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The Journal of Continuing Education in the Health Professions

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1. Caplan RM. A fresh look at some bad ideas in continuing medical education. Möbius 1983; 3(1):55-61.

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Editorial

A Succession of Editors and Leaders of the *Journal*

In 1981, Lucy Ann Geiselman established *Mobius*, the predecessor of *The Journal of Continuing Education in the Health Professions*. Her purpose was to promote lifelong, continuous learning in the health sciences professions. She expected that continuing education and health policy were related and those with an interest in either area could benefit from a thoughtful journal. The options for publishing peer-reviewed studies were limited. There were medical journals with no interest in medical education or health policy and medical education and health policy journals with no interest in continuing education. Lucy Ann Geiselman was the first editor of *Mobius*.

Mal Watts was a gentle listener, a successful medical practitioner able to beat back the ghosts that keep town and gown doctors suspicious of one another. Knowledge and ability made him successful. Like many medical doctors, he learned continuing education on the job, serving as Associate Dean for Continuing Medical Education at the University of California, San Francisco. During his stint as editor, 1986–1991, he virtually nailed scholarship of teaching and learning to the practice of continuing education. *Mobius* became *The Journal of Continuing Education in the Health Professions* (*JCEHP*) in 1988, under the leadership of Malcolm S.M. Watts.

Although he never served as editor, Milton R. Stern, Dean of University Extension, University of California, Berkeley, helped keep *The Journal* on its feet with forward thinking and occasional financial support. Milt was always ahead of his time. In 1983, he edited "Power and Conflict in Continuing Professional Education." Browse through the book and you will find contributors such as Robert C. Derbyshire, Cyril O. Houle, and Benjamin Shimberg and insightful pieces on accounting, banking, medicine, licensure, the federal interest, and self-regulation. Early on, Milt Stern believed you could make money from education, stay true to your academic principles, and influence the social good.

Starting in 1992, Bill Felch helped *JCEHP* to expand toward a substantial international presence. He encouraged all contributors to express their opinions. Commentaries and essays often complemented original studies. No topics were too controversial. Accreditation, credit, newer instructional technologies, and essays questioning the value of continuing education were served up to interested readers.

In 1995, Bob Fox accepted the position of editor. He is a serious academician who brought presence to *The Journal* and strengthened the theoretical foundation of our field. His contributions to adult and continuing education often are subtle—even transparent to those who are not paying close attention. They are simple and powerful messages. Like adjusting light to alter the mood and course of conversation, Bob Fox issues effectual ideas that communicate change from the environment influencing our day-to-day work. His better known projects in continuing medical education include *Change and Learning in the Lives of Physicians* and *The Physician as Learner*, but there are systems of accreditation and certification throughout North America in architecture, medicine, and veterinary sciences—all bearing his mark of influence—recognition of the value of self-directed learning to ensure the continuing competence of professionals.

Under Bob's direction, *The Journal* brought to readers a steady stream of writings from the finest scholars in continuing education and health care. He enabled the stability and growth of *JCEHP* into a respected source of scientific information for those who plan and study change and learning. Bob Fox and *JCEHP* have helped to

shape the research agenda for continuing education in the health professions.

Having prepared it well for the future, Bob Fox is passing stewardship of *The Journal* on to its next editor. For the immediate future, the concepts and policy directions of *JCEHP* will hold. We are a varied readership including entrepreneurs, meeting planners, administrators, instructional designers, researchers, and regulators. In general, our diverse interests converge around the desire to influence the behavior of health care practitioners who try first to do no harm. *The Journal* will uphold its longstanding interest in teaching, learning, and change, while encouraging more work in health policy, measurement, cognition, motivation, personality, and quality improvement.

The editorial board has been dedicated and active in its support of *JCEHP*. The associate editors, Nancy Bennett, Jocelyn Lockyer, and Don Moore, have provided a strong infrastructure and maintained momentum for quality. John Parboosingh, B.C. Decker, and the administrative board have granted us steady service and financial stability. All are offered our deepest gratitude. All have been invited to stay on and to intensify their efforts during the next year, as ideas are formulated to enable *The Journal* to become a more visible and useful tool in the armamentarium of those who practice and study continuing education in the health professions.

Paul E. Mazmanian, PhD

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Original Article

Overcoming Remoteness in CME Videoteleconferencing: "I Want My MD TV"

Jeanne E. Bitterman, EdD, Joseph Schappert, MD, and John Schaefer

Abstract

Videoteleconferencing in continuing medical education (CME) is here to stay. In the growing health care climate, with increased mergers of institutions and facilities, education's reliance on this medium promises to grow. This project summary describes one large metropolitan institution's effort to improve the commitment to, use in, and effectiveness of videoteleconferencing in its multisite delivery of CME programs. The institution is a nationally renowned interdisciplinary teaching and research hospital health center, with more than 1000 beds. The medical staff numbers more than 1100. The CME program, accredited by the Medical Society of the State of New York, sponsors more than 44 activities a year, awarding over 13,000 certified category 1 CME credits and serving a combined total of over 806 participating MDs and DOs. A study team comprised of the Medical Board Education Committee's Chair-director of CME, an adult education consultant-professor of adult education, and a visual literacy consultant undertook a year-long qualitative research project to explore issues, unearth dilemmas in practice, and generate recommendations for future policy and practice related to videoteleconferencing. The primary objective was to derive strategies for enhancing the educational effectiveness and community building potential of videoteleconferencing at the hospital-health center.

Key Words: Community building, continuing medical education (CME), information technologies, media literacy, networks, telecommunications, teleconferencing, video activities, video literacy

Background

At the St. Luke's-Roosevelt Hospital Center, course evaluation data, along with an annual "survey" of continuing medical education (CME) needs, indicated that although physicians often rated individual speakers and presenters in televised CME as excellent, in general, there was greater dissatisfaction expressed with the quality and educational effectiveness of recurring teleconferenced activities. Some of the problems reflected in these evaluations included the following: attendance at the remote site was disparately low, audience participation was not encouraged or enabled, the quality of televised images tended to be lower at the remote site, and visuals, in general, were not incorporated in typical activities. Overall, physicians expressed a lower quality of program effectiveness and some reluctance for attending educational opportunities when participation was not obviated at the primary conference site. Finally, when presenting in this format, the majority of speakers did not perceive themselves as projecting in the way that television affords—neither in terms of image nor information conveyed. This infor-

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mation, coupled with discussions by the Medical Board's Education Committee, spurred the conception of a project to explore the nature of the problems related to quality and use of the teleconferenced format. An additional objective included devising a set of recommendations for improving practice at the hospital center.

Assumptions

The study proceeded with three major assumptions. First, the researchers firmly believe that knowledge and information exchange is never neutral.[1] It is the authors' belief that effective CME involves learners in a process of constructing, evaluating, and interpreting meanings. Second, teleconferenced CME involves physicians in highly complex communications processes that involve a multiplicity of complex, "interdependent" relationships, all impacting on effectiveness.[2] Even when the remote audience does not have the means for feedback and participation, there is a multilevel, multidirectional message conveyed: information flows not only from the presenter and planners to the audience participants but from the audience back to the speaker and planners. Finally, while the authors believe that in-person interactive communications are most effective in helping learners critically evaluate information, they recognize that telecommunications are here to stay; telecommunications afford unique and heretofore unimagined possibilities for information exchange and connectivity. It is incumbent upon the CME educator to deal with the medium responsibly and to address issues of efficacy and effectiveness.[3]

Description of Process

Initially, there was an analysis of documented data; after review of an Annual CME Questionnaire Survey (conducted in 1995), there was follow-up confirmation of the problem through review of first-quarter course evaluations. This review of documented data was then followed by the team's review of randomly selected videotapes of selected conferences. Concomitantly, an exhaustive online search was conducted for relevant literature on Telemedicine, practice, CME innovations, and implications for future practice. A series of teamwide telephone conferences then took place to analyze and discuss the videotapes, identify perceived needs (by the outside consultants), and chart a course of action. The needs identification process resulted in a set of informal exploratory questions. These constituted the basis for an interview protocol that was then used in a series of planning interviews with the health care institution's assistant vice president of Information Services, coordinator of Audiovisual (AV) Services, selected course directors, conference presenters, hospital administrators, and directors of service. An action plan was devised for the year that incorporated both plans for a culminating credited CME conference on videoteleconferencing—entitled "I Want My MD TV"—and the development of a set of guidelines and recommendations to assist the institution in moving forward. Findings from the project were then validated through a follow-up telephone needs assessment survey,[4] which targeted all course directors of CME and ultimately included 77% of those providing service in fiscal year 1996–1997.

Description of Site

The details of this institution's infrastructure are provided to allow readers to better make generalizations regarding applicability to their home settings. Overall outcomes and recommendations are presented at the conclusion of the article. It is hoped that the lessons learned may have practical relevance for all institutions facing telecommunicated delivery of CME in the approaching new millenium.

Institution's Communications/ Information Technology Infrastructure

The hospital center's mainframe environment is fully integrated with other systems through the use of interface engines; these allow previously incom-

patible systems to communicate with each other, providing connectivity and hardware independence needed by diverse systems and applications. A redundantly configured communications processor provides a high-powered, highly functional link to the external communications networks.

The hospital center network infrastructure consists of a multiprotocol wide-area network and a synchronous/asynchronous network, which communicate across the fiber optic and T1 lines linking the hospitals and their offices, data and distribution centers. The direct fiber optic link supports voice traffic, videoteleconferencing, and an FDDI link for data communication.

Current Teleconferencing and Video Activities

Intersite videoteleconferencing operates on dedicated, single-mode fiber between the hospital sites. Advanced audio and digital viewing options are provided. When necessary, the AV department provides technical support for live sound and viewing adjustments. Implementation of channel-switching equipment provides conferencing between the operating rooms and diagnostic laboratories (e.g., surgical pathology) and greater flexibility in linking teleconference ready rooms (see below). The weekly schedule, at the time of this study (fall 1996), supported 11 regularly scheduled videoconferences and an additional 32 regularly scheduled meetings. CME activities include obstetrics-gynecology (weekly), psychiatry, gastroenterology, pulmonary/critical care, and colon rectal surgery.

The hospital center's AV teleconferencing capabilities included, at the midtown campus, approximately 11 rooms (a composite of conference rooms, classrooms, and laboratories), with additional planning for 2 more conference rooms and the addition of the operating rooms; at the uptown campus, 7 rooms, with a state-of-the-art conference center (under construction; this then opened in early 1998) with an additional 4 rooms. In addition, satellite videoteleconferencing support included five satellite dishes, which are maintained and operated by the AV department. This feature is used by several services. The Health Sciences Television Network's (HSTN) satellite video broadcasts are continually videotaped for the Department of Education and Organizational Development. Closed circuit TV networking provides channels dedicated to patient education, staff education, and patient viewing. Six different channels are currently supported. Other than one channel that offers patients entertainment, the remaining four provide continuous patient health education. One channel receives videoteleconferences from a steerable satellite dish. TV/VCR equipment is located on all patient units to facilitate staff education, using internationally produced materials and programming from the HSTN. Videotaping and editing services are created jointly with other departments to create staff training materials and support marketing needs.

Preliminary Findings

Team Review of CME Teleconferenced Activities

A review of tapes of videoconferences highlighted the limits of the new media and the differences posed by distance learning. Although there was an occasional excellent presenter (with skill and facility at incorporating interactive techniques and who used high-quality visuals), the tapes generally revealed the converse—with a number of recurring emergent weaknesses. These problems included:

- A need for audience preparation (seating designed to optimize interactivity by arrangement to fall within camera range and audio recognition range),
- A general absence of visual clues (visuals were seldom used or positioned to allow for simultaneous split-screen viewing of the speaker),
- A lack of interaction with home and distant audience,

- Significant visual limitations (caused by small screens—square not rectangular and an insufficient number of and positioning of screens),
- Poor sound and lighting,
- A lack of coordination with the AV department, and
- Suboptimal magnification of graphics.

Questions that were developed revolved around what could be done to address both the awareness level of physicians (that they were being transmitted "on TV") and more institutionally oriented problems; the latter included such things as seating, the illusion of empty rooms, the timely preparation and dissemination of materials for both sites, overcoming fuzzy sound, improving lighting, enhancing feedback to the presenter, increasing visual awareness for the use of visual aids, increasing interactivity with audience participants, and coordinating with in-house services to improve graphic images and overcome scheduling problems.

Teamed interviews further revealed that:

- The physical separation in videoteleconferencing exacerbated by poor television technique manifested itself in expressions of alienation (often this was accompanied by poor attendance and the intentional seating by participants outside of camera range);
- Intervention by remote sites was difficult; often, it was impossible to get speaker attention;
- Questions were not repeated and no one assumed the role of facilitator;
- There was a need for physician training with the equipment;
- There was a need for expansion of videoconferencing capabilities (to provide physicians with the capability of participating in the many educational offerings from their offices and opportunity to increase cross-department communications).

Conclusions and Recommendations

This health care center maintains a state-of-the-art hospital-wide network and strong information and instructional technology infrastructure, which potentially allows for the seamless integration of its hardware, network, and telecommunications components; these provide an excellent foundation for the deployment of emerging applications and technologies. The AV Services is a full-service audiovisual department providing the following: videoteleconferencing, videotaping, editing and conversion services, specialty consulting, and a wide range of equipment. However, the institution is not most effectively using its AV resources. Future options might include the archiving of conferences for future viewing, documenting of and viewing of videotaped presentations to be followed by scheduled videoconference question and answer sessions with presenters, providing of in-house services for conversion of images to digitalized projections to improve resolution of transmitted images, coordinating of schedules to alleviate problems in bookings of rooms with other hospital services, using in-house talent for presentations, and using in-house talent for training in presentation strategies for interactivity.

Within the context of CME, there is a need to develop physicians' basic communication and presentation skills. Problems with interactivity and program planning were not evidenced solely in relation to remote audiences. Presenters were not taking advantage of the opportunities offered by the video format and continued to teach using traditional lecture methods. Due to this and to the observers' expectations for broadcast-quality video, the poor formal presentations negatively affected the perception of quality content.

Improved use of AV resources and more effective presentation skills would not only improve the quality of CME but would also foster a sense of audience awareness and, ultimately, of a system-wide community.

Recommendations resulting from these conclusions include the following:

- To improve physicians' distance learning skills, plans for interactive training programs must be designed to heighten physician awareness of themselves as communicators. To aid conceptualization of their audience's needs, physicians should be trained to rethink their presentations, looking forward to how they might be enhanced by visual aids and increased interactivity.
- To assist presenters in recognizing that they are presenting in a TV setting, the following should be implemented to facilitate presenters' awareness of the transmitted images: small monitors that project images of the presentation placed on the podium (monitors), tapes of the presentation given to the presenters for their review, and encouragement by key personnel for presenters to remain aware that the medium is television (implied, for example, is that questions be repeated for the benefit of the remote site).
- To assist in the recognition and involvement of the remote site and to foster a sense of community, a site facilitator for each course should be designated; the site facilitator should be trained to assume the following responsibilities: ensuring an introduction of the remote site and/or the staff present at the beginning of a presentation; ensuring an appropriate seating arrangement, which distributes the staff in attendance within the range of the video camera (semicircular arrangement, elimination of extra seats, etc.); ensuring that questions and comments from the remote site are recognized, that handouts are disseminated at both sites, that both sites have compatible refreshments, etc.; and since a sense of community is only built upon trust and cannot be forced, the site facilitator should have the ability to turn distance cameras off except during the introduction and during interactions.
- To ensure proper use of existing resources, including staff, the institution should develop the following: a list of supported products, capabilities, and services of the current AV system (provided to course directors at the start of each academic year and to speakers prior to their presentation); and slides and other visual materials, which should be delivered to the AV department with adequate advance notice.
- To ensure transmission of optimal images, the use of digitalized images should be encouraged through provision to course directors and speakers of a list of supported products and of the capabilities of the current AV system; the use of institutionally approved presentation packages (encouraged and supported through training); guidelines provided to the course directors and to each speaker for the format of images (since the media requires coordination and training for optimal effect), for proper sound (lapel microphone), and for proper lighting (the speaker is well lit only on a designated part of the stage).
- Implementation of new technologies should be planned with sufficient training to facilitate their use by the hospital staff (e.g., videoteleconferencing, visual and media literacy, digital networking).
- Speakers should not only be provided with the institution's capabilities and planning forms but they, too, should provide materials for their audiences that reinforce the information they are hoping to share (slide views of presentations, bibliographies, and so on).

