

Integrative Medicine in Residency Education: Developing Competency Through Online Curriculum Training

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Abstract

Introduction The Integrative Medicine in Residency (IMR) program, a 200-hour Internet-based, collaborative educational initiative was implemented in 8 family medicine residency programs and has shown a potential to serve as a national model for incorporating training in integrative/complementary/alternative medicine in graduate medical education.

Intervention The curriculum content was designed based on a needs assessment and a set of competencies for graduate medical education developed following the Accreditation Council for Graduate Medical Education outcome project guidelines. The content was delivered through distributed online learning and included onsite activities. A modular format allowed for a flexible implementation in different residency settings.

Evaluation To assess the feasibility of implementing the curriculum, a multimodal evaluation was utilized, including: (1) residents' evaluation of the curriculum; (2)

residents' competencies evaluation through medical knowledge testing, self-assessment, direct observations, and reflections; and (3) residents' wellness and well-being through behavioral assessments.

Results The class of 2011 ($n = 61$) had a high rate of curriculum completion in the first and second year (98.7% and 84.2%) and course evaluations on meeting objectives, clinical utility, and functioning of the technology were highly rated. There was a statistically significant improvement in medical knowledge test scores for questions aligned with content for both the PGY-1 and PGY-2 courses.

Conclusions The IMR program is an advance in the national effort to make training in integrative medicine available to physicians on a broad scale and is a success in terms of online education. Evaluation suggests that this program is feasible for implementation and acceptable to residents despite the many pressures of residency.

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Introduction

Graduate medical education is challenged to train enough primary care physicians to meet the nation's growing chronic illness burden.¹ Primary care physicians need training in approaches that engage patients in self-care, health promotion, and prevention, including nutrition, diet, physical activity/exercise, stress management, and use of nutritional supplements. Because 75% of patients use complementary and alternative medicine (CAM) together with conventional medicine, the Institute of Medicine recommends that health professional schools incorporate information about CAM into standard curricula at undergraduate, graduate, and postgraduate levels.^{2,3}

Integrative medicine (IM) is healing-oriented medicine that takes account of the whole person—body, mind, and spirit—including lifestyle. It emphasizes a therapeutic relationship and use of conventional and alternative approaches to care.⁴ Curriculum guidelines for IM have been published for medical students and residents.⁴⁻⁶ Residency might be the most appropriate level to teach IM as demonstrated by a 4-year model that included a full family medicine residency plus an IM fellowship.⁷ This model successfully increased graduates' IM competencies and enhanced student recruitment.⁸ A limitation is that the program educated just 6 to 8 residents annually.⁸ To promote IM training on a larger scale, we developed the Integrative Medicine in Residency (IMR) program, a 200-hour, competency-based online curriculum incorporated throughout all 3 years of a primary care residency. We describe the development and content of the IMR program and its evaluation design, and present preliminary findings from 3 measures (course completion rates, course evaluations, and medical knowledge test scores).

Methods

Curriculum Development

In 2007, the Arizona Center for Integrative Medicine solicited participation from family medicine faculty trained in IM to implement a 5-year pilot project to determine the feasibility of incorporating 200 hours of IM content into residency training. Eight programs (TABLE 1) committed participation for 3 graduating classes (2011, 2012, 2013). The IMR curriculum followed guidelines from the Accreditation Council for Graduate Medical Education (ACGME). Content development was guided by data from a faculty and residents needs assessment.⁹ Previously published IM competencies

What was known

Three-fourths of patients use complementary and alternative medicine (CAM), and the Institute of Medicine has called for incorporation of information about CAM into medical curricula.

What is new

A 200-hour Internet-based, collaborative educational initiative was implemented in 8 family medicine residency programs to incorporate training in CAM into the residency education.

Limitations

Single specialty (family medicine), presentation of preliminary results and lack of a control group.

Bottom line

Multidimensional evaluation of a multisite test of a CAM curriculum showed positive course evaluation by residents, and improved medical knowledge, suggesting a curriculum suitable for widespread dissemination.

were referenced to develop IMR core competencies and link them with specific evaluation methods (TABLE 2).^{5,10}

The online modular curriculum allows maximum implementation flexibility. Self-contained units can be adapted to use longitudinally, within individual rotations, as electives or tracks. Case-based teaching reflecting diverse populations is infused throughout, and maximum interactivity holds learners' interest. Most content (166 hours) is delivered online (TABLE 3), leaving 34 hours for topics taught in face-to-face sessions based on faculty expertise and resources. Standard onsite sessions include curriculum orientation, annual resident wellness and self-care assessments, and experiential workshops in mind-body medicine and motivational interviewing. Other onsite activities include a yoga class, a visit to a health food store and potlucks with healthy foods. The first unit, Prevention and Wellness, emphasizes conventional recommendations for preventive services along the life cycle and includes courses in nutrition, dietary supplements, physical activity, mind-body tools for stress management, and sleep. Interactive cases provide clinical integration. Tools in IM include courses on botanical medicine, manual medicine, mind-body medicine, spirituality, and an introduction to whole systems (naturopathy, homeopathy, traditional Chinese medicine, Ayurveda). All other units address problems of specific patient populations (TABLE 3). The majority of the content was written by integrative primary care physicians and reviewed by faculty at participating residency programs.

