BASIC SCIENCE EDUCATOR

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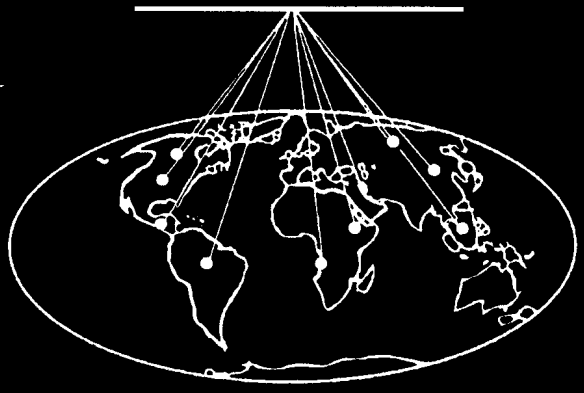
The Journal of the International Association of Medical Science Educators

IAMSE



The Edinburgh Declaration

Do Freshman Need to Flounder?

Medical Curriculum Governance

Learning the Skills of a Physician

Teaching With the Web

Mentoring Junior Faculty

IAMSE on the Web:
http://www.iamse.org

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MISSION STATEMENT

The mission of the International Association of Medical Science Educators is to promote medical education through faculty development and to ensure that the teaching and learning of medicine in the 21st Century continues to be firmly grounded in science. We strive to achieve this by:

- sharing both current and innovative means to teach the sciences fundamental to the practice of medicine, and by
- providing a forum for discussion of issues in medical education which affect the basic sciences and those who teach these subjects.

CONTENTS

VOLUME 9 • NUMBERS 1 & 2 • 1999

MESSAGE FROM THE PRESIDENT

Roger W. Koment, Ph.D.

Who was it that said, "The only thing constant is change"? Of course, we have all seen that process abused, but when change is linked to well-considered plans, the result is termed progress. In this issue of the *Basic Science Educator*, our lead article by Professor Henry Walton, Past President of the World Federation for Medical Education, presents an example of a well-considered plan, formulated and implemented in cooperation with leaders around the globe. His reflections on the work of the World Federation that resulted in creation of the *Edinburgh Declaration of 1988*, and a decade of influence provide us a window on change. This article serves to underscore that we in North America are not unique. The global movement toward reform in medical education is real, and it has created the environment and need for the International Association of Medical Science Educators (IAMSE). With reform comes the expectation that individual faculty members will rise to meet the challenge. And that is precisely where IAMSE with its mission of professional support and educational resources helps individuals become proactive influences on what can then be termed progress.

Progress within IAMSE itself has resulted from many well-considered plans involving change, not the least of which have influenced the *Basic Science Educator*. Peruse this issue and see the evidence. To begin, there is a 40% increase in number of pages compared to our last issue. A major step forward has been the appointment of J. Charles Eldridge, Ph.D., of Wake Forest University School of Medicine as Managing Editor of our journal (p50). Chuck is now the second of the proposed Editorial Board leadership triad of Editor, Managing Editor, and Production Editor, as our search for this latter position continues (p25). Since the last issue, seven of eventually fifteen Manuscript Reviewers (p30) have been accepted to the Editorial Board now relieving our Associate Editors who formerly did all reviews.

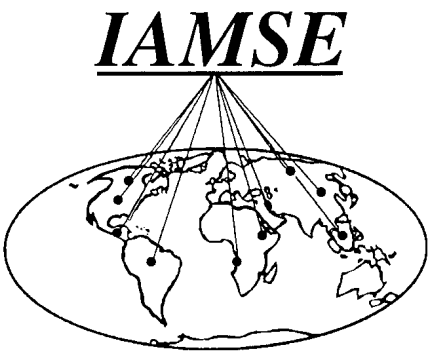
Debuting in this issue are two new features. *Recognitions* (p45), is a column dedicated to recognizing IAMSE members who are walking the walk and living the talk. Such honors to our members by their students and peers reflect well upon IAMSE and we are proud to acknowledge them in print. Submission of your award or honor is encouraged. The second feature *Afterthoughts . . .* (p39) now replaces the former *Quotable Quotes . . .* This is a redirection to encompass not only quotations, but anecdotal accounts, original poetry, or brief commentary reflective of the process and meaning of medical education and the practice of medicine. In this issue, Michelle Rodgers, a fourth year medical student, demonstrates the gentler side of becoming a physician.

The extent and relevance of our articles continue to evolve and this issue focuses on several diverse and timely themes. The feature *In My Opinion . . .* returns with another debate, this time presented by Scott, Groshong, and Margolius on the issues surrounding governance of the medical curriculum (p19). Shomaker et al. (p8), and Gloria Casale (p26) both speak to the necessity of training students in professionalism in medicine, and Lee Lee Doyle (p34) presents a novel program to ensure that quality in junior faculty through mentoring. D'Eon and Lyon demonstrate an example of piloting curricular innovation when influence is restricted to only one portion of a course (p13). Our Webmistress (p46) tours us through major revisions of the IAMSE website to be launched on the significant eve of Y2000, and Chris Chandler (p31) helps the "electronically challenged" among us with a primer for teaching in this "Brave New World". As the voice of IAMSE, the *Basic Science Educator* continues in its goal to provide our membership with useful and thought-provoking material.

Other news presented in this issue relevant to our organization includes announcement of plans for the Fifth Biennial IAMSE Conference to be held on July 21-24, 2001. We are pleased to announce that Mayo Clinic will be our joint-sponsor and host for this meeting in Rochester, Minnesota, U.S.A. (p12). Mark your calendars now, as the alliance of IAMSE and Mayo Clinic promises to produce an exciting and memorable event. It further underscores our commitment to science as it applies throughout the continuum of medical training.

Also to be mentioned is the first election of the IAMSE Board of Directors to be held in 2000. The IAMSE Nominating Committee will evaluate for candidacy all volunteers who express interest in serving on the Board (p44). We encourage you to participate in this electoral process by following our progress at http://www.iamse.org/electioninfo.htm and voting your choice.

As we enter a new millennium, we see the future of medical education as a new and exciting opportunity to effect change and stimulate progress. This is truly a global opportunity that requires a global response. With cutting-edge technology, and our collective experience and creativity, IAMSE is poised to accept this challenge, and to foster professional excellence worldwide in medical science education.



The *Edinburgh Declaration*: Ten Years Afterwards

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INTRODUCTION

The *Edinburgh Declaration* (Table 1) is a mandate for reform of medical education, which was derived from enquiry at national level, internationally agreed upon by medical educators in global consensus, endorsed regionally, formally accepted by governments, and approved by the world health parliament. It reflects the convictions of medical teachers, medical students, doctors and other health professionals, and the general public around the globe. Its long-term goal is improvement of health care for all the populations, and its implementation has been wide.

The *Declaration* is an instrument for reorientation of medical education. Its initial justification derived from a signal U.S. venture[1] demonstrating that any reform was bound to fail unless based on a specific statement which had been arrived at, and formally adopted by, those committed to the change process. The World Federation for Medical Education (WFME) undertook to provide such an instrument for reform, the essential statement necessary for reorienting medical education to produce doctors relevant to health care needs of individuals and communities. This article reviews the tenants of that document and the impact it has made on reform in medical education around the world over the past decade.

> ***The* Edinburgh Declaration, *now translated into all major languages, has been very widely adopted as a basis for reform of medical education.***

WFME GLOBAL COLLABORATIVE PROGRAM

The WFME began a Global Collaborative Program in 1984, initiated by an intensive global enquiry, the first such investigation ever conducted. The *Six Major Themes* document[2] was translated into many languages and sent to the deans of all medical schools world-wide. They responded to 32 questions. Their replies were analysed at national conferences, and the ensuing *National Reports* were intensively considered at six Regional Conferences during 1987-1988 (Dublin, Brazzaville, New Delhi, Amman, Kuala Lumpur and Rio de Janeiro). The World Conference on Medical Education[3] followed. Held in Edinburgh, Scotland in 1988, delegates from the six Regional Associations represented all countries world-wide.

The *Edinburgh Declaration* sets forth the recommendations of the 1988 World Conference, encapsulating the consensus views of medical teachers, health care advisers, national governments and international bodies across the world, and constitutes a model for the reorganization of medical education.[4] The *Declaration* subsequently received endorsement by governments of all member countries, the World Health Assembly (WHA) adopting Resolution 42.38 on 19 May 1989.[5] The health parliament of the world thereby endorsed the mandate for reform arrived at by national, regional and global action, and fostered the necessary political will by calling on the governments of all member states to implement the reform in medical education which the *Declaration* has outlined. Five years later, WHA Resolution 48.8, 1995 repeated the charge to member states to reform their medical education systems.

The *Edinburgh Declaration*, now translated into all major languages, has been very widely adopted as a basis for reform of medical education. Currently, there is a greater surge of reform world-wide than at any time since the start of the century.

OUTCOMES OF THE *DECLARATION*

Entire regions of the world have in recent years aimed to change their medical education systems in keeping with the 12 principles of the *Declaration*. For example, the Pan-American Federation of Associations of Medical Schools credits the *Declaration* accordingly, as do the National Associations for Medical Education of many South American countries. The *Declaration* was reformulated[6] to meet South American regional priorities and administrative structures at the 1995 international conference at Bogota of the Colombian Association (ASCOFAME). This meeting was cosponsored by WFME, the World Health Organization (WHO), the Pan-American Federation of Associations of Medical Schools (PAFAMS) and the Latin American Association of Medical Schools (ALAFEM).

Individual countries perhaps illustrate most explicitly the direct impact of the *Declaration*. An example is Portugal, where

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Table 1. The *Edinburgh Declaration* of 1988

ACTIONS WITHIN THE MEDICAL SCHOOL
1. Widen educational settings
2. National health needs as the context for curricula
3. Active learning methods (tutorial, self-directed and independent) for continuity of learning throughout life
4. Require professional competence (not mere knowledge recall)
5. Train medical teachers as educators
6. Prevention of illness and health promotion
7. Integration of science and clinical practice
8. Selection of applicants for non-intellectual as well as intellectual attributes

REQUIRES WIDER INVOLVEMENT
9. Coordination of medical education and healthcare systems
10. Balance in production of categories of medical staff and other health professions
11. Multiprofessional training and teamwork
12. Provision for continuing medical education

UNESCO and WFME, with the Portuguese government and national medical education authorities, carried out a joint project for reorienting the curricula of the medical schools. The *Declaration* was used as "a reform protocol of medical education in Portugal at the request of the Ministers of Education and Health of that country."[7] The recent monograph[8] which specifies in detail the extensively revised medical curriculum to be implemented in all the Faculties of Medicine in Portugal cites the *Edinburgh Declaration* as its first reference.

Regarding the South East Asia Region specifically, a country that may be cited in illustration is Thailand, best conveyed in the words of Professor Charas Suwanwela addressing the WHO/WFME Regional Conference on 7 February 1996 at Pattaya:[9] "The World Federation for Medical Education with its 1988 World Conference and 1993 World Summit on Medical Education has provided ideas and stimulus for change in medical education. The *Edinburgh Declaration* and the *Recommendations* of the World Summit were milestones providing directions and guidelines for action. The impact was felt at the National Medical Education Conference in Thailand and has led to changes in all medical schools. For instance, experience in a rural health setting is now a requirement in all medical curricula, and the ability to manage health care facilities is now required of medical graduates."

This demonstration of the primary importance of the *Declaration* as the very basis of reform and reorientation of curricula medical world-wide can be replicated by manifold instances where explicit acknowledgement is expressed. Equally frequent are the extensive national or institutional reforms that manifestly implement the principles of the *Declaration* without overt acknowledgement, but with close accord. The validity of the *Edinburgh Declaration* remains uncontested as a global mandate for reform of medical education.

The late James Grant,[10] Executive Director of UNICEF, spoke of "the historic *Edinburgh Declaration*", commenting it had been a vision in 1988 but by the 1993 *Summit* the proposed reforms had become "practical, realistic and do-able."

REAL LIFE SETTINGS VS THE IVORY TOWER

The very first principle (Table 1) of the *Edinburgh Declaration* was the insistence that the university center alone could no longer serve unaided as the educational base for future doctors: "Enlarge the settings in which educational programs are conducted to include all health resources of the community, not hospitals alone."

For such enlargement of the learning base to occur, all health service resources of the country must be mobilized. *Principle 2* requires medical education to reflect national health priorities and the resources available in countries. Ministries of Education and Ministries of Health must cooperate, and together create the committee structures integrating the medical education system with the health care system. Perhaps such academic and health care delivery partnership is foremost among the necessary reforms, and spells the end of academic elitism and exclusivity in medical education. District hospital, community clinics, and family practices are settings for learning in addition to the teaching hospital, as are schools and the workplace. Skills are to be acquired in the places where medical morbidity is actually encountered.

ACTIVE LEARNING

Principle 3 requires elimination of passive methods of learning. The Flexner Report[11] at the start of this Century already insisted that the only sort of medical student of any use is an *active* medical student. Exactly because contemporary medicine requires a scientifically sophisticated doctor, the science base of the medical curriculum must function to activate students, and not simply perpetuate the passive role induced by obsolete didactic methods. Flexner could never have envisaged the disastrous misreading of his Report, leading to separate basic science departments being administered as competing fiefdoms, each with their own didactic agendas, resulting in passivity-inducing curricula becoming commonplace.

INFORMATION OVERLOAD

Two other liabilities result, one of which – information overload – is targeted by *Principle 4*. The curriculum is disfigured by emphasis, both in teaching methods and in examinations, on retention and recall of facts as a curricular aim. Much content now cluttering curricula in any case can be moved into postgraduate programs or, indeed, continuing medical education (CME).

MEDICAL TEACHERS AS EDUCATORS

One obdurate barrier to necessary reform, which *Principle 5* addresses, is the inertia of medical teachers - a profound obstacle within the medical school itself. Educational commitment is accorded scant regard. Many teachers, it hardly needs mention, have not ever had personal instruction about how to teach. The ACME-TRI Report[12] published by the Association of American Medical Colleges showed that a main reason for failure of reform is the apathy of teaching staff. The general conclusion was that it seemed next to impossible to get a critical mass of medical teach-

ers interested, concerned and involved in the education of medical students. At issue was the regularity with which medical education can still be dismissed as merely the harmless hobby of isolated academics. The medical education literature remains little cited in medical faculties, and medical education research is invariably a closed book to all but a very few medical teachers.

Such educational obscurantism on the part of the staff of medical faculties is now altogether untenable. The entire medical professional scenario has changed, and with this transformation medical education has come of age. Economically, medical education is big business. In England the postgraduate deans receive government funds to pay half the salaries of all junior doctors (the hospitals pay the other half); in Scotland the postgraduate deans pay the total salaries. Medical education is legally of great consequence. In the European Community medical education is governed by international law. For instance, the European Court ruled against the legality of the United Kingdom specialist regulations, and this adverse legal ruling led to massive restructuring of the entire postgraduate training system of Britain. Postgraduate training previously had been in stasis under the aegis of the Royal Colleges. Managerially, medical education has become a force with which to be reckoned. Medicare now pays half the costs of graduate medical education in the United States.

To package different sciences in separate departments obfuscates learning, by suggesting that the sciences present clinically in separate subject or disciplinary parcels.

THE NEW MEDICINE

The preamble of the *Declaration* urged:[4] "The aim of medical education is to produce doctors who will promote the health of all people, not merely deliver curative services to those who can afford it or for whom it is readily available." The first principle insisted on extended settings for learning. Skills are to be acquired in the places where medical morbidity is actually encountered. *Principle 6* states that the new medicine calls for equal emphasis on promotion of health and prevention of illness, as well as curative medicine. The requirement follows that every department and branch of medicine must rethink the educational content provided as its contribution to the medical curriculum.

EDUCATION IN THE SCIENCES

Principle 5 attends to the charge that basic science education is too little, too isolated, and too simplistic. Throughout the world the medical sciences are taught separately from the clinical subjects. *Principle 7* specifies science teaching must be integrated with clinical practice. As anomalously, the sciences are taught in isolation from each other.[13] To package different sciences in separate departments obfuscates learning, by suggesting that the sciences present clinically in separate subject or disciplinary parcels. Division of the curriculum into halves, with the so-called *basic* sciences taught first, has been disastrous. Empirical surveys repeatedly show students are bored with these *preclinical* disciplines, which they regularly perceive as hurdles to be overcome before they can proceed to clinical studies.

Science must imperatively be rehabilitated into the curriculum, vested interests and expediency countered by insistence on the biosciences as integral to proper medical studies. Of the three curriculum paradigms (traditional, systems-based, and problem-based), only the first is tenable when the curriculum is bifurcated. The third paradigm is supported by *Principle 7*.

THREE KINDS OF CURRICULUM

Most medical curricula are *traditional*: they have a preclinical phase, they are discipline focused, the major objective is memorization of facts, with teachers in a dominant authority role and students passive. The innovative development since the 1960's was the *organ systems approach*, with basic sciences and clinical subjects integrated, and with the curriculum administered by educational committees and not controlled by individual disciplines. The third, most recent form of curriculum is *problem-based learning*, in which separate disciplines are not learned in sequence; instead, the students (working in groups) are presented with a particular "problem" (e.g. sudden, severe left chest pain), and they pursue all possible knowledge and skills to explain that phenomenon. All medical schools wish to advance from the traditional paradigm; however, the difficulty is that, by and large, medical teachers are not trained as educators. They do not have the skills for adopting sophisticated teaching styles, which promote self-learning on the part of their students. This of course is necessary in recognition that the knowledge base is constantly changing.

TWO TYPES OF MEDICAL SCHOOLS

Medical schools are either *public*, when they are government funded and in most cases part of the national university system almost always under the Ministry of Education. Otherwise, they are *private*, meaning independently funded, and the students pay comprehensive tuition fees. This differentiation constitutes two rather distinct spheres of medical education, administered by separate organizations (e.g. in Japan). Some of the very many private medical schools around the world either within countries or "offshore" are academically substandard, inadequately funded, and sometimes established mainly for profit motives. On the other hand of course, private schools can be flexible and innovative. For example, the only problem-based curriculum in Germany is at Witten Herdecke, a private school.

GOVERNANCE

Reform of any particular subject in a medical curriculum is an overall faculty undertaking and not merely a departmental matter. The medical school as a whole often resists it. The politics of medical education are only now coming to be understood. The hard lesson has not yet been learned that a curriculum should never be changed until the system of administration and the committee structure responsible for the curriculum has first been modified appropriately. A separate, independent curriculum

committee is essential to counter the influence of departments over the organization of teaching, and thus to prevent control of the curriculum by staff who are certainly not concerned primarily with education. Information overload, which is perniciously destructive, is inevitable and progressive unless demands of departments are neutralized by taking the curriculum out of departmental control.

Bloom[14] has documented that "Educational values become subordinate to the requisites of the organizational structure of the medical school." Curricula are controlled by basic scientists or by teachers whose primary interest lies in research, clinical investigation and scientific publication. Medical school teachers appointed to be in charge of academic departments and teaching hospitals are, of course, scientists and specialists. They all stake claims for curriculum time, and inevitably the empire-building that results has a distorting influence on the curriculum. Special pleading by such department heads for "coverage" of their discipline is a doctrine now thorough discredited.

Furthermore, those responsible for administering medical schools do not give priority to education. Certainly in the United Kingdom, the deans state candidly that they have too much else to do, and thus will delegate educational matters to curriculum committees. However, such committees often have no budgets of their own, have limited autonomy, and indeed may be dominated by departmental heads. A governance *system* must be established which reports directly, and only, to the dean, and is not answerable to the various departments of the medical school.

INSTITUTIONAL LEADERSHIP NEEDED

The solution to these problems lies in educational leadership, certainly not commonly provided by all deans. The necessary educational administrative and committee structure is essential, as is medical student involvement in the process. The curriculum must on no account allow or require medical students to be passive. Teaching and learning must focus on clinical competence and performance, not memorization of excessive detail. Neither can medical school staff continue as educational amateurs. The curriculum is no longer to be constructed through powerplay among contesting departments. The literature on curriculum reform leaves no doubt about the customary sabotage manoeuvres that constantly neutralize efforts at reform, and is equally explicit about methods to achieve effective change. The educational brief for institutional leadership is clear.

THE INSIDE-OUT DICHOTOMY

The *final four principles* of the *Declaration* insist that forces extraneous to the medical school are formidable barriers to reform in medical education. Medical education is only partially under the control of medical faculties. As medical schools face up to the challenge of reform they are confronted by the brute reality that capacity to change is only partially within the power of the institution itself.

These last four principles, which are outside the scope of medical schools themselves, depend for implementation on external agencies. Examples include the national government, or a national statutory body such as the General Medical Council in the United Kingdom, or a quasi-statutory body such as Wissenschaftsrad in Germany, or the Commission of the five universities with medical faculties in Switzerland. Full cognisance must be given to this crucial reality, that external agencies have statutory powers over the medical schools that may prevent reform. In Denmark, for instance, all medical schools by governmental decree now must institute a bachelor degree within the curriculum, a policy not conducive to countering the preclinical-clinical division.

The educational institutions have often proved inept at reforming aspects of curricula well within their competence to change. This is particularly true for their obsolescent, damaging teaching methods and examination practices. Medical schools, however, do not carry sole blame. Their room for manoeuvre can be drastically restricted by limiting external forces, often not identified.

MEDICAL EDUCATION AS A CONTINUUM

The *Declaration* concludes with *principle 12* that specifically targets continuing medical education. It is accepted as an anachronism to focus on any one of the three phases of medical education (Undergraduate, Postgraduate, and Continuing Medical Education) in isolation. Comprehensive planning of the entire continuum has become obligatory. The number of entrants admitted to medical school should be in keeping with the provision for postgraduate training places and these in turn should accord with the doctors needed by the nation. Competence of such doctors must be maintained throughout professional life. This actuarial planning should also seek to achieve a proper balance between specialists and primary health care doctors (general practitioners). Medical education policy-making bodies are essential in every country, with representation from the universities, postgraduate training bodies, health services, governments, medical associations, etc. Their purpose must be to ensure professional standards, warrant public confidence, and prevent the misguided production of excessive numbers of doctors with defective skills.

AFTER THE *DECLARATION*

Since its adoption, a concatenation of massive social, political, economic and managerial changes impacted in major ways on medical schools world-wide. The 1993 World Summit on Medical Education[15] again held at Edinburgh, was titled "The Changing Medical Profession" precisely to emphasize that educational redefinition of medical doctors had to heed the sweeping changes in health care delivery.

