

## Changing Surgical Education Strategies in an Environment of Changing Health Care Delivery Systems

Gary L. Dunnington, M.D.,<sup>1</sup> Debra A. DaRosa, Ph.D.<sup>2</sup>

<sup>1</sup>Department of Surgery, University of Southern California School of Medicine, Health Care Consultation Center, Los Angeles, California 90033, U.S.A.

<sup>2</sup>Department of Surgery, Southern Illinois University, Springfield, Illinois, 62026 U.S.A.

**Abstract.** Emerging changes in health care delivery will have a significant impact on the structure of surgical education in academic departments of surgery. Based on some assumptions as to the probable nature of the final product of this reform, this article encourages a proactive stance by surgical educators to anticipate changes and move toward restructuring in areas of curricular content, the teaching process, performance evaluation strategies, and faculty infrastructure of the academic department. Curriculum changes must bridge the gap between public health and medicine and continue the aggressive trend toward teaching in the outpatient setting. Surgical educators must adapt to evolving computer and instructional technology that will make multimedia presentations, distance education, teleconferencing, hypermedia, and virtual reality commonplace in the teaching setting. Increased emphasis on accountability and accreditation will require stringent criteria in performance and program evaluation methodology. The academic infrastructure will need to adapt to the changing goal of training more general surgeons and fewer specialists and yet maintain the fundamental responsibility of an academic surgeon for mentoring the medical student and surgical resident.

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*The future never just happened, it was created.*—Will Durant

It is the health care delivery system and not health care itself that needs dramatic reform in the United States. The goal of such reform, however, must be to improve access and delivery of health care to all citizens without undermining the current quality of patient care. Those involved in the education of the future physician will play a critical role in this delicate balance between improvement in delivery and preservation of quality. Although we are unable to predict what the final product of this reform will look like, assumptions can be made to provide a framework for discussion on the effects of the changing health care delivery system on surgical education. It is likely that the restructuring plans will include (1) measures that ensure the training of a greater percentage of generalists and fewer specialists; (2) a transition toward managed care for both community and academic medical center practice; (3) increasing emphasis on health promotion and disease prevention; (4) decreasing autonomy of physicians in the selection of evaluation and treatment regimens for their patients; and (5) clear definitions on the limits of medicine as a science. These changes, together with advances in computing, instructional, and medical technology, the growing diversity of students matriculating to medical schools, and changing patient populations will synergistically alter the traditional teaching, learning, and evaluation approaches prevalent in undergraduate and graduate surgical education programs. A proactive

stance by surgical educators will involve changes in curricular content, the teaching process, performance evaluation strategies, and the faculty infrastructure of academic departments of surgery.

### Anticipated Changes in Curriculum

Although the core of surgical knowledge will remain at the center of graduate and postgraduate training in the coming years, there are significant additions to the curriculum that must be addressed. Surgeons have traditionally played a minor role in preventive medicine, but health care reform will mandate improved integration of public health and medicine. The emphasis on improved curative potential and sophisticated surgical technology has moved ahead but is still out of pace with overall public health strategies. Both student and housestaff curriculum must focus on the health care delivery system in an effort to bridge the growing gap between the fields of medicine and public health. Physicians must realize that an integrated health care system includes the provider, the insurer, the patient, and administration. In her address at the 102nd Annual Meeting of the Association of American Medical Colleges, June Osborn noted that "if we really mean this prevention business, we must learn to celebrate things that do not happen" [1]. Surgeons must become more involved in large-scale screening programs for cancer prevention. In some cases, education must emphasize earlier surgical intervention with minimally invasive surgery for health maintenance and overall cost savings. In addition, medical students and housestaff on surgical services must be taught to pay increasing attention to the financial cost of their diagnostic evaluations. They must come to appreciate that a diagnostic study must significantly affect the treatment plan in order to be cost-effective. There will be less room for diagnostic procedures ordered for academic curiosity outside of research protocols. An appreciation of cost-effectiveness in surgical care must be accompanied by greater emphasis on outcome assessment after surgical intervention. Academic departments of surgery pursuing contracting for their specialists in "centers of excellence" must bear increasing responsibility to provide both outcome statistics and cost-effectiveness, and trainees must understand and become part of this process.

