

American Surgical Association Blue Ribbon Committee Report on Surgical Education: 2004

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American surgical education has a rich heritage, and its programs produce some of the best trained and most competent surgeons. Although surgery residency training has changed little since its formulation by Halsted at the beginning of the last century, surgery residency and fellowship programs continue to maintain high standards because they are highly structured, monitored, evaluated, and credentialed.

At the dawn of the 21st Century, however, numerous forces for change are impacting medical education in general and surgical training in particular. On the one hand, the explosion of knowledge from the advances of science, systems, and information technology provide new opportunities to improve our training programs. On the other hand, as the public has become increasingly better informed about its healthcare needs and safety, its expectation has shifted and now increasingly demands advanced and specialized care. Contrary to earlier predictions of excess physicians by 2010, we appear to be on the threshold of a shortage in physician workforce. This impending shortage should be viewed in the context of Association of American Medical Colleges (AAMC) data, which show that the number of applicants to medical schools in the United States has declined by 25% since 1996. Now, nearly 50% of students entering medical school are women. The average U.S. medical student now graduates with a debt in excess of \$100,000. Students of both genders are increasingly selecting specialties with more controllable lifestyles than general surgery. Furthermore, general

surgery residencies experience an attrition rate of nearly 20%, primarily because of lifestyle concerns of residents. Major changes have occurred and more are foreseen in the practice of surgery. Much clinical care has moved from the inpatient hospital setting to the outpatient, and the length of stay for inpatients has significantly decreased. These shifts have resulted in a significant impact on both undergraduate and graduate medical/surgical education. Surgical care is moving from discipline-based to disease-based practice in which surgeons will increasingly practice within a team of experts. How do we train surgeons to be leaders of such multidisciplinary teams?

Recognizing the multitude of changes taking place, and spearheaded by the Presidential Address at the 2002 annual meeting of the American Surgical Association (ASA), the ASA Council in partnership with the American College of Surgeons (ACS), the American Board of Surgery (ABS), and the Resident Review Committee for Surgery (RRC-S), established a Blue Ribbon Committee on Surgical Education in June 2002. The Committee was charged with examining the multitude of forces impacting health care and making recommendations regarding the changes needed in surgical education to enhance the training of surgeons to serve all the surgical needs of the nation, and to keep training and research in surgery at the cutting edge in the 21st Century.

This report is based on the work done and consultations obtained by the ASA Blue Ribbon Committee over a 2-year period. The Committee quickly recognized the complexity of its tasks and how any major recommendation for change could provoke controversy among many stakeholders, including members of the committee itself. Gradually, however, the committee was able to arrive at a consensus. On a separate track, the ABS has come to similar conclusions on how to restructure the surgery training program. The Committee

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recognizes that its recommendations are just recommendations, but sincerely hopes that they will serve as an impetus for a concerted effort by the ACS, ABS, and the RRC to further refine and implement them.

What is being recommended here is no less than a new surgical education system but one that takes place in the context of patient care. This will require major redesign of surgery residency training and allocation of sufficient resources to achieve the desired outcomes. Given that such an education system is essential not only for producing the next generation of highly trained surgeons, but also for enhancing the quality of the most advanced patient care in the nation's teaching hospitals and clinics, appropriate strategies need to be developed at the national level to implement the recommendations. The report is presented under the following headings:

- Surgical/Medical workforce
- Medical student education in surgery
- Resident workhours and lifestyle in surgery
- Residency education in surgery
- The structure of surgical training
- Education support and faculty development
- Training in surgical research
- Continuous professional development

The Executive Summary highlights the conclusions and recommendations of the Committee.

SURGICAL/MEDICAL WORKFORCE ISSUES

Estimating physician workforce has proved to be a difficult, unreliable task. Nevertheless, a number of recent developments warn that a shortage in the surgical workforce may be already on us. In recent years, we have seen fewer applicants to medical schools and variable interest among medical students regarding general surgery as a career choice. The results of the 2001 National Residency Matching Program served as a wake-up call for the surgical community when there were 68 unfilled first-year positions for general surgery. Although since that year, the applicant numbers have returned to their original levels, the trend for the future is unknown. Close to 20% of trainees leave general surgery residencies to enter either other specialties of surgery or nonsurgical specialties with more predictable lifestyles. This attrition rate in the number of trainees in general surgery could have a significant impact on future workforce needs. In addition, the introduction of the 80-hour week regulation for surgical residents in July 2003 has created a yet undetermined need for an enlarged nonphysician workforce in the provision of surgical clinical care within the hospital.