Summary

Greater understanding of the medium of videoteleconferencing and training in skills and techniques for using it effectively hold great promise for advancing CME (and for building the institution's sense of community). Telecommunications

can overcome complex problems of time and distance in large urban environments. Increasing the effectiveness of videoteleconferencing affords the institution the ability to present uniform conferences, ensures staffing receipt of singular messages, facilitates the establishment of system-wide patient care standards, and improves educational presentations and effectiveness with technologies that are easy to use. Ultimately, through training, videoteleconferencing has the potential to help build community through allowing physicians, either in their offices or through attendance at remote site activities, to participate in educational opportunities throughout the hospital center. Videoteleconferencing has the potential to foster the sharing of information through stimulated dialogue; it encourages the showcasing of specialists and their skills and the sharing of their talents. The televised promotion of staff and improvement of the quality of videoconferences furthers the sense of a health care community that physicians are proud to be identified with and facilitates information transfer between heterogeneous health care settings.

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Original Article

Skills and Topics in Continuing Medical Education for Rural Doctors

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Abstract

Background: *Organizations that fund and produce continuing medical education (CME) activities must have up-to-date information on the needs of their participants. The paper describes a method for assessing priorities for the provision of facilities to rural doctors in Australia for educational topics and skills upgrades. It uses an instrument designed to establish a measure of knowledge and skills that records the difference between the "current felt need" and "desired level of competence."*

Methods: *A questionnaire was sent to all identifiable rural doctors throughout Australia, including participants in various types of practice. The resulting dataset is designed for future dissection and comparison of subsets by gender, practice size, rurality, and style of practice (whether procedural). It seeks to deliver a prioritized list of educational topics based on subjective gap analysis with weighting on the degree to which the need is unmet.*

Results: *There was considerable consonance between the major "felt needs" and other measures of need.*

Implications: *In spite of statistical deficiencies, which would be corrected in future work, the method offers a new instrument to prioritize the use of resources for CME delivery.*

Key Words: Continuing medical education (CME), needs assessment, rural general practice

Learning is a lifetime continuum that enables us to cope from infancy to old age. The concept of continuing professional education underscores all work in an age where knowledge is increasing exponentially.

The principles of adult learning have been extensively described[1] and well reviewed in this journal by Merriam.[2] A major principle is that adults need to know why they need to know something before they are required to learn it and demonstrate the value and practical usefulness of the content. This has predicated the development of tools to identify appropriate areas for improvement in skills, knowledge, and attitudes, particularly by identifying gaps to be filled. In this context, this is described as needs assessment. The process has been well described by Kauffmann and English.[3] Soriano[4] builds on experience in carrying out needs assessment to provide an authoritative practical guide to methodology, including assessment methods, surveys, data collection, and reporting.

Organizations that fund and produce continuing medical education (CME) activities need up-to-date information on the perceived or "felt needs" of their participants. This study arose opportunistically from the desire of an organization that designs CME for Australian rural doctors to ensure that the most required and appropriate range of knowledge and skills were being presented. A pilot study in 1994 had proved of practical use in making decisions on CME provision.

CME was defined by the Royal Australian College of General Practitioners (RACGP) *Quality Assurance and Continuing Education Pro-*

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gramme Handbook as "activities designed to help doctors enhance the knowledge, skills, attitudes and judgement necessary to improve the health care of their patients and community."[5]

The rationale, modes, and content of continuing professional education have been well reviewed by Davies et al.[6,7] and Greco and Eisenberg.[8] The principles of needs assessment as a curriculum tool have been widely canvassed,[9] and the various components of a comprehensive needs identification process have been elegantly dissected.[10]

Four components of needs analysis were proposed by Bradshaw[11] as forming a logical package to support service choices. The term "felt need" is applied to the answer to the question "What do you think you should know?" The value of such self-assessment of felt needs has been attested to by Tracey et al.[12] Bradshaw's four types include "expressed needs" (a measure of the actual attendance at educational activities) and "comparative needs," a comparison of the services of different providers. Evaluation of attendance records of CME attendances confirms procedural skills support as the most popular activity (V. Sheedy, personal communication). The attendance patterns of rural doctors at satellite television presentations also assist in identifying relevant topics.[13] A fourth measure, "normative need," is to be identified from the curricula of teaching organizations, including the views of nonmedical personnel. The relevance of a measure of felt need may be validated by comparison of such a subjective statement with objective attendances at activities, the expectations expressed in lists of expected knowledge and skills.

In Australia, "normative" statements of needs are the training curricula of the RACGP[14] and the Prospectus of the Australian College of Rural and Remote Medicine (ACRRM).[15] There is also a "list of 100 procedures" described by Stone (personal communication) that lists skills often required of rural doctors.

The study aims to identify a hierarchy of felt needs for teaching topics to increase the knowledge and skills of rural doctors. It aims to compare their subjective assessment of their current level of competence with the level they felt they would wish to achieve. The result should be a prioritized list of the areas in which educational provision would be expected to have the highest return.

Such a prioritized list may assist teaching organizations to use limited resources to "fill the gaps" more appropriately. The method may be applied to differentiate the specific requirements of geographic or occupational subgroups.

Method

Content

An opportunity arose to distribute mail to 100% of rural general practitioners in Australia as identified by postal code areas. The list was composed from the national medical database of Australian Medical Publishing. Since the doctors are listed individually, multiple copies may have been received at group practices.

The questionnaire sought to determine the priorities of rural practitioners for education support in the areas of skills development and clinical knowledge through gap identification of their felt needs. A pilot questionnaire in 1994[16] had established that open questions as to "felt needs produced unusable information as respondents replied in generalities (like "cardiology" or endocrinology") that were not capable of being converted to useful curriculum for CME services. Thus, both the 1994 and 1997 instruments mainly used closed questions, with the opportunity for respondents to add further material if desired.

Lists of knowledge, topics and skills subjects were collected by extensive consultation with a range of providers and users of CME services. The criterion was the potential value of knowledge and skills to a rural medical practitioner. This is similar to the approach of Maloney and Kane,[17] but pioneers a methodology that encourages respondents to the questionnaire to indicate both current perceptions of competence and indications of future needs. The RACGP, ACRRM, and "100 pro-

cedures" sources formed the basis of skills questions, which may thus have some bias toward procedural rural practice.

The list of topics and skills was comprehensive and detailed in order that the results could drive future CME course selections by the Rural Health Education Foundation (topics = 192, skills = 119). An opportunity was given for participants to enter their own additional choices.

Questionnaire

The intention is to quantify the degree of priority that may be attached to each topic with a simple but specific and sensitive measure. A semiquantitative scoring method was developed in order that a hierarchy of need could be calculated. After extensive consultation, a scoring scale of 1 to 5 was established from lowest to highest appraisal of present knowledge and future felt need. The method was submitted to critical appraisal and modification from a focus group composed of established educators and users of CME and approved by the ACRRM, Australian Rural Divisions, and the Education Support and Evaluation Resource Unit. The descriptors for the levels were discussed with great care and the equality of the scale intervals was agreed to.

Respondents indicated on the 5-point grading scale both their present perceived level of knowledge (P) and their desired level of knowledge (D) for each topic. Measures of the present levels of skill or knowledge gave a view of the perceived competence of the doctors, but many of these skills and topics were already believed to be practiced at a high level and to need no refreshment. The desired levels expressed the perception that the item was important in practice. Thus, the subjects most urgently required for CME would be those with large differentials between present perceptions of skill and the level that the doctors desire to reach (expressed as D-P). Priority topics were regarded as those with the greatest differentials ($D\text{-}P > 0.5$). Those topics with low levels of desirability ($D < 3$) can be considered of minimal priority.

Responses

The response rate was disappointing and only 525 completed responses were received. It is acknowledged that, at 15%, this is too low a rate to be reliable. In addition to personal identifying information (which was optional for purposes of future follow-up only), the questionnaire included questions on the state, division of general practice, type of community, postal code, and rural and remote area classification of the practice. It also queried whether it was a solo or group practice or a hospital practice and the degree to which obstetrics, anesthetics, or surgery were practiced.

The responses were collected in an MS ACCESS 2 relational database and subjected to analysis. The length of the questionnaire was a likely deterrent, and some practices would have received copies addressed to each doctor and may have been content if one responded.

Although this negates the statistical significance of the results, the pragmatic usefulness to CME providers may be based on those interested enough to respond. We cannot assess the views on nonrespondents. Comparison of the priority selections did, however, fit well with requests received from participants in a major CME program and attendances at CME events (V. Sheedy, personal communication). Breakdown by state indicated consistent reporting of the priorities with only minor changes in the order.

Lessons for the future would include smaller random sample groups and follow-up by telephone and letter to stimulate responses. Volunteers would ensure better reporting but may over-represent doctors with active educational interests.

Results

Skills

Criteria were established to identify the skills that were most required by rural doctors by adding the individual responses that had desired levels greater than 3 ($D \geq 3$) and a differential between present

Table 1 Skills Where Most Improvement Is Desired Sorted by Importance

Skill	Importance (Mean of Desired-Present Level)
Cricothyroidotomy	0.9989
Tracheostomy	0.9836
Epistaxis—postnasal pack	0.7880
Regional blocks	0.7370
Injection of carpal tunnel	2.4225
Fine needle biopsy of breast, etc.	0.7238
Early management of severe trauma	0.7075
Medicolegal examination for sexual offenses	0.7070
Manage diabetic ketoacidosis	0.6794
Advanced cardiopulmonary resuscitation	0.6792
Management of poisoning and overdose	0.6329
Radical excision of nail bed	0.6265
Intermittent positive pressure respiration and ventilation	0.5783
Paracentesis of chest	0.5704
Resuscitation and intubation of neonate	0.5512
Radiology—read films	0.5427
Streptokinase therapy for acute myocardial infarction	0.5323
Management of coma	0.5313
Injections into joints	0.5244
Fitting of diaphragm	0.5231
Fractures of tibia and fibula	0.5219
Intravenous block	0.5206
Insertion of intercostal catheter	0.5198
Management of burns >3%	0.5104

Data for those skills (n = 24) where the difference between the desired level and the present level is greater than 0.5 (n = 50) and where the desired level is greater than 3 (n = 55).

and desired levels greater than 0.5 (D-P ≥ 0.5). Twenty-nine skills met these criteria and are listed in descending order of importance in Table 1.

The results show that rural doctors have selected as priority life-saving skills, which are liable to be required in practice situations. In fact, 27 of the 29 priority skill areas were such that they would not be likely to be practiced by urban practitioners, whose patients would be more likely to attend hospital emergency rooms. Core general practice skills followed in importance. Acute procedural skills were demonstrated to be of prime importance to rural general practitioners.

Topics

CME topics were similarly analyzed, except that a slightly higher differential (D-P ≥ 0.75) and individual desired levels of responses (D ≥ 3.5) were pragmatically selected, giving a premium list of 32 most wanted topics, shown in Table 2. Preferred topics for CME were an interesting mixture of emergency care, basic knowledge, and nonclinical management subjects. In contrast to the skills selections, the CME learning topics were much more in the area of core general practice, only 9 of 32 topics being specifically "rural." Remarkably, the first choice was business skills (practice management). Recall that systems for screening were

Table 2 Topics Where Most Improvement Is Desired by Individuals Sorted by Importance

Topic	Importance (Desired-Present Level)
Business skills	1.2291
Suicide in youth	1.0157
Near drowning	1.0090
Developmental assessment	0.9890
Poisoning	0.9621
The anemic child	0.9577
Facial injuries	0.9574
Back pain and spinal manipulation	0.9498
Envenomation—snakes, spiders, and jellyfish	0.9468
Easy fractures to miss	0.9133
Diabetic eye disease	0.9109
Failure to thrive	0.9044
Insulin in diabetes	0.8870
Recall systems	0.8861
Childhood orthopedics	0.8698
Acute psychosis and regulation	0.8689
Hepatitis A to G	0.8687
Management of head injury	0.8511
Impotence	0.8490
Other dermatoses	0.8448
Indications for CT, MRI, and radionuclide scans	0.8419
Advanced life support and resuscitation	0.8386
Meningitis and encephalitis	3.5476
Management of suspected neck fracture	0.8176
Sports medicine—the ankle	0.7987
Diabetic emergencies	0.7879
The unconscious patient	0.7833
Fractures of ankle and tarsal bones	0.7817
Chest trauma and pneumothorax	0.7744
Imaging in back problems	0.7740
Drugs in rheumatoid disease	0.7664
Sports medicine—the knee	0.7647

Data for those topics (n = 32) where the difference between the desired level and the present level is greater than 0.75 (n = 96) and where the desired level is greater than 3.5 (n = 94).

another choice. These topics represent the interest areas of rural practitioners and may be used as a guide by those who select such topics.

Discussion

While the disappointingly low response rate does not permit any claim to statistical significance, the responses may assist in selection of subjects for CME. Low scoring topics can be overlooked in favor of those seen as of most significance. The consonance between the comparative, expressed, and normative measures of need for rural doctors tends to confirm the usefulness of the measure.

The chosen subjects correlate well with attendance records for a major state program (V. Sheedy,

personal communication). Records of attendance at CME events by the Queensland Rural Divisions Co-ordinating Unit over recent years for purposes of evaluation have confirmed the high importance that rural doctors place on procedural clinical medicine and especially on emergency care. Items such as cricothyroidotomy, advanced life support, and ophthalmic and ENT procedures rank high in attendances at CME meetings, while geriatric care, rheumatic diseases, and other medical topics tend to attract small attendances. This is in confirmation of a 1991 Canadian study by Woolf comparing rural and urban CME.[18]

The selections support the view that rural practice in medicine requires a high level of general practice skills and knowledge, plus a range of procedural skills. The low position of obstetrics in the hierarchy may be merely a statistical anomaly but could also relate to the fact that obstetrics is conducted by only about one-third of rural doctors in Australia.

The fully relational nature of the "Access" database permits further analysis by rurality index, gender, practice size, and even the degree of procedural work in anesthetics, surgery, and obstetrics undertaken by the respondent. The chosen topics also reflect the curricula of the RACGP and ACRRM training program.

This national rural general practice CME needs analysis suggests that the felt needs of a large sample of rural doctors tends strongly toward procedural activities that are commonly practiced in rural and remote areas of Australia. The priority list of CME needs resulting from this questionnaire is seen to be closely consistent with the expressed needs and comparative needs, which are evidenced by attendances at CME events offered by units in all states and pick up the more acute procedural components of the curricular lists of RACGP and ACRRM. Thus, this subjective study is strengthened by reference to more objective determinants of rural medical needs for CME.

The study pilots a method of identifying priorities for CME for rural doctors. Future work would aim to improve the response rate by more realistic sample size and include a control group of urban doctors for comparison. Breakdown of data by degrees of remoteness, doctor gender, and the degree to which inpatient care is part of practice may be useful in designing education events for particular groups.

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Original Article

Self-Reported Effects of Computer Workshops on Physicians' Computer Use

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Abstract

Background: *The need for physicians to be proficient in the use of computers is undeniable. As computers have become easier to use and more widespread, their use in medicine is expanding. Several organizations have produced continuing medical education programs to teach physicians about the use of computers in medicine but little has been reported on the effects of such programs.*

Method: *We present the self-reported effects of a series of workshops that taught physicians about basic computer skills: information retrieval, the Internet, CD-ROMs, electronic mail, and computer-aided learning.*

Results: *A questionnaire mailed to 65 workshop participants yielded a response rate of 46% (n = 30). Of the 30 respondents, 27% (n = 8) had bought new hardware or software because of attending the workshops, with the most common purchase being a new computer. Fifty-seven percent (n = 17) had increased their use of computers, with the most common applications being use of the Internet for information retrieval and electronic mail.*

Key Words: Computer-aided learning, computers, continuing medical education (CME), Internet

The need for physicians to be proficient in the use of computers is undeniable. As computers have become easier to use and more widespread, their use in medicine is expanding. Whereas once mainly office staff used computers for word processing and billing, now physicians themselves are using computers for several medical applications. A survey of Canadian physicians in 1998[1] showed that 78% personally used a computer, with the most common applications being electronic (e-) mail (46%), bibliographic database searching (45%), and continuing medical education (CME) on diskette or CD-ROM (40%). In New Zealand in 1995, 85% of surveyed physicians felt that computerization was necessary and approximately 80% were using computers for recalls, office administration, or maintaining an age/sex register.[2]

By providing access to information and e-mail, the Internet has provided several opportunities for medical use, including information retrieval,[3,4] CME,[5,6] communication with patients[7] and colleagues,[8] and decision support.[9] The Internet is not

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necessary for all of these applications. CD-ROMs and disks provide current textbooks, CME, decision support for diagnosis and management, and patient education. Computers and information technology provide the possibility of integrating many of these applications,[10] particularly CME,[11] into routine medical practice. And there is evidence that use of computers leads to improved care[12] and lower costs.[13]

With so much potential, it is not surprising that initiatives have been developed to encourage physicians to use computers and educate them about the use of computers in medicine. The Medical Society of Nova Scotia has developed MedNet, an intranet to facilitate electronic communication among its members. The American Medical Association[14] and the Canadian Medical Association[15] have both promoted CME programs to teach physicians about the use of computers in medicine; however, we have found little published about the effect of specific CME programs on physician behavior. Tuominen and Crouse[16] surveyed physicians immediately after conducting seminars about the World Wide Web (WWW) and found that 65% would use the Web in their practice. However, there was no follow-up survey to determine how many actually started to use the Web. Teasdale and Bainbridge[17] reported that on-site training led to changes in use of information systems in medical practices, and Fullerton and Gravely[18] found an increase in self-rated computer skill levels in graduate nursing students as a result of a series of self-paced tutorials. In this article, we describe a series of computer workshops developed at Dalhousie University and the changes in behavior reported by physicians who attended them.