The IMR website contains a learning community section and online portfolio.¹¹ In the community section, residents' pictures and profiles are posted. Online dialogues (a "watercooler" and "curbside consult") are facilitated. The portfolio is a repository of completion reports, evaluations, and reflections completed in different modules.

TABLE 1 INTEGRATIVE MEDICINE IN RESIDENCY (IMR) PROGRAM SITES AND CONTROL SITES

IMR Pilot Sites	Control Sites
Beth Israel Medical Center, New York, NY	Alaska Family Medicine Residency, Providence Hospital, Anchorage, AK
Carolinas Medical Center, Charlotte, NC	Family Medicine Residency, Montefiore Medical Center and Albert Einstein College of Medicine, Bronx, NY
Hennepin County Medical Center, Minneapolis, MN	Moses H. Cone Memorial Hospital, Greensboro, NC
Maine Medical Center, Portland, ME	University of Minnesota/North Family Medicine Residency Program, Minneapolis, MN
Maine Dartmouth, Augusta, ME	
University of Arizona, Tucson AZ	
University of Connecticut, Hartford, CT	
University of Texas Medical Branch, Galveston, TX	

Evaluation

IMR evaluation is organized in 4 components: (1) evaluation of resident competencies; (2) course completion; (3) resident evaluation of the curriculum; and (4) assessment of resident wellness behaviors and well-being. Both quantitative and qualitative methods are used. With the exception of faculty ratings on direct observation checklists (DOCs), data are collected through the website.

The IMR group is composed of 3 cohorts—graduating classes of 2011, 2012, and 2013. The pilot sites represent a mix of community ($n = 3$) and university affiliated/university-based residencies ($n = 5$). To serve as controls, residents were recruited from the 2012 and 2013 classes from 4 residencies that do not have the IMR curriculum but attract similar residents as the pilot sites based on geographical proximity or overall residency characteristics (TABLE 1). Controls receive an annual incentive to complete the comparison measures of medical knowledge and resident wellness behaviors and well-being. Comparison data are still being collected and are not presented.

Approval for the study was granted by the University of Arizona Institutional Review Board (IRB) and the IRBs of the pilot sites and control sites.

Evaluation of Resident Competencies The evaluation of resident competence in IM encompasses medical knowledge, practice-based learning and improvement, patient care, interpersonal and communication skills, professionalism, and systems-based practice. Details of the evaluation are provided as online supplemental material.

Course Completion Upon completion of each course, residents click a “finish” button that records course completion. A minimum of 80% completed courses is required.

Resident Evaluation of the Curriculum At the end of each course, residents complete a course evaluation. Items use a 5-point Likert-type scale to rate how well residents felt the course covered its learning objectives, whether the depth of material was challenging, the usefulness of the online resources, the usefulness of the course for patient care, and the functioning of the online technology. Residents also estimate the length of time it took to complete the course and can provide free-text comments. Appropriate curricular revisions and enhancements are made as a result of the residents’ feedback.

Assessment of Resident Wellness and Well-Being

Instruments with known evidence of validity are used to assess residents’ well-being: perceived stress, depression, burnout, emotional intelligence, mindfulness, gratitude, satisfaction with life, and positive and negative affect (TABLE 4).^{12–20} A new instrument to assess wellness behaviors (eg, restful sleep, physical activity, diet) was developed by faculty of the Arizona Center for Integrative Medicine. Residents are assessed at the beginning of each year and at the end of residency.

Results

Sample and Demographics

Our results are based on 61 residents in the 2011 IMR class, who completed the first 2 years of the curriculum (of 69 entering residents, 6 left residency and 2 were reassigned to the 2012 class). The majority of the cohort were women (66.6%, $n = 42$) and US medical school graduates (55.5%, $n = 35$). Ten residents (15.9%) were osteopathic graduates, and 18 (28.6%) were international medical graduates.