In June 2002, the AAMC altered its position on the physician workforce, which until that time had supported the 1997 consensus document that predicted a physician surplus by the year 2000. The new AAMC position is as follows: "In

the 1980s and 90s, workforce analysts and public policymakers, with few exceptions, predicted that the United States would experience a substantial excess of physicians by the beginning of the 21st century. In light of these analytical studies, the AAMC and other national organizations recommended steps to reduce physician supply to obviate the predicted surplus. It now appears that this predication may have been in error." Furthermore, "the AAMC has concluded that no definitive conclusions can be drawn about the adequacy of the workforce, nor can specific recommendations be made about the rate of supply of new physicians. The Association has, therefore, modified its physician workforce position. These positions reflect the present uncertainty but acknowledge the reality that a shortage of physicians is more consequential for society as a whole than is excess; a shortage of physicians would undeniably make access to care more problematic for all citizens, especially the disadvantaged."

In our opinion, a shortage of surgeons at a time of great international instability and war would be particularly problematic to the nation. It is necessary, therefore, that studies be undertaken to determine in greater specificity the national supply and demand for surgeons in the different specialties. In the estimation of Cooper,¹ based on economic projections, a severe physician shortage is predicted, particularly in the surgical specialties.

Nonphysician healthcare workers (physician assistants, nurse practitioners, technicians, and so on) will play an increasing role in providing care to patients. Although they will comprise an important component of the future surgical team, their impact on mitigating the shortage of surgeons will be minimal.

An important factor in physician workforce projections, particularly in surgery, is the role of women. Cooper¹ points out that fewer men are obtaining undergraduate degrees, and at the present, women comprise 60% of college undergraduates and 50% of graduating medical students. Historically, women have not chosen general surgery residency in large numbers, and in 2003, they comprised less than 30% of the total number of matching students. Unless surgical training and careers in surgery are made more attractive to women, a pipeline problem may develop in the production of surgeons. Also, the aging American population will require greater access to surgical specialty care in the future.

Recommendations

If the predicted shortage of physicians and surgeons is confirmed:

1. The infrastructure for medical student education should be expanded to produce more physicians.
2. The number of trainees in general surgery and other surgical specialties should also be increased. Funding for

this increase should come from IME and DME allocations. Also, a concerted effort must be made to recruit qualified women applicants.

3. The global impact of continued dependence on international medical graduates must be carefully studied.
4. A task force should be appointed to monitor the workforce needs of all surgical subspecialties on an ongoing basis using state-of-the-art methodologies.

MEDICAL STUDENT EDUCATION IN SURGERY

Traditionally, the priorities and expectations of surgery departments have been directed toward patient care and research. Surgery departments need to rededicate themselves to education to effectively address the learning needs of medical students, residents, and faculty.

Surgical faculty and residents must become more involved in undergraduate medical education to develop and sustain in medical students an interest in a career in surgery. Surgery departments should be involved in the teaching of medical students in the first 2 years along with faculty members from the basic science disciplines. Particularly appropriate may be an increased involvement of surgical faculty as facilitators in many of the problem-based learning curricular components now part of many medical schools. Such involvement would not only enhance the education in the basic sciences by providing additional context and demonstrating relevance, but would also provide the students with early exposure to surgeon mentors.

Most medical students make their specialty decisions by the end of the third year of medical school. The third-year surgery clerkships should provide students an exciting experience that will encourage them to consider surgery as a career. The development and understanding of the role of mentors is crucial. Often, the fourth year consists of relatively unstructured and poorly coordinated electives. Although there is value in providing students the freedom to engage in activities of their own choice, an opportunity is missed to use the fourth year more optimally and to possibly shorten the overall length of postgraduate training.