The World Summit focused on new external and tangential forces affecting the entire practice of medicine. Prodigious changes have resulted from economic recession, the managerial revolution, and transformation of medicine into a business. Immense political changes also supervened. In Europe the demise of Communism led to the creation of 22 new countries. World-wide genocidal wars of barbaric ferocity escalated. The 1993 Report of the World Bank, launched to the medical community at the Summit, documented the Health Transition. It described how developing countries now suffer from the same diseases as in the West, and how longevity was approaching that in developed countries. Medicine had helped to create, and was now confronted by, an ageing world. Moreover, AIDS, an entirely new epidemic

had arisen. This confronted educators with the novel challenge of young, often intelligent adults requiring care, when numerous surveys had amply established that a main deficiency of contemporary doctors was inability to communicate appropriately with patients.

REGIONAL ACTION

Implementation of the Summit *Recommendations* was carried further at six Regional Conferences[16] during 1994-1995. Every region of the WFME (Europe, Africa, the Americas, the Middle East, Southeast Asia and the Western Pacific) explored intensively, within the local context, the crucial requirement that effective medical education is no longer possible without a close relationship between the health care system and the medical education system. To achieve such harmonization between medical education and health care, all six WFME Regional Conferences called for the conjoint creation in every country of authoritative and resourced health councils, to link Ministries of Education and of Health, the medical schools, and professional bodies.[16] Medical education reforms always need the sanction of national governments for full implementation, very often imperatively so if any practical action is to follow aspirations and plans.

For such enlargement of the learning base to occur, all health service resources of the country must be mobilized. Ministries of Education and Ministries of Health must cooperate, and together create the committee structures integrating the medical education system with the health care system. Perhaps such partnership is the foremost among necessary reforms, and spells the end of academic elitism and exclusivity in medical education. Both WHO and UNESCO have sponsored the global enquiries resulting in consensus that supports this major reorientation, and have together called the Ministerial Consultations[17] for mobilizing governmental commitment.

CONCLUSIONS – THE TIDE OF REFORM

Progress in educational reform has been prodigious. An inexorable tide, greater than that at any time since the start of the century when Flexner's Report[11] revolutionized medical education in North America is now flowing world-wide. There is no doubt that the world scene is at last set for decisive, effective action.

In formulating the extensive reorientation of all stages of the training of doctors, to accord with the health needs of countries, WFME has been allied in the reform process by the United Nations agencies concerned with health in the widest sense. Notably, these have been WHO, UNESCO, UNICEF, UNDP and the World Bank, and by the international non-government organizations partnering the Federation, the great foundations, and the national governments.[18] The health parliament of the world, by World Health Assembly Resolutions 42.38, 1989 and 48.8, 1995, has endorsed the mandates for reform arrived at by regional and global action. It has fostered political will by calling on the governments of all member states to implement the reorientation in medical education as outlined in the *Edinburgh Declaration*. Over the past ten years, the principles espoused in the *Declaration* have successfully unified an international effort and provided a global strategy for reform in medical education.

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Introduction to Medicine: Do Freshman Medical Students Need to Flounder?

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INTRODUCTION

Like many other medical schools across the United States, the University of Utah School of Medicine heeded the growing chorus of reports from various organizations calling for a review and revision of the process and content of the medical school curriculum.[1-3] Four years ago we set out to design a new medical school curriculum that was built both upon valid principles of adult education and capable of giving our students the knowledge and skills they need to practice medicine in the dynamic health care environment of today. In the process of introspection and information gathering, we identified many of the same problems and reached many of the same conclusions of others who had blazed the trail of reform before us.[4,5]

Thus, we too relied heavily on passive learning formats and assessment procedures that emphasized rote memorization over true understanding. In general, no efforts were being made to integrate related material across courses and to structure its presentation in ways that made it relevant, consistent and interesting. We could see that our students were in class for so many scheduled activities that they had little time to contemplate what was learned and why it was important. In addition, we concluded there was insufficient opportunity for students to develop life-long learning skills.

We also came to agree with a conclusion previously raised by the AAMC report, *Physicians for the Twenty-First Century*,[6] that "... medical education should be viewed as a continuum that spans premedical preparation, medical school, residency training and continuing medical education." Fourth-year subinternships and first-year residency orientations help prepare medical school graduates to assume the new roles and responsibilities of being house officers. Many residency programs offer practice management courses to senior-level housestaff to prepare them for medical practice. However, we were not doing enough to help incoming freshmen adjust to the rigors of medical school.

On the transition between baccalaureate education and medical school, little has been said or written despite the fact this transition is important to the long-term development of physicians-to-be. This is an extremely exciting, challenging, and stressful time for students. Rather than allowing students to flounder with basic science course work on the first day of school in the kind of "sink or swim" approach our traditional curriculum employed, we decided to take a different approach. It was calculated to take advantage of the commingled sense of wonder, excitement, and anxiety we all see in our freshmen students in the early days of their medical education. We designed and implemented a new course in the fall semester of 1997, titled "Introduction to Medicine." This four-week course begins on the first day of medical school and ends four weeks into fall semester *prior to* the beginning of the first year basic science coursework. As described in this following report, it is specifically intended to serve as a bridge between college and medical school.

On the transition between baccalaureate education and medical school, little has been said or written despite the fact this transition is important to the long-term development of physicians-to-be.

TRANSITIONS

The Introduction to Medicine course is an explicit acknowledgment that the starting of medical school is an important transition. In fact, it is no exaggeration to say that beginning medical school is a life-altering event. In most cases, students have worked and dreamed for years about reaching this point. The beginning of medical school is an important milestone, the symbolic welcome to an ancient and honorable profession. As such, it is also an opportunity to socialize and educate students about the roles and responsibilities of physicians. A "White Coat Ceremony" is held during the first week of medical school to mark this transition and begin imprinting the idea of the physician as a professional. During this ceremony, each incoming student receives his/her first white coat.

Another transition experienced by students is that of advancing from undergraduate to professional school. This is impor-

tant in two ways. First, students will be called upon to deal with a workload they have most likely never experienced before. Many are aware of this reality of course, and it manifests itself in anxiety and apprehension. Second, several of the educational techniques employed such as problem-based learning and hands-on clinical activities are foreign to many students, and they may not understand their roles and responsibilities in these learning formats.

To address these issues a number of activities have been designed to acquaint students with their educational responsibilities and to provide them with some "coping skills". Thus, on the first day of school an "active learning orientation" is held in which educational formats that will be used and what students will be expected to do in each format are described. In addition, this session introduces the idea that students are primarily responsible for their own education, and therefore, must take an active rather than a passive role to receive the most from their experiences.

Introduction to Medicine also incorporates time management, study skills and stress management workshops. To encourage a sense of community and shared purpose among the class, a team building exercise is also included, modeled on similar programs developed for industry. A number of social activities are spread throughout the month to encourage students to get to know each other and the faculty that will guide them through the rigors of the curriculum.

GOAL

Introduction to Medicine is the only course students take during the first four weeks of medical school. Its goal is to set the tone for the entire four years of undergraduate medical education that follow. Thus, it is intended to familiarize and gradually acclimatize students to what will be expected of them academically and professionally. In addition, the course introduces and establishes a number of key themes that feature prominently in later courses and run concurrently throughout the medical curriculum. They include (1) professional and ethical development, (2) humanism/humanities, (3) personal health and fitness, (4) information management, and (5) evidence-based medicine/the health of populations. These five themes are the fundamental foundation upon which the new curriculum rests. Some examples of the reappearance of these themes in future curriculum include the following. A Social Medicine course in which various psychosocial issues surrounding medical practice are addressed during the first two years. A Science of Medicine course in which students learn basic biostatistics and to critically read scientific articles taught during the first two years. A Topics in Medicine course in which rotation specific patient cases are discussed during third year hospital rotations. An Ethics course taught during the fourth year, and a required Rural Medicine Preceptorship during the fourth year in which students serve in an under-served area of the state and complete a health project in the community.

Each theme is treated in several different ways over the duration of the Introduction to Medicine course. The traditional curriculum of this school typically began by giving students important basic science content information before they had any idea of why the information was important or where it fit into the context of being a physician. Our hope is that by introducing these five themes early on, when students are most accepting and open minded, they will begin to develop (a) a framework of attitudes and principles about medicine and its place in society, and (b) a context in which they may place specific information that will follow.

In general, the academic work load for students during Introduction to Medicine is fairly light; however, it does increase in intensity as the month progresses so that students begin to appreciate the task they will face when the basic science curriculum begins.

1. Professional and Ethical Development

As the practice of medicine has become more cost conscious, economic incentives are being used more overtly to influence physician behavior.[7] In many cases these incentives are perfectly appropriate but some encourage physicians to "cut corners" that may compromise patient care.[8] Often, the only bulwark standing against the erosion of the doctor-patient relationship that is the cornerstone of medicine is the professional ethic of the physician.[9] Therefore, we believe the subject of professionalism bears early and repeated emphasis in the curriculum. The "White Coat Ceremony" previously described is the beginning of this process in Introduction to Medicine. There are also a number of other activities that develop this theme in the course. For example, a small group exercise is done where students are asked to develop their own code of ethics. They then compare the results of the various groups in a plenary session. Multiple sessions are devoted to talks and panel discussions presented by a variety of practicing physicians that discuss the roles, challenges and satisfactions of medicine in the 90's. Finally, a model of effective doctor-patient communication is presented, having a master clinician perform a history and physical examination of a patient in front of the class.

2. Humanism/Humanities

Social subjects have sometimes been regarded by medical students as "soft" and not important when compared to the hard sciences.[10] However, students often lack the perspective to see that these social skills, in reality, comprise the true art of medicine and are essential to the profession. In the Introduction to Medicine course the concept is established that a caring approach to people is often the physician's most important disease-fighting or health-enhancing tool.[11] Several activities designed to highlight humanism have been included to encourage students to think seriously about this philosophy. For example, several patient panels introduce students to what it is like to struggle with chronic diseases and what patients like and dislike about the physicians they have encountered. These are extremely powerful sessions that students find very meaningful. The master physician examining the patient in front of the class, mentioned above, models a humanistic approach to the most personal of encounters in the doctor-patient relationship.

In addition, a series of lectures on the history of medicine places the role of physicians in western society into context. Sessions on medical anthropology and alternative medicine challenge students to think about the role of healers in other societies and about the role of nontraditional health practices in our own society.

3. Personal Health and Fitness

Little emphasized, but simple truth, is that physicians must be healthy themselves if they are to effectively care for their patients. Good personal health habits are certainly just as important for physicians as they are for patients. Patients find their physician's advice on lifestyle choices much more credible if those physicians model the expected behavior themselves.

Personal health is also important for medical students because many habits acquired in medical school are carried over into residency and practice. Many students who exercise regularly abandon the habit when they confront the time pressures of medical school. In the Introduction to Medicine course we emphasize that taking care of yourself as a physician is important and that healthy habits should not be abandoned. Eating correctly and exercising need not take a lot of extra time. Each student completes an individual personal health assessment consisting of aerobic fitness testing, body fat analysis, a personal habits and nutrition survey, and cholesterol and HDL screening. A plenary session is held to interpret the results of this testing for the students.

A panel of physicians who are recovered substance abusers address the students about the potential for and dangers of substance abuse in medicine. Finally, a stress reduction workshop provides practical tips on how to manage the stressful life of a medical student.

Placing the medical profession in a context they can understand, and to which they can relate, allows students to appreciate why basic science material they are learning is important and relevant to their development as physicians.

4. Information Management

As we learn more about how the human body works in health and disease we are required to be continuously selective about what we choose to teach our students. There is time to expose them to but a fraction of what is known today, and there is no way of knowing what unanticipated wonders we will discover tomorrow. The only practical approach is to focus not on content, which is ever changing, but rather on process. Thus, students must be taught how to approach problems.

Problem solving requires collecting, analyzing and synthesizing data, tasks for which the computer is the ideal tool. It is already impossible to imagine practicing medicine without the assistance of computers, and the 21st Century will no doubt see an acceleration of this inevitable trend. Medical education is also being revolutionized by the availability of Internet learning resources, sophisticated educational software and electronic syllabi.[12] Although these developments continue to unfold, the reality is that there are still many students who come to medical school knowing little about computers or how to use them. Because many courses in the new curriculum depend heavily on computer use, the Introduction to Medicine course provides training to ensure that all students acquire a minimum level of computer literacy. Students receive small group seminars in basic information management skills including e-mail, word processing, data base searching, spreadsheet manipulation, and the use of audio visual and presentation software.

5. Evidence Based Medicine/Health of Populations

The use of the primary literature as a tool for patient management decisions, specifically evidence-based medicine, has recently been discussed and advocated.[13] The information management revolution has, for the first time, made this practical. At the same time, medicine has been called to task for its lack of emphasis on the health of the population as a whole.[14] Epidemiology and public health issues were afforded little importance or discussion in the traditional curriculum. The Introduction to Medicine course provides the necessary basic instruction in computer skills and epidemiology that will be built upon in subsequent coursework devoted to research methodology, medical literature analysis and evidence-based medicine.

The basics of the content domain of epidemiology are covered in four internally written problem-based learning cases spanning six three-hour sessions. These cases call for the students to use their information management skills to produce a series of assignments including a literature search, a paper on an important topic in epidemiology, and a fifteen-minute oral presentation using audio visual aids and presentation software.

These assignments not only force the students to use their computer skills but also begin emphasizing the importance of learning interpersonal communication skills in medicine. In the problem-based learning sessions students have their first exposure to small group learning and practice skills of oral communication and self and peer assessment which are so important to successful group dynamics.

STUDENT ASSESSMENT

Students are graded exclusively on the epidemiology module, as this represents the most structured aspect of the Introduction to Medicine course. Epidemiology provides sustained contact of faculty and students though six three-hour sessions. Grades are given for the two major assignments: the paper and the oral presentation.

COURSE EVALUATION

Following the pilot course in 1997, 93 respondents from a class of 100 students evaluated Introduction to Medicine as the most popular of the six new courses in the curriculum (3.3 on a scale of 1-4). Again in 1998, the Introduction to Medicine course received good evaluations (3.1 on a scale of 1-4) from 99 respondents (see Appendix for evaluation instrument). Students especially appreciated the problem-based learning sessions, patient panels and physician professionalism sessions. They enjoyed the opportunity to interact and develop interpersonal relationships with faculty, staff and classmates. Specific suggestions were made

regarding sessions to add, delete or modify which were incorporated into the 1998 version of the course. For example, the history of medicine content was reduced and several introductory anatomy classes were added to provide students a "head start" on this difficult course. Some of the required computer skills classes were made optional as computer background varied widely amongst the entering students. Finally, some additional sessions on professionalism and medical values were added to further emphasize the importance of this subject to students.

CONCLUSIONS

The Introduction to Medicine course at the University of Utah School of Medicine represents a unique opportunity to ease students into the rigors of medical school while exposing them very early to topics of great importance to the practice of medicine. Although other curricular designs also teach students these subjects, the advantage of the Introduction to Medicine format is students are presented this material at a time when not distracted by the demands of other courses. Some might argue that students have insufficient background at this early stage of their education to appreciate some of these subjects. We would respond that students always surprise us by knowing more than is expected, and it is never too early to plant seeds that will bear fruit in the future.

Another significant advantage of this course is that it provides students with a framework in which to begin considering what it means to be a physician. Placing the medical profession in a context they can understand, and to which they can relate, allows students to appreciate why basic science material they are learning is important and relevant to their development as physicians.

We anticipate that the gradual transition to medical school this course affords students will significantly reduce stress levels and academic adjustment problems that are so common early in the curriculum. Finally, we believe the use of team building exercises, social events, and small group learning sessions will help students get to know each other and contribute to a sense of shared mission that will encourage class cohesiveness. We hope this will result in the development of an informal peer support group that might also reduce academic problems.

The Introduction to Medicine course provides a unique opportunity to establish a positive educational and supportive environment for the entire curriculum. Furthermore, the subthemes of professionalism, humanism, personal health, information management and evidence-based medicine that are established in this course are of fundamental importance to the practice of medicine. Although Introduction to Medicine is only the first in a series of exposures to these issues, their emphasis early in the curriculum sends a clear message that these subjects are integral to the type of physician graduate we strive to produce.

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APPENDIX 1. Introduction to Medicine Course Evaluation, Autumn of 1998

The following ratings were used to evaluate the course:

4= I strongly agree; to a very great extent.
3= I agree; to a moderate extent; happened frequently.
2= I'm neutral.
1= I disagree; to a small extent; happened infrequently.
0= I strongly disagree; did not occur.

	Mean	Respondents
1. The course objectives were clearly defined.	3.2	98
2. The amount of material presented was appropriate.	2.9	97
3. Epidemiology concepts were adequately covered.	2.5	98
4. The clinical relevance of the subject matter was clearly demonstrated.	3.3	98
5. Overall, the grading system was fair.	3.5	98
6. Overall, this course was effectively presented.	3.1	97

ANNOUNCEMENT

Mayo Clinic
To Joint-Sponsor Fifth Biennial IAMSE Conference

The IAMSE Executive Committee is pleased to announce that Mayo Clinic will Joint-Sponsor the Fifth Biennial Conference of the International Association of Medical Science Educators. Thomas Viggiano M.D., M.Ed., Associate Dean for Student Affairs, Mayo Medical School, will be our Site Director and Host for this event that will be held in Rochester, Minnesota, U.S.A. on July 21-24, 2001. Preparations for this event have already begun with a call for nominations to create an International Program Committee posted to the IAMSE member e-mail broadcast list. As in the past, this committee will determine the central theme of the conference and have responsibility for developing all aspects of content. All nominees for this committee should send a letter stating their interest and areas of expertise to Robert Carroll, Ph.D., Secretary of IAMSE <carroll@brody.med.ecu.edu> This request for background information has become necessary since the selection committee routinely receives between 6 and 8 applicants for each of the 7 positions on the conference Program Committee.

For further information and to follow our progress as it happens, please visit the 2001 conference website at http://www.iamse.org/conf5_menu.htm

Helping Medical Students Learn Pharmacology

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INTRODUCTION

At first glance teaching seems to be a simple and straightforward activity. But, to the conscientious practitioner, it is a complex, challenging, and rewarding experience because (among other reasons) the central purpose of teaching is helping students to learn. Teaching is primarily about helping. It is not the main activity that takes place in classrooms, lecture halls, and small group settings but rather is secondary to learning, the outcome it is intended to promote. Teaching is also a relationship of one human being to another. We do not, for example, teach pharmacology, but rather we teach students of varying backgrounds, abilities, and aspirations to master or understand the body of knowledge that we call pharmacology. Finally, teaching is inextricably linked to learning, which we define briefly as a relatively durable change in an individual. By teaching, we are trying to change our students; to help them think new thoughts (what receptors are, how drugs work), to be able to do new things (make diagnoses and treat patients intelligently), and hold new values and attitudes (pharmacology is worthwhile and interesting). It was with this philosophical orientation that a radical departure was made from more traditional approaches during a time the Department of Pharmacology was engaged in a course revision.

The module described... featured several departures from tradition, especially in the lecture format, and in the tutor-student pattern of interaction during small group sessions...

This article describes how a 2.5-week module within a 33-week pharmacology course for second year medical and dental students was designed, and also how that module was evaluated. Both content and process expertise were bought to bear on this project. The course was organized so that each week a 50 minute lecture (given to all 80 students) was followed by a 75 minute tutorial (16-18 students divided into four groups of four or five). This pattern of lecture and small group tutorial was common to all modules in the course. However, the module described in this report featured several departures from tradition, especially in the lecture format, and in the tutor-student pattern of interaction during small group sessions that is prevalent in the largely conventional medical school curriculum at the University of Saskatchewan. We found that students held positive views of several features of this module; e.g., receiving an orientation to the unit days before the first class, having less packed and slower paced large group sessions, the teaching style of the instructor, the preparation for the cases and exercises, and the more active small group sessions. The information that was collected as part of the evaluation has enabled thoughtful reflection on teaching and made further changes and refinements to the module possible.

DESCRIPTION OF THE COURSE

Changes were made to the pharmacology course because faculty in the department had serious concerns about the previous structure and outcomes. Students had been divided into five small groups of approximately 16 each. There were no whole-class lectures. An instructor would teach his or her specialty area to each of the groups in turn, so that on any given day, each group received instruction in one of five areas of pharmacology. A large and daunting collection of exercises for students had become the basis of the group discussions and problem solving. However, these classes often became mini-lectures and students were generally unprepared. Faculty became dissatisfied with this situation and recognized the need to develop methods to encourage more active student participation.

The revised 33-week general pharmacology course now consists of 10 modules that "bridge" basic science and clinical drug therapy by teaching students the scientific principles upon which rational drug prescription is based. To help achieve this integration, the order of the modules matched closely instruction in the various body systems taught collaboratively by several of the clinical departments. A few pharmacology instructors took the initiative to consult with these clinical faculty members regarding the relevance of the content of the module they were designing. During the 33 hours of whole-class sessions (1 hour per week) and 49 hours of small group tutorials (1.5 hours per week), students are introduced to the mechanisms by which drugs and classes of drugs produce their effects. The course does not emphasize detailed information on individual drugs as this may be obtained from reference textbooks. Specific drug therapies are

taught in the clinical courses.

DESCRIPTION OF THE MODULE

The module described below is the fourth of ten modules in this course. The overall goal was to help students learn to explain and apply the principles of pharmacology necessary to understand the treatment of patients presenting specifically with the following clinical features. 1) Elevated cholesterol levels alone or in combination with elevated triglycerides (antihyperlipidemic agents), and 2) a venous or arterial thrombus (anticoagulant, antiplatelet, thrombolytic agents). The 2.5 weeks actually consisted of a total of six scheduled hours, which included three hours of whole-class instruction (lectures) and three hours of small group discussions. To prepare the four cases and recall exercises used in this module, the instructor consulted extensively with a hematologist on faculty to help determine the most clinically relevant information and her opinion of the level of basic science understanding that medical students ought to have.