Course Completion The PGY-1 curriculum consisted of 8 courses, and the mean percentage of course completions

TABLE 2 INTEGRATIVE MEDICINE IN RESIDENCY COMPETENCIES AND EVALUATION STRATEGIES

Competencies	Direct Observation	Open-Ended Questions	Medical Knowledge Assessment (Multiple-Choice)	Self-Assessment
Patient care				
Demonstrate patient-centered history-taking, using a biopsychosocial approach that includes an accurate nutritional history, spiritual history, and inquiry of conventional and complementary treatments.	✓			
Facilitate health behavior changes in patients, using techniques such as motivational interviewing or appreciative inquiry.	✓			
Collaborate with patients in developing and carrying out a health screening and management plan for disease prevention and treatment using conventional and complementary therapies when indicated.	✓	✓		
Medical knowledge				
Understand the evidence base for the relationships between health and disease and the following factors: emotion, stress, nutrition, physical activity, social support, spirituality, sleep, and environment.			✓	
Evaluate the strength and limitations of evidence-based medicine as it applies to conventional and complementary approaches and its translation into patient care.			✓	
Demonstrate understanding of common complementary medicine therapies, including their history, theory, proposed mechanisms, safety/efficacy profile, contraindications, prevalence, and patterns of use.		✓	✓	
Interpersonal and communication skills				
Facilitate open and responsive dialogue with patients and/or families.	✓			
Demonstrate active listening skills with patients and their families.	✓			
Demonstrate respect for peers, staff, consultants and CAM practitioners who share in the care of patients.		✓		
Demonstrate respect and understanding of patients' interpretations of health, disease and illness that are based upon their personal cultural beliefs and practices.	✓			
Recognize the value of relationship-centered care as a tool to facilitate healing.		✓		
PRACTICE-BASED LEARNING AND IMPROVEMENT				
Identify personal learning needs related to conventional and complementary medicine.				✓
Use EBM resources, including CAM, at the point of care.	✓			
PROFESSIONALISM				
Demonstrate the ability to reflect on elements of patient encounters, including personal bias and belief, to facilitate understanding of relationship-centered care.		✓		
Understand importance of self-care practices to improve personal health, maintain work equilibrium, and serve as a role model for patients, staff, and colleagues				✓

TABLE 2 INTEGRATIVE MEDICINE IN RESIDENCY COMPETENCIES AND EVALUATION STRATEGIES				
Competencies	Direct Observation	Open-Ended Questions	Medical Knowledge Assessment (Multiple-Choice)	Self-Assessment
SYSTEMS-BASED PRACTICE				
Understand different reimbursement systems and their impact on patient access to both conventional and complementary interventions.		✓		
Identify strategies for facilitating access to integrative medicine services for their patients, including low-income populations.		✓		
Understand national and state standards related to training, licensing, credentialing, and reimbursement of community CAM practitioners.		✓		
Collaborate with community CAM practitioners and other health care specialists in the care of patients, while understanding legal implications and appropriate documentation issues.		✓		
Understand the principles of designing a health care setting that reflects a healing environment.		✓		

was very high, 98.7% (range 98.4%–100%). The PGY-2 curriculum consisted of 16 courses, and mean percentage of completion was high at 84.2% (range 61.1%–96.2%).

Course Evaluation Resident ratings of meeting stated learning objectives (*adequately and definitely*) for the PGY-1 and PGY-2 courses combined averaged 93.8% (range 84.6%–98%). Ratings on clinical utility (*useful and very useful*) of courses averaged 89.7% (SD = 5.9%, range 77.8%–98.7%), and ratings of the functioning of the online technology (*smooth and very smooth*) averaged 84.6% (range 67.4%–97.4%).

Medical Knowledge Test For scores on first- and second-year tests, there was statistically significant improvement from pre- to posttest. The mean percentage correct increased from 50.98% to 64.71%, {t[50] = -6.129, P = .001} for PGY-1 and from 43.82% to 51.37%, {t[45] = -3.397, P = .001} for PGY-2.

Discussion

The IMR program represents an important advance in efforts to make training in IM broadly available in graduate medical education. Preliminary results presented here, including high levels of course completion and resident satisfaction, suggest the program is feasible during residency and is useful to residents. The high rates of course completions address a concern from the faculty and program directors’ needs assessment⁹ that a 200-hour curriculum would constitute a barrier to implementation. The modest yet significant gain in medical knowledge between pre- and postintervention scores suggests the curriculum might be effective in increasing baseline IM knowledge. Additional data from control sites will provide more comprehensive results.

Certain measures can assure successful implementation of the IMR. Although distributed learning allows residents to access content developed by leaders in IM, program success requires that some onsite faculty have IM expertise. The IMR web-based format can facilitate faculty development, allowing faculty to increase their own knowledge and skills in IM. Further, support from the program director is required, as is a faculty leader with at least 10% full-time equivalent (FTE) to coordinate onsite activities. It is also critical that residents apply IM knowledge within the outpatient setting. A strength of the web-based curriculum is that it can be accessed from anywhere at any time, avoiding potential duty hour violations. The potential for further dissemination of the IMR program is evidenced by the fact

QUALITATIVE RESIDENT FEEDBACK ON THE INTEGRATIVE MEDICINE RESIDENCY PROGRAM

“I most valued information about natural therapies, how to prescribe them, and the evidence for them.”
 “Great set of modules. These are situations we all see in clinic at least a few times a day and these modules provided great resources to give patients.”
 “I liked the video where I could see the interaction between the provider and the patient.”
 “Combining and comparing the integrative medical remedies and the medications. It helps me put it all together in my head as to what tools I have to treat my patients with.”