Also, students need to develop technical proficiency in clinical skills laboratories before encountering patients. The technology and experience with skills laboratories is now sufficiently advanced to be indispensable in medical student education.

Recommendations

1. Departments of surgery should renew their commitment to education and develop surgical education centers that emphasize teaching expertise, education science, and education research. Such an endeavor should be coordinated through the Division of Education of the ACS, which should also provide supervision and set the standards.
2. Recruitment of professional educators by surgery departments is strongly encouraged. These professionals would collaborate with the surgical faculty in designing educational activities, promoting standards of evaluation, and pursuing educational research.
3. Surgery departments should strive to make surgical clerkships and resident preparedness courses of the highest quality and meet the highest standards of teaching and evaluation.
4. Surgical residents, who play a significant role in medical student education, should be offered opportunities to enhance their teaching skills and allowed sufficient time to serve as effective teachers and evaluators.
5. A conscious endeavor to identify and encourage surgical role models is an example of what the ACS could develop.
6. To assist with the transition from medical student to surgery resident, the Blue Ribbon Committee recommends that the Division of Education of the ACS should play a lead role in collaborating with the ACGME, AAMC, surgical boards, and selected medical schools to partially restructure the fourth year of medical school and develop a surgical prerequisite curriculum. This prerequisite curriculum would, without minimizing the breadth of the fourth-year education, permit those students electing a career in surgery to better prepare for surgical residency and ultimately perhaps even obtain credit that would shorten the length of their surgical training. Surgery departments with demonstrated faculty commitment, skills laboratories, and acceptable methods of instruction and evaluation should be allowed modification of the fourth-year curriculum for students pursuing surgery.

RESIDENT WORK HOURS AND LIFESTYLE

The ASA Blue Ribbon Committee endorses the recent regulation on the 80-hour week for residents and believes that the introduction of these regulations provides a unique opportunity to reexamine the entire system of surgical care and surgical education in the United States by:

1. Defining a standardized, national curriculum for surgical education and training;
2. Focusing surgical residency programs on education and patient care by eliminating hospital services without educational value (patient transport, phlebotomy service, secretarial work, and so on);
3. Creating a training environment for residents that reduces fatigue and promotes improved lifestyles for the residents and their families, and provides flexibility for parenting; and
4. Restructuring surgery training programs to produce the spectrum of surgical specialists that the nation requires to provide surgical care in all communities.

Recommendations

1. A carefully planned nationwide study should be conducted to determine the impact of the 80-hour week regulations on the operative experience of residents, on patients' safety and continuity of care, on resident education, and on satisfaction and quality of life. The Division of Education of the ACS should coordinate this effort with other national organizations and residency programs.
2. Resources must be provided to hire the necessary nonphysician workforce that will provide the noneducational services that the residents will no longer perform.
3. To sustain quality patient care as well as the quality surgical education, additional funding mechanisms should be developed to compensate for the additional work and stress of the teaching faculty. Such a strategy is key to retention of the teaching faculty.
4. Resident services alone should not be used to treat the underserved in our cities. Local, state, and national governments need to accept their responsibilities in this area.
5. The new educational paradigm should emphasize commitment to efficient patient care characterized by high quality and safety.

RESIDENCY EDUCATION IN SURGERY

The process for attracting, interviewing, and selecting medical students for surgical careers needs to be more efficient and user-friendly.

Recommendations

1. A realistic and valid system should be developed to describe each residency program and the surgical experiences it offers. Based on this system, residency programs may be categorized according to what type of surgeon each aims to produce.
2. Surgical residencies should create greater diversity by actively recruiting women and underrepresented minority students.
3. The surgical profession should urgently address the indebtedness of residents and design programs with more reasonable time duration and other methods of reducing debt such as scholarships and grants and federal debt-forgiveness programs.
4. Every effort should be made to keep residents' salaries at a level sufficient to support standards of living appropriate to age and contribution.
5. Basic topics that all surgical residents need to master need to be defined and should serve as the foundation for further training in the various specialties. This "fundamentals of surgery" curriculum should be modular and competency-based to allow incorporation into the overall educational programs of respective surgical specialties. The Division of Education of the ACS is taking the lead role in

the development of this curriculum, which will be based on the ACS's *Prerequisites for Graduate Surgical Education: A Guide for Medical Students and PGY1 Surgical Residents* document. The ACS will collaborate in this endeavor with various organizations, including the Boards, RRCs, and program director organizations.