Four days before the first session of our module, students were provided a handout describing what was expected of them from their previous courses and pre-medical school studies. These were termed "entrance objectives". Entrance objectives were developed in collaboration with directors of the physiology and biochemistry courses that medical students had taken the year before. Also contained in the handout were objectives for this module of pharmacology and the case studies and problems to be discussed in tutorial groups (See Appendix 1). Objectives were clearly written, attainable, and observable.[1]

The first lecture of this module began with a 10-minute overview of hemostasis and its regulation. Students were then allowed 30 minutes to read their textbooks (*Basic and Clinical Pharmacology* by B.G. Katzung) and consult within pre-assigned small groups regarding the mechanisms of action of heparin, warfarin, aspirin, streptokinase, and alteplase, before the session ended with a 10 minute summary. These specific drugs were selected as they are representative of classes of drugs commonly used to treat either venous or arterial thrombi. We believed that students would better acquire a framework to enable them to engage in purposeful reading and independently achieve the module objectives for other agents such as glycoprotein IIb/IIIa antagonists and ticlopidine, if first they learned the mechanisms by which these agents interact with specific biochemical pathways during a 50-minute large group session. Unfortunately, there was no mention of bleeding disorders, a mistake that will be corrected in the next iteration of the module.

The second lecture included an overview of the metabolic pathways of lipids and lipoproteins and a discussion in their small groups centered on a multiple choice question related to a patient presenting with elevated triglycerides. Students were allowed 30 minutes to read about and discuss the mechanism of action of bile acid binding resins, niacin, fibrates and HMG-CoA reductase inhibitors. The lecture ended by polling the students for their answers to the question and providing a model answer and explanation.

The tutorial sessions that followed each lecture featured four case studies (for the anticoagulant, antiplatelet and thrombolytic agents) or four information recall exercises (for the antihyperlipidemic agents), one for each of the small groups of four or five students within each tutorial grouping. These case studies and recall exercises are presented in Appendix 1. The students were expected to spend time with their assigned small group to prepare the case study or exercise prior to attending the tutorial session. During the tutorial, each small group was given about 10 minutes to meet to confirm that all group members had answers to the questions for their assigned case. Following this, the students formed new groups with representatives from each of the four cases or questions under study. In that way, each of the new mixed groups had at least one student member that could teach the others about one of the cases or questions. For the next 50-60 minutes, students presented and discussed their specific case or exercise to the other three or four members of this mixed group. The role of the tutorial leaders (members of the department) was to circulate among the groups to listen, ask questions if necessary, and help with the resolution of difficult issues that arose out of the group deliberations.

The module contained a final lecture during which a 10-minute summary of key messages for the antihyperlipidemic agents and the anticoagulant, antiplatelet, and thrombolytic agents was given by the instructor. For 15 minutes of that last lecture, the clinical hematologist on faculty with whom the instructor had been working, presented relevant clinical scenarios which involved using the pharmacological agents that had been studied in this module. The final few minutes of the lecture were spent responding to questions related to the survey we used to help evaluate this module.

THE EVALUATION DESIGN

The evaluation of this 2.5-week module was done separately from the overall pharmacology course evaluation. It consisted of polling students (using a questionnaire and a focus group session) and a review of the literature on best practices in teaching in higher education. The questionnaire presented 13 key statements related to the organization and delivery of the module and asked students to rate their agreement on a 7 point Likert scale from zero to six. A numeric value of "6" was assigned to "Strongly Agree" and a value of "0" was assigned to "Strongly Disagree", "Don't Know" (between the two extremes and reflecting ambivalence) was given a score of "3". Sixty-eight students completed the survey (85% of the class) and most of them added detailed comments. A focus group involving 10 randomly selected students was subsequently convened and provided greater insight into the perspectives of the students.

EVALUATION FINDINGS

Several themes emerged from our evaluation, and these are discussed in turn. They include (1) the usefulness of distributing the module handout in advance of the first class, (2) the importance of presenting a manageable amount of material, (3) the role that the personality of the instructor plays, (4) the value of student preparation, (5) the effectiveness of the small groups, and (6) some miscellaneous problems with the module. A summary of the questionnaire results is provided in Appendix 2.

1. Providing Handouts in Advance

Overwhelmingly, students appreciated receiving the hand-

out a few days before the beginning of the module. The mean score in response to the statement, "I appreciated getting the handout before the first lecture", was 5.38 (SD 1.09). They felt that it helped them learn the material (Item 1, Mean 4.9, SD 1.04). Students commented that they could prepare themselves by reviewing what they were expected to know from previous courses and orient themselves to the new module generally. In particular, the objectives for this module were clearly written and attainable in the time allotted, an important feature in helping students learn.

Joyce and Weil[2] advocate the use of advance organizers as first articulated by Ausubel.[3] Although what we offered students was not designed to be precisely an advanced organizer, the material contained in the handout had the effect of orienting the student to the material to be learned which is one function of advance organizers. Ralph[4] proposes that attracting the attention of the learners is very important to effective instruction and we believe that providing the module information helped students to begin thinking about the content that we were going to help them to learn. Pre-reading, such as the course outline, is a way to achieve distributed practice that aids learning.[1] The objectives contributed to the effectiveness of the handout because they were specific and attainable in the allotted time.[5,6] A number of students noted that they found the objectives to be useful tools for their learning. For the question, "I made good use of the objectives," the mean was 4.57 (between Don't Know and Strongly Agree) with a SD of 1.34.

The overall goal was to help students learn (about) elevated cholesterol levels . . . and venous or arterial thrombus . . .

2. *Manageable Amounts of Material*

Students were also delighted with the lecture format and pace. Item 4 on the survey stated, "I came away from each of the two lectures with a clear take-home message" (Mean 5.19, SD 1.01). They were happy to have less detail and a clearer idea of the important overall framework. The mean score to Item 6, "I would have preferred longer, more detailed lectures." was 2.47 (SD 2.00) indicating moderate disagreement and wide-ranging opinions. Student comments support the questionnaire results: "It was nice to have some direction from (the instructor) in lectures (take home messages) to reinforce what was important," "It was nice not to have an info overload each lecture" and "(When there is too much information) I can't absorb it in one lecture". Students commented that they liked to get "the main concepts and principles", the "bigger, broader picture", and have "questions stressing the important points". The workload seemed to be manageable and appropriate (Item 12, Mean 4.99, SD 1.18). A student wrote, "I found that I learned what I needed to know but at the same time it didn't take me hours to figure it out!" On the other hand, some students wanted more detail from the lectures and thought they were not getting "the full package".

The literature favors lectures that have a manageable amount of material rather than lectures heavily loaded with content.[2, 4, 5, 7, 8] Newble and Cannon[9] write, "As a rule, lecturers attempt to achieve too much in their lectures" (p. 4) and Gibbs[6] concurs stating that where staff cover the material, students do not learn the material (p. 48). Conversations with faculty and written accounts confirm that it is difficult for faculty to know what to leave out.[10]

3. *Characteristics of the Instructor*

Although there were no items on the questionnaire to more objectively determine student perceptions of the instructor's teaching style, many students volunteered comments. Students mentioned her sincerity, hard work, clarity of presentation and organization, enthusiasm for pharmacology and teaching, willingness to help students learn, and that she successfully determined what students had learned in other courses. It was clear that she was respected and admired by students and that they noticed and appreciated her efforts on their behalf. Students reported that they learn better from people with whom they have rapport: "it makes you want to learn" and "it helps a lot".

Ralph[4] indicates that it is the responsibility of the instructor to ensure a positive learning climate in the classroom (p. 29). He suggests that instructors portray a humane attitude, be honest, be fair (especially in handling diversity), show respect for students, and keep promises. The socio-emotional element of the teaching and learning situation, Ralph contends, is every bit as important as the cognitive and academic elements because teaching is, as stated in our introduction, essentially a human undertaking. Ralph is supported by Davis, Alexander, and Yelon[1] who state that learning should be pleasant both in the conditions and the consequences. It seems the students were correct in independently recognizing the important role that instructor rapport played in establishing a positive climate for learning.

4. *Value of Student Preparation*

Students also felt that the preparation of the cases and questions prior to class was time well spent. Item 9, "The out-of-class preparation of the cases and questions helped me to learn" had a mean of 4.94 (SD 1.23). They considered the exercises appropriately challenging (Item 7 on hemostasis, Mean 4.78, SD 1.24; Item 8, Mean 4.68, SD 1.46). Although groups were expected to meet outside of class time to prepare for the tutorial, results of the survey indicated that almost 20% did not do so.

Preparation ahead of class time is clearly an issue of distributed practice recommended by Davis, Alexander, and Yelon,[1] and Gibbs[6] who all suggest that material be learned in short bursts.

5. *Effectiveness of Small Groups*

Many students enjoyed and benefited from the small group work in preparation of the tutorials, during the tutorial sessions, and within the lectures. Students indicated moderate agreement with statements about the small group work outside of class (Item 10, Mean 4.33, SD 1.77) and about the tutorial sessions (Item 11, Mean 4.37, SD 1.67). Comments exemplify the feelings of many, "I have found the small group sessions quite effective in

reinforcing knowledge" and "splitting up into smaller groups just to talk instead of formal presentations are (sic) excellent and have really helped me to learn". Students seemed to understand why this process was helpful to their learning: "Trying to explain to group members helps to see how well you understand" and "(students) get a great deal out of the teaching".

Many authors recommend active learning as an effective approach to helping students learn.[1,5-8] Ralph[4] recommends that students be challenged to think, give comments, practice, apply, and solve problems during periods where the instructor is present and use a "...thoughtfully planned assortment of student-centered activities at strategic points" during a lecture (p. 22). This is certainly what occurred during this module.

The following anecdote illustrates the power of the small groups to promote active learning and engage students. During the first lecture of the module the instructor directed the students to meet in their small groups to complete a short task. They had been working productively in groups for about 15 minutes when the time came to leave for their next class. Very few students actually stopped working and most continued to discuss the pharmacology task. It was necessary to point out the time and suggest that they move on to their next class. This contrasts markedly with what is normally observed in regular lectures where students watch the clock and interpret the final professorial statement, "Are there any questions?" to mean, "It's time to go!", as they quickly exit the lecture theater.

6. Miscellaneous Problems

In spite of the generally positive assessment of the module, there were some problems. A few small groups did not function very well as determined both by the students' own admission (survey results and comments) and by informal observations during lectures and tutorial sessions. The item dealing with tutorial sessions had a range from zero to six (Strongly Agree to Strongly Disagree), a mean indicating moderate agreement (4.37) and a standard deviation of 1.67. Furthermore, over 16% disagreed that the tutorials helped them to learn and almost 20% did not know. One source of frustration for students was that discussions during tutorials were not thoughtful: "There is little value in me going to them (tutorials) so that I can get a bunch of answers thrown at me." Another student expressed problems with the small group: "The difficulty was in the small group that I was assigned to work with." Some students had difficulty spending adequate time in preparation, and one student suggested that there be a weekend between the lecture and the ensuing tutorial to "assimilate the knowledge and perhaps get more from the small group session." The problems listed above are not insurmountable and we intend to make changes where possible in coming years.

CONCLUSIONS

This 2.5-week module designed to help students learn about elevated cholesterol and venous or arterial thrombus was judged by students to be successful in attaining its goal. This conclusion is supported by student survey results and is consistent with advice from published literature. The best features of this module were (1) early distribution of an outline (with clearly written objectives including "entrance objectives"), (2) the manageable amount of content, (3) the learning climate set by the instructor, (4) the value of advanced student preparation, and (5) active learning promoted by small group work. These features will be kept in further iterations of the module while solutions are sought to some of the problems pertaining to scheduling of lectures and tutorials and teamwork among students. Although there were no students' comments or questions specifically targeted at the clinical presentation by a hematologist during the last large group session, this part of the module will also be maintained.

In the same way that teaching is complex and challenging, so too is changing one's practices of teaching. Teaching is a social activity subject to the norms and constraints of peer approval and support.[11-13] One does not easily depart from accepted methods and approaches without sufficient support and resolve. The changes that were undertaken in development of this 2.5 week module had been contemplated over a number of years and the instructor, new to the department, was somewhat uncomfortable breaking with tradition by using a much more active and student-centered whole-class (lecture) instruction. Individuals who have made similar changes may take heart that they are moving in the right direction, while others may become more determined to make positive, student-centered changes to their courses, modules within courses, or individual lectures.

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APPENDIX I. Cases and Recall Exercises

Cases

ACUTE MYOCARDIAL INFARCTION

Albert Walkins is a 52-year-old man who arrives by ambulance to the emergency room of his local hospital complaining that it "feels like someone is squeezing his chest in a vise". The pain began approximately 2 hours ago while he was getting ready to go to work. The pain is radiating down his left arm and to his jaw and was not relieved when he tried to rest. On admission to the emergency room, the patient received three sublingual nitroglycerin tablets with no relief of chest pain.

1. Assuming the diagnosis is acute myocardial infarction, what initial drug therapy might you recommend? Why?
2. What adverse effects might be observed with this therapy?
3. What discharge medications would be most appropriate for this patient? Why?

Three months later, Mr. Walkins returns to the cardiology clinic for a routine follow-up appointment. He appears to be tolerating his medications well.

4. What potential modifications might you make to his medications at this time? Why?

DEEP VENOUS THROMBOSIS

Sonja Johnson is a 30-year-old woman who seeks medical attention because her right calf is very swollen and uncomfortable. She states that her right calf was tender yesterday morning and it has worsened over the past 24 hours. Ms. Johnson just drove back from Vancouver 2 days ago.

1. Assuming the diagnosis is deep venous thrombosis, which initial drug therapy might you recommend? Why? How would you initiate this therapy? Why?
2. What adverse effects might be observed with this drug therapy?
3. How do you monitor the therapy?
4. On what drug will you discharge the patient to home? How do you initiate and monitor this therapy? Why?

Approximately 2 weeks later the patient returns to your office for a follow up visit. At this time, she mentions that her stomach has been quite upset so she started to take some cimetidine tablets that she had kept from an earlier prescription.

5. What would you do now? Why?

About 2 months later, Ms. Johnson returns to your office to discuss another issue. She is contemplating becoming pregnant.

6. What would you do now? Why?

EMBOLIC STROKE

Edith Wilson is a 68-year-old woman who was brought into the emergency room by her husband about 8 hours after having the acute onset of right-sided hemiparesis. He mentions that his wife has been well until early this morning. Ms. Wilson's major concern was that her right arm and leg became weak and she couldn't get up from a chair.

1. Assuming the diagnosis is acute embolic stroke, what initial drug therapy might you recommend? Why? How would you initiate this therapy? Why?
2. What adverse effects might be observed with this drug therapy?
3. How would you monitor your therapy?
4. What long-term therapy would you recommend for this patient and how would you switch this patient from acute therapy to chronic therapy? Why?

On the third day of the switch from acute to chronic therapy, the patient's INR value is recorded as 1.8.

5. What changes in therapy would you make at this time? Why?
6. What information regarding the chronic therapy do you need to tell the patient prior to discharge from the hospital?

PULMONARY EMBOLISM

Wallace Wagner is a 69-year-old obese alcoholic male who seeks medical attention because he has had persistent pleuritic chest pain and problem breathing over the last day or so.

1. Assuming the diagnosis is pulmonary embolism, what initial drug therapy might you recommend? Why? How would you initiate this therapy? Why?
2. What adverse effects might be observed with this drug therapy?
3. How do you monitor this therapy?

4. On what drug will you discharge the patient home? Why? How do you initial and monitor this therapy? Why?

Approximately 2 weeks later, the patient returns to your office for a follow-up visit. During this visit you collected a blood specimen to monitor the efficacy of the patient's current drug therapy. About 10 hours later, you receive a call from the laboratory because his INR value was greater that 7.5.

5. What would you do now? Why?

When you contact Mr. Wagner, he mentions that just recently he has noticed that his stools seem to be black and tar like.

6. What would you do now? Why?

Recall Exercises

BILE ACID BINDING RESINS

Describe the mechanism of action for this class of drugs:
List the therapeutic uses for bile binding resins. Would you use resins in combination with any other lipid lowering drugs? If yes, why?
Outline and explain adverse effects associated with the use of bile acid binding resins.

HMG-CoA REDUCTASE INHIBITORS

Describe the mechanism of action and pharmacokinetics for this class of drugs:
List the therapeutic uses for HMC-CoA reductase inhibitors. Would you use HMB-CoA reductase inhibitors in combination with any other lipid lowering drugs? If yes, why?
Outline and explain adverse effects and toxicities with the use of HMG-CoA reductase inhibitors.

NIACIN

Describe the mechanism of action and pharmacokinetics of niacin:
List the therapeutic uses for niacin. Would you use niacin in combination with any other lipid lowering drugs? If yes, why?
Outline and explain adverse effects and toxicities associated with the use of niacin.

FIBRATES

Describe the mechanism of action and pharmacokinetics for this class of drugs:
List the therapeutic uses for fibrates. Would you use fibrates in combination with any other lipid lowering drugs? If yes, why?
Outline and explain adverse effects and toxicities associated with the use of fibrates.

APPENDIX 2. Questionnaire Item Results (n=68)

Strongly Agree = 6; Strongly Disagree = 0

	Mean	SD*
1. The module handout was helpful for my learning.	4.90	1.04
2. I appreciated getting the handout before the first lecture.	5.38	1.09
3. I made good use of the objectives.	4.57	1.34
4. I came away from each of the two lectures with a clear "take-home" message.	5.19	1.01
5. The activities in the lectures made good use of my time.	4.54	1.43
6. I would have preferred longer, more detailed lectures.	2.47	2.00
7. The tutorial cases dealing with hemostasis were appropriately challenging.	4.78	1.24
8. The questions dealing with lipid reducing drugs were appropriately challenging.	4.68	1.46
9. The out-of-class preparation of the cases and questions helped me to learn.	4.94	1.23
10. Our small group worked well together in preparing the questions and cases for the tutorial sessions.	4.33**	1.77
11. The two tutorial sessions helped me to learn.	4.37	1.67
12. The workload was appropriate.	4.99	1.18
13. I am confident that I have learned what was expected of me.	4.04	1.34

* *Standard Deviation* ** *n=57; 11 students did NOT meet outside of class*

IN MY OPINION . . .

Medical Curriculum Governance in the 21st Century: Centralized or Departmentalized

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INTRODUCTION

To centralize or remain departmentalized in the organization and control of the medical curriculum is a question facing many administrators and faculty members involved with curricular reform. With reform comes concern about the new and as yet, little used centralized governance system versus the tried and trusted departmentalized system of governance. This is certainly an issue when integration is the focal point of that reform. From an informal survey during the IAMSE Third Biennial Conference, most attendees were involved with curricular reform at some level, and most were interested in the governance of medical education that accompanied that change. The 1984 report from the Panel on the General Professional Education of the Physician,[1] commonly known by its acronym the GPEP Report, recommended an interdisciplinary approach for designing and implementing an integrated curriculum. This was a major philosophical change. At that time, the traditional curricular governance that centered on the dean and departmental Chairs was preferred by the AAMC.[2] In spite of this, curricular reform, driven by a variety of factors has occurred.[3] The main goals have been integration of content and use of educational methodology other than strictly didactic lectures.

Jane N. Scott, Ph.D.

Based on the experience of developing a problem-based integrated curriculum at the University of Pittsburgh School of Medicine, Reynolds and his colleagues[4] enumerated the advantages and disadvantages of departmentalized and centralized governance in designing, implementing, and sustaining curricular reform. Departmentalized governance is familiar to virtually all faculty members and establishes units of common interest and expertise. In this setting, faculty members can develop a curriculum based upon cutting edge research. The Chair or Head of the department sets clear expectations for responsibilities, rewards, and for establishing career objectives. S/he is able to mentor junior faculty members at a critical time in the development of their careers. Faculty members identify with the mission of the department and their responsibilities are assigned accordingly. Peer review occurs within the department with departmental goals put forth as the standard for evaluation.

In 1991, the Liaison Committee on Medical Education (LCME) stated[5] that "There must be integrated institutional responsibility for the design and management of a coherent and coordinated curriculum." Centralized governance of curriculum provides an opportunity for faculty across departments to develop an integrated curriculum that is designed to meet the mission of the entire institution. Centralized governance serves as a forum to resolve volatile turf issues should they arise, and it offers a mechanism for broad-based peer review of participating faculty members. Areas of content overlap can be modified reducing student time or content that has been omitted can be identified and included. A mechanism for collecting, storing, and analyzing data as it relates to the broad goals of general medical education can be established.

Strong opinions have developed around this issue and have generated many lively discussions at all levels of medical education. In this special feature of the *Basic Science Educator*, we are pleased to present an abbreviated version of a debate on this issue that was presented at the IAMSE Third Biennial Conference. Materials were taken directly from recorded transcripts of the live session. Although this debate was held in 1997, the issues are still as current today as they were then. The debate format is particularly useful in presenting both sides of an issue and allowing readers to draw their own conclusions.

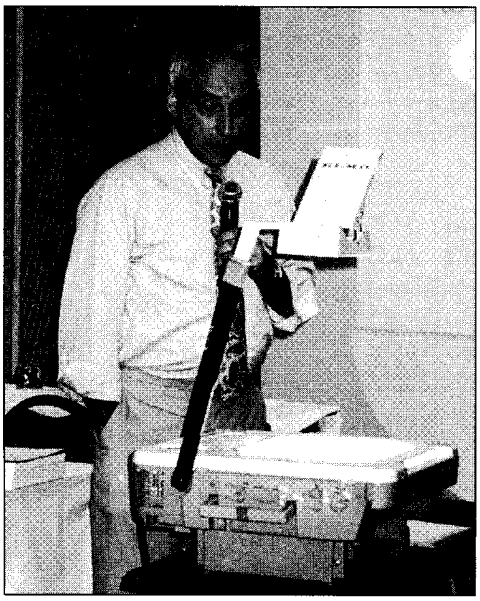
As the Moderator of that debate, it was, and is once again my pleasure, to introduce the two participants. Dr. Harry Margolius is the Chair of the Department of Pharmacology at

the Medical University of South Carolina. He was invited to present the case for Departmental Governance and his views on why this structure must be maintained. Dr. Margolius' extensive leadership experience in all aspects of departmental policy makes him particularly qualified for this role. Dr. Ted Groshong is the Chair of the Department of Pediatrics at the University of Missouri Columbia School of Medicine. He was invited to present the case for Centralized Governance of the medical curriculum and his views on why this system should replace the traditional structure. In his former role as Associate Dean for Medical Education, Dr. Groshong was instrumental in developing the problem-based learning integrated curriculum at Columbia.

Since Departmental Governance is the oldest and most traditional basis for curricular decisions, we asked Dr. Margolius to begin the debate.

Dr. Margolius

I'm a pharmacologist and I'm a physician. Sometimes I'm on call, and sometimes I give lectures. I teach students, I take care of patients; and the most onerous task I have is the administration of a department. However, I believe in the importance of departmental structure and this belief is the basis for my position. Departmentalized governance of the medical curriculum is obligatory if American medical education is to continue to be the best in the world.