TABLE 3 | IMR CURRICULUM CONTENT

Units & Courses	Approximate Time to Complete	Units & Courses	Approximate Time to Complete
Prevention & Wellness	18 h	Chronic Illness	58 h
Introduction to Integrative Medicine	1 h	Approaches to Cardiovascular Health	
US Preventive Services Guidelines	2 h	Intro to Cardiovascular Health	1 h
Nutrition and Diet	4 h	Metabolic Syndrome	2 h
Supplements and Prevention	3 h	Dyslipidemia	6 h
Physical Activity	1 h	Hypertension	6 h
Stress and Mind-Body Medicine	2 h	Coronary Heart Disease	4 h
Sleep and Health	1 h	Patient Case: Cardiovascular Health	4 h
Clinical Integration	4 h	Nutrition and Cardiovascular Health	5 h
Women's Health	16 h	Integrative Medicine Approaches to Back Pain	6 h
Introduction to Women's Health	1 h	Gastrointestinal topics	6 h
PMS/PMDD	1 h	Obesity	6 h
Dysmenorrhea	1 h	Approaches to Diabetes	6 h
Pregnancy and Lactation	3 h	Approaches to Rheumatology	6 h
Eating Disorders	2 h	Tools in Integrative Medicine	38 h
Fibromyalgia	1 h	Integrative Medicine Intake	2 h
Depression in Women	2 h	Botanical Tools and Basics	4 h
Women's Health Case Study	1 h	Mind-Body Techniques in Practice	2 h
Menopause	2 h	Motivational Interviewing	2 h
Osteoporosis	2 h	Manual Medicine	8 h
Acute Care	7 h	Integrative Medicine Treatment Plan	4 h
7 interactive virtual patient cases in:		Whole Systems Introduction	8 h
Acute Back Pain	1 h	Energy Medicine Foundations	2 h
Urinary Tract Infection	1 h	Spirituality and Health Care	2 h
Gastroenteritis	1 h	Practice Management	4 h
Otitis Media	1 h	Special Topics	18 h
Vaginitis	1 h	HIV	6 h
Atypical Chest Pain	1 h	Cancer Survivorship	6 h
Upper Respiratory Infection	1 h	Environmental Medicine	6 h
Pediatrics			
Pediatrics and Integrative Medicine	9 h		
Pediatric Allergies and Asthma	1 h		
Integrative Medicine and ADD/ADHD	4 h		
Chronic Pain Syndrome	2 h		

TABLE 4 WELLNESS AND WELL-BEING MEASURES

Dimension	Measure	Authors
Perceived stress	Perceived Stress Scale (PSS)	Cohen, Karmack, & Mermelstein, 1983 ¹²
Depression	Center for Epidemiologic Studies Depression Scale (CES-D)	Radloff, 1977 ¹³
Burnout	Maslach Burnout Inventory (MBI)	Maslach, Jackson, & Leiter, 1996 ¹⁴
Affective state	Positive & Negative Affect Schedule (PANAS)	Watson, Clark, & Tellegen, 1988 ¹⁵
Wellness behaviors	IMR Wellness Inventory	Developed for the IMR
General life satisfaction	Satisfaction With Life Scale (SWLS)	Diener, Emmons, Larsen, & Griffin, 1985 ¹⁶
Gratitude	Gratitude Questionnaire-6 (GQ-6)	McCullough, Emmons, & Tsang, 2002 ¹⁷
Mindfulness	Freiburg Mindfulness Inventory (FMI)	Walach, Bucheld, Buttenmuller, Kleinknecht, & Schmidt, 2006 ¹⁸
Emotional intelligence	Trait Meta-Mood Scale (TMMS)	Salovey, Mayer, Goldman, Turvey, & Palfai, 1995 ¹⁹
	Interpersonal Reactivity Index (IRI)	Davis, 1980 ²⁰

Abbreviation: IMR, Integrative Medicine in Residency.

that 12 additional family medicine and 2 internal medicine residencies adopted the curriculum as of July 2011.

Our intervention has some limitations. We report preliminary findings for the first 2 years of the first cohort, and there was no control group. Data from subsequent classes will enable a more robust analysis with control group comparisons.

Conclusions

Early evaluation data suggest the IMR curriculum may be suitable for widespread dissemination in graduate medical education. The IMR program demonstrates feasibility of incorporating a standardized, web-based curriculum into diverse residency settings. Future planned analyses of the curriculum will provide more definitive evidence of its effectiveness and potential for dissemination.

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