STRUCTURE OF SURGICAL TRAINING

There are many forces driving change in the nature and structure of surgical residencies. Among these are the explosion of knowledge in all surgical fields; new technologies for teaching and assessing surgical skills and for performing surgery; evolution toward multidisciplinary collaborations in patient care; progressive subspecialization; concern for quality and safety of patient care; emphasis on professionalism and competency; and higher expectations of patients. Regulatory changes have limited allowable work hours by residents and put additional stress on the ability to meet the service needs of hospitals as educational needs are given priority.

Today's surgical resident is a different person. There are more women in surgical training, and residents have more education-related debt. Residents have greater concerns about their lifestyle and length of training. There is need to maximize efficiencies and minimize the duration of residency.

It is increasingly apparent that as subspecialization in surgery continues to evolve and the appeal of broad general surgical practice diminishes, the illusion that a uniform training program purporting to produce competence in all areas is fading. "One size no longer fits all." Uncommon case materials are less efficiently distributed when they are used to train individuals whose ultimate goals do not involve focus in these areas. Education research is pushing toward competence-based advancement, replacing time-in-service.

Subspecialty fellowship training is at present largely unregulated, unsupervised, nonuniform, and uncertified. Research by residents during residency is too often for the sole purpose of attaining a clinical fellowship or to meet the needs of faculty for laboratory workers.

A new paradigm is needed that promotes both the varieties of general surgical practice and the subspecialties that derive from general surgery. This training paradigm must achieve greater efficiency and use different methods to be able to accommodate the changing needs of surgical residents and surgery as it will be practiced.

Recommendations

1. Surgical residencies should be restructured to ensure that all trainees receive a common grounding in basic principles of surgical disease and patient care.
2. There needs to be acceptance of the reality that most surgeons will confine the scope of their practices to meet

definable goals. This should lead to earlier differentiation into goal-oriented specialty tracks.

3. New teaching technologies (ie, simulators, virtual reality) and verification of competence at each training milepost should be introduced as they become validated and available. A goal should be to define a curriculum for surgical skills that must be acquired by surgical trainees outside the operating room before they begin to operate on patients.
4. It is suggested that a modular format be developed to include a basic surgical core curriculum, and further training in either general surgery or a surgical subspecialty leading to the relevant, specific certification as shown in Figure 1.
5. Furthermore, focused subspecialization would be available through postgraduate fellowships (ie, breast, endocrine, HPB, congenital heart, hand).
6. An optional research module of not less than 2 years can either be interposed between the basic and advanced modules or taken at completion of the residency/fellow-

ship for career development in conjunction with a first faculty position.

7. The option to study for completion of an advanced graduate degree (PhD, MPH, MBA) may occur either after the basic module or after residency.
8. Design, supervision, and certification of the new curricula and the training programs in which they will be used will remain the domain of the respective Boards, RRCs, and surgical specialty societies.
9. It is understood that there will be manifold logistic challenges to implementation, including acceptance by the various stakeholders.

Many of the proposed tools have not yet been developed or are rudimentary. Problems such as logistical planning for training programs, possible instability of early career choices, funding, and unanticipated adverse effects on hospital utilization and surgical practices will need to be studied and managed. For these reasons among others, this proposal