Method

Program Description

Dalhousie CME offered its first educational program on the use of computers in medicine in May 1995. At the request of the Medical Society of Nova Scotia, we presented a day-long workshop at the society's general meeting. Content of the workshop was planned by three general practitioners, a librarian, a medical informatics specialist, an educator with experience in teaching computer skills, and the head of the medical computer laboratory. This workshop was divided into two groups: one group for physicians who had little or no experience with computers and the other for those with some experience.

Both groups attended a lecture and discussion providing an overview of the use of computers in medicine. The inexperienced group had a series of lectures, demonstrations, and discussions about the essential components of a computer and buying and operating a computer. The more experienced group attended a series of demonstrations, practice sessions, and discussions about specific applications of computers in medicine: literature searching, computer-aided learning, and information retrieval and storage using the Internet and CD-ROMs. A total of 30 physicians attended the workshop, 12 in the inexperienced group and 18 in the more experienced group.

This day-long workshop provided the basis for four series of more extensive workshops presented in the spring and fall of 1996 and 1997. Each series consisted of 4 or 5 day-long workshops. The content of the individual workshops varied from series to series but the overall content of each series included computer basics, introduction to use of computers in medicine, information retrieval and storage using the Internet and CD-ROMs, electronic communication, and computer-aided learning. The content of a typical series of four workshops is shown in Table 1. The goal of the workshops was not necessarily to convince physicians to use computers. Rather, it was to expose physicians to the capabilities of computers so that they could decide independently on their worth.

Each workshop consisted of a brief lecture and discussion of a specific topic such as computer-aided learning. Then the instructor displayed a demonstration of a computer application or soft-

Table 1 Content of Typical Series of Computer Workshops

Workshops	Content
Computer Basics	Computer components, buying a computer, common applications (Windows, word processing, spreadsheets, databases), office automation, computer contracts
Introduction to Computers in Medicine	Overview of medical informatics, using CD-ROMS for information retrieval (Stat-Ref!, CPS, American Family Physician, SAM-CD) and computer-aided learning (Discotest II, PrimePractice), introduction to the Internet for information retrieval and communication
Introduction to the Internet	E-mail, listservs, newsgroups, navigating using specific URLs and subject orientation, Netscape (bookmarks, printing), search engines such as Alta Vista and Lycos, basic MEDLINE searches
Computer-aided Learning (CAL) and Information Retrieval	Explanation of different types of CAL, using different programs for CAL (Discotest II, PrimePractice, Family Practice Recertification, Clinical Dermatology Illustrated, DxR Clinic); information retrieval strategies using full-text textbooks and journals on CD-ROM, Medline on CD-ROM, and the Internet; electronic table-of-contents services

ware program on a large-screen data projector. Participants then practiced the application in the computer laboratory, with each participant having a separate computer. We provided a workbook with specific instructions and problems. Participants were free to follow the workbook or explore their own interests. The instructor and at least one assistant were present, providing a teacher/learner ratio of 1:6 or better. At the end of each workshop, participants and instructors discussed points covered throughout the day. Participants could attend as many workshops in a series as they wished.

Survey Procedure

To determine if attendance at the workshops affected participants' use of computers, in March 1998 we mailed a questionnaire to all those who had attended series 2, 3, and 4 (n = 65). (We had already surveyed participants in series 1 separately to determine its effects; however, we used a slightly different questionnaire, and so have not included results of that survey in this paper.) The questionnaire asked participants if they had increased their use of computers or bought new hardware or software as a result of attending the workshops. It also asked them to specify for which applications they had increased their use and the hardware and software they had purchased. Those who had not increased their use of computers were asked to specify why they had not. The questionnaire consisted of five closed questions, most of which allowed respondents to enter choices other than those listed. There was also one open-ended question asking for suggestions to improve the workshops and topics for other workshops.

Results

Attendance

Many participants attended a complete series, although some attended selected workshops in a series. Attendance figures are shown in Table 2. Most workshops in series 1 to 3 were fully subscribed and most workshops in those series had waiting lists. The exception was one workshop on computer-aided learning and information retrieval using CD-ROMs in series 3. This workshop was canceled because of low registration. The whole of series 4 was undersubscribed, with an average

Table 2 Attendance for Four Series of Workshops

Series (n)	Total Enrolment	Number Learners*	Average Attendance per Workshop
Spring 1996 (5)†	53	32	10.6
Fall 1996 (4)	48	24	12.0
Spring 1997 (3)‡	37	24	12.3
Fall 1997 (4)	26	17	6.5
Total	164	97	

n = number of workshops.
*Number of learners is less than total enrolment because some attended more than one workshop.
†Workshop on computer basics was given twice.
‡Workshop on computer-aided learning and information retrieval was cancelled because of low registration.

of 6.5 people attending each workshop. The total enrolment for all workshops was 164. Since many people attended more than one workshop, this represented a total of 97 learners: 61% were general practitioners and 38% were specialists. One person was a secretary/receptionist who accompanied a physician.

Questionnaire

We received 30 responses, a return rate of 46%. Table 3 summarizes results of the questionnaire. Eight respondents (27%) had bought new hardware and/or software, the most common purchases being a new computer (six), fax/modem (four), Internet service (four), and CD-ROM drive (three). One other respondent had purchased Lotus 123, Microsoft Money, and Windows 95 as a result of the workshops.

More respondents had increased their use of computers than had made new purchases. Seventeen (57%) had increased their use of computers, with the most common applications being use of the Internet for information retrieval (12) and e-mail (11). Nine respondents had increased their use of both these categories. Four respondents had increased their use of CD-ROMs for information retrieval, two of whom were also using the CD-ROMs for computer-aided learning. Two respondents had increased their use of MedNet. Other uses listed by respondents were home financial planning, word processing, slide preparation for presentations, and joining an electronic discussion group (listserv).

We asked respondents to specify why they had not increased their use of computers. Of the 13 who had not done so, the most frequent response (five) was that they were already using their computers before attending the workshops. Other reasons were lack of time (three), lack of belief in the effectiveness of computers in medical practice (two), and that computer work was done by office staff (two). Five respondents each listed one of the following reasons: computers are not easy enough to use, computers are not reliable, computer aversion, computer CME is too expensive, and "haven't gotten around to it."

Discussion

This study has several limitations. The sample size was small and the return of the questionnaire slightly less than 50%. Those who responded to the survey may have been more likely to have made changes, although several respondents made negative comments. Ideally, a preworkshop survey should have evaluated participants' computer use before the workshop to provide baseline information against which to compare the results. Also, the survey was sent out at differing intervals from the presentation of the workshops. For instance, the survey was sent out 18 months after the first

Table 3 Respondents' Purchase of New Hardware/Software and Increased Computer Use as a Result of Attending Workshops

	Percent	N*
Bought, new hardware/software		
Computer	20	6
Fax/modem	13	4
Internet service	13	4
CD-ROM drive	10	3
Overall increase†	27	8
Increased use of computers		
Internet for information retrieval	40	12
E-mail	37	11
CD for information retrieval	13	4
CD for computer-aided learning	7	2
MedNet	7	2
Overall increase†	57	17

*Total N (number of questionnaires received) = 30.
†Overall increase is less than the sum of individual domains because some participants made an increase in more than one domain.

workshop but only 4 months after the last workshop. In the latter instance, respondents may not have had enough time to change their behavior. Conversely, respondents who attended the early workshops had more time to make change but also more time to abandon change after initial enthusiasm. However, the responses we received do suggest that the workshops affected physician behavior in use of computers. Significantly, six respondents (20%) said that they had purchased a new computer because of the workshops, a change in behavior that involves considerable expense.

Not surprisingly, more physicians reported increased use of computers, a change in behavior that involves less cost. By far the most common increases in use were information retrieval on the Internet and e-mail. Most respondents who reported an increase in use of the Internet also reported increased use of e-mail, an expected result since e-mail is provided as part of Internet access. These findings agree with surveys done by the Canadian Medical Association,[19] which found that physicians increased their use of the Internet and e-mail between 1997 and 1998. (In 1997, 41% used the Internet and 37% used e-mail, compared to 56% and 51%, respectively, in 1998.) However, the same surveys also found that physicians' use of computers for CME on diskette or CD-ROM also increased from 24% to 40%, a finding not in agreement with our survey in which only two respondents (7%) purchased CD-ROMs for computer-aided learning. Part of this discrepancy may be because of different phrasing of the question in the two surveys. Consideration should be given to standardizing survey questions designed to determine computer use by physicians. Cork et al.[20] have validated a questionnaire to determine physicians' use of computers, but it was developed for academic physicians and does not include questions about CME.

The reasons respondents gave for not increasing their use of computers were instructive. Five were already using their computers. Three of those five stated that they did not learn anything new, an indication that some physicians learn to use computers without formal education. A total of eight respondents stated in one way or another that computers are still too difficult to use considering the potential benefit. Three respondents stated that they did not have time. Other respondents stated that computers were not effective in medical practice (two), not easy enough to use (one), or not reliable (one). One respondent indicated computer aversion.

None of the applications we taught are likely to save time or money or generate income. On the contrary, they are likely to cost money and may impose at least one more task (e-mail as well as regular correspondence), so it is not surprising that some physicians did not readily adopt computers. Interviews with Nova Scotian physicians have found that difficulty with use and lack of perceived benefit are barriers to physicians adopting

computers in practice.[21] Office management is an application that may save time, but we did not include this topic in our workshops because no affordable comprehensive program existed.

There was no obvious reason for the low registration of the final series of workshops. A total of only 97 learners attended the workshops, a small percentage of the approximately 1800 physicians in Nova Scotia. Dalhousie CME has presented two other half-day workshops on use of the Internet, with a total enrolment of approximately 20. A survey of the CME needs of Nova Scotian physicians in 1995[22] indicated that 61% did not use the Internet and/or e-mail and that only 41% rated their computer skills as adequate or good. In this same survey, respondents ranked education about the use of computers first among nonclinical educational needs, so it is unlikely that the market was saturated. As computers become easier to use, physicians may be teaching themselves. Also, holding the course in Halifax may be a deterrent to physicians living in outlying communities, and it may help to provide the workshops in those communities.

To explore other ways to provide computer training to physicians, we held a workshop at the meeting of the Canadian Association of Medical Education in Ottawa, Ontario in April 1998. Several ideas that came from the group follow the PRECEED model of Green et al.[23] For instance, enabling strategies mentioned were (1) invite a resource person (spouse, child, secretary) to attend workshops with physicians, (2) provide technical support for physicians for several months after the workshops, (3) provide summer employment for medical students by having them provide one-on-one training for physicians in their homes and offices, and (4) work with a computer dealer to obtain discounts for those attending the workshops. Reinforcing strategies suggested were (1) have local physicians proficient in use of computers help with the delivery of workshops in their own communities, (2) make computer training part of traditional CME programs and list computer resources (CD-ROMs and WWW sites) that provide information pertinent to the program, and (3) incorporate use of computers in small-group, problem-based discussion modules.

Using a variety of these strategies is more likely to change physicians' use of computers than providing workshops alone.[24] Although we have provided evidence that workshops alone do lead to increased use of computers, CME providers should think of creative ways to enable and reinforce this behavior change when designing programs. Also, it is important to determine how effectively computers are being used because of educational interventions. Managing information is a complex process and involves more than knowing how to use a computer and do literature searches.[25]

Conclusion

There is evidence that workshops about using computers in medicine lead to increased use of computers by physicians. To make CME on computer skills more effective, it is important to consider novel ways to combine educational programs with enabling and reinforcing strategies. However, some physicians learn computer skills themselves and get little benefit from attending workshops. As computers become easier to use and routinely used by more physicians, there may be less need for formal CME on computer skills. To avoid wasted effort, accurate needs assessments should be done, a process that would be helped by development of a validated questionnaire to determine computer use by academic and nonacademic physicians.

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Original Article

Small-Group Format for Continuing Medical Education: A Report from the Field

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Abstract

Background: *For continuing medical education (CME) to be effective, several key features must be realized. These include a learner-directed agenda of topics, presentation of information by trusted peers or local experts, and opportunity for practice and feedback. If the information comes from several sources—printed materials, peer discussion, patient questions, and presentation from the specialist community—the perception of need for and the durability of change are enhanced. Finally, motivation for change must be high enough for change to occur, yet not overwhelming.*

Method: *Facilitated small-group discussion among general practitioner colleagues with an expert specialist around clinic-based problems meets many of these requirements. When followed up by relevant literature, key concepts and practice changes are reinforced.*

Results: *We discuss our 3-year experience with the small-group format, comprising more than 25 sessions as either learners or facilitators. We describe the maturation of our group. We highlight the benefits to learners, including the relevance to clinical practice and the opportunity to ascertain the standard of care of peers. The benefits to the specialist are also discussed, including opportunities to learn which suggestions are difficult to implement.*

Implications: *Our experience demonstrates that this format is sustainable over the long term. The success of the small-group format at improving CME and patient outcomes deserves further evaluation.*

Key Words: Small group, continuing medical education

Both the adult learning and the continuing medical education (CME) literature are clear that some formats are preferred for enhancing learning.[1–6] These highlight the value of learner-directed agendas, use of peers and local opinion leaders, and employment of multifaceted interventions. The ability to change practice is enhanced if skills are endorsed by trusted colleagues and supported by published literature, and there is opportunity for practice and feedback.[1,7] There also must be some motivation for learning and change: this can be ensured if the issues discussed are derived from the learner's own clinical practice.[8] The small-group format is ideally suited to address many of these issues. Since learners are involved in providing the topics, motivation is high and relevance to clinical practice is obvious. The format is highly interactive and readily allows for peer-to-peer discussion. It provides an opportunity to measure one's practice against that of one's peers. Direct, extended interaction with a local recognized

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expert is available. The expert can help inform participants about relevant literature that reinforces the change.

There have been several calls for new approaches in CME.[9–11] The small-group practice-based format is seen as one viable solution to current problems with CME.[11] We previously showed that this format is acceptable to both general practitioners (GPs) and experts.[12] Purdy et al. showed that specialists are motivated to facilitate this method of learning.[13] In a small controlled study,[14] and in a larger study of many small groups of GPs,[11] it was shown that this format leads to knowledge improvement.

For over 3 years, we have been involved as experts, facilitators, and learners in approximately 25 small-group sessions, covering a wide variety of topics. What follows is a description of our experience with the small-group format for CME. We describe our current practice, some issues relevant to setting up our small group, and the evolution of our group. We outline the benefits of this approach to GP learners, local experts, facilitators, and potential sponsors.

Current Format

Our group usually has 12 to 15 participants, an expert, and a facilitator. We are primarily composed of generalists and family physicians, but regularly invite a pharmacist and a representative from the sponsoring pharmaceutical company. We have at times invited residents from the Department of Internal Medicine, students from the College of Medicine, or others in Continuing Medical Education who wish to observe the process.

Sessions are generally held in the evenings with a meal. The topic, preselected by the learners, and the local expert are introduced. The expert is reminded of the small-group format and asked to avoid lecture presentations. Some experts provide a 10-minute overview of the topic to help to frame the discussion. A 1½- to 2-hour discussion period follows, in which one or two of our GP learners will present a case from their practice on the topic. There is rarely a need for further formal presentations, since discussion usually flows spontaneously from participants after the cases.

During the last 10 minutes of the session, we summarize the two or three main teaching points that arose. Either the facilitator or the expert is asked to recommend one or two relevant articles to follow up the discussion. The expert has frequently selected an article in advance, from knowledge of frequently asked questions in prior learning environments. These articles are provided at the end of the session. If this is not the case, we provide them to the participants through the pharmaceutical sales representative or during our next CME session.

