I am delighted and extraordinarily honored to be asked to give the Hayes Martin Lecture to what is now the American Head and Neck Society. This lecture represents the crown jewel of the Society of Head and Neck Surgeons, a society that was composed primarily of general and plastic surgeons who focused on head and neck trauma and malignancies. The list of past Hayes Martin lecturers represents the greats of this specialty—names that for me had extraordinary impact and yet to those generationally behind me are, in all likelihood, unfamiliar: Oliver Bears, Charles Harrold, Harvey Baker, Richard Jesse, Milton Edgerton. Each led their society with a strong hand and attempted to keep the American Society for Head and Neck Surgery (composed predominantly of head and neck–focused otolaryngologists) at bay. A generation of conflict and contempt gradually seeped away to measured regard from both societies eventuating in a fraternal consolidation of the 2 into what is now the American Head and Neck Society. On May 13, 1998, the American Head and Neck Society evolved from a merger of the American Society for Head and Neck Surgery and the Society of Head and Neck Surgeons. The discipline has benefited measurably.

Hayes Martin, for whom this lecture is named, was a founding member of the Society of Head and Neck Surgeons. He was born in central Iowa, served in World War I, and received medical training in New York City, predominantly at Bellevue. He then served his internship and a partial residency at Sloan-Kettering Memorial and then returned to Bellevue where he completed his surgical residency, after which he joined the clinical staff at Memorial. His contributions regarding the use of needle biopsy for solid tumors in the head and neck region are seminal. His clinical focus on cancer of head and neck resulted in the publication of many articles that have been repeatedly cited. In 1934, Dr Martin became the chief of the Head and Neck Service at Memorial Hospital, and yet it wasn’t until 1940 that surgery began to replace radiation therapy as the treatment of choice for the majority of tumors with which he dealt. He published a book, Surgery of Head and Neck Tumors, in 1957 and performed his last surgery assisted by Dr Elliot Strong in October of 1959. He died in 1977, having continued to see patients until that time.

The first Hayes Martin Lecturer was William S. MacComb in 1972, and it wasn’t until 1983 that John J. Conley became the first otolaryngologist–head and neck surgeon chosen to be the speaker. I am privileged to be the eighth otolaryngologist–head and neck surgeon to be given this honor, following behind Dr George Sisson, John Lore, Helmuth Goepfert, Eugene Myers, Michael E. Johns, and Jesus Medina, all distinguished surgeons and provocative thinkers.

What I intend to do in my allotted time is discuss some challenges and obligations that I feel confront our beloved specialty, including the recruitment of excellent candidates to the discipline, the assessment of competency in residents and fellows, regionalization and globalization of care, and then end with some comments for the leaders of tomorrow.
Our specialty has evolved from an era where the therapist was a warrior with a single arrow in his quiver to one armed with many options, where effectiveness of treatment is enhanced by multiple sequential arrows fired at our established enemy. For the last 60 years, our discipline has served as a cauldron of creativity, where energy and ingenuity have been given full reign to create and then cope with the morbidity resulting from treatment, while at the same time being receptive to technologies evolving in other related specialties, from genetic sequencing to even more precise imaging, to functional reconstruction, to the incorporation of adjunctive irradiation and chemotherapy. Starting with high-scale extirpation and radiation, we have endorsed organ-sparing concepts, free-tissue transfer, selective neck dissections, and a reintroduction of conservation surgery with an emphasis on preservation of function and enhancement of the quality of life. We are now entering the era of molecular analysis and concepts of genetic alteration, such that the identification of those predisposed to specific cancers and the utilization of molecular manipulation will eliminate the noted aberrant genetic changes.

As an example, recognition of the relationship of human papilloma viruses (HPVs) to head and neck cancers has opened the door to a new understanding related to the etiology of oropharyngeal squamous cell carcinoma and the potential of an enhanced response to treatments of these HPV-related tumors. Technology rolls on and on an incredible warp speed, transforming, on a day-to-day basis, our core of knowledge and therapeutic profiles.

Today's head and neck surgeons, therefore, must be multi-faceted; must be facile in molecular biology and radiobiology; must be skilled with the traditional head and neck surgical procedures as well as the less interventional, robotically influenced techniques that are evolving today. They must be intellectually complete, curious, compassionate, and durable.

I have a concern for the continued successful recruitment of the head and neck surgeons of tomorrow. Although each of the last 3 match classes resulted in all available positions being filled, there was no surplus of candidates. This is of great concern. I asked the senior level residents at Johns Hopkins why they weren't choosing head and neck surgery. Two answers surfaced. One was lifestyle focused, a pervasive current phenomenon that extends to all areas of medicine where, because of the clinical and administrative demands presented by patient care, personal time may occasionally be nonexistent or nonpersonal. I don't profess to have a cogent solution to this dilemma.