Harry Margolius, M.D., Ph.D.

The reason the United States has achieved this reputation of being the best is largely due to the people affiliated with specific departments. Departmental control and scrutiny in meeting educational responsibilities is likely to be more observant, more accurate, and quicker to respond with positive reinforcement or corrective action. Whether it's a department Chair, Course Director, or collection of peers that are sitting in the back of the lecture halls (which is where they belong when courses are being taught), their observations are critical to praise or correction, whichever is required. The obligation of local control and scrutiny is essential to allowing administrators above the department the opportunity to make judgements. These are judgements concerning the quality of departmental leadership. It is the job of the departmental Chair to create and sustain an environment for the discovery and dissemination of biomedical knowledge.

What does centralized governance do? It diffuses responsibility. It removes obligation and is likely to be administered by individuals who have lost the desire or forgotten how to teach students, do experiments, or care for the patient. Universities are traditionally organized into departments. This organization is more than just quaint academic custom, it evolved for solid academic reasons. A department provides a home for scholars having similar interests and background, somewhat like a family. It keeps the truth and determines the future of a field. A department becomes a natural teaching unit. Only departmental leadership in biomedical education will delay or prevent the progressive deterioration of the prominent position that the traditional basic sciences occupied for so many years in the medical curriculum. Only departmental citizens, good citizens, good teachers, good scientists, good doctors, under strong leadership, can defend and sustain the notion of the importance of a sound scientific education for any medical practitioner. Two years is precious little time to expose students to an outline of modern biomedical science, and to stress that, home influences, peer attitudes, and role modeling are more likely to mold the behavior of our graduates than any well-intentioned courses or discussion session stuffed into the curriculum.

A common argument against departmentalized control of curriculum is that it does not accommodate a broadly integrated view of general undergraduate medical education. In other words, supposedly when we think about pharmacology, that's all we think about; not about patients, and not about illness. The various academic disciplines tend not to identify strongly with the broader educational mission of the school. We microscopically focus on the bugs but without thinking about what those bugs do. We tend to be more educationally conservative. That's always what people have said of me. We exacerbate conflicts over turf and generate resistance to cross disciplinarian novel approaches. That's what departments do. And, with departmental governance, there's an absence of broad peer review and accountability. That's what we're told. But there's no evidence for that. There are no surveys, there are no questionnaires, there are no numbers, there is nothing; just scurrilous allegations which we've all heard before. I've looked for support of the case for centralized governance, but have been absolutely unable to find it, and I'm hoping my opponent can change my mind.

Dr. Groshong

I have to be honest with you and say that in the period subsequent to being invited to participate in this debate when my position was Associate Dean for Medical Education, I have assumed a new job, the dreaded job of... Department Chair! Or at least I'm an Interim Department Chair. Four weeks ago the Chair of pediatrics abruptly resigned and I was asked to assume the position of Interim Chair. As the Chair of surgery termed it in his congratulatory e-mail, I have now become an "evil Chair".

Now, in order to present a solution, it is necessary to have a problem. The problems identified in medical education have over the last several years been recited *ad nauseum*, but it is necessary to recap them here, albeit briefly.

First, medical education has been condemned for too heavy an emphasis on lectures, and too many of them. It's interesting that the Association of American Medical Colleges began railing against that as early as 1932.[6] The GPEP Report[1] in 1984 continued that attack. In 1991, the Association of American Medical Colleges issued a call for reform in its published document, the ACME-TRI Report,[7] acronym for Assessing Change in Medical Education, the Road to Implementation. Now, why is this a problem? From my perspective as an Associate Dean, most importantly, we had a bunch of unhappy students. Students come to medical school excited, enthusiastic, and eager to learn medicine and by Thanksgiving holiday, they are totally burned out; they are cynical, they are exhausted and that continues through the rest of their medical education. The students have poor retention of an enormous amount of material. For years, my clinical colleagues, and I complained repeatedly that the basic scientist faculty were not teaching students the information they needed to know about basic science in order for them to understand clinical medicine. After becoming Associate Dean and listening in on some lectures, I realized the basic scientists actually have been doing that; and they've been doing it very well. The trouble is the students just were not remembering it!

Ted Groshong, M.D.

Furthermore, students were unable to apply information they had learned because that information was fragmented by discipline. You could see students, when you'd ask them questions on rounds, flipping through their notes, "Ah, that's biochemistry" or "That's physiology". And finally, there was much unplanned duplication in the curriculum and continues to be. This is the result of departmental autonomy. Often lecturers from different departments provided the same material over and over again. Sometimes even worse, information was conflicting! I once asked a student how he dealt with conflicting information from microbiology and pharmacology on antibiotics. "Simple," he responded, "if it's a micro test, you answer one way, if it's a pharmacology test, you answer the other way." Finally, with departmentalized governance, there is no way to prioritize time spent by discipline. Distribution of time for the students is by tradition or by campus politics. In my school, I had all I could do just to prevent departments from adding extra lecture hours or more frequent examinations. Typically, what would happen is faculty members would feel that some course was not getting enough attention and so they would start adding more examinations. The first semester of the first year, we were having examinations every week!

So, what is the solution? Number one, reduce lecture hours. Number two, increase active learning. Number three, control for duplication. Number four, introduce flexibility. Number five, add integration. And I believe none of this is possible in the absence of a centralized control of the medical curriculum.

Most of the publications to which I referred earlier have called for such centralizing control. In 1988, a task force at the University of Missouri-Columbia began to look at curriculum reform. This was an effort that extended over four years and involved 150 of our 350 faculty. It culminated in a vote of the faculty in December 1992 to integrate the curriculum, to become largely problem-based, and to limit total instruction time to no more than 20 hours per week. Since then, we've modified it just a bit, to be no more than 10 hours of lectures per week and no more than 20 hours per week of total contact time (which includes the problem-based learning [PBL] sessions and laboratories). And finally, management would be a partnership between the Office of Medical Education and faculty members.

The organization of our curriculum is the following. There are only two courses in the first two years, Basic Science PBL and Introduction to Patient Care. The latter is really more problematic as far as I can see than the former. Interdisciplinary faculty committees govern both courses. That is, for each of the eight blocks in two years, committees represent at least three different departments. In these three or more departments, there are not more than two faculty members from any one department, and at least one clinician is also included (although, admittedly, that sometimes has been difficult to arrange). Each committee is led by a Block Director. He or she may be from any discipline (that's not significant), although Block Directors are chosen by the Office of Medical Education for their organizational skill and interest. Most of them are basic scientists, although there are a few who are clinicians. They report, in turn, to an interdisciplinary management committee, which is also comprised primarily of basic scientists. They make certain that the blocks are integrated one with the other, consistent, and eliminate duplication except when faculty members determine that duplication is desirable. They also assure adequate coverage of all of the learning objectives previously determined by our basic science faculty. Each week has a PBL core. No more than 10 hours of lectures are permitted. No more than 20 hours of

total contact time is allowed. At the end of the block, an independent committee of faculty members, three of whom are basic scientists who are uninvolved in that particular block, make recommended changes for the next year's curriculum. We feel this assures continued updating and, if you will, continuous quality control.

What are the results? First of all, we have happier students. Secondly, the faculty are happier, much happier; they're enjoying PBL. We've found that students now can actually apply their basic science. They obtain knowledge independently, and we've actually heard this comment frequently from clinicians who had absolutely no influence on developing the curriculum, other than their initial vote to approve the reform process. Students are able to critically assess medical practice. I will never forget a student in my clinic explaining why it is I had chosen the *wrong* diuretic for one of my nephrotic patients. The two things you must know are first, this was a first year medical student in only his second block, and secondly, he was right! (That was a bit embarrassing.) More objectively, our scores on the USMLE are the highest in the history of the school. The first class to go through scored the highest, the second, five points higher. USMLE Step 2, higher still, seven points above the national mean. We had actually no students fail USMLE Step 2 who had started with that class. We had five students in USMLE Step 1 who scored above the 99th percentile. In short, I don't think any of this would have been possible without a centralized control of the curriculum and a partnership between the dean's office and members of the faculty.

Dr. Margolius

I went to a group of freshman and sophomore students at random at my medical school (MUSC) and asked them about the problems in the curriculum. Exam planning in the first year was the first to be mentioned. Exam planning is now under the aegis of a central committee, which has representatives of the first year courses. They've had great difficulty scheduling the meetings so they decided to plan the exam schedules on Friday afternoons; but they could never accomplish that because there weren't any students there after 12:00 noon on Fridays. And the students strongly objected to that. I said, "Gee, how much is going on Friday afternoon and how much is going on Saturday morning here?" Nothing happens here on Friday afternoon and nothing happens on Saturday morning, which I suspect is the same at your institution.

Some of you who have gone to medical school might remember that the most integrative part of the American medical education, from my experience in four separate medical schools, was that which happens on Saturday mornings! It was then that an Anatomist (he wasn't called a Cell Biologist then), and a Physiologist, and a Pathologist, a Biochemist, a Pharmacologist, and a Clinician would have an integrative morning. We'd be there on Saturday because someone was going to talk about schizophrenia "in the 1960's way", or rheumatoid arthritis. Then a clinician would come with a patient. Only after you'd seen the patient would the week then end at 12:00 or 1:00 pm on Saturday.

Now, I teach in the problem-based curriculum here as well as in the traditional one. And, to me, the notion is ludicrous, that students are so depressed and upset by November that the only solution should be 10 hours of lecture and 10 hours of problem-based learning activity a week. Do any of you, as medical educators, remember when you worked only 20 hours a week? That to me is part of the problem. So, I went to medical students and I asked, what's going on? "Well," they said, "we come in Monday morning, we start at nine and we're out of here by noon on Friday. But many of the afternoons are off because this is free time to do whatever you wish. Some afternoons you're working, some afternoons you're in the learning lab, and some afternoons you're just taking off." How much work do you do on Saturday? "Nobody works on Saturday, Dr. Margolius," they said, "we're out of here on Saturday!" There's something profoundly wrong with that.

Medicine is not an education for anything other than an extraordinarily, exciting adventure in learning. It's about dealing with human health and disease. That's what we learned. And that's what you're supposed to demand of people. And the notion that students are unhappy by November may mean something else, but it doesn't mean you should alter the curriculum. And, it doesn't mean that you should allow some centralized committee to control it for you. Of course, the students are happier. Of course, the faculty are happier. They're not doing very much work!

Dr. Groshong

I think that many of you who are involved in PBL know that in fact, students work harder in a PBL curriculum and longer than they do in a standard curriculum. I can guarantee you that our students do work on Saturday, Dr. Margolius, and they are in the library. They are there until midnight, but they are there for a different reason than students in the traditional curriculum. In the traditional curriculum, students are there to memorize and when they finish memorizing, they leave. The responsibility for learning in the type of curriculum we have has been transferred from the faculty member to the student. Faculty members are there to help, students are there to learn. If they don't learn, they don't pass the examination. It's their responsibility. And, I can tell you they take it very seriously. The first year we had our new curriculum, the second-year students, who are in the traditional curriculum, began complaining about the first-year students because they refused to get involved in many of the campus activities such as AMSA and the AMA medical student section, and so on. Sophomores could not get freshmen interested. Why could they not? The sophomores said "All they (freshmen) do is spend their time in the library, and the PBL labs."

And, that is a direct quote from our President of AMSA! It's only during the second year, students begin to develop interest in some of the outside activities. Students work very hard in PBL, and in our curriculum it would be a serious mistake to think they work any less than students do in a traditional curriculum.

I think it's very important to keep in mind that when we talk about centralized control of the medical curriculum, we're not talking about taking control from members of the faculty. In fact, the faculty members now have even more control in our current curriculum than they did in the former one! If you think about the way a traditional curriculum works, a department Chair designates someone to direct that department's student program. It's likely this individual has probably burned out on his grant support. This person then gathers whomever s/he can to give the 160 lectures that are allotted to that department. There is no decision by the faculty members in most basic science departments, especially those basic science departments that are increasingly under pressure to generate grant support. There is very little interest by faculty members outside of the two lectures that I'm suppose to give in week four of my departmental course.

Contrast to that what we have at the University of Missouri, which is a widespread involvement by faculty members. Well over 100 individuals are involved in delivery of our curriculum, which includes most of the basic scientists. In the physiology department alone, for example, the department Chair has determined that every single faculty member must have at least two PBL tutoring sessions, must give lectures, and must be involved in the interdisciplinary committees. And, that includes the department Chair! Centralized governance of the curriculum does not mean loss of control by members of the faculty. And, the best thing about this system is that, as new information arises, it can be added without the necessity of cutting two hours from biochemistry to give those two hours to pharmacology! The curriculum has actually become more flexible.

Another interesting finding is that there is just as much interest in scientific investigation on the part of the students with the PBL curriculum as there was in our previous curriculum. That's probably because we treat medical students like graduate students. They're expected to learn on their own. There is no Ph.D. program in this country that I know of designed to encourage hour upon hour each week of simply memorizing information without analysis.

Dr. Margolius

Well, as I said, members of the department that I belong to are all actively involved in the problem-based learning curriculum here at the Medical University. An interesting finding is, that of the 17 students or so each year who are in the PBL program, 80-100% of them come to the pharmacology department lectures because they're finding that they're not learning the fundamental information they need to know about pharmacology in the PBL program!

Now I'd like to show you some numbers. The following data indicate performance in the Department of Pharmacology, which I think, mirrors performance in a lot of other basic science departments where the Chairs are held accountable.

Table 1 indicates performance for the last five of six years for our medical students. You see they're all doing well. This is a very heterogeneous class of students. Their medical college admission tests scores are pretty good but this isn't Yale, this isn't Harvard. Here's the National Board performance, just for your information. You'll note that Pharmacology has consistently done better than the MUSC average. We're in the 50th to the 60th percentile, which is, I think reasonably good.

Table 1. Mean Scores on USMLE Step 1 (MUSC/National) First Time Takers by Graduation Year

	1997	1996	1995	1994	1993	1992
Anatomy	NA	NA	NA	204/200	200/199	195/197
Behavorial Sciences	202/210	NA	202/204	197/199	187/198	189/198
Biochemistry	204/208	NA	205/205	209/204	202/202	198/200
Gross Anatomy & Embryology	195/201	NA	199/198	207/200	NA	NA
Histology & Cell Biology	196/200	NA	202/198	205/200	NA	NA
Microbiology & Immunology	211/213	NA	214/210	215/207	210/206	206/202
Pathology	212/220	NA	213/214	214/212	207/210	196/204
Pharmacology	210/211	NA	211/209	212/209	207/206	202/200
Physiology	205/213	NA	208/210	201/200	198/202	195/199

NA (Not Available)

Now, are we driving these students? These are past scores, and how students rate their instructors who, by the way, are not burnt out cynical old guys. Our Course Director is someone who loves teaching and scrutinizes each faculty member, including the Chair, to make certain that information is presented in a manner that's not just meant to be absorbed, memorized, and regurgitated.

How does all that happen? Does it happen because we're not interested? Here's the simplest technique we could have developed. There's a weekly schedule. At the beginning of the course I introduce myself and all the other department faculty members. I say to the assembled students (including the PBL students), here is a weekly schedule. Each faculty member in the Department of Pharmacology posts a copy of this on his/her door every Monday morning. Parts may be blocked out because s/he's either teaching or in committees or doing experiments or away at a meeting. But in the blank spaces, any of you has the opportunity to place your name in a space, and I guarantee that when your name is in a space, that faculty member will be there to speak with you about anything that you have on your mind. And, then during the week I walk around and I make sure everybody's schedule is on the door. And, if I see a faculty member who doesn't have his schedule on the door, I get angry and then the schedule is on the door. We've been doing that for 20 years. This is how we communicate with students. We're not there to throw out a bunch of stuff in an hour's lecture and then not be there. We're there all the time. That helps. To do so is actually fun.

Let's take the Department of Pharmacology syllabus, which we prepare every year. It's on our local area network where everyone can look at everyone else's syllabus that year. It's revised every single year. We all know what others are teaching, all we must do is plug into our computer. That's local control of curriculum. It's local control that is established in a department, and a department that has an objective to do the best job it can, educating students within the constraints placed upon it by a centralized administration.

Dr. Groshong

I, like probably all of you, am very impressed with the commitment to education of the Department of Pharmacology at the Medical University of South Carolina. And, it may well be that MUSC is different than the University of Missouri-Columbia. But, unfortunately, what I have found is that commitment to medical education is quite uneven among academic departments, and between clinical and basic science departments. The one benefit that can be ensured with centralized control is to make certain that the entire educational experience is of uniformly high quality. A centralized control makes certain of that.

Dr. Margolius has done a very good job of explaining how well the students do in Pharmacology. However, you will note from Dr. Margolius' Table that the scores are considerably lower in other courses at MUSC. So, obviously, there's substantial difference between the quality of education in the Department of Pharmacology and other departments, and that's going to be true of all of the traditional medical schools.

One thing he has not commented on, is the importance of integration in both gaining information and being able to use the information that students receive. I think integration, at least by adult learning theory, is extraordinarily important in retention, in use of the information which we pass on to our medical students. We try to make our medical education a seamless cloth so basic science and clinical science is all the same, a part of one learning process. One cannot understand clinical science without basic science. And, one of the interesting things that all of us as clinicians have noted, is the increased willingness of our students in the third and fourth year of medical school, to focus basic science information on clinical problems.

I'd like to close with some comments about resources. One of the problems of a centrally controlled curriculum is that obviously, the resources are in the hands of the department Chairs. Those resources of which I speak are the individual faculty members. By and large, we have been very successful in getting faculty members to volunteer. Mostly it is those who have a dedicated interest in medical education. However, I anticipate this will soon become more difficult. I believe that in the long term we must establish an incentive fund for those faculty members heavily involved in the curriculum, who are either tutoring, giving substantial time as block directors, case writers, and so on. In the long run the solution will be to establish an educational budget. Furthermore, I believe all of us are going to see the implementation of educational budgets in our institutions, regardless of whether we're in a traditional or an integrated, centrally controlled curriculum.

CONCLUSIONS

Drs. Margolius and Groshong have presented very different views regarding the advantages and disadvantages of departmentalized versus centralized governance of medical curriculum. The Liaison Committee on Medical Education (LCME), which is the national accreditation authority for allopathic medical education programs in the United States, historically has had an impact on the development of changes in medical education. This committee endorses and encourages the concept of integration of content and centralized governance of the medical curriculum.[2] At this time, the Association of American Medical Colleges also provides its support. It is only predictable that given the importance of this issue, there must eventually be a "meeting of the minds" between the Departmentalists and the Centralists. Perhaps this will take the form that central committees will make decisions regarding integration of content and modernization of educational methodology, and the departments will determine who is best suited to deliver the various content areas of the curriculum. Evaluation and rewards will be determined by both the central governance and department. This is

only one scenario, but perhaps the most likely to result in a win-win situation for everyone - faculty members, students, and the system of health care for the United States.

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ANNOUNCEMENT

Call for Nominations - Production Editor of the *Basic Science Educator*

The IAMSE Board of Directors is conducting a search for a Production Editor to serve in a key leadership role on the Editorial Board of the *Basic Science Educator* (*BSE*). The successful candidate will complete the new governance structure of the Editorial Board, that being the triad of Editor, Managing Editor, and Production Editor. All applicants must possess excellent skills in communication, a proficiency in the English language, and be adept at sending and receiving documents by e-mail attachment. This volunteer position carries the following responsibilities:

PRODUCTION EDITOR

- Works with the Editor and Managing Editor to plan and coordinate the contents of each issue of the journal
- Works with the Editor to invite, and to follow up on invited articles
- Works with the IAMSE Business Manager on all issues related to corporate advertising
- Acts as the *BSE* liaison with IAMSE corporate sponsors
- Oversees the layout and printing of each issue
- Advises the IAMSE Executive Committee on all issues of journal production costs
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- Works with the IAMSE Business Manager on the use of the journal for membership recruitment

The *Basic Science Educator* is the only peer-reviewed journal in medicine that deals specifically with issues in medical science education across all disciplinary boundaries. Distribution is to IAMSE members currently in 40 countries. This position offers a unique professional opportunity for creativity, international recognition, and personal career enhancement. Please send your e-mail letter of application to Roger Koment, Ph.D., IAMSE President, at <rkoment@iamse.org>, and include your CV by attachment.

INNOVATIONS IN BASIC SCIENCE TEACHING AND LEARNING

Associate Editor: Harold Traurig, Ph.D.

Integration in the Biomedical Science Curriculum

Dr. Casale's article is the third in a series examining the integration of basic science concepts and clinical applications. She describes a new course, the Healthy Human, for first year medical students at the University of Kentucky College of Medicine that integrates development of professionalism, communication skills and clinical problem-solving experiences. In addition, students are introduced to preventive medicine concepts and the roles and values of community health resources. There is emphasis on fostering wholesome health behaviors in patients as well as recognizing the value of these for themselves. The Healthy Human course runs concurrently with the basic science courses during the first 14 weeks of the first year. It uses a small group, problem-based learning format and patient cases.

Dr. Casale is well qualified to teach and comment on the interface between the science of medicine and physician-patent interactions. She served as an emergency medicine physician in the private sector for a number of years before completing a second residency in Preventive Medicine and a Masters of Science degree in Public Health. As a faculty member she played a prominent role in the Introduction to Professionalism program and development of the Healthy Human course at the University of Kentucky College of Medicine. She presently holds a position in medical management.

Learning the Skills of a Physician: Professionalism, Compassion, and Problem-Solving

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INTRODUCTION

Integration of educational components in the biomedical curriculum is the current theme for a series of articles in this column. Integration is especially relevant in blending the basic sciences with clinical medicine during the first years of undergraduate medical education. University of Kentucky College of Medicine (UKCOM) first year students participate in their first integration experiences during orientation week in an "Introduction to Professionalism" program which includes a "white coat" presentation ceremony. Integration is a recurring theme throughout the basic science and clinical curriculums at UKCOM. As a result, the physicians-in-training are repeatedly exposed to a practical format in which they learn and practice the skills necessary to effectively communicate with and treat patients and continue their medical education as life-long learners. Additionally, they learn to appreciate the importance of healthy personal behaviors and lifestyles in their patients and in their own lives. Following the orientation program, the process of developing attitudes which foster integration of basic science and medical practice, professionalism, compassion, ethics and other desirable personal traits continues during the first 14 weeks of the first year in a course titled "Healthy Human". This article discusses the goals, format and outcomes of this course.