It is certain that changes in health care delivery will support the aggressive trend toward outpatient management of surgical diseases. Emphasis on training medical students and residents in the outpatient facility must not be the domain of only departments of family medicine and internal medicine. If surgical educators are to maintain their critical role in the training of the broad-based generalist physician, medical students must spend increasing amounts of time in surgical clinics with focus on those disease processes managed predominantly on an outpatient basis. Future

primary care physicians are best taught evaluation of the breast mass by a surgical oncologist and treatment of benign perianal disease by a general or colorectal surgeon. Departments of surgery must move toward a well planned and coordinated teaching program guided by learning objectives and supplemented with instructional learning materials for students' outpatient surgical experience, such as that offered by the Association of Surgical Education [2]. Such outpatient experiences will also need to offer broad exposure to the surgical specialties, such as orthopedics, otolaryngology, neurosurgery, and urology. A sampling of only one or two of these surgical specialties would result in primary care physicians with inadequate knowledge in managing patient problems in these areas.

This shift in emphasis to outpatient clinic teaching in an effort to meet the generalist's curriculum will clearly affect the amount of time students spend on assigned surgical services functioning in the role of interns. In addition to meeting the generalists' curriculum, however, assigning learners to outpatient settings makes sense. Prospective payment systems for health care have resulted in incentives to reduce costs. Consequently, the practice patterns of surgeons have changed, resulting in shortened preoperative hospital stays and increased delivery of care in the outpatient setting. Hospital inpatients no longer represent the full spectrum of surgical problems and disease entities but, rather, only the critically ill. Hence departments of surgery must adapt undergraduate and graduate surgical curricula and teaching to be compatible with evolving practice patterns. Such a transition requires increased organization in the structure of the surgical clerkship curriculum to provide for increased faculty involvement. The latter requires particular attention, as a recent study indicated that more than half of the teachers interviewed, representing medicine and surgery, reported little if any tangible accountability related to their student teaching. By and large, their involvement with the clerkship or students was weak and infrequent [3]. This sense of faculty nonaccountability for undergraduate surgical education must change, as faculty responsibility will increase concomitantly with the decreasing teaching role of surgical housestaff. The shift in emphasis toward outpatient teaching will affect surgical housestaff as well, and our efforts must fully integrate them into the surgical clinics of full-time faculty. Curricular change must also include training that restores student and housestaff confidence in basic clinical skills supplemented—not replaced—by advancing technology. Recent literature has documented the unacceptable level of medical students' physical examination skills and patient-physician interaction skills on required clerkships [4, 5]. These clinical skills are best taught by role modeling and instruction during bedside rounds and are best evaluated by standardized patient technology.

Major population shifts will change the types of patients encountered by residents and students in both hospital and nonhospital settings [6]. The nation's minorities are becoming "emergent majorities." Current reports have cautioned that we can no longer depend on minority culture to be the sole providers to minority populations. The growing elderly population, largely female, will also affect health care delivery. The content of our curricula must adapt to the diversifying population, including instruction on ethical, social, and public health issues, communication skills, foreign languages, cost management, and economic issues in medicine as a whole [7].

### Anticipated Changes Due to Computers and Instructional Technology

Significant changes in health care delivery will likely have minimal impact on the current explosion in computers and other instructional technology. Medical informatics will continue to expand its applications to the clinical arena. During the previous 5 years, numerous advances in computing hardware, software, and networking have combined such information components as sound, text, data, and images to build innovative products for the clinical arena. Some have predicted that over the next 5 years true multimedia systems will be developed that smoothly integrate all information components on a desktop computer that travels with the provider from room to room or from clinic to home. The future computing in the academic medical center will meet with problems of costs and other obstacles, but its development and use are inevitable.