We also select future topics during the final 10 minutes. If topics cannot be identified, then participants fax ideas to the facilitator over the next 3 weeks. This ensures a constant supply of challenging, clinically based topics for future sessions.[15] In general, there has been no problem obtaining topics for future sessions, and we usually prioritize several suggestions. The facilitator is responsible for approaching identified local experts and inviting their participation.

Starting Format

Initially, we invited approximately 30 GPs, by letter and follow-up telephone call, to participate in an "educational innovation." All of these previously had referred patients to one of us, Dr. Peloso. Approximately 12 accepted the original invitation; eight attended all four initial sessions. Several issues were recognized early as important for proper group functioning. Most GPs will not readily discuss their practice styles with colleagues. The need to maintain the appearance of competence may be more compelling than the need to learn.[16] Several strategies helped us manage this issue. First, we tried to create as relaxed an atmosphere as possible. We arranged tables in a circle, removed all barriers such as screens, and held the sessions with a meal. Second, we had two

group members prepare cases from their office and present them in 3 to 4 minutes, to set the stage for discussion. Third, we actively solicited group participation throughout the session. This encouragement was a major function of the facilitator early on. Facilitators had previously been trained in several small-group workshops over approximately 20 training hours. Facilitators provided ample opportunity for all participants to ask questions and seek clarification from the expert. We actively encouraged participants to discuss their current practice patterns. The facilitator gently redirected conversations that moved off topic, calmed the skeptics, and encouraged quieter participants to share their personal experiences. We estimate it took three to four sessions for the group to be comfortable with this process. Open discussions and debates then came more freely, and the group continued to gel.

Mature Format

In the mature group, the facilitator's major role is to introduce the expert to the group and the process, and to provide some closure at the end of the meeting. The group selects topics, directs the agenda, points out inappropriate comments or inappropriate practices in a constructive manner, and also leads group members back on topic. The conversation is free-flowing and highly interactive. Virtually everyone participates in presenting a case, asking for advice or clarification, or describing their practice patterns. Conversations frequently are peer to peer, and may not always involve the expert, particularly concerning practice settings and office management relevant to the GP. The group encourages other points of view to establish practice norms. This allows individual GPs to see where they may deviate from usual standards of care. Innovative solutions to clinical problems can be shared, and nonstandard methods are highlighted in a nonthreatening way. With the mature group, we have had up to 20 individuals participating with no apparent drop in interaction or comfort with the process. This expansion happened from other GPs learning of the group and soliciting an invitation!

We continue to debate the value of having the expert make a 10-minute presentation to the group. Some members believe that a short presentation is unnecessary and artificially constrains questions. Others favor a short presentation to frame the topic and the questions. We have yet to reach consensus on the format preferred.

One additional debate concerns the balance between the science and art of medicine. We try to keep discussions evidence based. The follow-up articles help in this regard. However, in some situations evidence may not exist or local experts may disagree with the evidence. The facilitator can help by reinforcing the tenets of evidence-based medicine, by selecting methodologically sound overviews to be distributed later, and by asking the expert to address any evidence that exists for the recommendations made.[17] We emphasize that although the small-group format is a vehicle for transmitting evidence-based recommendations, not all recommendations provided will be evidence-based. We recognize that skills in evidence-based medicine are variable across learners and experts. We have routinely chosen to avoid pre-selecting articles for follow-up, since many of the changes we encourage are process, not knowledge, based and the principles of evidence-based medicine may not readily apply.

Topics Amenable to Format

We have had a range of topics, including joint injections, orthopedic fracture management, strains and sprains, referrals to chiropractors and physiotherapists, examination of the locomotor system, congestive heart failure, office arrhythmias, high cholesterol, exercise testing, management of impotence and vaginismus, use of birth control, osteoporosis, dementia, depression, and interactive sessions on interviewing skills. We have had sessions

on computer training and computer literacy, and demonstrations of resources on the Internet. We have had plastic models, human models, short video clips, and all manner of plastic and metal devices. We have had chiropractors, physical therapists, psychologists, and accountants discuss issues relevant to general practice. Short of surgery and anesthesia, there seems to be no limit to what the format can offer. It is possible to practice many hands-on skills.

Advantages to General Practitioners

General practitioners can discuss topics relevant to day-to-day practice. They get access to a local expert for a prolonged period of time without interrupting a busy clinic, and without any presumptions on background knowledge or skill. Since topics come out of their own and their peers' practices, and are discussed by the expert, it is more likely that perceived and unperceived needs will be addressed.[7,16] Importantly, GPs can demonstrate their knowledge in a particular area. Experts usually consult only on cases at the limit of the GPs' knowledge and skill, giving them a biased view of the clinical competence of a GP. The small-group format presents the breadth of GPs' competence, and helps to foster a good relationship between expert and GP. Relevant information and literature can be added to the GP's knowledge base.

Of greatest importance to GPs is the opportunity to measure their current practice patterns against that of their peers. Many GPs practice in isolation or in small groups, and have surprisingly few opportunities to gauge their practice against their peers.

We have also arranged for CME credits, needed to fulfill the educational requirements of ongoing licensure. We have had no problems obtaining credits from the University Continuing Medical Education Department and the Canadian College of Family Practice once our process and format was explained.

Most importantly, our learners have told us that their practices have indeed changed as a result of participation. As one group member expressed it, "CME should allow us to critically analyze our practices and change them to the betterment of our patients, otherwise it is an expensive waste of time."

Benefits to Facilitators

The group and the interactive format are fun. Since the facilitator's job is to facilitate, it is possible to acquire new knowledge and skills without having to admit ignorance. It is very satisfying to see the group mature and manage itself. There is also the opportunity to teach the facilitation process to others. To date we have been involved in six sessions in which other physicians have learned to facilitate the small-group format.

Benefits to Experts

It is a relaxed, enjoyable evening in a friendly environment. The expert interacts with the GPs in a personal manner, improving communications between them. The format allows the expert to receive feedback from GPs. Some recommendations provided by the expert are not readily implemented by GPs in their clinics. This exchange allows for clarifications and redirections, leading to learning for both GP and expert. It is also an opportunity for the expert to learn of the tremendous competence that exists within GP practice. One other benefit to the expert is that their referral base can be enhanced.

Only 1 of 25 specialists has been uncomfortable with the format. All other experts have had very positive reactions. Several experts have approached us for an invitation to the group.

Benefits to Sponsors

We feel fortunate to have had corporate pharmaceutical sponsorship. Although we rarely talk about our sponsors' pharmaceutical products, their sales representatives continue to endorse our pro-

gram for several reasons. First and foremost, the program builds rapport between the GPs and the sales representative. Second, when follow-up articles are required, the sales representative can call on the GP to provide them. Finally, by supporting the small group, the sales representatives are providing a high-quality, valued product that enhances their corporate image.

Future Issues

We recognize that motivation for practice change within our small group is high. This does little to address the problem of getting individuals to attend CME. We can only suggest that a small-group format might be more attractive than other forms of CME, since this has been our experience. We recognize that many personal, professional, and social forces affect attendance at CME beyond the format itself.[8]

We also recognize that keeping evidence-based medicine concepts in the process requires ongoing vigilance. Some small groups have prepared evidence-based handouts in advance.[7] We have avoided this to allow greater flexibility in our small group around learning needs and the resources that best meet them. We have instead asked our facilitators and experts to provide such handouts. We cannot comment on which practice is most acceptable or effective for learners.

We also recognize that not everyone will endorse the involvement of pharmaceutical companies.[18] We are not aware of any negative consequences of the interaction. Our learners set the topics, select speakers, and control the agenda. The pharmaceutical representatives are well trained in managing meeting logistics. They are in regular contact with group members and aid in the circulation of agendas and follow-up articles. The regular involvement of the pharmaceutical representatives has been a significant time saver for the facilitators, and has not been unwelcome by our learners. Other groups will have to judge this balance for themselves.

Conclusion

We have found the small-group format to be a great learning resource as well as a good deal of fun. The enthusiasm for this style of CME has been sustained over a 3-year period and shows no sign of slowing. We have had no trouble finding topics of interest to GPs. The process has been accredited, and endorsed by learners, facilitators, experts, and pharmaceutical representatives beyond original expectations. General practitioners have clearly stated that the format is relevant to their practice and leads to practice changes. Measuring and quantifying those changes is our next goal.

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Original Article

Need for Comprehensive Women's Health Continuing Medical Education among Primary Care Physicians

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Abstract

Background: *The Council on Graduate Medical Education's (COGME) Fifth Report on Women and Medicine states that "changes in undergraduate and graduate medical education, in addition to continuing medical education, are needed to address adequately the comprehensive health needs of women." Primary care physicians (PCPs) who completed residency training prior to the establishment of new guidelines for women's health education are dependent on continuing medical education (CME) to update their knowledge and skills.*

Methods: *Primary care physicians attending a university-based CME program in family medicine were surveyed (n = 300) about their need for CME in women's health topics. Responses were analyzed using chi-square analysis and Pearson correlations. Topics of interest were compared with women's health competencies published in 1997 by the American Board of Internal Medicine (ABIM) and in 1997 by the American Academy of Family Physicians (AAFP).*

Results: *Of 30 women's health topics listed, 22 were of interest to 50% or more of respondents and 11 were of very high interest ($p < .05$). Respondents most interested in women's health CME were most likely to believe CME would reduce the number of referrals currently required to evaluate women's breast problems. Topics of interest also align well with ABIM and AAFP competencies in women's health. CME in comprehensive women's health care is therefore of high interest to our respondents and topics of greatest interest are identified.*

Implications: *Areas of interest correlate well with new requirements by ABIM and AAFP and should be targeted by CME programs.*

Key Words: Continuing medical education, family practice, internal medicine, primary care providers, women's health

American women's health care has been described as a patchwork quilt with gaps.[1] The Council on Graduate Medical Education's (COGME) *Fifth Report on Women and Medicine* found that many women receive incomplete and poorly coordinated care for their routine and comprehensive health concerns, in part due to deficiencies in the education of physicians.[2] The Council stated that "changes in undergraduate and graduate medical education, in addition to continuing medical education (CME), are needed to address adequately the comprehensive health needs of women." Traditional medical education has been based on the paradigm of the 70-kg man,[3] and inadequate participation of women subjects in medical research has led to a lack of scientific basis in much of the

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medical care of women.[4] Women's health education is an emerging interdisciplinary body of knowledge and skills that addresses traditional educational deficiencies by integrating the primary medical, gynecologic, and psychosocial needs of women.[5]

The American Academy of Family Physicians (AAFP) and the American Board of Internal Medicine (ABIM) have recognized deficiencies in resident training and, in 1994 and 1997, published competencies in Women's Health Knowledge and Skills for training programs.[6,7] The American Board of Obstetrics and Gynecology also has identified a need for increased training in the primary care of women for obstetrics and gynecology residents, and has expanded residency requirements accordingly.[8] Despite these advances, the majority of practicing primary-care physicians (PCPs) completed residency training prior to establishment of these guidelines and are dependent upon CME to update their knowledge and skills.

The need for women's health education among PCPs is likely to increase as managed care organizations encourage patients to choose a PCP to provide an initial evaluation of comprehensive health needs and coordinate care. The concept of primary care involves integrated, accessible health services by clinicians that addresses most of an individual's needs, regardless of the problem type or organ system. Thus, a single individual is responsible for making decisions regarding all aspects of a patient's care.[9] An ideal provider of women's health would have expertise in most conditions common in women.

PCPs are assumed to be competent in initial evaluation of all problems with which patients present. Although many physician groups consider themselves PCPs to women, studies of actual practice patterns suggest that traditionally, only family physicians were trained to provide comprehensive care.[10] Studies of preventive medicine screening rates, the abilities of residents to evaluate women's health problems, and current practice patterns support the conclusion that PCPs need CME in women's health to provide better care for women patients.[11–14] Needs assessments have shown that obstetrics and gynecology is an area of great interest.[15] Nonreproductive areas of women's health such as psychiatry, oncology, and geriatrics also address the comprehensive health needs of women. Prior needs assessments may have failed to identify these areas, thereby limiting physician access to CME in nonreproductive areas of women's health. Needs assessments make CME courses more effective;[16] therefore, more detailed women's health needs assessments must be implemented to address PCP deficiencies properly.

The question remains: what are the greatest areas of need in women's health CME, including nonreproductive topics? The purpose of this study was to determine which women's health topics are thought to be most needed among practicing PCPs in CME offerings, assess whether CME in specific women's health topics influences self-reported referral rates of women by PCPs, and compare these topics with published ABIM and AAFP competencies in women's health.

Methods

A questionnaire was distributed in 1996 to 300 physicians at a university-based family practice CME course. The survey was completed anonymously; 91 completed surveys (30%) were returned. Setting of practice (urban vs. rural), location of practice (state), and number of years in practice were reported. The survey listed 30 topics selected from current women's health CME offerings and from textbooks on primary care for women.[17–20] Physicians indicated if they desired CME in each topic by marking one or a zero, and were able to write in additional topics of interest. Physicians were also asked: "Approximately what percentage of women with breast complaints that you see each year do you refer to a surgeon for evaluation?" and "Do you think this number might be reduced if you were to receive CME in the evaluation of breast problems?"

A mean proportion of interest was calculated for each item. Each item's mean proportion was tested to determine if it was significantly higher, lower, or equal to a proportion of .50. This proportion value was chosen as the point of comparison because any proportions significantly higher than .50 represent topics that are clearly of interest to the majority of the respondents, while topics with proportions significantly lower than .50 are of interest only to a minority. Mean interest was then compared to new ABIM and AAFP standards for competency in women's health topics. A physician's overall interest in women's health CME was measured by the number of topics for which he or she expressed interest.

Responses were compared to the .50 standard for level of interest by single group *t* tests for proportions (i.e., .50) or chi-square. Pearson correlations were employed to assess relationships among the variables.

Results

Of respondents who indicated their specialties, 85% were family-practice physicians and 15% had other specialties. Thirty-seven percent practiced in a rural setting and 63% in urban or suburban settings. Respondents had been in practice for an average of 13.5 ± 7.7 years. There was a modest but significant correlation between setting of practice and length of time in practice. Rural physicians tended to have been in practice longer than urban physicians ($r = -.30$, $p < .005$). The sample included physicians from 15 states; 18 respondents (20%) were from the state in which the CME course was held.

Interest in Women's Health Topics

Table 1 presents the results of single-group *t* tests for each topic. As noted above, the ratings of the topics could be divided into three interest levels: topics of interest to the majority of respondents (n = 11), topics of interest to a large segment of the respondents (n = 17), and topics of little interest to the group (n = 2). Write-in items were of significant interest to the group as a whole. Physicians were most interested in CME on the evaluation of menstrual disorders and the management of fibroids or dysfunctional uterine bleeding: they expressed little interest in CME on giving bad news and teaching breast self-examination (Table 1).

Physicians' interest did not vary greatly according to the setting of practice or length of time in practice. Urban physicians showed significantly greater interest than rural physicians in two topics: management of medical disorders during pregnancy ($\chi^2 = 4.61$, 1 df, $p < .05$), and contraception management and diaphragm fitting ($\chi^2 = 9.58$, 1 df, $p < .005$). Six of the 30 topics were significantly more interesting to physicians with greater time in practice: evaluation of obesity or eating disorders ($r = .33$, $p = .001$), premenstrual syndrome ($r = .30$, $p < .005$), post-traumatic stress disorder and sexual assault ($r = .27$, $p < .01$), evaluation of menstrual disorders ($r = .24$, $p < .05$), fine-needle aspiration techniques and indications ($r = .24$, $p < .05$), and methods of recommending chemotherapy to women with early-stage breast cancer ($r = .22$, $p < .05$).