BACKGROUND

In 1992 the Robert Wood Johnson Foundation Commission report on medical education[1] proposed a "Mandate for Change." Conclusions of the Commission reflected growing concerns that medical education in the United States inadequately prepares medical students to meet the needs of patients and medical practice in our evolving society. Although the traditional large group didactic lecture format provides the latest scientific and technologic medical information, the development of professionalism and compassion in medical students is often left to chance.[2,3]

Haggerty and colleagues[2] concluded that clinical instruction of medical students, including patient contact and interviewing techniques, should begin as early as the first day of medical school. They specifically suggested that basic science, including behavioral science, should be incorporated throughout the medical cur-

riculum. It is a widely held opinion that an important outcome of a medical education is that physicians must develop life-long learning skills.[4] Furthermore, life-long learning skills develop best when introduced early and practiced throughout the medical curriculum.[4, 5]

The practice of medicine is experiencing remarkable evolutionary developments. For example, every year technological advances occur providing new and increasingly expensive techniques to diagnose and treat disease. Patients demand the most expensive medical care, while at the same time health insurers require efficiencies in medical management that will reduce cost but not compromise medical care. Medical cost reimbursement is increasingly monitored and controlled in both the public and private sectors. These trends will continue for the foreseeable future. Physicians will be required to make decisions that could conflict with how they perceive their patients' needs or with their personal or professional ethics and interests. The necessity for physicians to increase their knowledge base, control costs, maintain high standards and provide evidence of outcome-based quality improvement will continue unabated. The patient and his family, as well as ethical and professional principles may easily be lost among these conflicting considerations. Special communication skills and attitudes regarding patient well-being are needed to enable physicians to proficiently manage factors that impact on medical practice. Attitudes and skills learned early in undergraduate medical education are subsequently more likely to be applied in practice.[4]

In 1994, in response to these concerns, the University of Kentucky College of Medicine implemented curriculum changes that integrated behavioral science, basic science, and concepts related to patient communication using problem-based learning methods. Students model their professional behaviors and their interactions with patients on the behaviors and attitudes of physicians they observe in clinical situations. It is important that these role model physicians effectively demonstrate and reinforce attitudes of concern and respect for patients, their families and their communities. Consequently, it was logical to design a first year course, subsequently titled the "Healthy Human", using appropriate clinician role models to reinforce desirable behaviors. Furthermore, an early introduction to concepts regarding health maintenance, disease prevention and the use of community-based health resources was desired for its intrinsic value and also as a complement to the patient oriented format.

GOALS OF THE HEALTHY HUMAN COURSE

The Healthy Human course was developed as one of the vehicles to provide first year students with role models and patient care-based exercises that facilitate achievement of the course objectives listed in Table 1.

Table 1. Objectives for the Healthy Human Course

- Demonstrate the integration of basic and clinical science.
- Develop professional and compassionate attitudes and behaviors.
- Develop problem-solving skills.
- Foster attitudes of life-long learning.
- Apply concepts of health maintenance and disease prevention.
- Access community-based health resources.

DEVELOPING NEW TOOLS: LIFE-LONG LEARNING AND PROBLEM-SOLVING SKILLS

Providing students with the expertise to cope with the multifaceted nature of modern health care requires the development of problem-solving skills at every opportunity throughout the medical curriculum. The process of deductive reasoning must be introduced and practiced early and honed to a fine art throughout the years of undergraduate medical education. Problem-based learning methods are uniquely appropriate to address this need and were adopted for the Healthy Human course. The result is that students benefit from a curriculum that integrates didactic lectures with the Socratic method of learning.

STRUCTURE OF THE HEALTHY HUMAN COURSE

Concurrent with the Healthy Human course, students attend traditional lecture and laboratory basic science courses. The Healthy Human course meets several times a week for the first fourteen weeks of the first year in small group sessions with a clinical faculty facilitator. During these sessions patient scenarios are presented as "paper cases". Data from the patient interview, examination and clinical lab are revealed in a format and sequence similar to an actual clinical setting. Students discuss and evaluate clinical data as revealed and formulate a next course of action (See patient case example below). Full discussion of a case may require several class sessions. All cases are based on actual patients evaluated and treated at UKCOM.

The Healthy Human course provides students opportunities to relate basic science content and concepts to their ultimate goal of providing competent and compassionate care for patients.

The Healthy Human course provides students opportunities to relate basic science content and concepts to their ultimate goal of providing competent and compassionate care for patients. The eight or nine students assigned to each group determine what "next steps" must be taken at each juncture in the patient's story. The facilitator provides guidance as students decide what additional information is necessary, which diagnoses to consider, which treatments to prescribe, what referrals to make, and which preventive behaviors or lifestyle choices might have averted this problem. The students prepare learning objective reports for each session and, in addition, may be required to draft appropriate letters to a consultant for referral or to the

patient's primary physician.

Thus, from the first day of medical school, students observe and practice the process of "thinking as a physician". They have the opportunity to practice the skill of organizing their thoughts to best obtain adequate patient histories, formulate differential diagnoses, order necessary diagnostic studies and prepare comprehensive care plans. During the problem-based learning sessions they are required to investigate and practice methods of communication that will effectively educate patients regarding their medical problems and health-compromising behaviors. In addition, they have opportunities to explore a variety of options for inexpensive or free patient assistance available in the community. Students identify available community services early in their medical training and are therefore more likely to incorporate community resources into treatment plans in their later practice. This format provides the additional benefit of developing communication skills through interactive dialogues and problem-solving during the small group sessions. The objective of faculty participation is to facilitate student discussion and guide the direction of problem solution rather than providing answers to students' learning objectives.

APPLICATION OF A PATIENT CASE

An 18-year-old female presents as a clinic patient with the complaints of nausea, weight gain and fatigue.

Students collaborate to determine how to obtain an adequate history. As they formulate questions, the facilitator provides the answers that were actually given by the patient. The facilitator guides the students in formulating appropriate questions. A review of systems follows. Students are given a general outline to follow to obtain this information. Armed with this information the group determines which examination procedures and lab tests to order and what further information is needed. As the case unfolds during the session the facilitator reveals additional patient data.

The patient normally has irregular menses, smokes a pack of cigarettes a day, drinks large quantities of beer and an occasional pint of whiskey on the weekends, and had a rash and fever that lasted a few days about 6 weeks before this visit. She is a high school drop-out who works in a fast food restaurant and lives in an inexpensive apartment close to work. However, she is extremely short on funds right now because she broke up with her live-in boy friend two weeks ago and now has to assume payment of the rent. She has not heard from him, but friends have told her that he has moved out of state. Her employer does not provide health insurance. She makes little more than minimum wage.

The learning objectives formulated by the students during the first session are usually quite sophisticated and include pregnancy testing, normal lab values, contraception, HIV-testing, binge-drinking, tobacco abuse among teenagers, causes for rash with fever, causes of irregular menses and/or amenorrhea and Medicaid eligibility. Each student in the group selects one learning objective to prepare as a brief report using resources such as reference texts, current literature, and interviews with faculty or other knowledgeable people in community services. They present this information at the subsequent small group session and a round table discussion ensues. The next piece of the patient's story is then presented. The students learn the results of the tests they requested. Again they determine, with the guidance of the facilitator, what additional information should be obtained.

Lab data confirm that the "patient" is pregnant and anemic.

A discussion ensues regarding family dynamics, abortion vs. adoption vs. single parenting, the necessity for HIV testing in all pregnant women, community and governmental programs and services that might provide assistance in the coming months. The students identify the difficulty in discerning the patient's expected date of confinement. They recognize that a viral illness may have produced the rash. In addition, the patient's smoking and alcohol history evoke concern about fetal abnormalities and developmental delays. Usually this evokes a tentative exploration and discussion about how to counsel the patient regarding the developmental risks her fetus is experiencing.

By working with the parameters of a real life scenario students quickly realize the importance of developing a plan for patient education and assistance in addition to the technical aspects of medicine. They will choose the areas they want to investigate as more patient information is provided and another set of learning objectives is identified. The second session elicits objectives regarding the ethical considerations that arise when a physician and a patient have opposing attitudes regarding abortion, adoption, AIDS and other patient-physician interactions that might result in conflict. Students have the opportunity to discuss appropriate solutions to irreconcilable differences in prejudices, moral standards and social values. Other learning objectives become apparent including which fetal malformations can be detected *in utero*, how to provide nutritional counseling, dietary supplementation, and the need for supplemental folic acid for women during childbearing years. Lively discussions ensue at each session as the "patient" progresses over the next few weeks. The same procedure is repeated at each session until the case is completed and summarized. By the time students reach the conclusion of the case, they have had valuable experiences in patient management, patient-physician communication, collaborative medical management, verbal presentation, literature search and the preparation of concise written reports.

This format presents multiple opportunities for students to determine which community services might be available to provide beneficial resources for their "patient". Students are encouraged to contact these services as if they had a "real patient" to refer. Lists of contact resource persons who have agreed to "act as consultants" to students are provided with the "paper case" information packets. These "consultants" are faculty and staff of UKCOM and also individuals from the public and private sector organizations that can provide assistance to patients or the patients' family. A sample of these organizations in Kentucky include State Health and Human Services, the local Health Department, the local WIC (Women, Infants, Children) office, Employment Services, Church Organizations, YMCA (Young Men's Christian Association) or YWCA (Young Women's Chris-

tian Association), Salvation Army, Blood and Plasmapheresis Center, as well as local support groups such as Alcoholics Anonymous, Home for Unwed Mothers and Family Planning Centers.

BENEFITS OF THE COURSE

The Healthy Human course is specifically designed to incorporate principles of preventive medicine and public health into the first year medical school curriculum. In addition, it provides the first opportunities to develop compassionate professional behavior, communication skills and problem-solving experience. Additionally, the course provides a vehicle to introduce concepts of epidemiology, immunization, travel medicine, occupational medicine, workman's compensation, changing patterns of health care delivery and health care access as well as the myriad types of health care cost disbursement methods. To assist the course, UKCOM has access to resources of the Department of Preventive Medicine, the Fayette County Department of Public Health, the Office of the State Commissioner for Health, and the Kentucky Department of Public Health.

An additional dividend of the Healthy Human Course is that it encourages students to incorporate healthy behaviors in their own lives. It is designed to relate life style choices and healthy behaviors not only to the student's eventual patient base but also to the students' own habits during the long years of medical education. Inviting the students to regard themselves as their own "first patient" brings the principles of healthy lifestyles into focus and allows for open discussions of nutrition, alcohol use, safe sex, the importance of exercise, and the benefits of spiritual and family support. Formulating solutions for their patients' unwholesome health behaviors prompts students to focus on the importance of formulating workable solutions for their own life styles. In this context, the importance of smoking cessation, alcohol in moderation, good nutrition, and exercise are discussed. In addition, the importance of recreation and healthy family interaction is stressed as students identify feasible solutions for their patients. The Healthy Human course demonstrates to first year students the interface between the science of medicine and the interpersonal aspects of the physician-patient interaction. Using the problem-based learning approach, students can relate preventive medicine and wellness concepts to their own habits and life style.

Students identify available community services early in their medical training and are therefore more likely to incorporate community resources into treatment plans in their later practice.

Other benefits include:

- Developing the ability to evaluate the validity of data presented in journal articles and clinical study designs
- Learning good medical writing techniques, including reports and letters of referral
- Obtaining an introduction to the concepts of comprehensive patient care
- Accepting the importance of continuing medical education
- Recognizing the importance of preventive medicine, wellness behavior, and public health services

COMMENT

Problem-based learning is an extremely effective method of teaching life-long learning skills, and colleges of Nursing, Dentistry and Medicine worldwide are incorporating this technique into their curriculums. A recent study done in Linkoping University in Sweden revealed that students who have used problem-based learning methods acquired at least the equivalent scientific knowledge base as students in a conventional medical curriculum.[6] Another report from the University of Ottawa concluded that problem-based learning resulted in measurable positive outcomes such as increased motivation for learning and developing skills in clinical reasoning and structuring knowledge in clinical contexts.[7]

A survey of recent graduates at the University of Wisconsin asked which components they believed made important contributions to their medical education. The most common responses were to enhance the clinical orientation of the first two years of medical education. Students in this group asserted that the highest priorities for receiving resources should be the coordination of the basic and clinical sciences throughout the medical curriculum, problem-based learning experiences and preserving teaching efforts throughout the third and fourth years.[8]

A cooperative study done by the Medical University of South Carolina College of Medicine and the University of Texas Medical Branch at Galveston compared students' perceptions of their learning environments. The problem-based learning curriculums at these schools are almost identical with respect to student selection and curricular organization and implementation. Results showed that students involved with problem-based learning experiences were more satisfied with their learning environment than students in the lecture/lab-based curriculum. In addition, the study supported the conclusions that this increased satisfaction was a direct effect of the problem-based learning in the curriculum.[9]

There is accumulating evidence that the Healthy Human course and insertion of problem-based learning experiences in the first year of the UKCOM curriculum have increased effectiveness of the educational program. The USMLE Step 1 scores are at or above the national averages. The specific impact of the "Professionalism" component is presently being assessed.

The patient's optimal health and comfort should be the first concern and ultimate goal of physicians. In that regard, integration of basic science concepts, clinical reasoning skills combined with professional attitudes and life-long learning are essential to attaining this goal. The introduction of courses with the objectives of the Healthy Human course early in medical education optimizes medical students' opportunities to develop and practice these skills throughout their professional lives.

CONCLUSIONS

The Healthy Human course, a component of the first curriculum block at UKCOM, utilizes problem-based learning methods to facilitate development of communication skills, and the professional and compassionate attitudes expected in physician-patient interactions. "Paper cases" describing actual patients are used as stimuli for small group discussions and problem-based learning sessions. Learning objectives are developed and subsequently presented by students as elements of the patient's problem are revealed. Basic science concepts and content related to the patient case are integrated, reviewed and extended. Students develop clinical reasoning and problem-solving skills as they evaluate clinical data and formulate courses of action. Students are guided to consider recommendations regarding health maintenance, disease prevention and access to community-based health resources.

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ANNOUNCEMENT

Call for Nominations - BSE Manuscript Reviewers

The Editorial Board of the *Basic Science Educator (BSE)* is conducting a search for qualified individuals willing to serve as manuscript reviewers for our journal. Approximately fifteen reviewers will be appointed to the Editorial Board, of which seven have already been approved by the reviewer selection committee (see inside front cover). We seek representatives from a wide range of interests and expertise in medical education, consistent with the diversity of materials submitted for publication. The Editorial Board will also represent a diversity of geographic locations having individuals familiar with the systems of medical science education in their particular part of the world. All candidates must be proficient in the English language and have computer communication skills. Each appointed reviewer will not be asked to review more than three manuscripts per year. The term of appointment is 3 years with the option to renew by mutual consent.

The *Basic Science Educator* is the only peer-reviewed journal in medicine that deals specifically with issues in medical science education across all disciplinary boundaries. Most all business for the *BSE* is conducted electronically and manuscripts are transferred by e-mail attachment. To indicate proficiency with these methods, we ask that you submit your letter of application by e-mail and include your CV by attachment. Send applications or inquiries to Roger Koment, Ph.D., *BSE* Editor, at <rkoment@iamse.org>. Letters should include a description of the applicant's experience and expertise in medical science education in enough detail to permit the editorial leadership to select manuscripts that match the reviewer's qualifications.

COMPUTER APPLICATIONS IN BASIC SCIENCE EDUCATION

Associate Editor: W. Marshall Anderson, Ph.D.

In this issue of the Basic Science Educator, *Dr. Chris Chandler, Director of the Office of Educational Development and Research at the University of Oklahoma College of Medicine presents an interesting and informative article titled Teaching with the Web: Practicalities and Pitfalls. In it, Chris discusses the details of designing and implementing a web-based course including copyright considerations, and the technicalities of this process. For those thinking of using the World Wide Web for instruction, Chris' article should be an invaluable resource. In the next issue, we plan to have an article about the use of e-mail tutorials in pharmacology to increase problem-solving skills of medical students.*

On a sad note, the scientific world lost a widely respected teacher in December of 1998. James Baggott, Ph.D., biochemistry faculty member at Allegheny University of the Health Sciences Medical College of Pennsylvania • Hahnemann School of Medicine passed away after a short illness. Jim was co-author of the article in the last issue of the Basic Science Educator *and has contributed to our journal in the past. He also designed the website, NetBiochem. It was my pleasure to work with Jim on several web projects and found his knowledge and advice to be second to none. We will all miss him, but his legacy will live on in his works, his colleagues, and his students. Rest in peace, Jim.*

Teaching With the Web: Practicalities and Pitfalls

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INTRODUCTION

The advent of the World Wide Web and related technologies has the potential to transform medical education. Several institutions have already implemented web-based lectures and courses in a variety of formats.[1-3] Often-touted advantages of web-assisted instruction include the large potential for interactivity, universal access to materials, personalized learning environment, collaborative learning, asynchronous instruction, and enhanced teaching of problem solving.[4,5] Scores of studies have shown that computer-aided instruction is just as effective as or is more effective than conventional teaching methods.[6-9] Moreover, studies have also shown that diagnostic accuracy could be improved through the use of computer-based simulations.[10,11]

> ***The appropriate use of quality graphics and animations can turn mundane textual material into a high quality interactive learning experience.***

While the excitement to generate web-based courses and educational tools continues to rise, there is a noticeable lack of objective standards to compare and evaluate the educational effectiveness of these tools.[12-14] Oftentimes, these online educational resources do not fully utilize the highly interactive nature of the web, but merely present factual information similar to what could be accomplished with lectures, hand-outs, and textbooks.[15] As an increasing number of online courses and tools are planned, instructors and administrators have need to understand the practicalities of planning successful web-based instruction. This article will explore several of these issues.

PLANNING

When planning for online materials, instructors must explicitly state the educational objectives for the course or topic in question. These instructional goals should drive technology decisions, not vice versa. The next step is to clearly define the role this online material will play in their course. Will it complement existing course materials or will it totally replace certain course content (assuming a mandatory student computer requirement or that computer laboratory facilities are readily available)? If it replaces a traditional handout or syllabus, will the department continue to print and sell hardcopies?

Engaging students in the use of online resources can be frustrating to instructors who work hard to create materials only to find them little utilized by students. Students are best engaged

by demonstrating the online content during course orientation and receiving clear explanations on how they should use this in conjunction with other course resources. The most compelling online tutorial is of little use if students do not understand its role within the course.

Perhaps the most important issue to consider when developing online educational materials is the degree to which it is educationally compelling. Content that is merely ancillary to standard course materials will be minimally used.[16] Content that consists of pure text is also of little utility, as here the web represents slightly more than an electronic "page-turner". Another major factor to consider when creating compelling material is how closely web-based materials are relevant to the course examinations. Students will seek out the highest yield material when studying for examinations and if the online materials are merely "for additional information", then usage will be minimal.

. . . instructional goals should drive technology decisions, not vice versa.

The appropriate use of quality graphics and animations can turn mundane textual material into a high quality interactive learning experience. Through the use of web browser "frames", instructors can provide basic text with hypertext links that, when activated via a mouse click, display a graphic in a neighboring window. These graphics might include simple diagrams, slide shows (such as Microsoft PowerPoint), gross and microscopic anatomical images, animations, video clips, and clinical images. The incorporation of such graphical elements combined with explanatory text could be further improved with the addition of questions during or after the lesson. In this way, instructors can reinforce concepts and monitor student learning.[5]

Another measure of educationally compelling material is how well it integrates within a course or lecture. Instructors may easily achieve integration by using these materials in their lecture via an overhead LCD panel or computer projector. Gaining familiarity with audio-visual equipment before the lecture begins cannot be overemphasized. Examples of web-based materials that might be used while lecturing include computer-generated slides, animations, audio-clips, video-clips, and simulations. Additionally, instructors must realize that when lecture materials are published on the web, a decrease in lecture attendance may occur. Another method to integrate materials into a course is via independent study materials. Examples include multimedia review modules, question banks, patient simulations, and image atlases. Independent study materials can be used to present or review course materials outside of the classroom, to reinforce concepts, and help students assess their fund of knowledge. As alluded to previously, it is important that web materials contain content considered "fair game" for examinations and that students are made aware of this from the beginning of the course.

Copyright has become a vital consideration for faculty members developing resources to be used on the web. Individuals should always obtain permission to use copyrighted materials and dutifully check all materials they are posting to their educational website. Currently, "fair use" as it applies to the Internet and the Web remains vague, as there have been no landmark cases to test the limits of what is legally possible. In addition, copyright laws vary from country to country. Instructors are advised to exercise caution in all cases. One must realize that online materials often have an associated copyright, even though it may not be explicitly stated. Furthermore, password-restricting a web site containing illegally obtained materials does not avoid copyright law.

TECHNICAL CONSIDERATIONS

When developing web-based materials, it is often helpful to identify the technical audience. If that audience is in a computer laboratory with excellent network access, then no restraint on file size should be necessary. But alternately, if the technical audience is mainly users in a home setting connecting via a dial-up modem connection, then file sizes must be constrained to the lowest possible without loss of quality. To assist students desiring to view larger volumes of material at home, developers might consider creating a CD-ROM that students would buy or borrow from the department or library. Students could bring this to their home and transfer materials directly to their hard drive. Fortunately, web-based content will typically function appropriately when saved on a CD-ROM. Hardware to create a CD-ROM is becoming less expensive to obtain and relatively easy to install and use. However, as with posting to their website, developers must always be certain of copyright status before transferring materials to a CD-ROM.

Commercial software and CD-ROMs are often highly interactive with superior graphics and sound. In some cases, CD-ROM materials may be accessed directly via the web, and appropriate site licenses for an entire class of medical students will range from a few hundred to several thousand dollars. Installing the appropriate hardware to serve multiple CD-ROMs simultaneously (e.g. CD-ROM jukebox) may cost up to several thousand dollars. Because of these costs, instructors may decide to develop their own content rather than invest in commercial products. However, both technical and compatibility issues must be considered. For example, if using software to be loaded on a server or CD-ROM jukebox, it is essential to ensure compatibility with existing computers. Additional aspects to consider when making this decision are the scope of the material in question, cost per topic, time required for development, and technical limitations (e.g. works only on Macintosh computers).