The other answer made me think. It was that head and neck surgery has evolved to represent the court of last resort, where, in the end, more often than not, the surgical patient represents a previous single or combined therapeutic failure where surgery becomes the only option remaining and becomes an exercise consisting of complicated procedures in an environment that has been substantially marginalized by anatomical distortion, further transformed by small-vessel fibrosis, with a low therapeutic yield.

While this is, in part, true, I recognize that residents in training frequently fail to gain exposure to the lesser surgical procedures, surgical treatment of early-stage disease, the staging procedures prior to definitive treatment, and, most importantly, the intensely rewarding relationships that develop between the head and neck surgeon and the patient over time. Unfortunately, much of this patient contact is missed in residency training and is only acquired during the fellowship training process. We, as mentors, must assume the responsibility of exposing our residents in training to the full spectrum of care provided to our patients. This responsibility falls directly to the departmental or divisional directors guiding the training programs.

In my presidential address to the American Society for Head and Neck surgery in 1996, I broached the concept of regionalization for the treatment of advanced levels of head and neck cancer. I want to revisit this concept because, in my opinion, the fiscal constraints present in health care today, as well as the documented improvements in the results of major surgical procedures performed at regional centers mandate a look at restructuring our referral equation for the benefit of the patients and trainees.

Most of the literature to date has focused on tracking the morbidity and outcomes of non-head and neck patients in high volume, specialty driven facilities as contrasted to lower-volume hospital settings. It is time for head and neck oncologic surgery to engage the same formula of analysis.

Let me state from the outset that I am not advocating a wholesale exodus of head and neck cancer patients to regionalized cancer centers, rather, that those requiring multidisciplinary technologically intensive treatment should be so directed. The lower-intensity procedures (for instance total laryngectomy, partial glossectomy, thyroidectomy, neck dissections, and most laryngeal procedures) would be best treated locally provided the presence of an experienced head and neck surgeon. High-intensity procedures (such as subtotal or near-total laryngectomies, composite resections, esophagectomies, procedures requiring extensive tissue transfer for reconstruction, and paranasal and skull base surgery for malignancy) should be referred to a regional center where a multidisciplinary team and cutting-edge technology is in place and where surgical volumes are high.

I do not feel that this formula diminishes the local practicing head and neck surgeon because, in most instances, I suspect this referral pattern is already established. In all probability, the local head and neck surgeon is unable to commit from his practice the time required to engage in the demands of this highly complex enterprise.

This formula best fits with the curriculum of our training programs today where graduates from approved residency training programs have achieved a level of competency in the established core of head and neck surgery, whereas those graduates from head and neck fellowship programs have acquired an added level of competency to include the high-intensity, more demanding head and neck procedures.

Let me back up my contention with references from literature. Finlayson et al in the Archives of Surgery compared the relationship of high surgical volumes to operative mortality in cancer surgery. The authors noted
that there was a trend toward lower operative risks in high-volume hospitals for 7 of the 8 procedures that they evaluated (including pancreatectomy, pneumonectomy, and esophagectomy). The positive effect of increased surgical volumes was manifested the most in elderly patients. Their conclusion was that surgical operative mortality decreases with the increase in hospital volume.

Begg et al\(^2\) in JAMA reported a retrospective study using the Surveillance, Epidemiology and End Results (SEER) Medicare linked database. They evaluated 5013 patients looking at pancreatectomy, esophagectomy, pneumonectomy, liver resection, and pelvic exenteration. The most striking contrasting results were from the esophagectomy, where the operative mortality was 17% in low-volume hospitals compared to 3.4% in high-volume hospitals. The conclusion was that mortality rates are lower when complex surgical oncologic procedures are provided by surgical teams in hospitals with multispecialty experience and high volumes.

Dudley et al\(^3\) in JAMA evaluated selective referrals to high-volume hospitals involving a California hospital network. The authors concluded that neither publication of hospital-specific results nor selective referral initiatives are common in the current health care market. ... Our data suggest that many patients could benefit from selective referral based on the best available proxies for quality of care. ... We believe employers, health plans, and government health care programs should actively consider policies of selective referral and call for additional research on the topic.\(^3(p1164)\)

Birkmeyer et al\(^4\) wrote about volume standards for high-risk surgical procedures and potential benefits to the Leapfrog initiative. Their conclusion was that a large coalition of employers (the Leapfrog Group) could require volume standards for 5 high-risk procedures: coronary bypass surgery, aortic aneurysm repair, coronary angioplasty, esophagectomy, and carotid endarterectomy. The authors concluded that using this formula of volume standards would save 2581 lives (coronary bypass with stent, 1486; abdominal aneurysm repair, 464; esophagectomy, 168; and carotid endarterectomy, 118) based on the patients included in the network of the Leapfrog Group.