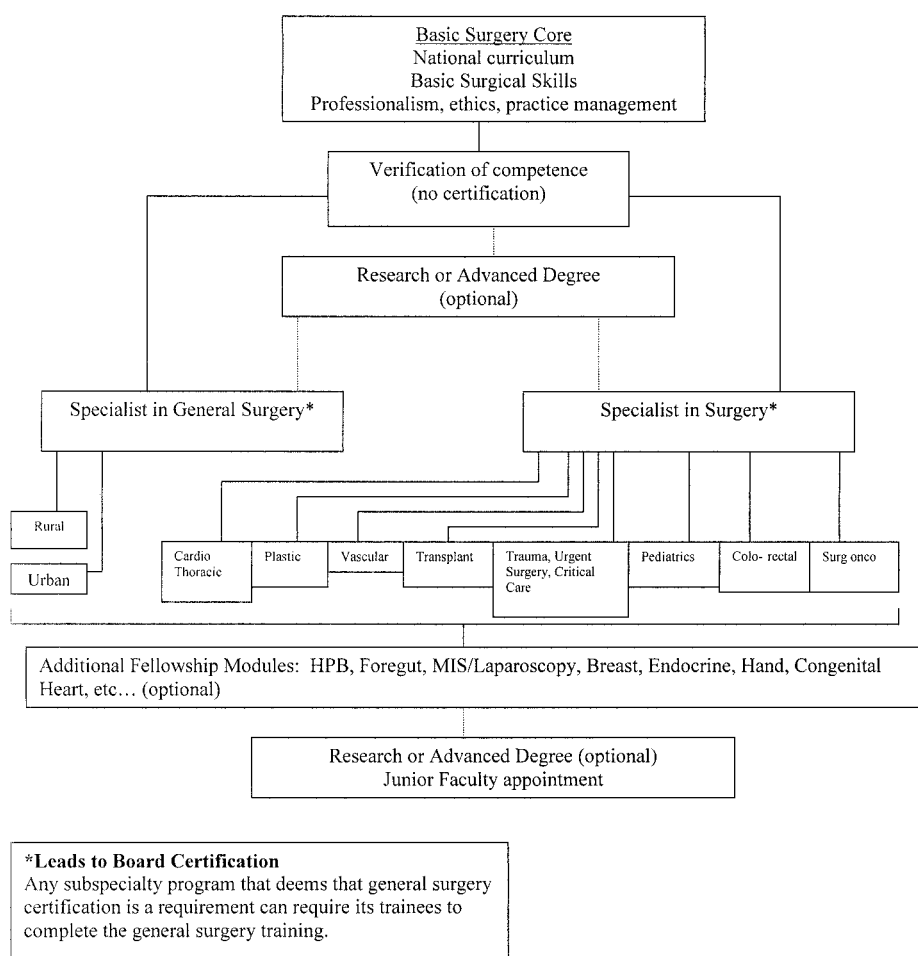


FIGURE 1. Proposed schema for restructured surgical residency training.

is offered as a goal to be explored, tested, and accomplished incrementally over a period of time.

EDUCATION SUPPORT AND FACULTY DEVELOPMENT

A hallmark of American surgery departments and their faculty has been their unparalleled commitment to and pride in their trainees and training programs.

To sustain and improve quality of training, the surgical faculty should develop expertise in education. Surgical leaders should be committed to incorporating high standards of education in medical student education, resident education, and continuing education.

Specific financial remuneration of the faculty for their educational activities is often lacking. This fact combined with the greater demands on faculty for clinical productivity, the greater hassle in clinical practice they have to endure, and the time-consuming documentation requirements imposed on them by unfunded federal mandates (eg, PATH Audits, HIPAA) leave the surgical faculty with ever decreasing time to contribute to educational activities.

Traditionally, departments of surgery have focused their priorities and expertise on patient care and research, and have not allocated sufficient resources to education. As a result, the use of contemporary educational principles and state-of-the-art evaluation methods is not widespread. In addition, educational efforts of the faculty are inadequately recognized and rewarded.

The budgeted revenue for most surgery departments is derived from clinical practice, and only a small percentage comes from the medical school. This reality creates a disincentive for the faculty to participate in educational activities and particularly to engage in medical school admissions processes and curricular affairs. Surgery departments, therefore, need to develop a mechanism to enable faculty to devote more time in the nonrevenue-generating educational activities. We must accept that remuneration for activities such as education has to be seen as important as other professional activities. This will require education of the public and the payers. It may be possible to link such remuneration to compensation provided for administrative and regulatory demands.