Distance education and computer-assisted instruction (CAI) are other applications of how computers are changing the ways by which learners learn. Videodisks, teleconferencing equipment, hypermedia, and broadcast television enhance interconnectivity and subsequently enable learners to reach beyond the local library and faculty for discussion and answers. John Sculley, Apple Computer's president, believes that hypermedia, computer simulation, and artificial intelligence will be the core technologies of a future learning environment [8].

Most students entering medical school today are computer literate and familiar with CAI as well as information access systems. Faculty and those students without this kind of background will require training on computer use and information management skills. Several state-of-the-art software programs designed for surgical resident and student education already exist, but more will be required to meet the demands and needs of the faculty, students, and residents. These technologies are particularly important in settings where the size of the inpatient services is diminishing and student and resident activities are more diverse. It can also enhance the continuing education efforts of practicing surgeons.

Multimedia instructional technology someday will be commonplace in classrooms. Given that the most important recent innovation in audiovisual aids was the overhead projector introduced 50 years ago, it is a welcome addition that holds promise for more interactive learning in large and small groups. An anthropology professor at the University of Washington, for example, brought new life to his classroom by using material about early Egypt in the form of animations, slides, graphics, and video sequences that depict culture and geography of the region. The capabilities and applications to surgery are limited only by the teacher's imagination.

Virtual reality will also be used to train the surgeons of the twenty-first century. It has been said that television is like a window one can view, whereas virtual reality is like a door one can walk through. This technology creates a three-dimensional, life-like environment that is computer-generated. It will enable learners to practice and hone psychomotor skills not requiring direct supervision during the early stages of skills learning.

As computer and instructional technology proliferates, faculty will need to update themselves just as they do with medical technology. Surgical education will appear archaic to our students

and residents if we do not integrate these new technologies that they experience in their everyday lives into our programs.

### **Anticipated Changes in Program and Performance Evaluation**

Health care delivery changes will likely increase the fervor for accountability and accreditation for surgical expertise and will likely result in even more stringent criteria in performance and program evaluation methodology. Although multiple choice examinations are still a popular and acceptable method for evaluating learners, the use of standardized patients and performance-based examinations are continuing to grow. A recent conference sponsored by the Association of American Medical Colleges on "The Use of Standardized Patients in the Teaching and Evaluation of Clinical Skills" attracted 185 educators, researchers, medical school deans, and academic leaders. The outcome was a clear consensus about the basic role and value of standardized patients suggesting that they are "here to stay" [9]. Medical education journals are filled with research and application descriptions, including those in surgery clerkships and residency programs [10–12]. Licensing bodies, such as the National Board of Medical Examiners, the Education Commission of Foreign Medical Graduates, and the Medical Council of Canada, are already using or exploring the use of performance-based examinations for licensure purposes.

External control of the number and size of residency programs may prompt residency program directors to expand methods for evaluating their programs. Quality control will be critical to maintain residency accreditation as programs compete for dwindling dollars. Program evaluation options include longitudinal follow-up research of residents, outcomes research, and additional program feedback measures within the residency program to ensure that curriculum, teaching, and performance evaluation measures are functioning as a synchronized system to produce a premium education for their residents as efficaciously as possible.

### **Anticipated Changes in Faculty Infrastructure**

Finally, proposed changes in the nation's health care delivery system will significantly affect the personnel infrastructure in academic departments of surgery. The move toward a capitated system of managed care banks heavily on cost savings achieved by a significant number of physicians serving in primary care areas. Jacque Sokolov, founder of the Sokolov Strategic Alliance, has suggested an ideal capitation ratio of one primary care physician for each 2000 covered lives and has projected a ratio of 1.0 to 1.2 specialists for each primary care physician (currently the average ratio is near 2:1) [13]. This generalist/specialist ratio is drastically different from the current ratio in American medical schools. Most national organizations now speak of a goal of 50% of medical school graduates entering training programs that will prepare them for careers as generalists. It will likely become a financial disincentive to continue the current pace of training surgical specialists, and the emphasis is likely to return toward training general surgeons. The number of general surgeons in training has decreased by a total of 909 residents (10.5%) since 1983–1984 [14]. A strong argument can be made that general