Referrals to Specialists

Physicians reported that they refer approximately 35% (mean 34.7% ± 3.0%) of their women patients with breast complaints to surgeons for evaluation (range < 1% to 100%) each year. When asked if the proportion of patients referred might decrease as a result of CME in breast problems, 60% answered yes (single-group *t* test: $t = 1.81$, $p = .07$). More experienced physicians tended to refer less frequently ($r = .21$, $p = .08$). Response to the question about whether CME would change referral practices did not vary significantly among physicians according to practice setting or length of time in practice. The subgroup of physicians with the greatest overall interest in CME in women's health topics was most likely to report

Table 1 Women's Health Topics: Mean Physician Interest and Comparison to Internal Medicine (IM) and Family Practice (FP) Standards

Topics	IM Standards	FP Standards	Mean Interest	p*
Evaluation of menstrual disorders	Yes	Yes	0.85	<.001
Management of fibroids or DUB†	Yes	Yes	0.75	<.001
Evaluation or treatment of vulvar disease	No	Yes	0.69	<.001
Indications for pelvic ultrasound or EMB‡	Yes	Yes	0.66	<.0005
Evaluation of obesity and eating disorders	Yes	Yes	0.65	<.005
Breast cancer treatment alternatives	Yes	No	0.65	<.005
Osteoporosis diagnosis and treatment	Yes	Yes	0.64	<.01
Premenstrual syndrome	Yes	Yes	0.63	<.05
Controversies in breast cancer screening	Yes	Yes	0.63	<.05
Post-traumatic stress disorder and sexual assault	Yes	Yes	0.62	<.05
Menopause and estrogen replacement therapy	Yes	Yes	0.60	<.05
Management of medical disorder during pregnancy	No	No	0.59	NS
Painless pelvic examination for all women	No	No	0.59	NS
Managing fibrocystic breast disease	Yes	Yes	0.58	NS
Infertility for the primary care physician	Yes	Yes	0.58	NS
Evaluation and management of cervical dysplasia	Yes	Yes	0.58	NS
Evaluation of breast pain	No	No	0.58	NS
Fine-needle aspiration techniques and indications	No	Yes	0.55	NS
Screening for domestic violence or sexual abuse	Yes	Yes	0.53	NS
Office gynecology for the primary care physician	Yes	Yes	0.51	NS
Contraception management and diaphragm fitting	Yes	Yes	0.51	NS
Evaluation of nipple discharge	Yes	No	0.50	NS
Sexually transmitted diseases among women	Yes	Yes	0.48	NS
Interpretation of mammography reports	Yes	No	0.48	NS
Evaluation of coronary risk among women	Yes	Yes	0.46	NS
Preconception counseling	Yes	Yes	0.45	NS
Evaluation of breast masses	Yes	Yes	0.42	NS
Recommending chemotherapy for early breast cancer	No	No	0.41	NS
Giving bad news	No	No	0.37	<.05
Teaching breast self-examination	Yes	No	0.26	<.05

*Mean interest is compared to 0.50 (see Methods); †DUB = dysfunctional uterine bleeding; ‡EMB = endometrial biopsy.

that their referrals might d0ecrease as a result of CME (r = .45, $p < .001$).

Discussion

The present study sought to determine the women's health topics for which CME is most needed by PCPs to assist them in providing comprehensive primary care to women patients. The model was a comprehensive view of women's health, not merely reproductive care. Interest in women's health topics was found to be high, especially among physicians who felt CME in breast problems might reduce referrals. Eleven women's

health topics emerged as being of significant interest to PCPs, and 22 of the 30 topics suggested overall were considered needful by 50% or more of PCPs. Which topics were of highest interest did not vary greatly by location, setting, or length of time in practice. PCPs wrote in items of greatest interest; therefore, it is unlikely that important topics of interest were omitted. Items of greatest need can be categorized as advanced problems in gynecology (as opposed to routine office care), advanced issues in breast care, and topics of emerging national interest in women's health: osteoporosis, obesity and eating disorders, and post-traumatic stress disorder and sexual assault.

The self-reported interests of PCPs provide one perspective on what is needed in women's health CME. There are valid concerns, however, that physicians may not know what information they lack. For example, data have recently emerged regarding coronary artery disease risk in women, or that support chemotherapy to women with early-stage breast cancer, but neither of these items were of interest to more than 50% of PCPs. Objective data (i.e., based on new scientific information or performance and clinical outcomes) should be used to define topics for which CME is needed.

PCPs are assumed to be competent in the evaluation of breast problems. The broad range of responses physicians gave for their referral rates for breast complaints is of concern. Rates of referral ranged from <1 to 100%, with urban physicians referring more frequently than their rural counterparts. The high referral rates in urban areas may reflect fear of litigation or the availability of breast surgeons, although physician inexperience may be a factor. Rural physicians tended to have been in practice longer and also referred less often. While high referral rates may be a concern to managed care companies on the basis of cost, inappropriately low rates can also be a concern. In rural areas, for example, higher than average mastectomy rates and inappropriate ordering of unilateral mammography has been reported, and underscores the need for improved breast care for women by PCPs.[21]

Studies of physicians who provide breast care have shown that CME can positively affect the practice patterns of PCPs, especially if it is given in the form of feedback, interaction with standardized patients, or both.[20,22] The Structured Clinical Instruction Module (SCIM), which incorporates both of these elements in a modification of the objective structured clinical examination (OSCE) format, is a promising venue that has been shown to be highly effective in increasing the skills and knowledge of PCPs in breast cancer detection and treatment.[23] Clearly, interactive methods of teaching PCPs in women's health topics are desirable and ultimately would benefit women patients.

The new competency standards published by AAFP and ABIM are very well-aligned with the perceived needs of practicing PCPs for CME on women's health topics. The requirements include all of the topics of significant interest to PCPs except for evaluation and treatment of vulvar disorders and evaluation of fibroids or dysfunctional uterine bleeding. Both boards implied that education about treatment alternatives for breast cancer treatment was necessary, although this topic was not explicitly listed. Indications for pelvic ultrasound and the premenstrual syndrome are topics of significant interest to PCPs, and are listed by ABIM but not by AAFP. Breast physiology, fine-needle aspiration, and mammography are listed by both ABIM and AAFP as areas of required competency, but these areas do not appear to be of significant interest to PCPs.

In summary, PCPs in our survey showed a high degree of interest in CME in women's health, and topics of highest interest did not vary greatly by location or length of time in practice. Because PCPs showed little consensus in referral rates of patients with breast complaints to surgeons, and most believe CME in breast problems might reduce referral, education of breast problems and breast cancer screening should be valuable CME offerings. Topics in gynecology, especially uterine bleeding and vulvar disorders, also should be offered because of high interest among PCPs. To best serve patients and providers, courses should incorporate all dimensions

of women's health, not simply obstetrics and gynecology. When given a detailed needs assessment survey, physicians identify other disciplines such as psychiatry, geriatrics, and oncology as areas of great interest and need, which should be taken into account when designing women's health CME courses.

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Original Article

An Educational Intervention to Improve Diagnosis and Management of Suspicious Skin Lesions

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Abstract

Background: *Family physicians have an important clinical role in assessment and management of suspicious skin lesions. As a result of a previous needs assessment study, an educational intervention based on audit and feedback with opportunity for reflection on practice was introduced to 46 family physicians randomly allocated to either an intervention (23) or control group (23). As an educational tool, audit allows doctors to systematically review their practice and establish the quality of care they provide. When combined with feedback and comparison of clinical performance with peers or standards, it has been shown to increase learning and change behavior.*

Methods: *Data based on their own patients, on the correlation between clinical and histologic diagnosis, and excisions of skin lesions were collated and reported to the intervention group.*

Results: *Despite randomization of the doctors, the patient population of doctors in the intervention and control groups were significantly different in key characteristics, including the types of skin lesions treated. The intervention group of doctors showed improved performance in providing clinical information on pathology requests and in adequate surgical excision of skin lesions. Diagnostic performance did not improve significantly, but physicians' certainty of diagnosis did.*

Implications: *This study design has highlighted the difficulty in balancing the use of evidence-based educational strategies in an equivalent setting to normal practice with evaluation of performance using measures that include characteristics of practitioners' patients that cannot be controlled.*

Key Words: Audit, feedback, measurement of performance in office practice, practice-based continuing medical education, reflection on practice, skin cancer

Skin cancer is a significant public health problem in Australia, with an estimated $278 million in direct costs to the health care system resulting from nonmelanoma skin cancer (NMSC) in 1993–94.[1] Most suspicious skin lesions are assessed by family physicians,[2] who commonly resolve diagnostic uncertainty by excision biopsy. However, this informal and expensive method of skin cancer screening has increased over the last 10 years more rapidly than the incidence of NMSC has warranted.[3] Therefore, improved education for Australian family physicians in the diagnosis and management of skin cancer is justified. Similarly, NMSC is estimated to account for 800,000

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cases annually in the United States,[4] where the performance of primary care physicians in diagnosing and managing skin cancer is also under scrutiny, since they are the gatekeepers for dermatology referrals in managed care. Studies of the diagnostic and management capabilities of primary-care residents compared to dermatologists have shown that they may not be ready to optimally triage for skin cancer.[5] Primary care physicians themselves also believe they need more education on the early detection of skin cancer, especially early melanoma.[6–8]

Educational programs should be designed to change practice performance, but this has proven difficult. For skin lesions, knowledge, confidence, and diagnostic skills can be improved using photographic slides,[5,6,9] but even an intensive educational intervention involving workshops and attachments to a melanoma unit have not demonstrated change in the way family physicians behave back in their practices.[9] However, combining the use of photographs together with an algorithm to monitor the lesions seen in practice has reduced the proportion of benign excisions in a randomized controlled trial.[10] Clearly, linking education to the usual practice environment improves educational outcomes. Further, linking identified educational needs of participants to an educational program can contribute to changing practitioner behavior.[11]

Clinical audit and feedback can link learning to real-life practice by allowing practitioners to systematically review their management skills and quality of care for their own patients. Implicit in considering self-audit and feedback as an educational activity is the expectation that these processes provide a climate for reflection on practice and assessment of deficiencies, and motivate knowledge increase and practice change.[12] These aspects of professional knowledge and action are necessary to turn experience into learning[13] and achieve change.[14] When feedback on clinical performance compared to peers or standards is combined with audit, there has been increased learning and changed behavior, although the effectiveness of these strategies assessed in the Cochrane Reviews may only be small to moderate, yet worthwhile.[15] However, a number of factors may have an impact on the effectiveness of the feedback. In an examination of interventions using feedback to influence test-ordering, important factors included the message, who provided the feedback, who it was given to, how it was delivered, and its timeliness.[16] Combining peer comparison profiles in feedback also had a significant but minimal clinical effect in changing practice.[17]

For skin cancer, histology reports on excised lesions provide a valuable tool that can assist medical professionals to self-assess their diagnostic accuracy and estimate what change is required, since all excised lesions should be submitted for pathology. However, the lack of a system in practice to do so is a barrier to their effective use for reinforcing learning.[18] This paper reports the development and evaluation of a practice-based educational strategy employing audit and feedback to improve clinical diagnosis and management of suspicious skin lesions. Audit and feedback were defined as a summary review of specific clinical performance together with a reporting-back procedure to the participating practitioners.[15] The research questions were (1) Would clinical diagnosis of suspicious skin lesions improve if practitioners were able to systematically review their own practice activity through audit to assess their clinical performance? and (2) Would their management of skin cancer improve if feedback highlighted specific deficiencies in their diagnosis and performance of skin excisions and provided grouped peer data for comparison?

Methods

Study Design

The study was undertaken over approximately 9 months in 1996 in Townsville, Australia, a provincial city of approximately 127,000 residents with a high incidence of skin cancer.[19] A prospective randomized controlled trial with pretest and post-test design was used to evaluate the effectiveness of the educational intervention. The

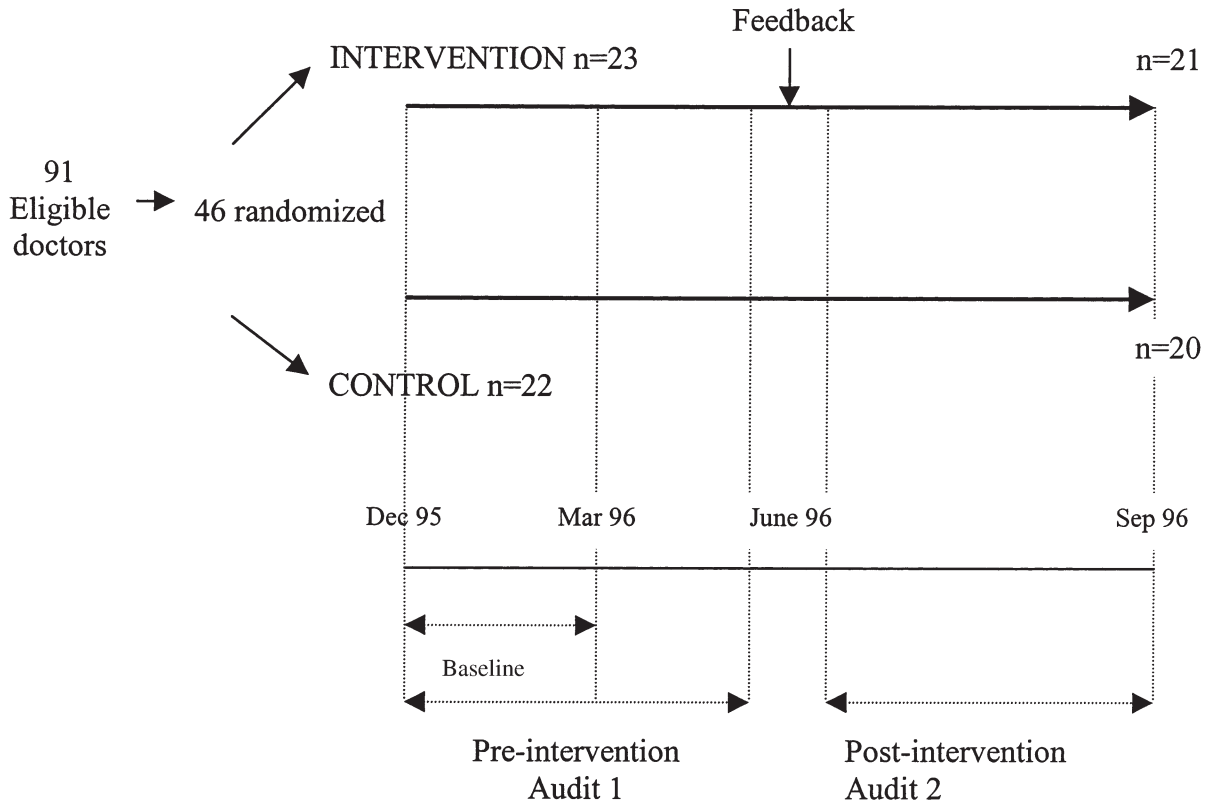

Figure 1 Study design and flow chart of participation, randomization, and timing of surveys and feedback.

flow chart (Figure 1) outlines the study design and timing of data collection and feedback.

Clinical performance of family physicians was judged by the ability to make a correct clinical diagnosis based on histology of the excised skin lesions, and to adequately excise those lesions requiring surgical treatment. In addition, since the setting of this study was office practice, characteristics of the practitioners and the patient population needed to be considered within the framework of the study as determinants of clinical practice that have been identified as impacting the effectiveness of practice-based educational interventions.[20]

Study Population

Inclusion and exclusion criteria and recruitment. Practitioners eligible for the study were family physicians working three or more sessions per week in a primary-care situation, who were available for the whole of the proposed 9 months of the study. Previous investigation showed that those doctors working fewer than three sessions per week excised few suspected skin cancers.[21] Based on these data, and taking into account the clustering of patients, it was estimated that 356 patient consultations for clinically suspicious or dysplastic skin lesions would be required by the intervention and control group doctors before and after the intervention to detect a 10% difference in the proportion of correct diagnoses with 80% power ($\alpha = 0.05$).

A comprehensive list of practitioners was compiled from divisional and local medical group mailing lists and the telephone directory, and validated by personal contact. Recruitment of doctors

was through an introductory letter explaining that further research on skin cancer was being done. If they were prepared to be involved, they would in turn inform all of their patients who had suspicious skin lesions requiring excision about the study and gain their consent to participate. The introductory letter was followed up through personal telephone calls to encourage response.

To ensure similarity of most characteristics, randomization of doctors who agreed to participate was carried out using a random number table and all were offered practice-assessment points for the Royal Australian College of General Practitioners Quality Assurance and Continuing Education program. The doctors were made aware only of the fact that a skin cancer study was going on: they were not formally made aware if in an intervention or control group. The justification for this was that the intervention was not harmful and information normally available to doctors was not withheld, so care would be at the usual standard at minimum.[22] All control group doctors were provided with feedback on their activities at the end of the study.

Practitioner characteristics. Characteristics of eligible doctors were obtained via a questionnaire: this had a 100% response rate for participants and 82% response rate for nonparticipants. The intervention and control group practitioners differed only on the mean number of doctors per practice (Table 1). The nonparticipants in the study were more likely to be older (χ^2 p = .006) and have been in practice for longer than 10 years (χ^2 p = .022).