The surgical faculty is often more committed to resident training than to medical student education. Indeed, medical student education during clinical rotations has often been left to overburdened and fatigued residents. Furthermore, surgeons have infrequently participated in the curriculum of first and second years of medical school. Students are not exposed to surgical role models and to early introduction to the excitement of a career in surgery to the extent that they need to be. The skills of problem-solving, decision-making approaches to rapid treatment, and expertise in pathophysiology and anatomy, which are all characteristic of surgeons,

need to be emphasized in all years of the medical school curriculum.

The past decade has seen medical schools throughout the country adopt major curricular innovations requiring multidisciplinary teaching in small groups. Surgeons need to be more involved in this format of teaching because they are able to contribute relevance and excitement to education in the preclinical years.

Surgical faculty members also need recognition and support for their efforts in residency education to facilitate development, implementation, and evaluation of innovative educational approaches. Also, such recognition and support is necessary for the much-needed changes in continuing education.

Recommendations

1. Academic departments should provide in the budget salary support for clerkship directors and residency program directors and compensation for time spent by faculty in educational activities. To enable this to happen, surgical faculty need to join with the department chair to allow practice revenues to be redistributed to those educational activities the faculty holds in high value. Indeed, departmental income from all sources should be examined for appropriate distribution to support educational and administrative activities.
2. The RRC-S should stipulate and review institutional financial support for the teaching programs.
3. Academic surgery departments should play an active role in educational, administrative, and curriculum development activities of the school. Surgical faculty should actively seek opportunities to teach and mentor medical students in the first and second years of medical school.
4. The effectiveness of teaching and the provision of education should be improved by:
 - a. Requiring all academic surgical chairs and division chiefs to acquire fundamental knowledge of education and demonstrate commitment to promote high standards of education within their departments or divisions;
 - b. Establishing standards for qualifications and training of clerkship directors and residency program directors in both education and administration. The Division of Education of the ACS should take the lead in establishing and supporting these standards, working collaboratively with the Association of Program Directors in Surgery, the Association for Surgical Education, and the Residency Review Committees.
 - c. Providing faculty development courses in teaching and the education process;
 - d. Recruiting surgical faculty with advanced training in education and educational research;

- e. Requiring clerkship directors and residency program directors to participate in training in program development and evaluation before assuming responsibility for educational programs; and
 - f. Making research in education a priority and providing the necessary resources to develop it (salary support, space, equipment, grants, and so on).
5. Surgical faculty should take responsibility to promote to students the attractiveness of a career in surgery by:
 - a. Providing opportunities to students to see the life-style and professional satisfaction of surgeons through social interactions;
 - b. Developing surgical clubs, research opportunities, preceptorship, and mentorship; and
 - c. Designing surgical clerkship and resident preparedness courses of the highest quality to meet leading-edge standards of teaching and evaluation.
 6. Surgery departments should develop surgical skills laboratories with an appropriate program of instructions and validated system of evaluations. The Division of Education of the ACS should play a leadership role in setting and monitoring the standards for skills centers nationally.
 7. Fund raising should be a strategic priority for academic surgery departments. External grants and support for endowed chairs should be sought from alumni, philanthropic donors, and corporations.

TRAINING IN SURGICAL RESEARCH

The research and innovation of American surgeons throughout the centuries has contributed significantly to scientific knowledge and has helped develop the best patient care in the world. A few examples that may be cited include the development of anesthesia, antisepsis, blood transfusion, organ transplantation, open heart surgery, clinical nutrition, joint replacement, biomaterial, and artificial organs. The future of surgery as an academic and professional discipline that will continue to contribute to the discovery and clinical translation of new knowledge, technology, and surgical therapeutic innovation might depend on how high research is on the priority scale of surgical education and practice. Great need and urgency exist to train clinical investigators and surgeon-scientists. It is inherent in the education of a surgeon that he or she be exposed to a thorough understanding of basic scientific methods. It is especially important that the surgeon in training understands the appropriate methods of evaluating published material, clinical research, and decision analysis.