Linking to other sites on the web is yet another option that has become a common practice with potential merit. Before doing so, however, it is considered polite to e-mail the webmaster of the remote site stating your interest and estimation of use. It is important that faculty members do not become too dependent on outside resources or use them in lieu of developing their own. While it may save time and money, this practice places the developer's course at risk, as there is no control over the continued availability of materials, or their maintenance of quality and scope of content.

DEVELOPMENT

To assist faculty members with the creation of web-based materials, many schools have multi-media or instructional design departments housing individuals trained to develop web pages and graphics. However, many faculty members have quickly learned Hypertext Markup Language (HTML) and proceeded to build their own course web pages. Such early-adopters should coordinate their efforts with in-house instructional design personnel and other faculty members to ensure interoperability, consistency of design, and efficient use of hardware.

A particularly frustrating problem instructors and developers encounter when developing materials is that the two most common web browsers, Internet Explorer and Netscape Navigator, may not interpret HTML exactly the same and therefore may display web pages differently. Faculty members are advised to regularly view their materials in both browsers to ensure consistency of presentation and functionality. Another consideration is browser version. Older versions of both browsers do not support many of the newer web technologies and features such as colored text, frames, and JavaScript. Lastly, web developers must be considerate regarding the screen size and screen resolution (e.g. 800 x 600) of their average user. Designing a wonderful web page on a twenty-one inch monitor in 1024 x 768 will not display appropriately on the fifteen inch 640 x 480 resolution monitors owned by many typical users.

Tracking student usage of web materials is useful knowledge to course instructors and multimedia developers as they try to understand what types of resources were most utilized. Modern web servers permit tracking of many types of activity on a web site through standard analysis of log files. These log files usually contain information on the location of the user (e.g. on-campus or off-campus), which resources were accessed the most, the average length of time spent on various pages, activity patterns during the day and during the week, and which web browser was used most to view the materials. Detailed analysis of this information can lead to better understanding of student study habits and learning preferences.

CONCLUSIONS

In summary, the World Wide Web has added many options to the medical educator's armamentarium. Faculty members are now able to provide highly interactive materials to students, independent of time or location. However, the path to implementation must be trodden with care. Too many instructors have, with good intention, rushed to create web materials only to find them used little or not at all. As educators around the world struggle to provide the best possible medical education, they must be aware of and avoid the common pitfalls of this new technology. This can only be accomplished by knowledge and meticulous planning.

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THE EDUCATOR'S PORTFOLIO

ASSOCIATE EDITOR: Jay H. Menna, Ph.D.

Thus far in the Educator's Portfolio section of the Basic Science Educator *we have discussed the nature of the Educator's Portfolio and the process of documentation of academic endeavors that one should consider for inclusion in their portfolio. In Volume 7 Numbers 1&2, 1997, Dr. Diane Heestand, Director of the Office of Educational Development, discussed a computerized system for the documentation of faculty educational activities at the University of Arkansas for Medical Sciences College of Medicine. Documentation of educational activities is an ongoing process, much like a ship's log, that hopefully leads to academic promotion and tenure. In a manner of speaking, the educator's portfolio says, "Here, this is what I have done." It does not ask the important question – how? Indeed, how do we get from new faculty member to a seasoned faculty member presenting an excellent portfolio? Much of the time the waters of academic life seem uncharted and tempestuous, even though many have sailed them before. Why? Perhaps for two reasons: few of us have had the opportunity of being the captain of our own ship, and we have too few seasoned colleague-sailors willing to board our ship and light the way.*

In this issue, Dr. Lee Lee Doyle, Associate Dean for Continuing Medical Education and Faculty Development, College of Medicine, University of Arkansas for Medical Sciences (UAMS), discusses a mentoring program for new faculty members. This program takes some of the guesswork out of navigating the waters of academic life in a medical school. The mentoring program that Dr. Doyle, and the Women's Faculty Development Caucus, initiated at the College of Medicine, UAMS, is both straightforward and functional. Dr. Doyle has defined a mechanism whereby seasoned faculty-sailors can help pilot the ships of new faculty. Get on board!

Formalized Mentoring A Simplistic Solution to Helping Junior Faculty Plan as Academic Career

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INTRODUCTION

The times they are a changin'. "Publish or Perish" is being challenged by "Educate or Expire". In response to stakeholders' calls for accountability, medical schools have sought objective ways to demonstrate effective teaching at both the individual and institutional level. The Educator's Portfolio has become the favored tool for faculty members to demonstrate ability and achievement in teaching. Large amounts of time and ink have gone into how to prepare and present such a portfolio, but too few faculty members have been reminded that the portfolio represents only the last of the four dimensions of career development – Deciding, Designing, Doing and Documenting.[1] The quantity and quality of the material available for the document, the portfolio in this case, is dependent upon how effective a faculty member has been in the first three "D's". Deciding just where we want to go dictates how we design activities we do to achieve that end. Unfortunately, deciding on our ultimate or even interim destinations, and designing our route to get to that destination must be started early in our career, the time we are least equipped to do it. The Office of Faculty Development (OFD) and the Women's Faculty Development Caucus (WFDC) at the University of Arkansas for Medical Sciences College of Medicine had been looking for ways to help junior faculty with these early but critically important steps. Mentoring seemed the most reasonable approach, and a "Mentoring Committee" was appointed.

> *The times they are a changin'. "Publish or Perish" is being challenged by "Educate or Expire".*

MENTORING

For those thinking of beginning a mentoring program, read-

ing the literature on mentoring is discouraging as, according to much of it, effective mentoring programs appear to require an inordinate amount of time and effort from an already over committed faculty. Campbell[2] states that two functions must be fulfilled for a mentoring relationship to exist: career functions and psychosocial functions. According to his definition, and that of others, mentoring is a personal relationship that includes professional and personal development. He compares it to marriage or parenting, two time consuming, challenging, and intense relationships. Chalmers[3] and Kram[4] speak of the phases of mentoring: initiation, cultivation, separation, and redefinition, implying a long-term commitment possibly over a period of years or even a lifetime. Classical or "traditional" mentoring, according to Healy and Welchert,[5] is dynamic, spontaneously occurring between two people of goodwill and commitment, long term, multifaceted, and potentially profound in its impact. Given these definitions, it is not surprising that mentoring has developed a sort of mystique that often frightens and overwhelms committees or individuals interested in providing guidance to junior faculty members.

. . . the portfolio represents only the last of the four dimensions of career development – Deciding, Designing, Doing, and Documenting.

There is, however, a second kind of mentoring, termed formalized or "imitation" mentoring. Formalized mentoring consists of short-term, assigned, cost-effective arrangements of limited significance. Although considered by mentoring purists[5] to be second class, formalized mentoring has been demonstrated to be effective.[6] It is ironic that using these definitions, the first mentoring relationship arranged by Odysseus for his son, Telemachus, would be considered an "imitation" mentoring since Mentor was appointed to his position!

THE MENTORING PROGRAM AT UAMS

The Mentoring Committee chose to design a program to provide neophyte academics with assistance and advice, a mentoring program that would not require an inordinate amount of time on the part of either mentor or protégéé. One aspect of this program that makes it unique is how it handles the concern of many senior faculty members that they lacked the breadth of expertise to be a good mentor. Designing the program so that the mentor was the primary, but not the only advisor addressed this concern.

To this end, a questionnaire listing of knowledge items and skills that are considered useful to academicians (Appendix 1) was sent to 300 women faculty members. Potential mentors were asked to rate their ability in these areas on a 1-4 scale, with 1 representing "Competent" and 4 being defined as "No Experience". Potential proteges used a scale of 1-4 as well with 1 being defined as "No Help Needed" and 4 being defined as "Really Need Help". This information was used to compile the Resource Book given to all mentors and described in more detail later.

At the end of the survey page, faculty members were asked to signify if they were willing to be a mentor or if they required a mentor. Approximately 100 faculty members responded initially, and those who had indicated interest in the program either as mentor or protégéé were each asked to submit their curriculum vitae. Ultimately 22 senior faculty agreed to participate in the program as mentors. Junior faculty members seeking a mentor were also asked to submit curriculum vitae. Using this information and any personal knowledge the committee members had of the faculty members, the committee chose the mentor-protégéé pairs. All protégéés were instructors or Assistant Professors while mentors were tenured at the level of Associate Professor or Professor. Since a great concern of younger faculty members dealt with issues around promotion and tenure, only faculty members who had negotiated this academic hurdle successfully were considered appropriate for primary mentors.

The mentors were invited to an informal dinner/orientation session where the project was discussed, questions were answered, and a packet was given to each mentor. The packet contained reprints on mentoring, the curriculum vitae of their protégéé, brief survey forms to be completed each month, more detailed evaluation forms to be filled out at 6 and 12 months, and two booklets, the Resource Manual and The Mentors' Mentor, an informal mentoring handbook developed by the OFD. A similar packet was sent to each protégéé.

The handbook explained the project design and set out expectations for the mentors and the protégéés. A mentor was expected to contact her protégéé and set up the initial meeting. This was done to overcome any shyness on the part of a junior faculty member in contacting a senior faculty member to arrange a meeting. At the first meeting the mentor was expected to make sure that her protégéé understood the nature of her academic track, review her academic goals, and discuss how she planned to achieve them. The pair also reviewed the protégé's curriculum vitae in light of these goals.

Subsequent meetings, to be held at least once a month, would allow the mentor to go into these issues in greater depth, determine what assistance her protégéé might need, and arrange for the required assistance by consulting the Resource Manual. In the manual, under each of the areas of knowledge and skills listed on the questionnaire, the names, addresses, and phone numbers of those who had responded with a 4 or 5 were listed. Additionally, any campus resource persons with expertise were listed in the appropriate area along with their telephone number. A mentor was expected to set up the initial appointment for her protégéé to meet with an expert in any area where the protégéé might need assistance. The official program would be finished at the end of one year and the formal relationship would automatically terminate.

Mentors were asked to fill out a brief questionnaire each month (Appendix 2), as well as a more detailed evaluation at six months and one year (Appendix 3). Protégés filled out a similar

form with similar questions asked from their perspective. Because of the brevity of the pilot study, outcomes were not measured, only subjective satisfaction with the program. During the initial year, however, one protégéé was promoted to Associate Professor, and one protégéé received a grant that her mentor assisted her in applying for.

Twenty-two mentor/protégéé pairs started the year. Three pairs had problems of incompatibility of time, interest, or personality; one discontinued due to maternity leave; and four pairs dropped out when the protégéé left or was promoted. Of the fourteen pairs that finished the first year, 67% of the mentors and 100% of the protégés agreed or strongly agreed that the program should be offered to all faculty. Of the fourteen mentors who finished the year, ten were enthusiastic enough to agree to accept another protégéé for the second year. While some of the initial pairs are continuing to meet occasionally, it is not possible at this time to predict how many, if any, may become classical mentoring relationships, but for the stated purposes of this program, that is not important.

. . . mentoring has developed a sort of mystique that often frightens and overwhelms committees or individuals interested in providing guidance to junior faculty members.

PROBLEMS AND PITFALLS

The most common problems cited by mentor and protégéé centered around finding a time to meet, the lack of a clearly stated structure and agenda for the first meeting, the requested monthly frequency of meetings, and the monthly survey. During the second year, surveys will only be done quarterly and the year-end evaluation will be briefer. Issues discussed at mentoring meetings included, in order of frequency, research, promotion and tenure, teaching, short-term goals, personal matters, departmental concerns and clinical concerns. From the perspective of the protégés, the most rewarding aspects of the program were the opportunity to exchange ideas with senior faculty members, getting assistance in planning and deciding on career goals, having assistance in the grant process, having someone with whom to discuss departmental problems, and having an advocate. Mentors listed the satisfactions they found as discovering they had more expertise than they thought, finding the experience was easier and more rewarding than they had anticipated, and a sense of personal satisfaction. A debriefing session was held with the mentors following the first year, and they suggested that it might be worthwhile for the mentors to meet informally once or twice during the year to discuss common problems.

CONCLUSIONS

Overall, the first year of the pilot has been a very positive learning experience, and the problem areas mentioned above are being changed during the second year of the pilot which simply repeats a slightly revised first year with a new group of mentor/protégéé pairs. The project is considered useful by the administration and the participants. This success is in great part due to the continuous nurturing on the part of the project director who reminded mentors and protégés of missed meetings, late evaluations, and constantly pushed the project forward. Other elements we consider integral to the success of the program are 1) the voluntary nature of the program; 2) the program was college wide rather than done by individual departments; 3) the pairs were chosen by the committee; 4) the mentor functioned as a facilitator, not the sole expert; 5) the availability of the Resource Manual; 6) and the time limited nature of the program.

Mentoring programs, or their lack, often illustrate the old adage "Don't let perfect stand in the way of good." While this mentoring program may not meet the lofty standards of mentoring purists who may still be struggling to construct a perfect program, it is a good program that can be accomplished without an inordinate expenditure of time or money. It may not provide a lifetime of advice and counsel, but it does address the requirement to get assistance to junior faculty members early in their career when they need the most help in setting their academic goals. The benefits of such a program may well be reflected in the contents of the Educator's Portfolio.

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APPENDIX I.

Dual Purpose Questionnaire
Needs Assessment for Protégés & Measure of Expertise for Mentors

Mentors (Senior Faculty and Resource People)

1 = Competent 2 = Fairly Competent 3 = Some Experience 4 = No Experience

Protégés: (Junior Faculty)

1 = No Help Needed 2 = Fairly Comfortable 3 = Need Help 4 = Really Need Help

Duties/Skills:

1. Promotion and Tenure	1	2	3	4
2. Teaching Portfolio	1	2	3	4
3. Budget Writing	1	2	3	4
4. Grant Writing	1	2	3	4
5. Research Design	1	2	3	4
6. Research Funding	1	2	3	4
7. Curriculum Development	1	2	3	4
8. Curriculum Evaluation	1	2	3	4
9. Resident Teaching	1	2	3	4
10. Resident Evaluation	1	2	3	4
11. Graduate Student Teaching	1	2	3	4
12. Graduate Student Evaluation	1	2	3	4
13. Time Management Skills	1	2	3	4
14. Presentation Skills	1	2	3	4
15. Communication Skills	1	2	3	4
16. Computer Skills	1	2	3	4

Name _____ Rank _____

How Long in Present Rank _____ Degree _____ Phone _____

Please Indicate Whether You Would Like to be a

Mentor ____
Protégé ____

APPENDIX 2.

Mentoring Monthly Activity Report

_____ 1. I did not meet with my protégé this month.
_____ 2. I met with my protégé at least once this month.

We discussed subjects in the following areas:

___ Research
___ Teaching
___ Departmental concerns
___ Short term goals
___ Other_____
___ Clinical
___ Promotion and Tenure
___ Long term goals
___ Personal matters

Comments:_____

_____
Signature

APPENDIX 3.

1998 - 99 Mentoring Program Evaluation for Mentors

Please rate the questions on the overall program according to the scale - fill in the circle.

Disagree = D; Neutral = N; Agree = A	**D**	**N**	**A**
1. Mentoring has been a good experience for me.	❍	❍	❍
2. Mentoring should be expanded to all faculty.	❍	❍	❍
3. I read The Mentor's Mentor.	❍	❍	❍
4. It is important to have an agenda at the first meeting.	❍	❍	❍
5. My protégé and I were well matched.	❍	❍	❍
6. Meetings with my protégé were readily scheduled.	❍	❍	❍
7. I referred my protégé to a secondary resource.	❍	❍	❍
8. I benefited from this relationship.	❍	❍	❍
9. My protégé benefited from this relationship.	❍	❍	❍
10. This relationship required too much of my time.	❍	❍	❍
11. My protégé needs another year of mentoring.	❍	❍	❍
12. I would prefer to have a different protégé.	❍	❍	❍

13. What I liked about mentoring: _____

14. What I did not like about mentoring: _____

15. My suggestions for the next year of mentoring: _____

My Name_____

❍ **I will be a mentor 1999 - 2000** ❍ **I do not want to be a mentor 1999 - 2000**

Please return this form by August 13.

This report is confidential

AFTERTHOUGHTS . . .

Afterthoughts . . . are anecdotal accounts, original poetry, or commentary that are reflective of the process and meaning of medical education and of the practice of medicine. In this issue, we present a poem by Ms. Michelle Rodgers, a fourth-year student at the College of Medicine, University of Arkansas for the Medical Sciences. This poem, composed in her first year of medical school, describes in an insightful manner her thoughts regarding Gross Anatomy and the pivotal role of the cadaver in her professional growth. Ms. Rodgers was recognized for her talent when the Dean of the College of Medicine chose this poem to include in his annual address to the senior class during the 1999 Medical Student Honors Convocation. Not only a gifted poet, Ms. Rodgers was recently elected to Alpha Omega Alpha Honor Medical Society.

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Another Sunday

By Michelle Rodgers

Another Sunday comes
and the body indeed my temple.
Amongst these parishioners,
silent in their stainless steel pews,
I pray.

And I listen.

They sing the hymn of despair and joy
in perfect harmony -
    -silent echoes of better days remembered.
And I send my unspoken
chorus to the heavens as well.

I turn myself inside out,
exposing all which is black and slick
and full of fear,
as I begin to understand
the gravity of my chosen role.

And I hold the cold hands
of the most important person
I have *never* met.

And wonder if I am seeking to console
    or be consoled?

And I look into his face;
this man who teaches me
    what no one living can.

He tells me the story of *his* life
without uttering a word,
. . . and becomes a part of *mine* to come.

His gift not given in vain -
    - I learn more than can be dreamed

And find I am no longer afraid.

SOCIAL ISSUES IN THE BASIC SCIENCES

ASSOCIATE EDITOR: David Bolender, Ph.D.

Copyright law affects all of us and its interpretation is still confusing to many. Recently I was informed about a helpful guide to copyright and fair use that is published by the University System of Georgia. It can be found at http://www.peachnet.edu/admin/leagal/copyright. The guide contains well written explanations of the law and useful examples of what is and is not considered "fair use". An additional site describing ten myths about copyright is located at www.templetons.com/brad/copymyths.html

The following announcement "Electronic Copyright Law Passes" by Ms. Julie Gores highlights some of the changes or pending changes which will affect electronic media. Julie is Interlibrary Loan, Copyright, and Reference Librarian for the Todd Wehr Library at the Medical College of Wisconsin. She is the key resource person for the library on all matters dealing with copyright and regularly attends conferences and meetings that address copyright issues. Much remains to be resolved before the academic community realizes the full effect of this legislation. In spirit, the copyright laws were written to provide protection for the copyright holder as well as the need of society to use copyrighted materials for teaching and learning. Unfortunately economic considerations may play a significant role in these decisions.

My final comments come in the form of two suggestions. The first is to compile a list of available public domain materials that would be useful for basic science educators. For example, The Sourcebook of Medical Illustration edited by P. Cull (Partheon Publishing, Park Ridge New Jersey, 1989, ISBN# 0-940813-72-6) which contains over 900 anatomical, medical and scientific illustrations that are free of normal copyright restrictions. Second, let's use the resources of IAMSE to form a library of public domain material (e.g. graphs, illustrations, charts, micrographs, etc.) which would be available to basic science colleagues through our website. Let us know what you think about these issues.

Electronic Copyright Law Passes

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Announcement

After 3 years of intense debate, the United States Congress approved the Digital Millenium Copyright Act (DMCA) (H.R. 2281) and the Copyright Term Extension Act (S. 505) in October of 1998. It is a victory of sorts for librarians, educators, scholars, etc., but some uncertainties remain. A brief listing of the key provisions which may affect libraries and non-profit educational institutions follows.

- Perhaps, the biggest victory of all is that the Fair Use Doctrine, as defined in the Copyright Act of 1976, was not changed by the new laws. It was determined that fair use standards apply to information in all formats.

- The DMCA also prohibits the copyright holder from restricting access to their material through use of encryption or a password (anti-circumvention). It also prohibits the manufacture of any such device designed to circumvent such prohibitions.

- No online service provider or carrier of digital information (i.e. your library) will be held liable for copyright solely on the content of a transmission misused by one of the system's users.

- For preservation purposes only, libraries will be allowed to electronically "loan" copies to other qualifying institutions. Authorized institutions will also be allowed to make up to three digital preservations of a copyrighted work.

- In May of 1999, recommendations on distance learning were sent to the United States Congress for review. Should Congress enact those proposals, educators would have new options for including some copyrighted works in transmissions to students at remote locations. However, educators would need to limit access to students enrolled in a course and implement ways to inform

students and others on copyright. Formal education programs and warning notices are just two examples of how this might be done.

- Laws for electronic reserves were not defined. Variations of traditional copyright laws for classroom copying (Section 103 of H.R. 2223), which were not changed, will most likely be the guidelines for electronic reserves at many institutions.

- The Copyright Term Extension Act extended the length of protection to work created by individuals or corporate copyright holders. The term now covers life of the author plus an additional 70 years for individuals and 95 years for corporate creators. The law includes an exemption for libraries, archives, non-profit educational institutions allowing them to treat the last 20 years of protection as if the material was in the public domain — provided that certain requirements are met.

While some progress seems to have taken place, there may be trouble on the horizon. The Collections of Information Antipiracy Act (H.R. 2652/S.2291) has yet to be decided. This Act proposes to provide new legal protection for "collections of information", including those *not presently protected by copyright.* The battle, as they say, wages on.

THE MEDICAL EDUCATOR'S RESOURCE GUIDE

ASSOCIATE EDITOR: John R. Cotter, Ph.D.

The Medical Educator's Resource Guide was a feature that made its debut in Volume 7 of the Basic Science Educator. *At that time, it was simply an unreviewed listing of educational websites judged to be of value by the individuals who had submitted them. Since that time, however, more extensive plans have evolved including the appointment of this writer as the Associate Editor of the feature. Beginning with this issue of our journal, the scope of The Medical Educator's Resource Guide has now been expanded. We are seeking reviews of World Wide Web sites that are judged to be of interest to basic science educators. If you are aware of a site that has the potential for being used in teaching the basic sciences, or that facilitates the learning of basic sciences, I encourage you to contribute to this Guide. Send all submissions to jrcotter@buffalo.edu. Please follow our published format and include the URL and a short critique (100-150 words) that summarizes the essence, and importantly, the utility of the site.*

In general, the journal will only publish reviews of sites that can be used by faculty and students in teaching and learning of the basic sciences. We are especially interested in, but not limited to, reviews of sites that utilize multimedia, contain unique instructional materials, and are interactive. All submissions will be reviewed for relevance, content and length. Revisions, if needed, will be made in consultation with the author. Once published in the journal, these educational sites and their reviews will be posted in hyperlinked form on the IAMSE website under our educational "Resources" branch.