Intervention Process

Educational principles underlying the intervention. The strategies used in the educational intervention were selected based on the results of

Table 1 Practitioner Characteristics in Intervention and Control Groups

Characteristic	Intervention (n = 23)	Control (n = 23)
Sex		
Male	15 (65.2%)	14 (60.9%)
Female	8 (34.8%)	9 (39.1%)
Age		
<35	10 (43.5%)	9 (39.1%)
35–54	12 (52.2%)	12 (52.2%)
55+	1 (4.4%)	2 (8.7%)
Years in practice		
<2	1 (4.4%)	1 (4.4%)
2–5	9 (39.1%)	9 (39.1%)
6–10	6 (26.1%)	3 (13.0%)
>10	7 (30.4%)	10 (43.5%)
Type of practice		
Full time	17 (73.9%)	19 (82.6%)
Part time	6 (26.1%)	4 (17.4%)
Number of doctors in practice*	2.1±1.6	3.6±2.8
Postgraduate qualifications		
None or other	18 (88.3%)	16 (69.6%)
FRACGP†	5 (21.7%)	7 (30.4%)

*Significant difference between intervention and control by t test (p = .0034); †Fellow of the Royal Australian College of General Practitioners

Table 2 Relationship of Educational Interventions to Needs Assessment for Skin Cancer Education

Needs Identified	Proposed Intervention
	Predisposing factors to change
"Poorly managed basal cell carcinoma" by general practitioners	Provision of personalized feedback on correlation between clinical and histologic diagnosis and adequacy of surgical procedures so deficiencies identified
Lack of confidence in biopsy and procedural skills	
Clinical information not recorded on requests	
	Enabling factors to change
Inability to access collated information in records	Collating information on practice from pathology reports for practitioners
Lack of time	Practice-based activity
	Reinforcing factors to change
Incapacity to compare own practice over time and with peers	Provision of comparison peer data with feedback
Lack of practice structure for case review and audit	Provision of prompts about inadequate excisions for follow-up and recording clinical information
	Providing opportunity to review and reflect on practice and discuss cases with the investigator if desired*

From Raasch.[23]
*Discussion of study results was ongoing with individual practitioners, but was not formalized as part of the intervention.

a needs assessment for skin cancer education among a population of rural and provincial general practitioners in the same geographic area. In that project, 93% of doctors could not readily obtain information on their skin cancer patients through their records, although 79% felt it would be of benefit to do so, and 77% could not identify their patients with melanoma through an audit of their records.[23] The proposed interventions were designed to target those needs by the use of predisposing, enabling, and reinforcing strategies (Table 2).[24]

Audit. The objective of the intervention was first to facilitate and operationalize the desire to audit practice activity in suspicious skin lesions in a manner that did not require a large time commitment by doctors. Doctors obtained their patients' consent to allow the investigator to access copies of pathology request forms and reports on excised skin lesions. This caused only a minor change in the usual routine within practices and received support from pathology laboratories and pathologists. No inter-rater reliability studies were carried out on histologic diagnosis of basal cell carcinoma (BCC) and squamous cell carcinoma (SCC) in this project, since the same pathologists were reporting histology data throughout the study. Any misclassification was therefore likely to be nondifferential.

Data collection comprised an initial baseline period of 3 months for comparison of the groups under usual practice circumstances: a further 3 months of recording was then combined with the baseline data to constitute a pre-intervention audit of activity. During a 3-week period before the second prospective audit, doctors had an opportunity to examine the feedback material and reflect on their performance (Figure 1). The data extracted

from the pathology reports included patient demographics, clinical and histologic diagnosis, certainty of diagnosis, adequacy of excision, and anatomical site of lesion.

Feedback. Following the first audit, data were entered into a database (Corel QuattroPro v. 4) and written reports on activity for each doctor in the intervention group were generated by the investigator, who is also a family physician in the community. The feedback included an educational message about the practice data collected to the time of feedback, highly specific to treating suspicious skin lesions in general practice. For example, information was provided explaining why correct diagnosis of benign lesions was less frequent than for malignant lesions, and what this could mean for management. In addition, some general suggestions were made to address deficiencies in diagnosis.

The feedback report incorporated tables and graphs including individual and grouped peer data for comparison. They included a cumulative summary of the number of patients seen, the age and sex of patients, and the histologic diagnoses and corresponding clinical diagnoses on all excised lesions. This allowed each doctor in the intervention group to review their case series of clinical diagnoses, to highlight the types and variety of lesions they treated, and to assess their clinical skill in diagnosis by viewing any misclassification of clinical diagnoses detected by histologic diagnosis. Each doctor was also provided with a score of the proportion of correct clinical diagnoses of benign and malignant lesions (based on histology results), a count of the number of inadequately excised lesions, and the number of pathology request forms in which no clinical diagnosis was recorded. Grouped scores on these items for all doctors were provided for comparison with individual performance. Verification of receipt of the feedback was by telephone, which also gave an opportunity to discuss results with the investigator.

Outcome measures and statistical analysis. The doctors' individual skin cancer practices, with the doctor as the unit of analysis, were compared on these variables within and between groups before and after the intervention using paired and unpaired *t*-tests: (1) proportion of all lesions correctly diagnosed, (2) unrecorded clinical diagnoses, (3) inadequate excisions, and (4) certainty of diagnosis. Where assumptions requiring a variables' normal distribution could not be met, comparisons of medians were performed using Wilcoxon tests (paired and unpaired). If paired data were analyzed and missing data related to dropouts occurred, these were not included in the analysis. Certainty of diagnosis (i.e., certainty that a clinical diagnosis would be confirmed by histologic examination) was recorded by an ordinal scale ranked from very certain (1) to very uncertain (4). A numerical certainty score for each phase of the study was developed by adding the score for each lesion and dividing it by the total number of lesions seen in that phase of the study (i.e., pretest to post-test). Throughout the analysis, *p* values less than .05 were considered significant.

Two views of diagnostic performance are reported in this study, chosen to represent clinical practice in the diagnosis of suspicious skin lesions. The first assessed the ability of the practitioners to accurately clinically predict the histologic diagnosis of lesions among all lesions seen in their practice population. The second evaluated the sensitivity of their clinical diagnoses by examining clinical skill in discriminating between malignant and benign lesions. Lesions were categorized into two mutually exclusive categories, malignant or benign. Histologically proven BCC, SCC, or melanoma are referred to as malignant and histologic solar keratoses; intraepithelia carcinoma, kerato-acanthoma, seborrheic keratoses, naevi including dysplastic naevi, and other benign diagnoses were called benign lesions. Predictive value of a clinical diagnosis was the proportion of all clinical diagnoses made that were confirmed as correct, and sensitivity was the proportion of all histologically proven skin cancers that had been identified correctly prior to excision. These calculations were made at the level of individual

lesions, and results are given together with 95% confidence levels. All recorded clinical diagnoses were matched with the corresponding histologic diagnosis. Those lesions with available histology but no recorded clinical diagnosis were not included in this analysis: failure to record a clinical diagnosis on pathology requests was a separate outcome measure of performance.

Analysis at the level of the doctors alone could not account for variation introduced by the office practice, nonstandardized setting of the study. Therefore, analysis was also undertaken to describe and compare the patient population treated by the intervention and control group doctors.

Results

Participation by Doctors

Of 124 nonspecialist doctors in Townsville, 17 were not considered to be family practitioners, 9 were working less than three sessions per week, and 7 were unavailable for a substantial time during the study. The remaining 91 doctors formed the study population (see Figure 1). On first request, 14 declined to participate because of ill health, personal commitments, or undisclosed reasons. Thirty-one declined at second request or failed to respond, leaving 46 (51%) of eligible doctors participating. One control group doctor recorded no data from the start, leaving 22 in the control group. Two doctors from the intervention group and two from the control group dropped out during the study and were not replaced. All doctors who dropped out had moved from the city or the practice.

Patients and Lesions

During the study, 1366 patients were recorded as having excisions performed for suspicious skin lesions, 1051 of these occurred in the baseline plus pre-intervention period (6 months) and 315 in the post-intervention period (3 months). A baseline comparison of patients who had skin lesions excised showed that the patients of intervention and control group doctors differed significantly in several ways. The intervention group doctors saw more female patients ($p = .0340$), more younger patients ($p < .0001$), and had fewer patients in whom they made a clinical diagnosis of one or more malignant lesions ($p = .0001$) than the control group. The patients of the intervention group doctors also differed with respect to the actual histologic diagnoses of lesions, having fewer histologically proven malignant lesions ($p = .0001$). These significant differences in the patients seen by intervention and control group doctors persisted throughout the study. The patients also were not evenly distributed among the doctors. The median number of patients treated per doctor in the first 3 months (baseline) was six (range 1–30) per doctor in the intervention group and 12 (range 1–39) by the control group. In the second 3 months, the median number in the intervention group was 7 (range 0–26) per doctor and 12 in the control group (range 0–41): in the final 3 months after the intervention, the median number of patients per doctor was 5 (range 0–26) in the intervention group and 4 (range 0–26) per doctor in the control group. This final tally did not differ significantly between intervention and control group patients ($p = .47$). The decrease in recorded cases per doctor in the final 3 months of the study was also not significantly different.

Because some patients had more than one lesion, the total number of lesions examined by intervention and control group doctors was 1416 lesions in the pre-intervention period and 420 lesions post-intervention. The median number of lesions treated per doctor at 3 months was 8 in the intervention group (range 1–41) and 16 in the control group (range, 1–53). In the second 3 months, doctors in the intervention group treated 12 lesions on average (range 0–4) versus 15 by the control group (range 0–62). In the final 3 months, the median number of lesions treated was 6 (range 0–43) for the intervention group and 5 (range 0–31) for the control group.

At baseline, the intervention group doctors recorded 151 (49.4%) clinical diagnoses by lesion

that were correct and 110 (36%) that were incorrect: 45 (14.7%) lesions had no clinical diagnoses recorded on the pathology request. The control group had 205 (53.1%) clinical diagnoses correct, 168 (43.5%) incorrect and 13 (3.4%) with no clinical diagnosis on pathology request. The difference was not statistically significant ($p = .47$).

Measures of Doctors' Performance

With the doctors as the unit of analysis, the intervention group performed fewer inadequate excisions and significantly improved both in recording a clinical diagnosis on the pathology request form and in their certainty that a clinical diagnosis would be correct. The control group also improved significantly, in that they had fewer inadequate excisions and were more certain of their clinical diagnosis. The only outcome measure that showed a significantly different degree of change between intervention and control group doctors was the intervention groups' improvement in recording their clinical diagnosis on the pathology request form for excised lesions (Table 3).

Effect of the Intervention at Patient Population Level

The prevalence of malignant lesions differed between the patients of the intervention and control group doctors (Table 4). In the pre-intervention period in the intervention group, the predictive value of a clinically malignant diagnosis was 45.7% (95% confidence, range 40.1–51.3) and 51.7% (95% confidence, range 43.6–59.8) post-intervention. Corresponding results for the control group were 54% (95% confidence, range 49.6–58.4) and 54.5% (95% confidence, range 45.6–63.4) post-intervention. The higher positive predictive value of a clinically malignant diagnosis by the control group at pre-intervention was statistically significant ($p = .046$) but there was no statistically significant difference in predictive value at post-intervention.

Sensitivity of Clinical Diagnosis

When a skin cancer was present based on the histology of the lesion the intervention group doctors had made a correct diagnosis in 72.2% (95% confidence, range 65.8–78.6) of cases. After the intervention, 77.1% (95 confidence, range 68.7–85.5) of malignant lesions had been correctly diagnosed. This was not a significant improvement ($p = .375$). There also was no significant difference in sensitivity of diagnosis for malignant lesions between intervention and control group before or after the intervention.

When a lesion was benign, the study group had made a correct diagnosis in 44.7% (95% confidence, range 39.5–49.9) of cases before the intervention, compared with 28.5% (95% confidence, range 23.8–33.2) of correct diagnoses in the control group. After the intervention 37.3% (95% confidence, range 29.1–45.4) diagnoses were correct, compared with 22.4% (95% confidence, range 11.7–33.1) in the control group. The change in correct diagnoses before and after for the intervention group was not statistically significant ($p = .144$).

Where full excision was carried out and the adequacy of that excision was reported, adequate excisions were performed on 542 (91.7%) lesions by the intervention group doctors and 656 (92.5%) lesions by the control group doctors prior to the intervention. After the intervention, 221 (93.3%) of lesions were adequately excised by the intervention group doctors and 132 (93%) by the control group doctors. Between the groups, there was no significant difference pre-intervention ($p = .5860$) or post intervention ($p = .9140$).

Discussion

Summarized feedback based on data available on pathology reports was a workable and inexpensive educational strategy based on previously identified needs. It enabled doctors to review and reflect on their activity and the result of their own treatment, and had the potential for introduction as an ongoing self-monitoring educational activity that

Table 3 Comparison of Practice Activity between Intervention and Control Group Doctors

Outcomes	Intervention Group	Control Group	Intervention vs. Control* (p)
Mean proportion of correct clinical diagnoses per doctor			
Pre-intervention	44.6 ± 20.9%	50.9 ± 13.9%	.3312
Post-intervention	49.6 ± 23.9%	45.5 ± 26.5%	.8851
Difference	+5.0%	–5.4%	.2404
Pre-post comparision†	p = .3623	p = .4518	
Mean certainty of diagnosis score per doctor‡			
Pre-intervention	2.4 ± 0.54	2.42 ± 0.44	.7689
Post-intervention	1.7 ± 1.1	1.6 ± 1.2	.8179
Difference	–0.7	–0.8	.7707
Pre-post comparision	p = .0274	p = .0166	
Mean number of inadequate excisions per doctor§			
Pre-intervention	2.4 ± 2.7	3.07 ± 4.2	.7689
Post-intervention	0.5 ± 0.9	0.6 ± 0.74	.9446
Difference	–1.8	–2.5	.5831
Pre-post comparision†	p = .0032	p = .037	
Mean number of pathology requests for which no clinical diagnosis recorded per doctor§			
Pre-intervention	2.8 ± 4.3	1.2 ± 1.5	.1714
Post-intervention	1.3 ± 2.9	1.1 ± 1.3	.7962
Difference#	–1.5	–0.13	.0427
Pre-post comparision†	p = .0133	p = .6848	

*Unpaired *t* test; †Paired *t* test; ‡Very certain = 1 and very uncertain = 4; difference means an improvement in certainty of diagnosis; §Desirable outcome is to have a decrease in the number of inadequate excisions and a decrease in the number of requests where clinical diagnosis not recorded; #This change in outcome was significant.

could improve outcomes for patients with skin cancer. The idea of monitoring results of tissue examination was recommended for further study as one element of a practical and low-cost method to monitor physician performance, provide educational feedback, and improve quality of surgical care of cutaneous lesions.[25] These activities were based on adult learning principles, being relevant and related to practice experience and involving direct patient care.

Practitioners' Management of Skin Cancer

The management of skin cancer in both intervention and control group did improve. As a result of the intervention, the study group recorded fewer pathology requests without a clinical diagnosis when compared with the control group, suggesting that the self-audit and feedback were responsible for the improvement. Attempting a clinical diagnosis and recording it on a request form when sending excised lesions for histologic examination was chosen as one valid indicator of adequate performance in the management of skin cancer, because several studies have found that correct preoperative diagnosis and appropriate management are strongly associated.[6,25] In addition, if ongoing feedback from pathology laboratories was to be developed to aid self-audit, then monitoring of performance could only be assessed if a clinical diagnosis was recorded. However, in

Table 4 Benign and Malignant Lesions in Patients of Intervention and Control Group Doctors

	Intervention Group		Control Group	
Lesions	**Before Intervention (n = 534)**	**After Intervention (n = 230)**	**Before Intervention (n = 763)**	**After Intervention (n = 151)**
Clinically diagnosed as malignant	300 (56.2%)	145 (63.4%)	586 (76.8%)	121 (80.1%)
Histologically diagnosed as malignant	187 (35.0%)	96 (41.7%)	406 (53.2%)	92 (60.9%)

keeping with the observation that continuing education seeks to achieve the Hawthorne effect,[26] the intervention and control group both improved significantly in the adequate performance of excisions. It is likely that the request to be involved in skin cancer research also had an impact on the control group by highlighting reporting requirements, even though they were not formally aware of the feedback data being provided to the intervention group during the study. The high proportion of excisions adequately performed at the baseline by both groups may also have made it difficult to show improvement as a result of an intervention.