Research training in surgery is regarded almost as an afterthought, and the surgical profession has not placed a premium on its development and support. Research training in surgery lacks the structure, organization, and oversight that are so well developed for clinical training. No organization

has assumed the responsibility to provide oversight for research training.

The Committee views with concern the unstructured, obligatory 1 or 2 years of research required as a prerequisite to enter training in some specialty programs. The value of this research experience should be assessed based on its benefits to the individual and the specialty.

Research proposals by surgeons are less likely to be funded by the National Institutes of Health (NIH). Few surgeons participate in the NIH review process, and surgeons are in the minority even within the Surgery Study Section. Although we continue to hold a strong perception that surgical research is not fairly reviewed and funded, we must also accept that research proposals from surgeons sometimes lack scientific rigor and originality. One factor that contributes to making surgeons less competitive in research funding is the lack of adequate protected time for research.

Recommendations

1. The Division of Research and Optimal Patient Care of the ACS should play a leadership role in coordinating with the ABS, with the RRC for Surgery and the Society of Surgical Chairs to develop a definitive agenda for the research training of surgeons. Such an agenda should include:
 - a. Training of all residents in basic research methods and biostatistics during the residency;
 - b. Creation of a surgeon-scientist training pathway leading to a Masters and/or PhD degree;
 - c. Provision of opportunity for residents and fellows to avail themselves of advanced, curriculum-based training in clinical research, public health, or policy. Ideally, such training should lead to a degree.
 - d. Identification of a single organization that should be responsible for setting standards, evaluation, and oversight.
2. The academic surgical community should develop measures to enhance opportunities for a career in surgical research and to integrate research into clinical practice. Every effort must be made to take full advantage of the new "NIH Roadmap" that emphasizes clinical research and training coordination throughout the country.
3. Leaders of surgery should engage in serious discussion with the NIH leadership to make the case for a robust surgical enterprise as a necessary asset to the health care of the nation. Such discussion should be preceded by assembling data, unassailable evidence of commitment by the surgical community to the scientific discipline, and developing a tightly reasoned argument why research in surgery is so important to the country.

CONTINUOUS PROFESSIONAL DEVELOPMENT

The Blue Ribbon Committee of the ASA recognizes the importance of continuous professional development (CPD) in

the acquisition and maintenance of surgical competence. The competencies of medical knowledge, patient care, interpersonal and communication skills, professionalism, practice-based learning and improvement, and systems-based practice should be addressed within the context of CPD using cutting-edge educational approaches and state-of-the-art technology. Principles of contemporary adult education, effective experiential learning, and development of expertise should form the basis of educational efforts directed at supporting CPD. These principles should also be considered within the context of Maintenance of Certification as efforts are made to address the commitment to lifelong learning and involvement in periodic self-assessment, assessment of cognitive expertise, and evaluation of performance in practice.

The Blue Ribbon Committee discussed many of the general concepts underlying effective surgical education and interventions but made a conscious decision to only focus on the educational needs of surgical residents and medical students, and not to directly address issues relating to CPD. The Division of Education of the ACS is pursuing a spectrum of educational activities to support CPD and will continue to play a pivotal role in this regard, working collaboratively with Surgery Specialty Boards, accrediting bodies, and licensing authorities.

Closing Remarks

The work of the Blue Ribbon Committee was generously supported by the ASA, ACS, and ABS and effectively staffed by the Division of Education of the ACS. Special recognition needs to be given to Patrice Gabler Blair, MPH, Associate Director of the Division of Education, ACS, for

playing a pivotal role in supporting the activities of the Blue Ribbon Committee. She was ably assisted by Rosemary Morrison, Administrative Assistant, Division of Education, ACS.

As the Blue Ribbon Committee completes its work, it requests that its mission and goals be carried forward by the ACS, much as was done with past projects of national importance.

The committee recommends that the ACS should establish mechanisms to address the recommendations of the committee, in collaboration with other national organizations such as the ABS, the RRC-S, and the Association of Program Directors in Surgery, the Association for Surgical Education, and the Association of American Medical Colleges. The ACS is also requested to provide the Council of the ASA annual reports outlining the status of the recommendations and the progress made in addressing various items.

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