My final citation, by Luft et al\(^5\) from the New England Journal of Medicine, is entitled “Should Operations Be Regionalized? The Empirical Relation Between Surgical Volume and Mortality.” They noted that mortality of open heart surgery, vascular surgery, TUR (transurethral resection), and coronary bypass were decreased with increasing numbers of cases. This was in contrast to cholecystectomy (a low-intensity procedure), where there appeared to be no relationship between volume and mortality.

Certainly a study sponsored by the American Head and Neck Society might provide a pathway to more successful head and neck cancer management. It would appear that the consideration of regionalization of high-intensity head and neck cancer care should gain momentum based on the objective evidence of other similarly intensity surgical procedures where, with high surgical numbers and a multidisciplinary team, outcomes appear to result in lower patient mortality and morbidity.

It is becoming increasingly apparent to me that we as teachers and mentors lack the tools necessary to objectively evaluate the global competency of our finishing residents or fellows, and yet we are called upon by society to certify competence. By this I mean the newly finished surgeon’s capability to utilize his or her acquired knowledge and skills as well as demonstrate a professional attitude to new situations in addition to those that are routine. Much effort is being directed to create an effective assessment formula incorporating multiple evaluative elements. No single dependable formula exists to measure the graduates’ competencies in varied and disparate environments. Technical skills, which are the core of a surgical practice, seem to be the most weakly assessed. During residency training we expect the residents to acquire technical skills for benchmark procedures; however, the assessment of these skills depends on recall-based evaluations from the faculty.

What is the current status of the evaluation of resident operative competency? A recent study of competency assessment from US otolaryngology–head and neck program directors disclosed that 69 of the 72 respondents used subjective evaluations.\(^6\) Summative feedback at the end of the rotation was done by 41 of the 72. Formative feedback of the surgical cases was done by only 28 of the 72. An objective structured assessment of technical skills was used by only 11 of 72 programs. Resident operative portfolios were maintained by 35 programs. Mechanisms for remediation were present in less than half the programs. Those programs that provided remediation were likely to have methods for formative feedback in place (Table). Thus, in otolaryngology–head and neck surgical training, the standards for the evaluation of surgical competency fall below a level that we should expect.

I recommend to you an article, “The Aviation Paradigm and Surgical Education,” by James M. McGreevy.\(^7\) In this article, McGreevy compares the characteristics of a good F-16 pilot and a good surgeon with reference to selection for training, structure of the training process, and the evaluation of competency. He suggests that most of the training paradigms successful in aviation would be useful in skills acquisition for surgeons, recognizing that the body presents far more variability than the airplane. What follows is a list of the aviation paradigms that might be transferred to surgical training.

---

Table. Selected Results From “Assessment of Operative Competency in Otolaryngology Residency: Survey of US Program Directors”\(^6\)

<table>
<thead>
<tr>
<th>Competency Evaluation Method</th>
<th>Surveyed US Programs, No. (%) (N=72)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjective evaluations</td>
<td>69 (96)</td>
</tr>
<tr>
<td>Summative feedback</td>
<td>41 (57)</td>
</tr>
<tr>
<td>Formative feedback</td>
<td>28 (39)</td>
</tr>
<tr>
<td>Resident portfolios</td>
<td>35 (49)</td>
</tr>
<tr>
<td>Objective structured assessment of technical skills</td>
<td>11 (15)</td>
</tr>
</tbody>
</table>

---


©2009 American Medical Association. All rights reserved.
1. Applicants can be tested for innate dexterity and personality traits.
2. Faculty can be encouraged to define a designated learning objective (DLO) for each clinical encounter.
3. Resident/fellowship rotations can be defined by a checklist of objectives.
4. Benchmark operations can be dissected into essential steps to be drilled with “deliberate practice” in skill trainers and the operating room.
5. A checklist of essential skills, to include operative, and other tasks can track residency training and competency. These lists would direct resident education as we define the surgical rotations by skills acquired rather than a segment of time.
6. Residents can use the designated learning objective concept so that the learning becomes active rather than passive.

I quote:

If I could run my program like a fighter squadron, residents would come to work each day with a learning objective (based on curriculum), faculty would define a DLO for each clinical encounter, applicants would be screened for aptitude and desire, residents would have training devices, and residents’ proficiency would be tracked and documented.11(p143)

Tools like OSATS (objective structured assessment of technical skills), ICSAD (Imperial College of Surgeons assessment device), and even eye-motion tracking to assess the surgical dexterity of the surgeon are being developed and tested. In otolaryngology—head and neck surgery, Bhatti and Cummings8 have taken a step forward by bringing the use of assessment tools, which remain in the confines of skill laboratories, to the operating room.