Practitioner Diagnostic Performance

The failure of improvement in clinical diagnostic performance on skin lesions following this practice-based educational intervention and other more traditional educational programs designed to address knowledge and skill requirements in skin cancer needs an explanation.[5,9] The only study that has shown improved clinical performance in diagnosis and management of specially selected skin lesions was a multi-component intervention including one-to-one feedback on performance;[27] however, that study does not equate with the unselected patients seen by these general practitioners.

Practitioners showed better diagnosis for benign lesions than skin cancers when they were evaluated by standardized problem-based case studies with photographs,[6] which is opposite to what occurred in practice in this study. Both intervention and control group doctors were also significantly more certain of their clinical diagnoses, although actual improvement did not occur. This is an important finding about education to improve diagnostic skills for skin conditions, since often the most pragmatic approach is to teach using photographs or slides and measure outcomes in self-reported improvement in confidence.

When measuring educational outcomes in practice, change and improvement in clinical management may be hampered by barriers within the practice environment, such as inadequate information management systems and variability among patients.[28] The learning in this study may have been more to predispose to change by gaining new knowledge about the need to correct deficiencies in skills or performance rather than to improve the performance itself. Through reflection, individual practitioners have the opportunity to determine their need for further education based on the problems and types of patients they see. Learning is most likely when learners can define their own problems, acknowledge their own strengths and weaknesses, decide on a course of action, and evaluate the outcomes of their decisions.[12] The feedback data provided the opportunity to do this, so the educational aspects of audit may have seeded more self-directed learning rather than achieving the immediate outcome of improved diagnosis of skin lesions.

Another possible explanation for the failure to achieve the outcome of more correct clinical

diagnoses is that the prevalence of lesions in the practice population influences the probability that a diagnosis will be correct, even when diagnostic skill remains constant. Standardizing the patient population of the practitioners or a more precise prior knowledge of the population could have provided a better universal outcome measure, but the outcome may no longer have reflected real clinical performance in the practice setting.

The second view of diagnostic accuracy in which the true diagnosis is known measures the clinical ability and skill required to differentiate correctly between different types of lesions. Overall, the practitioners in the study prior to the intervention showed a moderate level of skill in correctly diagnosing malignant lesions when they were present. This may have mitigated against a large improvement. On the other hand, the ability to correctly diagnose benign lesions was low and did not improve significantly due to the intervention.

If correct diagnosis of skin lesions depends on pattern recognition, then practice at examination of skin lesions is required.[29] However, errors in diagnosis may result when this process fails, and it has been proposed that contextual factors such as the location of the lesion or patient factors might create a bias for a particular diagnosis even when features typical of a particular lesion are present.[29] In this community at high risk of skin cancer, there is a possibility of true skin cancers remaining untreated if fewer lesions are thought to be benign, an undesirable change for valid reasons.[30]

Constraints Imposed by Study Methods

In the real world of office practice, randomized controlled trials are constrained by self-selection for participation and selection bias with respect to patients. It was not possible to randomize the patients as well as the doctors, so the most likely explanation for the difference in the patients of the intervention and control group doctors is the effect of clustering. Only a much larger sample of doctors could reduce this effect, especially where a particular problem such as skin cancer that requires specific treatment or procedural skills is the subject of the study. In a relatively small community of practitioners, it is also difficult to conceal an intervention from a control group and provide a more formal educational program on diagnosis of skin lesions only for the intervention group. The potential effectiveness may have been limited by the time constraint to further feedback imposed by the study, or averaging of findings across the broad range of practitioners, with their heterogeneous range of patients, may have contributed to the demonstration of little change in average diagnostic performance.

Implications for Evaluation of Educational Interventions

The use of different educational strategies is about introducing and implementing change: evaluation of these strategies provides the impetus for improvement. This study attempted to locate the learning about both skin cancer diagnosis and management within the practice of participants, and measure clinically appropriate diagnostic and management performance outcomes resulting from an educational intervention. However, several challenges that limited the effectiveness or the measurement of the effectiveness of the intervention were encountered. When the change in practice (to attempt clinical diagnosis and record it for the pathologist, and improve the number of adequately excised skin lesions) was under the doctors' control, improvement resulted once a need to change had been identified. Since diagnostic performance was patient-centered, caution is advised in concluding from this study that diagnostic skills for general practitioners cannot be improved. The study highlights the difficulty in choosing suitable outcome measures of diagnostic performance in a heterogeneous group. In addition, although audit and feedback may not have produced the desired change, more information is needed about the behavioral response to feedback of audit data in

the longer term. More complex patient- and doctor-related interventions might be required to promote improvement in diagnostic performance, although from the practitioners' point of view, appropriate management rather than a specific correct diagnosis may produce similar patient outcomes.[31]

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Original Article

Continuing Medical Education-Driven Skills Acquisition and Impact on Improved Patient Outcomes in Family Practice Setting

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Abstract

Background: *An abundance of educational theory, design, and delivery of continuing medical education (CME) learning interventions, including their impact on learners, are described in the health and social sciences literature. However, establishing a direct correlation between the acquisition of new skills by learners and patient outcomes as a result of a planned CME learning intervention has been difficult to demonstrate.*

Methods: *The learning intervention described here tested the impact of an injection skills-acquisition program for family physicians treating osteoarthritis of the knee by measuring patient outcomes using the pain and function subscales of the Western Ontario and McMaster (WOMAC) 3.0 osteoarthritis index, a standardized and fully validated patient-centered outcome measurement. It was hypothesized that patients of family physicians who participated in this skills-acquisition CME program would benefit from treatment administered by their physician during the time between injection skills acquisition to 6 weeks post-injection. Inclusion of a validated health status measure administered pre- and post-injection in addition to more traditional faculty and participant program evaluations was deemed necessary to test this hypothesis. Rheumatology, orthopedic surgery, and family medicine specialists from across Canada were invited to contribute to the planning, curriculum elaboration, and delivery of the viscosupplement injector preceptorship (VIP) program. Thirty-nine orthopedic and rheumatology specialists agreed to serve as expert faculty and participated in training 474 Canadian family and general practitioners over 8 months. The learning intervention involved a review of pertinent literature by a local preceptor and a summary of recommendations of the planning committee, followed by demonstration of injector skills and then supervised practice with patients, who received hylan G-F 20 (Synvisc™, Ridgefield, NJ) usually in the offices of the family physicians. The pain and function subscales of the WOMAC 3.0 questionnaire were self-administered to each patient in their physician's office, prior to receiving their joint injection and again at or near 6-weeks post-injection. Data were analyzed in the Department of Epidemiology and Biostatistics at The University of Western Ontario, London, ON.*

Results: *Clinically important statistically significant improvements in pain and physical function were noted in patients who received viscosupplementation treatment from family physicians who had recently acquired the necessary injection skills. Approximately three-quarters of the*

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patients experienced a reduction in pain and an improvement in physical function of at least 20%.

Implications: *These results suggest a positive relationship between acquisition of a new skill by learners and improved patient outcomes as a result of this planned CME learning intervention.*

Key Words: Continuing medical education (CME), family physicians, injection, measurement devices, patient outcomes, skills acquisition, validation, viscosupplementation, WOMBAT, WOMAC

An environmental scan of the continuing medical education (CME), rheumatology, and orthopedic literature and input from expert preceptors from across Canada revealed there is no standardized country-wide undergraduate or postgraduate curriculum or other well-defined educational process for acquiring joint injection skills.[1] For most family physicians, these skills seem to be acquired on a rheumatology or orthopaedic rotation as an undergraduate, intern, or resident, or from a colleague while in practice. A needs assessment conducted among 44 family physicians in southwestern Ontario indicated that 59% were interested in acquiring knowledge about joint injection, of which half expressed particular interest in viscosupplementation. This article reports the development of a knowledge- and skills-based CME program. The impact of the program on participating family practitioners and on the patients they subsequently treated with their newly acquired skill was also evaluated.

Methods

A curriculum-elaboration meeting was organized, involving seven medical specialists in orthopedic surgery, rheumatology, and family medicine; these specialists also formed a steering committee. This group was to provide professional input in the development of a curriculum for injection training of family physicians and elaborate the scope and dimension of a suitable learning intervention, including an instruction manual and participant workbook along with other relevant CME materials. A 1-day meeting was held to define target audience needs, training group size, faculty qualifications, training locations for physician instruction, patient qualifiers, evaluative mechanisms, and incentives. It was also agreed that viscosupplementation with hylan GF 20 (Synvisc™, Ridgefield, NJ), an injectable form of osteoarthritis therapy, would be used in the training of family physicians.

A viscosupplement injector preceptorship (VIP) program skills acquisition manual (SAM) was developed with input and review from the steering committee. The SAM was to serve as both a guide for expert faculty and a resource for participants: it included information on basic anatomy of the knee, diagnosis of knee osteoarthritis, treatment guidelines for knee osteoarthritis, and patient selection criteria for viscosupplementation with Synvisc™. Sections addressing mode of action, clinical and adverse effects, warnings and contra-indications to Synvisc™ treatment, and practical pointers were also included. Issues concerning use of injectable corticosteroids were also addressed for the same areas as for viscosupplementation. The remainder of the manual provided practical tips for giving injections and for the prevention and management of adverse reactions, and troubleshooting guidelines. The manual also included samples of all evaluative mechanisms (pre- and post-injection pain and function subscales of the Western Ontario and McMaster [WOMAC] 3.0 questionnaire, faculty expert preceptor-program evaluation, and participant-

preceptor program evaluation questionnaires) and an extensive reference list of peer-reviewed literature. The WOMAC index is widely used, and is a valid, reliable, and responsive self-administered tridimensional health status measure for knee and hip osteoarthritis studies, available in visual analogue and adjectival formats in over 30 different languages.[2]

Faculty trainers (expert preceptors) were contacted by a third party (KARMA® Clinical Relations Canada Inc.) to participate in the program. Faculty identification was based on market research and intelligence provided by the supporting pharmaceutical and device manufacturers, and used the following criteria:

- Specialist or family physicians who have particular skills in injection techniques, primarily in the knee;
- Physicians who possess advanced knowledge of principles of viscosupplementation and its mode of action and success rates, and have used viscosupplementation in the past month;
- Physicians who have successful experience with Synvisc™;
- Physicians who are local experts in osteoarthritis of the knee as evaluated by local family practitioners; and
- Physicians who are interested in CME and in teaching other physicians and health care professionals.

Forty potential expert preceptors were contacted by telephone and interviewed to determine their suitability, interest, and availability to participate in the learning intervention; 39 agreed to participate. Each subsequently met with members of the steering committee either personally or by conference call to discuss the program. Each received a SAM prior to follow-up contact to familiarize themselves with the instruction materials that participants would receive before their training session.

Participants (family practitioners) were identified and contacted by representatives of the pharmaceutical and device manufacturers, and were invited to attend the VIP sessions by the following criteria, evaluated in a personal interview:

- The family practitioner expressed an avid interest in acquiring joint-injection techniques to the representative;
- Viscosupplemenation was not currently used for osteoarthritis therapy in the family practitioner's practice, primarily due to lack of expertise in joint injection;
- The family practitioner was willing to devote 4 hours to participating in a training session;
- The practitioner could provide a patient with osteoarthritis of the knee(s) who was amenable to joint injection;
- The practitioner would participate in the evaluation process (pre- and post-injection WOMAC 3.0 questionnaires); and
- The family practitioner would continue self-directed use of the injection skill to maintain competency.

Representatives then organized a training session for three to five family practitioners and a local expert preceptor; this is an effective format to enhance learning.[3] Each session was conducted in the clinical practice of the participants, which, although variable, always was one of the following: the preceptor's offices or group-practice clinic; the expert preceptor's private practice, or a hospital. A typical training session consisted of a small-group interactive learning session followed by live patient injection-technique demonstration and practice, all taking place over approximately 4 hours. Each family physician was required to bring one patient with osteoarthritis of the knee(s) and the patient's x-rays to the training session. Prior to injection, participants supervised the administration of pre-injection WOMAC 3.0 questionnaires to their patients and the expert preceptor re-examined each patient and confirmed the

osteoarthritis diagnosis and suitability for visco-supplementation therapy. The practical work began when the expert preceptor determined that the group felt ready to begin injecting. Each family practitioner injected their own patient under the supervision of the expert preceptor, while being scrutinized by their peers. Since a full course of Synvisc™ requires three intra-articular injections administered 1 week apart, the preceptor was available to the family practitioner should difficulty be encountered during subsequent injections. In only 9 of 445 (2%) cases did a family practitioner contact the expert preceptor for additional training or to request that the expert preceptor perform the follow-up injections on their patient. An average of four family practitioners participated in each training session, with 96 individual sessions completed in 6 months across Canada.

A second objective of this study was to validate a patient global assessment question for future incorporation into a modified WOMAC 3.0 index, that we have provisionally termed the Western Ontario Measurement Battery (WOMBAT 3.0). If successfully validated, the WOMBAT 3.0 would contain the WOMAC pain and physical function subscales, and a patient global assessment of knee osteoarthritis subscale. In contrast to the WOMAC 3.0, the WOMBAT 3.0 would not contain a stiffness subscale. This modification was to accommodate recommendations made at the OMERACT III Conference[4] and in the Ostearthritis Research Society guidelines document[5] in which pain, function, and patient global assessment (but not stiffness) were established by international consensus as core set clinical variables for future osteoarthritis studies. The WOMAC 3.0 and the patient global assessment question were prepared in adjectival (Likert) format, in both English and French for Canada, and combined in a single questionnaire, hereafter referred to as the WOMAC/PGA questionnaire.

Data were coded, entered, and analyzed in the Department of Epidemiology and Biostatistics at the University of Western Ontario using the SAS program.[6] Descriptive statistics were used to characterize responses to the three questionnaires. The statistical significance of the treatment effect was evaluated using both parametric (Students *t* test) and nonparametric (Wilcoxon Signed Rank test) methods. Previous comparisons of these two approaches using the WOMAC Index has not shown important differences in levels of significance or data interpretation.

In order to validate the patient global assessment question, the approach captured by the OMERACT Filter was used.[7] The OMERACT Filter for selecting outcome measures places emphasis on those that fulfill criteria for truth (validity), sensitivity (responsiveness + reliability), and feasibility. Validity was assessed by testing convergent construct validity between patient global assessment scores and WOMAC pain and function subscale scores. Sensitivity was evaluated by comparing post-injection and pre-injection patient global assessment scores: feasibility was evaluated by observing if completed WOMAC questionnaires were accompanied by completed patient global assessment questions.

Results

Only 445 five patients received injections, since 29 of the 474 physicians were unable to supply a patient but had not stated this in the interview selection process (completion rate = 94%). Of the 890 potentially available WOMAC/PGA questionnaires, 602 were returned sometime after the first injection: of these, there were 163 complete pairs (i.e., preaccompanied by post) that were used in the analyses reported. Of the remainder, 115 had only a pre- and 25 only a post-injection assessment, 18 contained data from different knees at the two assessment points, and in 118 (59 pairs), the post-injection assessment was made less than 21 or more than 84 days after the pre-injection questionnaire was completed. Although all post-injection assessments should have been completed at 6 weeks, there was considerable variation in when post-injection assessments were made (Figure 1). We elected to restrict the data analysis to

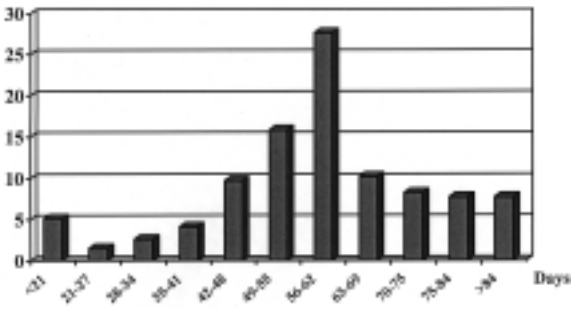

Figure 1 Time to completion of post-injection WOMAC 3.0.

subjects who had completed their post-injection assessments between 3 and 12 weeks. Three weeks is the first week after completion of the series of three injections, and 12 weeks is the point used in several published studies to evaluate the early response to Synvisc™.

Data from 163 subjects were used in the analysis. Pre- and post-injection WOMAC scores and associated change scores for the two subscales are presented in Table 1. These improvements were clinically important and statistically significant for both WOMAC 3.0 subscales (pain = physical function at $p < .001$, by both parametric and nonparametric analyses). Notwithstanding the current lack of responder criteria for osteoarthritis knee studies, patients were classed as responders if they fit either of the following two definitions: 20% or more reduction in pain and 20% or more reduction in pain as well as 20% or more improvement in physical function. Seventy-four percent of participants were responders by the first definition and 73% by the second.