Basic Embryology Review Program. University of Pennsylvania Health System.
http://www.med.upenn.edu/meded/public/berp/

Twenty-seven drawings illustrate implantation, embryogenesis, and the external form of the fetus between day 1 (fertilization) and the 38th week of gestation. Each image is annotated. Three components of most screens - a structure list, an image and explanatory text are actively linked. A video summarizes the changes in the microanatomy of the embryo and external appearance of the fetus. Chapters dealing with the development of structures and systems are not available over the internet. (Reviewed by John R. Cotter, Ph.D., State University of New York-Buffalo)

BloodLine. Carden Jennings Publishing Co., Inc.
http://www.cjp.com/blood/

This resource takes a global view to matters of interest to those in the field of Clinical Hematology. Its target audience is the physician, resident, and advanced medical student in Internal Medicine. Morphological diagnostic hematologists will also find it useful. The number of diseases that is offered is limited but the illustrative content of what is available is excellent. Experience with laboratory materials however is required for clinical competence. Instructive, interesting case histories and stimulating articles that deal with current issues are presented. (Reviewed by Chester A. Glomski, Ph.D., State University of New York-Buffalo)

Hypertexts for Biomedical Sciences. Pathophysiology of the Digestive System. Colorado State University.
http://arbl.cvmbs.colostate.edu/hbooks/index.html

This is an entertaining, thorough, and clearly written survey of the digestive system. Topics presented include the anatomy, biochemistry and physiology of pregastric digestion; the stomach, liver and pancreas; and the small and large intestine. The gross and microscopic anatomy of the organs is illustrated with photomicrographs and physiological events are illustrated with animated drawings. Interactive quizzes use multiple choice, matching and completion style questions and a crossword puzzle. (Reviewed by John R. Cotter, Ph.D., State University of New York-Buffalo)

Human Microscopic Anatomy and Greg Rogalski's Quiz Bank. University of California at Davis.
http://medocs.ucdavis.edu/CHA/402/course.htm

The UC Davis web site has some of the best images on the Web in terms of resolution and color and is exemplary of what students learn by studying histological preparations. The format of Rogalski's Histology Quiz-O-Rama! is especially useful for reviewing. Answers are given only if desired and a short description draws attention to diagnostic features. Other discriminating aspects are: 1) graphics that define the structure in question, and 2) magnification levels that permit the identification of associated structures and the recognition of structures within the context of the image. (Reviewed by Meredith Regina, B.S., State University of New York-Buffalo)

Microbiology Video Library. Leicester University.
http://www-micro.msb.le.ac.uk/Video/Video.html

This multipurpose site features a modest number of teaching videos including an excellent one on HIV replication and several from James A. Sullivan's *Cells Alive!* Expect that more videos will be added as this site accepts contributions. In addition, there are experiments (completion requires a registration fee); multiple

choice questions; lecture notes for introductory and upper level courses; and online tutorials. (Reviewed by John R. Cotter, Ph.D., State University of New York-Buffalo)

Pathology 703. University of Wisconsin Medical School.
http://www.medsch.wisc.edu/path703/path703.html

The Pathology 703 website is a good example of the trend toward computer-assisted teaching. Histological sections corresponding to students' laboratory exercises are imaged, with interactive text and progression from low-to-high-power viewing. The gem of this website is its Clinicalpathologic Correlations exercises: each case presentation has an interactive glossary, 10-15 autopsy images, and a question/answer session. The only limitation of this growing website is the modest number of images (53) and case presentations (6). (Reviewed by Christina Keaney, M.D., State University of New York-Buffalo)

Structure of the Human Body. Loyola University Medical Center.
http://www.meddean.luc.edu/lumen/MedEd/GrossAnatomy/GA.html

This site serves as the home page for the gross anatomy course at Loyola University. Though many of the materials are password protected, students who are enrolled in a professional level gross anatomy course will find sections that are not, i.e., LUMEN Learn 'Em, Cross-Sectional Anatomy, Cross-Sectional Tutorial, Master Muscle List, Practice Exams, Other Lessons, and List of Three's. These contain study materials that are useful in understanding concepts as well as learning and reviewing anatomy. (Reviewed by Raymond Dannenhoffer, Ph.D., State University of New York-Buffalo)

The Internet Pathology Laboratory for Medical Education. University of Utah.
http://www-medlib.med.utah.edu/WebPath/webpath.html#MENU

This site offers over 1900 images of gross and microscopic pathology findings, as well as text descriptions, examination questions, and up-to-date case-based exercises. Organized according to topics in systemic and organ-based pathology, it covers a wide range and offers multiple examples of disease processes. In-depth tutorials in topics such as cytology and forensic science are also available. A unique feature is the case-of-the-week challenge, which invites visitors to respond with their diagnosis for the pathology imaged. While this Web site is said to be geared primarily toward second-year medical students, residents in medicine and pathology would also find it useful as a succinct "finger-tip" review. (Reviewed by Christina Keaney, M.D., State University of New York-Buffalo)

The THCME Medical Biochemistry Page. Indiana University School of Medicine.
http://web.indstate.edu/thcme/mwking/home.html

This is a useful site for biochemistry education. It gives basic information about most topics of interest to a student of medical biochemistry. It is well designed and has good diagrams and easy-to-follow links. A particular strength is its links of biochemically related diseases to the NCBI Online Mendelian Inheritance in Man database, which contains extensive information about inborn errors of metabolism. (Review by Richard Marks, Ph.D., East Carolina University)

The Whole Brain Atlas. Harvard University.
http://www.med.harvard.edu/AANLIB/home.html

This site has a wealth of information about magnetic resonance imaging (MRI) that both students and experts will find valuable. Students will enjoy using a listing of 100 brain structures, each of which can be located by selecting a structure by name. Alternatively, brain structures can be presented for students to identify. A variety of conditions are presented under the rubrics of cerebrovascular diseases, tumors, degenerative diseases, and inflammatory or infectious diseases. Videos of brain MRI slices can be viewed in sequences that convey information about the progression and spatial distribution of the conditions. Display options allow users to choose T1-weighting, T2-weighting, rendering of cerebral blood flow (CBF), or overlays of CBF on MRIs. (Reviewed by Christopher S. Cohan, Ph.D., State University of New York-Buffalo)

Vesalius. Lion Reef Software.
http://vesalius.com

Vesalius is a free anatomical and surgical reference for the medical community that is maintained by a commercial multimedia production company. It consists of a collection of color drawings with brief text descriptions of the basic anatomy being illustrated, and a series of "clinical folios" that illustrate and describe various surgical procedures. Images may be downloaded for educational use, but may not be altered. Registered users can annotate the images with primitive on-line tools and store up to 300 such "mark-ups" on the Vesalius server for 3 days. Longer storage (e.g., for a semester) requires a fee. The site is NOT an atlas: the illustrations contain no labels, so they are more useful as visuals for instructors than as study aids for students. However, the clinical folios provide accessory information for more advanced students and mini-reviews of surgical procedures for residents. The range of illustrations is currently limited, but the project is an evolving one, with new regions and structures being added. There are also plans for the inclusion of more extensive animation (e.g. rotating views of some structures are available) and other types of images such as X-rays and MRIs. (Reviewed by John Kolega, Ph.D., State University of New York-Buffalo)

Webvision: The Neural Organization of the Vertebrate Retina. University of Utah.
http://insight.med.utah.edu/Webvision/index.html

The Webvision site by Helga Kolb, Eduardo Fernandez, and Ralph Nelson provides a good overall description of the structure and

function of the retina, with an emphasis on the morphology, physiology, and pharmacology of each class of retinal neuron. Most topics are up-to-date and it provides an excellent initiation point for both students and researchers. There is an extensive bibliography. A limitation is that the text and bibliography is rarely linked to other sites. (Reviewed by Malcolm Slaughter, Ph.D., State University of New York-Buffalo)

ANNOUNCEMENT

Call for Nominations - IAMSE Board of Directors

In accordance with our bylaws, the first general election of the Board of Directors for the International Association of Medical Science Educators will occur in the year 2000. Because this is the first election, all twelve positions on the Board (three Officers – President, Secretary, and Treasurer – and nine Directors) will appear on the ballot. Officers serve a two-year term, and Directors serve a three-year term. The entire process, including relevant dates, responsibilities and requirements of Board members, etc., is described on the IAMSE website at http://iamse.org/electioninfo.htm

It is the task of the Nominating Committee to identify, recruit, and propose candidates who wish to participate in this election. We seek your help in this most important charge. Any IAMSE member in good standing may nominate themselves or another member in good standing for consideration by this Committee. As directed by the bylaws (http://www.iamse.org/bylaws.htm), the Committee will evaluate and compile a list of candidates to be posted on the IAMSE website no later than April 1, 2000. Article V Section 3 of the bylaws provides means to identify additional candidates for the ballot between April 1 and May 1 of 2000.

IAMSE is the premier organization for the support and professional advancement of individuals around the world involved in teaching the fundamental sciences of medicine. The Board of Directors is responsible for defining the current and future direction of our organization, and utilizing the human, financial, and material resources of the organization to achieve these purposes. Participation offers unlimited opportunities for international recognition and the development of leadership skills. If you would like to become part of a dynamic team, or know of another IAMSE member who would, please contact a member of the Nominating Committee today!

Carol F. Whitfield, Ph.D. – Chair; Pennsylvania State University College of Medicine; TEL: (+)1-717-531-8570; FAX: (+)1-717-531-7667; cfw1@psu.edu
Marguerite Coomes, Ph.D.; Howard University College of Medicine; TEL: (+)1-202-806-9760; FAX: (+)1-202-806-5784; mcoomes@fac.howard.edu
Eugene Hamori, Ph.D.; Tulane University School of Medicine; TEL: (+)1-504-587-7359; FAX: (+)1-504-586-3857; eha@bioc.tulane.edu
Thomas J. Schmidt, Ph.D.; University of Iowa School of Medicine; TEL: (+)1-319-335-7847; FAX: 1-319-335-7330; thomas-schmidt@uiowa.edu
Thomas R. Viggiano, M.D., M.Ed.; Mayo Clinic and Medical School; TEL: (+)1-507-284-3627; FAX: (+)1-507-284-2634; viggiano.thomas@mayo.edu

RECOGNITIONS

RECOGNITIONS is a feature that seeks to share information about IAMSE members who have been recognized by their students and peers for outstanding accomplishment and dedication to teaching and/or innovation in medical education. Your submission of awards such as those listed below, and other related accolades is encouraged.

Nehad El-Sawi, Ph.D., Member of the IAMSE Board of Directors, Associate Professor of Microbiology, and Associate Dean for Curriculum at the University of Health Sciences College of Osteopathic Medicine in Kansas City, Missouri recently received the 1999 Governor's Award for Excellence in Teaching. Selected recipients of this award demonstrate the spirit and expertise to establish excellence in the higher education system of Missouri.

Denise Ferrier, Ph.D., Former Member of the IAMSE Board of Directors and Associate Professor of Biochemistry has received a Golden Apple Award from the Class of 2003 for Excellence in Teaching and her work as Course Director at MCP-Hahnemann School of Medicine in Philadelphia, Pennsylvania.

Nancy K. Hall, Ph.D., Member of the *BSE* Editorial Board and Associate Dean for Admissions and Medical Education was selected for a University of Oklahoma Samuel Roberts Noble Presidential Professorship. This honor is awarded to the University's most dedicated scholars in recognition of the power that great teachers have to influence the lives of their students. Her area includes the development and implementation of a longitudinal bioethics program in medicine and the humanities for the College of Medicine.

Adam Myers, Ph.D., Professor of Physiology & Biophysics at Georgetown University School of Medicine in Washington, DC has received the 1999 Kaiser-Permanente Award for Excellence in Basic Science Teaching. Awardees are chosen by a panel of past recipients and representatives of the medical student body.

Todd R. Olson, Ph.D., IAMSE Treasurer and Member of the Board of Directors, and Professor of Anatomy and Structural Biology at the Albert Einstein College of Medicine in Bronx, New York was the 1999 recipient of the College's Harry Eagle Award for Outstanding Basic Science Teaching. The College presents two different outstanding teacher of the year awards, and Dr. Olson is one of only a small number of faculty members to have received them both.

József Szeberényi, M.D., Ph.D., D.Sc., Member of the *BSE* Editorial Board, Vice Dean of Education, and Professor of Molecular Cell Biology at the University Medical School of Pécs, Hungary has received the 1999 Romhanyi Award for Excellence in Teaching. One individual is chosen each year by the students of the graduating class of the medical school. This is the third consecutive year this award has been presented to Dr. Szeberényi.

William Zehring, Ph.D., Member of the *BSE* Editorial Board, and Associate Professor in the Department of Biochemistry at the Robert Wood Johnson Medical School in Piscataway, New Jersey received the 1999 Excellence in Teaching Award for Basic Sciences. This award is presented by the Trustees of the Foundation of the University of Medicine and Dentistry of New Jersey and includes a $1000 grant for the support of teaching.

N. B. Although RECOGNITIONS makes its debut with the majority of entries coming from current and former members of the IAMSE Board of Directors and Editorial Board of the Basic Science Educator, *we wish to emphasize that this featue is to recognize any and all IAMSE members. Send notice of your award or honor to J. Charles Eldridge, Managing Editor at <eldridge@wfubmc.edu>; FAX: (+)1-336-716-8501.*

IAMSE WEB-SIGHT

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So, have you heard the news? IAMSE is developing a totally new website! Yes, the address is still the same, but with the new millennium is coming a totally state-of-the-art design in information technology, and accessibility. Do not be deceived by the simple clean lines and modest arrangement of navigational buttons that you see on our homepage reproduced to the right. Like solid state circuitry, this URL is designed for power!

The goal of the IAMSE website is to provide straightforward, no nonsense access to useful information. Many features will be provided to all web users, but a main focus will be on the IAMSE member. Your membership (and personal membership password) will now provide access to a series of special features. For instance, in the **PUBLICATIONS** section, listing of contents of back issues of the *Basic Science Educator* (*BSE*) will be available to all. By mid-year 2000, IAMSE members will be able to conduct their own searches of the *BSE* by topic or author. This, in addition to an extensive listing of medical and educational journals and cross linked with MedLine search capability will provide manuscript writers with the most direct and powerful literature searching techniques available in science today.

Beginning with the next issue of our journal, all *BSE* articles will have abstracts available in PDF format online. IAMSE members however, will be able to read the full article and/or complete journal by entering their personal password. It is inevitable that membership fees eventually will be reduced for those who wish to forego receiving hardcopy issues and simply access our journal online.

Our **CONFERENCES** section has been revised and standardized so that information on back IAMSE conferences will be available to all. Once again, special features will be accessible only by membership password. Technology is being installed for audio presentations of recorded sessions (including all previous conferences). This, together with live real-time participation in our conferences *from your office* (watch for it in 2001), will be a special feature of the Distance Learning section on our website. Already we have an active site for the next Biennial Conference, to be joint-sponsored by Mayo Clinic, which will pilot these features.

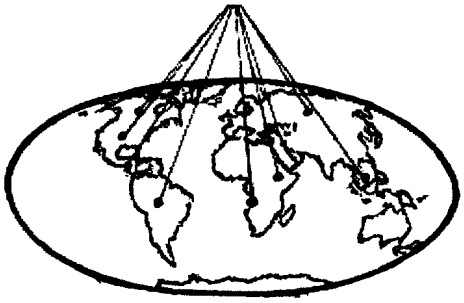
Come discover a searchable Directory of Colleagues (using your personal password, of course) in the expanded **MEMBERSHIP** section. Need to update your records? Submit the form that is accessible to you alone. Have a question or need some advice? Tap into our "Find an Expert" feature, as we share the diversity of our expertise. Look for information on demographics of medical science educators, salary information from around the world, conduct job searches uniquely geared toward medical science education, and browse our educational grant sources database. Discover opportunities for medical faculty and student exchange programs and fellowships and participate in IAMSE surveys.

We've added a new section titled **ABOUT IAMSE** that holds all the logistical information on our organization. Learn about our history, meet the Management Team that works behind the scenes, and participate in the Y2000 election of the Board of Directors. Has your accounting department ever asked for IAMSE's Tax ID Number, or do you need our Mission Statement? It's all here under this heading.

And of course, I cannot end without mentioning our *piece d'resistance*, the **RESOURCES** section. This is destined to become a major portion of our website and the only one to be headed by a special team of four members of the IAMSE leadership. On the first division, the visitor may select the fully interactive branch of our website. Here both real-time and delayed Faculty Development Workshops will be presented around the world. Take an IAMSE course in MCQ item writing, or learn how to create customized Triple Jump evaluation exercises. Physician CME subscription programs will be offered as will other special activities in multi-media Distance Learning. Under the more traditional branch, members may conduct searches of IAMSE resources by topic, or select to be guided by a special search engine keyword (e.g. Histology, or Molecular Biology). Find problem-based learning cases that you can download or investigate how your students can best benefit from our MCQ databases.

That and more are coming. Not all at once, but we ask your patience (and ideas) as they develop. Some features described are costly to create and implement, and although we are seeking grant assistance, that process is slow. What's important to remember is that this site has been designed with a framework to accommodate cutting edge technology. As time and funds permit, that technology will be expanded, and I will be here to keep you apprised through Web-Sight, and periodic e-mail broadcasts. The news is good and our future bright. Knowing your needs and listening to your ideas are what will make this website a success, so talk to me at Julie@iamse.org.

INTERNATIONAL ASSOCIATION OF MEDICAL SCIENCE EDUCATORS



Dedicated to Excellence in Basic Science Medical Education.

We are an international forum sharing current and innovative techniques for teaching and learning the fundamental sciences of medicine.

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About IAMSE

Join IAMSE!

The International Association of Medical Science Educators (IAMSE) is a global non-profit organization dedicated to the professional support and development of individuals responsible for teaching the fundamental sciences of medicine. Those sciences are defined as subjects which have arisen from the traditional disciplines of Anatomy, Behavioral Sciences, Biochemistry, Microbiology, Pathology, Pharmacology, and Physiology. Our goal is to promote medical education through the sharing of current and innovative techniques in instructional methodology. As the rate of scientific discovery increases, we seek to ensure that the training of medical professionals around the world evolves in both process and content to meet the demands of medicine in the 21st Century.

We address this goal through several venues, all of which cross disciplinary, geographic, and political boundaries. Educational resources, new ideas and opinions, and personal interactions are promoted by means of a semi-annual peer-reviewed journal, international conferences, an Internet listserv, and this World Wide Web site. Members of IAMSE are medical professionals who live and work in more than forty countries. Our leadership is comprised of volunteers from medical institutions around the world. We generate financial support through federal, private, and corporate grants, sponsorships, the proceeds of educational conferences, and nominal membership fees.

Our greatest asset however, is the professional dedication of individual members united in a common cause. We invite all who have responsibility for, or interest in, any aspect of the medical education process to join with us as we strive towards our mutual support and professional development to be able to integrate science throughout the continuum of medical training.

CALENDAR OF EVENTS

2000

Developing Medical Education
Ninth Ottawa International Conference
March 1-3, 2000 - Cape Town, South Africa
This conference is a forum for professionals from around the world who are concerned with teaching and assessing health care professionals.
CONTACT: Dr. Athol Kent, Postgraduate Conference Centre, Medical School, Anzio Road, Observatory 7925, Cape Town, South Africa
TEL: (+)27-21-4066381; FAX: (+)27-21-4486263; E-MAIL: hero@ct.lia.net (http://www.ottawainafrica.co.za/letter.html)

Learning How to Learn
April 7-9, 2000 - Istanbul, Turkey
This is a national meeting in theTurkish language for educators, health sciences faculty, administrators and students. It will focus on Basic Concepts and Management of Learning and Cognition and Emotional Components and Neuro-linguistics in Learning.
CONTACT: Prof.. Dr. Talat Cantez, Head, Istanbul University Section of Informatics and Medical Faculty Department of Pediatrics, 34390 Capa, Istanbul, Turkey
TEL: (+)90-212-635-1189; FAX: (+)90-212-631-4170; E-MAIL: cantez@istanbul.edu.tr

Teaching Microbiology and Immunology to Medical Students
May 6-10, 2000 - Myrtle Beach, South Carolina, U.S.A.
Eighth Biennial Educational Strategies Workshop
Sponsored by the Association of Medical School Microbiology and Immunology Chairs, this conference is geared toward course directors and instructors of microbiology and immunology. It will feature presentations and workshops related to Curriculum, Evaluation, Technology and Learning Styles.
CONTACT: Richard Coico, Ph.D., Professor and Chair, Department of Microbiology and Immunology, City University of New York Medical School, New York, U.S.A.
TEL: (+)1-212-650-6628; E-MAIL: coico@med.cuny.edu (http://www.sci.ccny.cuny.edu/~lima/AMSMIC/myrtle.html)

Program for Leaders in Medical Education
June 18-23, 2000 - Boston, Massachusetts, U.S.A.
Harvard Macy Institute Annual Workshop
This program is designed for leaders with major responsibility for medical education, especially those introducing or managing significant interdepartmental changes or innovations in their institutions.
CONTACT: Harvard Macy Institute, Harvard Medical School, 260 Longwood Ave, MEC 384, Boston, MA 02115, U.S.A.
TEL:(+)1-617-432-0477; E-MAIL: harvard_macy@hms.harvard.edu; (http://134.174.17.108/conted-bin/hmscme.cgi?SECTION=CLASSES&ID=00202116)

Computers in Health Care Education Symposium
June 27-July 1, 2000 - Salt Lake City, Utah, U.S.A.
Annual Slice of Life Workshop
This annual workshop is for users of the "Slice of Life" Videodisc, developers of medical multimedia, and interested newcomers. Participants hear and see new technology for Medical/Health applications, demo new multimedia teaching programs they have made/bought/sell, and share innovations for WWW distance education.
CONTACT: Suzanne Stensaas, M.D., Eccles Health Sciences Library, University of Utah, 10 North 1900 East, Salt Lake City, Utah 84112-0589, U.S.A.
TEL: (+)1-801-585-1281; E-MAIL: suzanne.stensaas@hsc.utah.edu; (http://www.slice.gsm.com/index.html)