surgeons with broad-based practices in rural areas serve in the role of a primary care physician. With this point in mind, the goals of an academic department of surgery will be to produce such broad-based general surgeons, as well as the fewer surgical specialists who will be needed, predominantly in academic medical centers. It will be counterproductive to train a large number of specialists who will go into the community as competition to the major medical centers for the small pool of tertiary care. This generalist trend will likely force academic medical centers to develop alliances with large primary care groups. Can the training goals in surgery be achieved without major change in the current blend of surgical specialists in surgical departments? The argument can be made that whether training a third year medical student who will be a rural family practitioner or a surgical resident who will practice general surgery in a small town, the training can be most effectively rendered by a group of specialists teaching in cooperation with primary care practitioners.

During this time of change it is critical that surgical faculty responsible for educational programs, the leaders and administrators in medical schools, clerkship and elective course directors, residency and fellowship program directors, continuing education organizers, and division and department chairmen become more than teachers. They must be educators with a clear understanding of such issues as curriculum design, program evaluation, and performance assessment. This focus is necessary if they hope to be positioned to better plan and arbitrate with groups such as the Association for American Medical Colleges and the accreditation and other professional authorities, which are typically represented by nonsurgeons. Clinical teaching seminars and workshops are increasingly being held in surgery departments throughout North America. The American College of Surgeons recently offered a 6-day course entitled "Surgeons as Educators" [15]. Several schools offer fellowships in medical or surgical education, with individuals earning a Masters Degree in education. Professional societies, such as the Association for Surgical Education and the Association for Program Directors in Surgery, provide forums for surgeons to learn how to enhance their roles as educators. These efforts grow in importance as we position ourselves to purposefully and thoughtfully adapt our education programs to changing times.

One of the most disturbing realities of the emerging changes in health care delivery is the increasing pressure on surgical faculty to maintain busy clinical practices to support academic salaries as more and more medical school revenues are derived from clinical practice of faculty. These pressures will continue to have a significant impact on the research and educational mission of academic faculty. The important role of surgical faculty as mentors of students and housestaff is threatened by these changes. Clerkships and residency programs must be structured to guarantee that every student and housestaff has an ongoing and meaningful relationship with at least one faculty member who can act as a role model in the surgical approach to problems, as well as interaction with patients, families, and other professionals. It is in this one-on-one relationship that the trainee comes to appreciate that despite all the political, economic, and social pressures on the physician the surgeon at the bedside, in the clinic, or in the operating room must still make decisions based on what is best for the patient.

## Résumé

Les changements actuels dans l'administration des soins vont avoir un impact important sur l'enseignement de la chirurgie dans les services de Chirurgie Universitaire. Basé sur quelques pré-somptions sur la forme finale de la réforme en cours, cet article encourage les enseignants futurs à anticiper ces changements et à commencer dès à présent une restructuration du programme, de l'enseignement, des stratégies d'évaluation et de l'infrastructure des services Universitaires. Le programme doit combler l'écart actuel entre les services de Santé publique et de Médecine et continue d'enseigner la prise en charge des patients dès la consultation. Les enseignants doivent s'adapter à la technologie informatique qui permet entre outre de réaliser les présentations multimédiatiques, le télé-enseignement, la téléconférence, l'hypermédiatique et la réalité virtuelle. On insiste aussi sur l'accréditation qui demande une méthodologie stricte d'évaluation et de contrôle de réalisation. L'infrastructure académique a besoin d'orienter ces objectifs vers la formation de moins de spécialistes et de plus de chirurgiens généraux. Elle doit avoir maintenir le principe fondamental d'un chirurgien académique responsable de la formation des étudiants et des résidents en chirurgie.