More than 94% of family practitioners agreed or strongly agreed that the VIP program was practical and relevant, met their objectives and expectations, was credible and well organized, that time and interaction were adequate, that the preceptor was knowledgeable, and that they now felt comfortable with the procedure and would consider viscosupplementation as a treatment option for osteoarthritis knee patients in their practice (Table 2). Almost 100% of preceptors agreed or strongly agreed that the program was practical and relevant, met their objectives and expectations, was credible and well organized, that time and interaction were adequate, and that they would participate in future VIP programs.

With respect to the validation of the patient global assessment question, there was a strong positive correlation between patient global assessment scores and WOMAC pain and function scores. For pre-injection, pain had an r = 0.59 and function had an r = 0.62 at $p < .001$; post-injection pain had an r = 0.79 and function had an r = 0.77 at $p < .001$; the change score for pain had an r = 0.69 and function, an r = 0.71 at $p < .001$.

Table 1 Clinical Profiles Pre- and Post-Injection with Synvisc™

	Variable	n	Mean	SD	Min.	Max.
Pre-injection	WOMAC pain	163	10.55	3.45	1	20
	WOMAC function	163	37.36	11.67	8	68
	Global assessment	157	2.94	0.79	1	4
Post-injection	WOMAC pain	161	6.04	4.5	0	20
	WOMAC function	163	23.18	14.36	0	66
	Global assessment	161	1.71	1.14	0	4
Pre- to post-difference	WOMAC pain	161	4.50*	4.16	–11	18
	WOMAC function	163	14.18*	14.32	–37.69	54
	Global assessment	156	1.21*	1.19	–3	4

* $p < .001$, by Student's *t*-test and Wilcoxon Signed Rank test.

Table 2 VIP Program Evaluation Summary

Ranking		Neutral (%)	Agree (%)	Strongly Agree (%)
Practice relevancy	EP	–	26.0	74.0
	FP	0.6	29.2	69.6
Met course objectives	EP	–	26.0	74.0
	FP	1.9	26.1	71.4
Met personal expectations	EP	–	32.0	68.0
	FP	2.5	27.5	69.4
Credible	EP	–	42.0	58.0
	FP	3.1	31.7	64.6
Well organized	EP	5.0	37.0	58.0
	FP	1.9	27.3	69.6
Adequate time for learning	EP	–	26.0	74.0
	FP	2.5	25.8	70.4
Adequate interaction with expert and peers	EP	–	21.0	79.0
	FP	0	20.1	78.6
Participate as expert again	EP	–	21.0	79.0
	FP	–	–	–
Learning objectives met	EP	–	–	–
	FP	0.6	25.0	73.7
Knowledgeable and skilled expert preceptor	EP	–	–	–
	FP	0.6	13.8	84.9
Comfortable with repeating procedure	EP	–	–	–
	FP	4.6	28.7	65.7
Will use viscosupplement in practice	EP	–	–	–
	FP	–	38.3	60.7

EP = expert preceptor, FP = family practitioner.

Pre-injection and post-injection patient global assessment scores and the associated change scores relating to responsiveness are illustrated in Table 1.

The improvements noted were clinically important and statistically significant ($p < .001$ by both parametric and nonparametric analyses). With respect to feasibility, all completed WOMAC questionnaires were accompanied by completed patient global assessment questions.

Discussion

The majority of previous CME studies have assessed the consequence of the CME intervention at the level of the motivation, knowledge, or intention to change behavior by the learner.[8–12] While these are useful endpoints from an educational standpoint, they leave unanswered the more important question of whether the CME program had a meaningful and beneficial impact on the health status of patients subsequently treated by those who participated. This tendency to measure more-proximal endpoints is understandable, since the measurement of clinical consequence is both complex and costly. Furthermore, it is difficult to directly attribute alterations in the health status of patients to the learning intervention: this may have deterred some previous investigators from pursuing the more important distal endpoints. Clearly, attendees at CME events are to some

extent self-selected by motivation, need, and ambition, and such individuals are not readily randomized by whether they do or do not attend the CME event.[13,14] Moreover, once attendees return to their practices, it is no longer possible to randomize their patients and examine differential effects of being treated by their own physician with versus without the recently acquired skill.[15–18]

In this study, not only the experience of the preceptors and learners but also the changing health status of those patients whom they treated immediately after acquiring the skills necessary to perform viscosupplementation were evaluated. The preceptors were clearly satisfied with the educational experience even prior to observing a beneficial effect on the patients they subsequently injected. It is noteworthy that, following review of the SAM and completion of a supervised injection of Synvisc™, almost all family practitioners felt comfortable about viscosupplementation and would consider its use in future management of osteoarthritis knee patients. For the family practitioners, this represented a relatively small time commitment to acquire a skill of general value in the management of osteoarthritis and delivery of intra-articular therapy. It also permitted skills acquisition to occur in a clinical environment supportive for both the family practitioner and participating patients. The preceptors were often teaching in locations remote from their practices and on patients they had not previously met or examined. That the preceptors were also satisfied with their involvement in the VIP programs and would participate in future programs underscores the success of the intervention.

This is particularly remarkable given the inherent difficulty of maintaining consistency in delivering a learning intervention at multiple sites in different geographic areas with regional variations in health care systems, and involving faculty and learners with different medical specialty backgrounds. The uniformly high level of satisfaction expressed by faculty and learners can be attributed to the planning, design, and delivery approaches employed in this intervention. Variations of several adult learning principles and other approaches described in the literature were adopted and applied,[19–21] and may be summarized as follows:

1. A multi-stakeholder approach, receiving input and validation by faculty and learners at each stage of the development and delivery processes;

2. Multiple learning devices versus reliance on a single educational event;

3. Delivery in or close to the community in which the learners practice;

4. Learners involving their own patients rather than artificial models;

5. Small learning groups; and

6. Self-assessment and immediate feedback to faculty and learners from their own observations of patient outcomes provided by their administration of the pre- and post-injection WOMAC 3.0 questionnaires.

In assessing patient outcomes, it is important to use measures that are valid, reliable, and responsive. The WOMAC osteoarthritis index is one such measure, and has been extensively used in over 50 countries throughout the world.[2,22,23] In this study, clinically important improvements were noted in WOMAC pain and function scores. Furthermore, while there is currently no internationally accepted definition of responder criteria for osteoarthritis knee studies, a cutpoint used in rheumatoid arthritis studies[24] was borrowed and three-quarters of patients were observed to experience a clinically meaningful response in both pain and function following viscosupplementation.

Furthermore, the patient global assessment question used in this study was shown to be valid, sensitive to change, and feasible, thus fulfilling the requirements of the OMERACT filter. It is therefore proposed that the patient global assessment

be used to supplement the standard WOMAC 3.0 index to create a WOMAC 4.0, or that it replaces the stiffness subscale in the WOMAC 3.0 to create a modified index termed the WOMBAT 3.0 that meets OMERACT/OARSI guidelines.

Potential limitations of the study merit consideration. In general, bias may occur as control over experimental conditions diminishes. Clinical benefit was observed among patients treated by participants in the VIP program. Since the program was delivered as a package, the relative contribution of its different components cannot be discerned. However, the combination of the SAM and the experienced preceptors provided optimum conditions for small-group learning and for practicing a newly acquired skill. This was an open study in which expectation bias both by the family practitioner and patient could modulate the response, potentially in a favorable direction. For example, the family practitioner could have presented the possible benefits to patients in an enthusiastic way, and patients who elected to participate might be self-selected on that basis. However, double-blind randomized placebo-controlled trials of Synvisc™ have demonstrated the intrinsic efficacy of viscosupplementation,[25] which has been substantiated in controlled trials of nonsteroidal class agents[26] as well as in open studies,[27] indicating that while the response may be modulated by expectation in some patients, it does not account for the improvement in health status observed.

Some procedures required for this study were more commonly used in clinical trials based in academic centers. The requirements for patient selection were detailed in the SAM, while the verification of a diagnosis of knee osteoarthritis was performed by the expert preceptor based on a personal interview and examination of the knee and accompanying radiographs. Of the 445 patients who participated, complete WOMAC/patient global assessment data within the 3- to 12-week period were available on 163, although some data were available on 380 patients. These protocol violations and losses to follow-up are likely attributable to the absence of a clinical research organization monitoring the data acquisition, a contingency strongly recommended for future family practitioner-based studies of this type.

The use of a self-administered outcome measure (WOMAC 3.0) in this study obviated any family practitioner-associated positive reporting. While the global question in the WOMBAT is new, this question is valid, responsive, and feasible, and may be used in future osteoarthritis knee studies either within the WOMBAT 3.0 or as a supplementary question within a WOMAC 4.0 index.

Conclusion

The VIP program was successful in training family practitioners to apply a safe and effective intra-articular therapy in patients with knee osteoarthritis. The most important design element was longitudinal evaluation of those patients who were recipients of a family practitioner's newly acquired skill. The clinically important and statistically significant improvements in health status that occurred following Synvisc™ injection underscore the true value of the VIP program and establish a link between improved patient outcomes and a newly acquired learner skill when CME professionals apply several essentials of adult learning theory and incorporate a standardized validated health-status measure in design and delivery of a CME enterprise. In an environment of multi-stakeholder demand for evidence of effective use of health care resources, including CME resources, the use of patient outcomes as a measure cannot be ignored. CME professionals need to consider this trend and examine cost-effective ways of incorporating these measures into the design and delivery of future CME endeavors.

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Review

Changes in Human Consciousness and Health Care

Lilian H. Hill, PhD

Daloz LAP, Keen CH, Keen JP, Parks SD. Common fire: lives of commitment in a complex world. Boston: Beacon Press, 1996.

The authors of this book designed a study exploring the idea of citizenship in an increasingly complex world. They conducted interviews over a period of several years with more than 100 people "who had sustained long-term commitments to work on behalf of the common good, even in the face of complexity, diversity, and ambiguity" (p. 5). Daloz et al. sought to answer four questions: (1) What are such people like? (2) How do they become that way? (3) What keeps them going in spite of inevitable discouragement? (4) What can be done to encourage this kind of citizenship to meet the challenges of the 21st century?

The authors' findings include five habits of mind that they found to be characteristic of people in the sample. They are (1) the habit of dialogue in which meaning is constructed through interaction with others; (2) the habit of interpersonal perspective taking, including the ability to take another's perspective and respond to their feelings and concerns; (3) the habit of critical, systemic thought demonstrating the ability to identify parts and their connections, to identify coherent patterns, and to evaluate them; (4) the habit of dialectical thought, the ability to hold contradictory thoughts by resisting premature closure or reframing one's thinking; and (5) the habit of holistic thought, the ability to grasp life as an interconnected whole. The people interviewed were not immune to discouragement or confusion, but these habits "steady them in turbulent times and foster humane, intelligent, and constructive responses to the complex challenges that we face" (pp. 105, 108).

Four primary directions are described that can be used as key points of orientation for our interactions with key sectors of our daily lives such as family, higher education, and the professions. These include (1) creating time to pause, reflect, and assess; (2) cultivating constructive engagement with otherness; (3) developing and using a consciousness of connection; and (4) attending to the character and use of language. The authors recognize that our current emphasis on autonomy, individuation, and separation leads us to overlook and neglect how diverse peoples, issues, and things are connected.

Changes in human consciousness mean that we (1) are capable of developing a more inclusive world view and forming allegiances beyond the local, (2) are becoming more cognizant of the interdependence among humans and between humankind and the earth, (3) have a growing ability to cope comfortably with ambiguity, and (4) are learning to value complexity and diversity. The authors are calling for changes in the way we think, the way we relate to the rest of the world, and the way we identify with all of humanity.

The first characteristic in our evolving consciousness is the identification with a larger group than our immediate relatives and neighbors or those in our immediate city, region, or nation. Rather than a local focus, we need to enlarge our view to encompass more of the globe. Because the survival questions we face are more collective

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than individual, a critical issue is how we define "our people." Empathy provides a path to species awareness. Daloz et al. suggest that constructive engagement with difference is a way of experiencing our human commonality through thinking and feeling our way into the minds of others. An innate ability that may be nourished or inhibited, empathy is essential to understanding the value of others beyond our immediate circle.

After centuries of promoting individual development with accompanying emphases on competition and separation, Western scholars in a variety of fields are questioning the centrality of individualism and note that the reverence for individualism contributes to a sense of isolation and loneliness, promotes economic exploitation, elevates a competitive view of international relations, and leads to exploitation of natural resources in the service of competition and self-gratification. Daloz et al. highlight the need to move away from a focus on self-interest toward viewing all of humanity as one species. Connectedness needs to be emphasized over individualism, interdependence on other human beings and the earth over separateness and domination. Meaning will be constituted in relationship with others as will our sense of self. Recognizing ourselves as an integral member of a larger system will allow us to cultivate the cooperation to address the urgent problems of our time.

The diversity of viewpoints and complexity of contemporary life can create ambivalence in our minds as we struggle to reconcile and make meaning of competing perspectives. Daloz et al. found that constructive engagement with otherness allows people to see cultures as systems, resulting in the ability to view their own cultures more critically. Conflict and contradictions may be seen as challenges to help us think more deeply and profoundly. Wisdom involves knowing that what separates us as human beings is unimportant compared to what unites us with all of humanity.

Diversity is necessary to survival and the resilience to adapt to our changing world. Differing cultures and peoples need to be respected in their wholeness and need not be forced into a Western model. Rather, cultures need to remain intact in their distinctness to be able to make unique contributions to cultural dialogue. Ways to communicate across differences need to be explored and a common ground to be found among us. Amid our cultural diversity we can recognize ourselves as what we are, a common species. Instead of searching for similarity or imposing conformity, the commonality of the characteristics and life experiences we share as humans are important.

Forming a comprehensive worldview, embracing complexity and diversity, and coming to understand our mutual interdependence engenders ambiguity. Human beings, by their nature, continually work to impose patterns of order and significance on their experiences; we are inveterate meaning makers: "The conditions of life assault our meaning-making capacity. The diversity of viewpoints and the complexity of contemporary conditions create an ambivalence that gnaws at the edges of our consciousness, eroding our conviction" (p. 107).

Changing the way we think will allow us to learn patience to cope with difference and multiple meaning systems; taking a holistic, comprehensive view of issues will help. Understanding an issue from within a larger set of relationships imparts a significance to what might otherwise seem contradictory, random events. Paradox may disguise an underlying unity. By linking immediate problems with larger, global issues, we can learn to see the connections between them and cultivate a broader framework.

Although this book has much to offer societal dialogue and the theory and practice of the health care professions, some reservations must be noted. It does not take into account cultures other than the U.S. that are already more communal or even microcultures within North America that do not accept the ethos of mainstream culture. The authors appear to be writing for a white, educated, middle-class audience. Little is offered in the way of a concrete path leading to changes in human

consciousness. Finally, in their unfortunate use of the term "the commons," they ignore centuries of slave history. Nevertheless, this is a compelling book that can stimulate reflections about our work and our role in the world. Their findings indicated that there are people who display a practical wisdom that allows them to see the big picture while not losing sight of the particulars, to recognize connections among people while maintaining their identity, and to understand the humanity of people different from themselves.

In the health care professions, we are daily confronted with diversity among our colleagues and patients and in differing perspectives on health care. Some of the people included in this study are involved in the health care professions, and they were found to have a clear sense of purpose for their work. They did not yield to cynicism. Many of them were under considerable stress, and strengthening the capacity to work effectively under stress is a critical skill to maintain good health. People in the study welcomed new people into their profession and provided mentoring. They advocated service to others as a path to healing, both for themselves and their clients. Finally, they taught others that the health of each individual depends on the health of all. To respect the interdependence of all and for the world to become a healthier place, many changes are needed. One critical change would be to make health care better available to all, which requires imagination and the ability to confront the complexity and ambiguity integral to this issue. Daloz et al. suggest that "healing entails addressing sources of health, stress, and disease in a manner that can restore wholeness and develop the capacity to maintain one's equilibrium amidst shifting forces. The purpose of healing is to manifest wholeness in the largest sense—the wholeness of spirit, body, society, and the entire earth community" (p. 237).

As health educators, the way we teach and learn contributes to the transformation of culture. What can be discerned from this book is the need to cultivate greater cognitive complexity, resist inappropriate simplification, emphasize communalism instead of individualism, and develop appreciation for diversity and our interdependence. We can emphasize the needs of the group, not to induce conformity but to encourage responsibility. We can emphasize engagement with otherness and assist learners not to be afraid of competing or different perspectives. We can support learners' efforts to persist in the face of ambiguity and complexity and to learn to see the connections in apparent contradictions by taking a larger perspective. Approaching our work with this kind of holism can amplify the meaning of our educational efforts, for ourselves and the people we work with.