Horizon Scanning in Medical Education
Association for Medical Education in Europe Annual Conference
August 27-30, 2000 - Beer Sheva, Israel
Penaries, Workshops, Short Communications, and Poster Sessions projecting a vision of medical education in the year 2020. Directed toward teachers, educators, practitioners, students, and administrators.
CONTACT: AMEE Office, Centre for Medical Education, University of Dundee, Tay Park House, 484 Perth Road, Dundee DD2 ILR, Scotland, UK
TEL: (+)44-1382-631967; FAX: (+)44-1382-645748; E-MAIL: p.m.lilley@dundee.ac.uk (http://www.dundee.ac.uk/meded/AMEE/conf2000.htm)

Annual Meeting of the Association of Medical Schools in Europe
September, 2000 - Porto, Portugal
AMSE creates a forum for European Medical Faculties to share experiences in the fields of education, research and management. Annual meetings address topics of interest to Deans and other staff members of Medical Faculties.
CONTACT: Prof. Dr. Sergio Curtoni, Department di Genetica, via Santena 19, 10126 Torino, Italy
TEL: (+)39-011-67-06-668; FAX: (+)39-011-67-4040; Dept. TEL: (+)39-011-633-6511; E-MAIL: curtoni@golgi.molinette.unito.it (http://www.ugr.es/~facmed/amse/amse99.htm)

Annual Meeting of the Association of American Medical Colleges
October 27-November 2, 2000 - Chicago, Illinois, U.S.A.
The mission of the Association of American Medical Colleges is to improve the health of the public by enhancing the effectiveness of academic medicine. Each year, representatives of mem-

ber medical schools participate in a number of diverse activities addressing progress and trends in medical education within North America.
CONTACT: AAMC Annual Meeting Registration Office
TEL: (+)1-202-828-0415; FAX: (+)1-202-862-6160; E-MAIL: meetsreg@aamc.org (http://www.aamc.org/meetings/annual/futrdts.htm)

American & European Associations for Cancer Education
November 2-5, 2000 - Washington, DC, U.S.A.
This joint meeting of the two associations will focus on developing and evaluating new educational strategies and methods for cancer education including the examination of objectives, courses, and evaluation instruments.
CONTACT: Secretariat Virginia Krawiec, MPA, AACE Secretary, P.O. Box 601, Snellville, Georgia, U.S.A.
TEL: (+)1-404-329-7612; FAX: (+)1-404-321-4669; E-MAIL: gkrawiec@cancer.org (http://rpci.med.buffalo.edu)

Medical Education 2000
Second National Congress on Medical Education
November 22-25, 2000 - Izmir, Turkey
This meeting (mainly in Turkish) is organized by the Turkish Society for Development of Medical Education and is designed for teachers, educators, medical practitioners, administrators, and students. Plenaries, Featured International Speakers, Learning Workshops, Small Group Sessions, and Thematic Poster Presentations will address a variety of topics.
CONTACT: Medical Education 2000, Ege University School of Medicine, Department of Medical Education, Bornova 35100, Izmir, Turkey
TEL: (+)90-232-343-4343/4636 or -388-2868; FAX: (+)90-232-342-2142; E-MAIL: euteb@med.ege.edu.tr (http://www.medicine.ege.edu.tr/~euteb/utek2)

2001

Fifth Biennial Conference of the International Association of Medical Science Educators
July 21-24, 2001 - Rochester, Minnesota, U.S.A.
This conference will be joint-sponsored by Mayo Clinic. International speakers will address topics related to understanding the process of teaching and learning the basic sciences. Plenary Sessions, Debates, Discussion Sessions, Learning Workshops, Original Papers and Poster Presentations.
CONTACT: Roger Koment, Ph.D., President, IAMSE Administrative Office, 5535 Belfast Place Suite A, Springfield, VA, U.S.A.
TEL: (+)1-703-333-5223; FAX: (+)1-703-333-5224; E-MAIL: rkoment@iamse.org (http://www.iamse.org/conf5_menu.htm)

Association for Medical Education in Europe Annual Conference
September 2-5, 2001 - Berlin, Germany
This conference will be held at Charité - Humboldt University. Directed toward teachers, educators, practitioners, students, and administrators.
CONTACT: AMEE Office, Centre for Medical Education, University of Dundee, Tay Park House, 484 Perth Road, Dundee DD2 ILR, Scotland, UK
TEL: (+)44-1382-631967; FAX: (+)44-1382-645748; E-MAIL: p.m.lilley@dundee.ac.uk (http://www.dundee.ac.uk/meded/AMEE/conf2001.htm)

Annual Meeting of the Association of American Medical Colleges
November 2-8, 2001 - Washington, DC, U.S.A.
The mission of the Association of American Medical Colleges is to improve the health of the public by enhancing the effectiveness of academic medicine. Each year, representatives of member medical schools participate in a number of diverse activities addressing progress and trends in medical education within North America.
CONTACT: AAMC Annual Meeting Registration Office
TEL: (+)1-202-828-0415; FAX: (+)1-202-862-6160; E-MAIL: meetsreg@aamc.org (http://www.aamc.org/meetings/annual/futrdts.htm)

2002

Meeting the Challenges of Medical Science Education
Date to be Announced - Accra, Ghana
This will be the First African Regional Conference on Medical Science Education and will address issues of regional impact. The venue being planned is the International Conference Center in Accra, Ghana.
CONTACT: Dr. S. Asante-Poku, Department of Biochemistry, University of Ghana Medical School, P.O. Box 4236, Accra, Ghana
TEL: (+)21-665401 Ext. 545/6448 E-MAIL: Stephen.Asante-Poku@gha.healthnet.org

Annual Meeting of the Association of American Medical Colleges
November 8-14, 2002 - San Francisco, California, U.S.A.
The mission of the Association of American Medical Colleges is to improve the health of the public by enhancing the effectiveness of academic medicine. Each year, representatives of member medical schools participate in a number of diverse activities addressing progress and trends in medical education within North America.
CONTACT: AAMC Annual Meeting Registration Office
TEL: (+)1-202-828-0415; FAX: (+)1-202-862-6160; E-MAIL: meetsreg@aamc.org (http://www.aamc.org/meetings/annual/futrdts.htm)

TRANSITIONS

Giulia A. Bonaminio, Ph.D., Member of the IAMSE Board of Directors, has been appointed Assistant Dean for Medical Education at the University of Kansas School of Medicine, Kansas City, KS. She continues in her role as Director of the Office of Medical Education.

J. Charles Eldridge, Ph.D., Associate Professor of Physiology and Pharmacology at Wake Forest University School of Medicine has been appointed Managing Editor for the *Basic Science Educator.* A prolific writer himself, Chuck has served on the Editorial Boards of the *Journal of Steroid Biochemistry* and *Biology of Reproduction.* Over the years he also has contributed to more than a dozen other peer-reviewed journal Boards as a manuscript reviewer and ad hoc member, including the *American Journal of Physiology, American Journal of Obstetrics and Gynecology,* and the *Proceedings of the Society for Experimental Biology and Medicine.* We are pleased to welcome him to this leadership role in our journal.

Nehad El-Sawi, Ph.D., Member of the IAMSE Board of Directors and Associate Professor of Microbiology at the University of Health Sciences College of Osteopathic Medicine, Kansas City, KS has been appointed Associate Dean for Curriculum for her school. This additional role gives her responsibility for the continued implementation, management, and evaluation of the newly integrated and centrally governed curriculum at UHSCOM.

Denise Ferrier, Ph.D., Former Member of the IAMSE Board of Directors, has been appointed Interim Chair of the Department of Biochemistry at MCP-Hahnemann School of Medicine in Philadelphia, PA.

Edward French, Ph.D., Associate Professor of Pharmacology at the University of Arizona College of Medicine has been appointed Western Region Convener of the AAMC Group on Educational Affairs Basic Science Education Special Interest Group (BSE-SIG).

IAMSE BOARD OF DIRECTORS

The following individuals have completed their term of service on the IAMSE Board of Directors effective June 30, 1999. We are grateful for their many contributions as Charter Members of the original Board constituted in 1997.

Wolfram Antepohl, M.D.
Linkoping University Hospital
Linkoping, Sweden

Pamela C. Champe, Ph.D.
UMDNJ Robert Wood Johnson School of Medicine
Piscataway, NJ U.S.A.

Denise Ferrier, Ph.D.
MCP-Hahnemann School of Medicine
Philadelphia, PA U.S.A.

We are also pleased to welcome our new members to the IAMSE Board of Directors. These individuals assumed their office on July 1, 1999.

Giulia A. Bonaminio, Ph.D.
Assistant Dean and Director, Office of Medical Education
University of Kansas School of Medicine
Kansas City, KS U.S.A.

Aviad Haramati, Ph.D.
Professor of Physiology and Biophysics
Georgetown University School of Medicine
Washington, DC U.S.A.

Alex de Hemptinne, Ph.D.
Professor of Physiology
University of Ghent Faculty of Medicine
Ghent, Belgium

MANUSCRIPT REVIEWERS APPOINTED TO EDITORIAL BOARD

The following individuals have been approved by the Manuscript Reviewer Selection Committee and subsequently appointed to the Editorial Board of the *Basic Science Educator.*

Nancy Hall, Ph.D.
Associate Dean for Admissions and Medical Education
University of Oklahoma College of Medicine
Oklahoma City, OK U.S.A.

Diana Ivanova, Ph.D.
Assistant Professor of Biochemistry
University of Medicine
Varna, Bulgaria

Dani McBeth, Ph.D.
Associate Professor of Microbiology and Immunology
City University of New York Medical School
New York, NY U.S.A.

Martha Regan-Smith, M.D., Ed.D.
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József Szeberényi, M.D., Ph.D., D.Sc.
Vice Dean and Professor of Molecular Cell Biology
University Medical School of Pécs
Pécs, Hungary

Lynn Yeoman, Ph.D.
Professor of Pharmacology
Baylor College of Medicine
Houston, TX U.S.A.

William Zehring, Ph.D.
Associate Professor of Biochemistry
UMDNJ Robert Wood Johnson Medical School
Piscataway, NJ U.S.A.

INSTRUCTIONS FOR CONTRIBUTORS

GENERAL

Contributions to the Basic Science Educator are encouraged from all who seek to have their information reach an audience of basic science course directors, members of the basic science faculty, clerkship directors, attending physicians, curriculum planners, residency directors, and all those involved with the teaching or administration of the medical sciences throughout the continuum of health professional training. With the exception of Letters and Commentaries, all articles must begin with an Abstract, have an Introduction which clearly indicates the purpose for the paper, and end with Conclusions. Appropriate section headings for the body of the text, such as Background, Commentary, etc. are at the discretion of the author(s) and the Managing Editor. All articles must cite appropriate References. Articles will be reviewed by the Managing Editor and two other members of the Editorial Board. Unless otherwise noted, send all submissions to J. Charles Eldridge, Ph.D., Managing Editor.

The *Basic Science Educator* has an international staff of Associate Editors and Manuscript Reviewers, and thus it is preferable we receive all materials electronically. These may be in any word processing program and submitted as e-mail attachments to eldridge@wfubmc.edu. Gels and other illustrations may be included as high quality scanned images. If electronic submission is not possible, please contact Dr. Eldridge by phone or fax to discuss alternate methods. This is also true when submitting articles for consideration to an Associate Editor. For their contact information, see inside front cover.

ARTICLES

Submission is encouraged of articles relating to all aspects of teaching and learning in the medical sciences throughout undergraduate and graduate medical education, continuing medical education, and all aspects of faculty development. Examples include, but are not limited to, integration of science throughout the continuum of medical training; experiments in individual course or curriculum design; creation of methods which stimulate thinking, problem-solving skills, and foster independent student learning; methods to encourage student integrity, humaneness, and team-building characteristics; and programs directed toward medical science faculty development.

INNOVATIONS IN BASIC SCIENCE TEACHING AND LEARNING

The purpose of this column is to share new approaches to the teaching of medical sciences that will enhance the student's ability to learn. Submissions to: Harold Traurig, Associate Editor.

COMPUTER APPLICATIONS IN BASIC SCIENCE EDUCATION

The purpose of this column is to explore means by which computer technology may be used to aid both faculty and students in the teaching and learning of medicine. Submissions to: W. Marshall Anderson, Associate Editor.

SOCIAL ISSUES IN THE BASIC SCIENCES

The purpose of this column is to present articles that stimulate basic science faculty to consider their role in all aspects of medicine and society. Submissions to: David Bolender, Associate Editor.

INTERNATIONAL PERSPECTIVE

The purpose of this column is to demonstrate both the diversity and yet commonality of how the fundamental medical sciences are taught throughout the world. Submissions to: Roger Koment.

THE EDUCATOR'S PORTFOLIO

The purpose of this column is to disseminate techniques currently in use, or under development, for the documentation of the educational activities of medical school faculty members. Submissions to: Jay Menna, Associate Editor.

THE MEDICAL EDUCATOR'S RESOURCE GUIDE

The purpose of this column is to present critical reviews of educational materials on the World Wide Web. Submissions to John Cotter, Associate Editor.

IN MY OPINION... (Debates)

Debates on issues of timely interest to medical science educators are welcome, and may actually be arranged with help from the Editorial Board. The purpose is to present readers with common arguments on each side of a controversial issue to help us better understand different views. To discuss your ideas, to volunteer as one side of a debate, or to suggest a topic you would like to see debated, please contact J. Charles Eldridge.

COMMENTARY

The Editorial Board encourages submission by individuals of their views on timely topics in medical education, especially those which relate to teaching and learning of the medical sciences. These essays may be up to 1,500 words in length.

IN THE LITERATURE...

This column features reference citations and brief excerpts from articles in medical science education which are published in other journals or sources. Your submissions are encouraged.

AFTERTHOUGHTS...

These are anecdotal accounts, original poetry, or commentary that are reflections on the process and meaning of medical education and the practice of medicine. Your submissions are encouraged.

LETTERS TO THE EDITOR

Reader response to articles in the *Basic Science Educator* is encouraged in the spirit of dialogue, and will be published as space permits. Letters may be up to 500 words.

ANNOUNCEMENTS

Announcements and news of interest to medical science educators are published in each issue. All topics may be considered.

CALENDAR OF EVENTS

Notices of upcoming conferences, workshops, and other events of interest to medical science faculty are listed chronologically in each issue. Please send information regarding your event as soon as possible to ensure inclusion in the next available issue.

MEMBERSHIP BENEFITS

International Association of Medical Science Educators

- Subscription to the newly revised *Basic Science Educator* (two issues per year). Written specifically *for* medical science educators *by* medical science educators, this peer-reviewed journal contains first released articles describing current trends in basic medical science education, reports, critiques, and commmentaries on innovative teaching methods, debuts of educational software, and candid editorials.
- 15% discount on registration, plus priority admission to limited access IAMSE conferences on educational strategies in the medical sciences. Charter members who continue without lapse of membership will receive a 20% discount.
- 10% discount on IAMSE Conference Proceedings and other IAMSE publications. Charter members who continue without lapse of membership will receive a 15% discount.
- Complimentary copy of the IAMSE Directory of Colleagues, containing each member's discipline, mailing address, phone, fax, and e-mail.
- Mailings of IAMSE conference announcements, brochures, calls for abstracts, and announcements of Conference Proceedings availability
- Professional advancement opportunities to network with colleagues at other medical facilities, establish collaboration and exchange programs, publish in the *Basic Science Educator*, conduct and/or attend workshops on educational methods, present projects from your school, and develop the credentials of a truly effective medical educator.

Membership Fees (in U.S. Dollars)

In an effort to equitably assess membership fees, the IAMSE Board of Directors has implemented the following three-tiered structure based upon each country's GNP per capita, as determined by the World Bank. A complete listing of countries may be found at: http://www.worldbank.org/data/databytopic/class.htm

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[†] Deans, Departmental Chairs, or equivalents may purchase Institutional Memberships which each provide 4 Individual Memberships. Those 4 individuals designated by the purchasing body will be listed in the Directory. Limit one per department or unit, although more than one department or unit in a school may become Institutional Members.

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NOTE: If using a credit card, you can become an IAMSE member in less than five minutes by simply dialing the telephone number listed above.

IAMSE CORPORATE SPONSORSHIP BENEFITS

As an academic organization, the International Association of Medical Science Educators (IAMSE) offers membership to all individual faculty members and staff of medical universities, schools, and health professions related institutions worldwide. Graduate and medical students, postdoctoral fellows, medical house officers, and residents are also invited to become full participating members of IAMSE at a special discounted rate.

As medical educators on the forefront of both excellence and innovation, we also share a special relationship with those in the corporate world who publish the textbooks, computer software, anatomical models, and other educational tools that help us in our vital task of training future generations of physicians. Indeed, many of us have actually created or authored these educational tools in collaboration with our corporate colleagues.

It is therefore with great pleasure that IAMSE offers a means for corporate entities to become formally involved with our organization by becoming Annual Corporate Sponsors. We cordially invite all companies concerned with the production of educational tools or products to participate with us in support of medical faculty throughout the world. For further information, please contact Ms. Julie Hewett, IAMSE Business Manager, at TEL: (+)1-304-733-1270, FAX: (+)1-304-733-6203, or E-MAIL: Julie@iamse.org

PLATINUM LEVEL – $4,500

- Five copies of the *Basic Science Educator*
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- Two free registration fees at the IAMSE Conference ($700-800 value)
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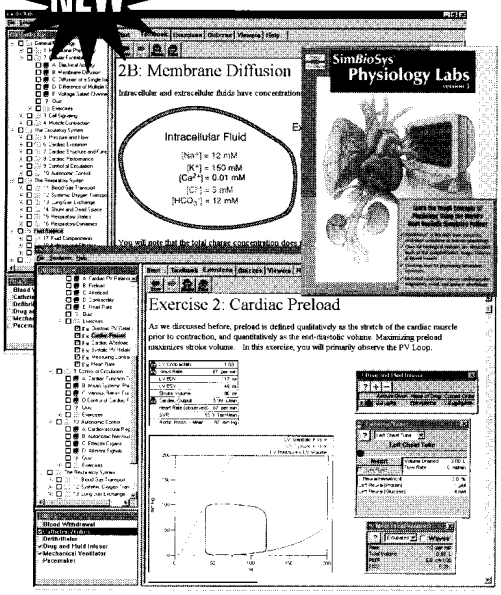

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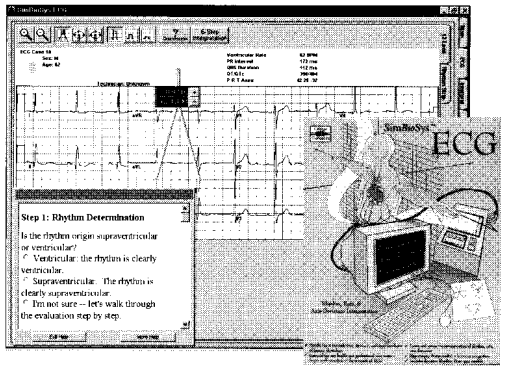

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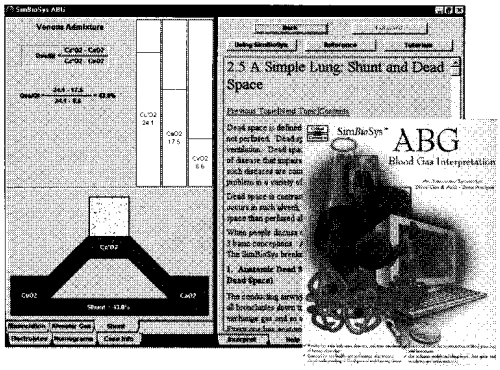

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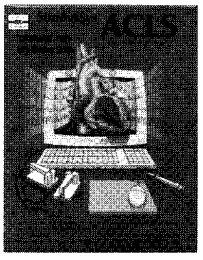

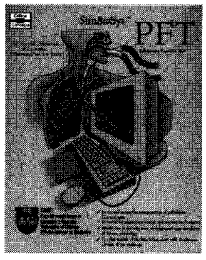

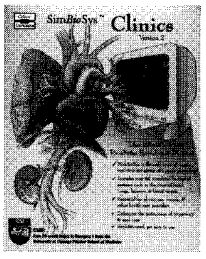

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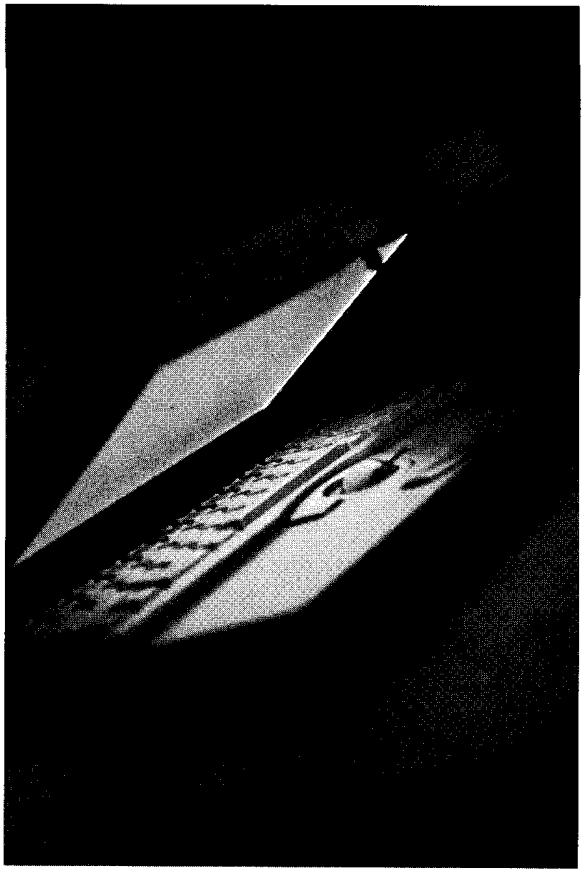

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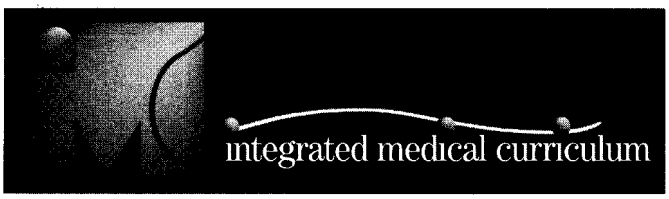

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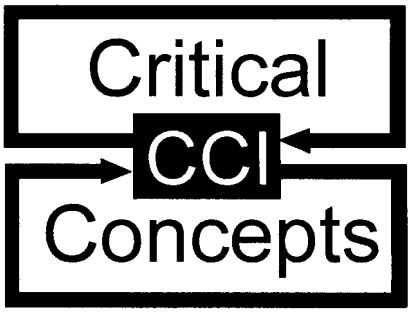

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