Mery et al9 in the Bulletin of the American College of Surgeons, reviewed the elements of ACGME competencies (Accreditation Council for Graduate Medical Education) in surgical residency. The authors note that practice-based learning and improvement involves a development of skills that identify areas of possible improvement in clinical practice: to obtain, analyze, and assimilate scientific evidence; to plan and implement changes; and to evaluate the impact of those interventions. This process involves the development of resident portfolios to include logs of cases; literature reviews; quality improvement projects; M&M (morbidity and mortality) conferences; and employment of systematic thinking, root cause analysis, and error investigation. Emphasis on the role of a 360-degree global evaluation is endorsed such that operating room personnel, anesthesia, clinic managers, nurses, and patients all have a role in the evaluation of overall competency of the individual in training. It is no longer appropriate for the residency program or fellowship director to assess performance based on nonobjective factors such as personal relationships, likeability, or physical appearances.

We are obliged to support the efforts of those who are attempting to establish a meaningful methodology for an objective and global assessment of professional competency in our graduating residents and fellows. The responsibility to society is entirely ours, and we must support these evolving concepts.

Let’s now look at the exciting trend toward the globalization of knowledge transfer and an unfiltered exposure to health care disparity as evidenced in developed, developing, and nascent countries. In my opinion, it is here that our head and neck society has the opportunity to provide the biggest impact. Globally, the volume of head and neck tumor cases is huge, and the number of experienced surgeons is relatively infinitesimal (a scenario that cries out for linkage to our surgical training programs and fellowships). These increased numbers of cases, were they to be treated by our trainees, would elevate the quality of care for the afflicted and contribute in a most positive, meaningful, and effective way for the trainee to gain the experience and judgment expected of the mature head and neck surgeon.

Consider that in 2007, East Asia (which includes China) accounted for one-third of all new cancer cases worldwide. The entire developed world, including North America and Europe, accounted for 17%, while southern Asia, including India, accounted for 11% (Figure).10 Lung cancer remains the top killer, and by inference head and neck cancer should be similarly high. A compelling article in the Journal of American College of Surgeons by Riviello and Ozgediz11 focuses on international medical graduates and the global surgical workforce. I quote:

There is a global shortage of 4.3 million healthcare workers and 1 million of these are in Africa. Africa bears 25% of the global burden of disease with only 2% of the world’s healthcare workforce. Africa has less than 1% the number of surgeons in the U.S. despite having 3 times the population. Anesthesia and nursing are similarly maldistributed.11(p143)

Surgical conditions that are routine, including head and neck entities, become lethal through neglect. Major humanitarian organizations overwhelmingly support programs in poor countries, but they are usually related to infectious or metabolic diseases and not malignancies. There is an urgent call for surgeons to address this unmet global need, to advocate for patients in areas without access to specialty surgery, and to affirm the role of global public health.

What is our responsibility? It is time to become involved in the decision-making process of the great humanitarian foundations of the world, the Gates and Moore...
foundations for example. It is time to establish formal linkages with the health care institutions that are based in areas of need such that part of our training programs may be spent (with appropriate supervision) in areas where exposure to advanced disease would be substantive; surgical skills would be enhanced by repetition; and the core element of medicine, the improvement of the human condition would be served.

It is my conviction that we head and neck surgeons, as responsible, caring, and compassionate individuals, should make the commitment to search for answers and solutions to the problems and challenges that confront us. We must ensure an open and not entrenched mind that can bend with technological change. We must find the way to maintain the necessary scope of surgery while at the same time pushing the envelope of minimal interventional image-guided surgery. We must find a way to maintain and enhance the desirability of the field of head and neck surgery by reinforcing the rewards of an in-depth patient-physician relationship.

We must ask of ourselves how we might construct ways to provide the greatest access to modern expertise for those afflicted globally, to include early diagnosis as well as the definitive treatment of advanced disease. As an example, large-scale screening programs through the analysis of genetic changes in saliva would identify those predisposed to head and neck cancer.

We must find financial advocates to export this technology to countries with high incidences of head and neck cancer. We must find the best way to implement upscale clinical research studies to the globe such that early diagnosis will become the norm, and the cost both financially and humanely to society will be markedly diminished.

Submitted for Publication: August 11, 2009; accepted August 13, 2009.

Correspondence: Charles W. Cummings, MD, Johns Hopkins Outpatient Center, 601 N Caroline St, Baltimore, MD 21287 (ccummin2@jhmi.edu).

Financial Disclosure: None reported.

Previous Presentation: This Hayes Martin Lecture was given at the American Head and Neck Society 2009 Annual Meeting; May 30, 2009; Phoenix, Arizona.

REFERENCES