## Resumen

Los emergentes cambios en los sistemas de atención de la salud han tenido un significativo impacto sobre la estructura de la educación quirúrgica en los departamentos académicos de cirugía. Con base en algunas suposiciones en lo referente a la probable naturaleza final del producto de esta reforma, el presente artículo estimula a los educadores quirúrgicos a tomar una posición activa con miras a definir los cambios por venir y a iniciar la reestructuración de diversos aspectos del contenido curricular, del proceso de enseñanza, de las metodologías de evaluación del rendimiento y de la infraestructura académica de los departamentos quirúrgicos. Los cambios curriculares deben eliminar la brecha entre la salud pública y la medicina y mantener una decidida tendencia hacia la enseñanza en los escenarios de consulta externa. Los educadores quirúrgicos deben adaptarse para asumir las tecnologías de computación y los nuevos métodos de instrucción que comprenden sistemas multimedia, educación a distancia, teleconferencias, hipermedia y realidad virtual, en tal forma que se conviertan en lo usual en el contexto educativo. El mayor

énfasis sobre responsabilidad auditada y acreditación demanda estrictos criterios en las metodologías de ejecución y de evaluación de programas. La infraestructura académica deberá adaptarse a los cambiantes objetivos de adiestrar un mayor número de cirujanos generales y menos especialistas, y, sin embargo, preservando la responsabilidad fundamental del cirujano académico en cuanto a la tutoría del estudiante de medicina y del residente quirúrgico.

## References

1. Osborn, J.E.: The nature of public health after reform. *Acad. Med.* 68:237-243, 1993
2. Da Rosa, D.A., Dunnington, G.L., Sachdeva, A.K., et al.: A model for teaching medical students in an ambulatory surgery setting. *Acad. Med.* 67:545, 1992
3. Rothman, A.I., Cleve-Hogg, D.M.: A medical school learning environment: views from the trenches. *Teaching Learning Med.* 2:12, 1990
4. Dunnington, G., Reisner, E., Witzke, D., Fulginiti, J.: Teaching and evaluation of physical examination skills on the surgical clerkship. *Teaching Learning Med.* 4:110-114, 1992
5. Reisner, E., Dunnington, G., Beard, J., Witzke, D., Fulginiti, J., Rappaport, W.: A model for the assessment of students' physician-patient interaction skills on the surgical clerkship. *Am. J. Surg.* 162:271-273, 1991
6. Council on Long Range Planning and Development and Council on Medical Education: The Future of Graduate Medical Education. American Medical Association, Chicago, 1989
7. Green, D.: Health care reform and the generalist physician. *AAMCC Reporter* 2:1, 1992
8. Sculley, J.: The relationship between business and higher education: a perspective on the twenty-first century. *EDUCOM Bull.* 23(1):20-25, 1988
9. Association for American Colleges Reporter 2:7, 1993
10. Shatzer, J.H., DaRosa, D.A., Colliver, J.A., Barkemerler, L.: Station length requirements for reliable performance-based examination scores. *Acad. Med.* 68:223, 1993
11. Brailovsky, C.A., Grand Maison, P., Lescop, J.: A large-scale multi-center objective structured clinical examination for licensure. *Acad. Med.* 67:S37, 1992
12. Ramsey, D., DaRosa, D.A., Finch, W.T., et al.: Evaluation of surgical residents using simulated patients. *Int. J. Eval. Program Plann.* 10:9, 1987
13. Sokolov, J.: The evolution of managed care. In *Proceedings of the University of Southern California Managed Health Care Symposium*, April 17, 1993
14. Karnell, L.H.: Longitudinal Study of Surgical Resident, 1990-1991. American College of Surgeons, Chicago, 1992
15. Folse, R.F.: Surgeons as educators. *Bull. Am. Coll. Surg.* 78:31, 1993