through the curriculum are achieving mastery of the cross-cutting themes at the level and depth deemed developmentally appropriate for them.

Many new cross-cutting themes have been integrated into the 4-year curriculum in the early stage of use of this model. The curricular change that has been required has been characterized by minimal disruption and a spirit of cooperation and acceptance by faculty from blocks and clerkships and from cross-cutting themes task forces. Preliminary assessment indicates that the program has been successful. Continued assessments will be used to make further alterations and judge the value of the changes that have taken place.

Acknowledgements

The authors wish to thank the support and participation of the following faculty in this educational process. Dr Valerie Romero-Leggott, Dr Greg Franchini, Dr Rosina Finley, Dr Cindy Geppert, Dr William Wiese, Dr Bronwyn Wilson, Dr Peter Barnett, Dr France Doyle, and Ms Sarah Morley.

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