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Imaging Informatics and Nuclear Medicine

For nuclear medicine, among the most “computerized” of imaging specialties, the year 2004 brought physicians, physicists, and technologists face-to-face with what has become the biggest challenge to all of imaging practice: the rapid increase in size and complexity of datasets. Although nuclear medicine was largely isolated from this rapid growth in the past, the advent of PET/CT and the promise of routine SPECT/CT have made the “image overload” associated with multichannel CT a new and, in many cases, daunting factor in planning for aspects as diverse as patient throughput, image interpretation, departmental workflow, and image archive, storage, and retrieval. Many clinical users are actively working with manufacturers to answer important questions, including, “How can we maintain throughput when it takes longer to reconstruct and send the images to an

archive or to workstations than it does to scan the patient, thus creating a bottleneck?” The question of image overload was addressed at major imaging meetings in 2004, and the Society for Computer Applications in Radiology held a special symposium on the topic in Bethesda, MD, earlier this month.

Another trend that began elsewhere in imaging but that is beginning to resonate in nuclear medicine is the routine use of 3D/multiplanar images. Picture archiving and communications (PACS) vendors are increasingly including 3D/multiplanar solutions in their products, but at the same time are struggling to find ways to integrate these with existing technologies. A new trend for 2004 was more general acceptance of the idea of doing 3D processing on a server rather than at the level of the

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computer workstation. Using this “thin-client” approach, a workstation does not need large memory capacity, nor does the entire study have to be transferred to the workstation before the physician can begin review. Instead, resources are shared over the network, with processing performed at a central server. The flexibility provided in the interpretation process itself is rapidly expanding, with a trend toward the physician interacting with images as total volumes, from which he or she may choose how to view the image, how to “slice” it, and how to relate it to other images or supporting data.

Last year also saw the continued emergence of the central hospital electronic medical record as a requirement and a renewed emphasis on the importance of getting the information contained in that record to the workstation quickly and reliably to serve as decision support. At the workstation, speech recognition continues to make inroads against not inconsiderable resistance from many potential users. The trend is toward less emphasis on brute force vocabulary recognition and more on a model that recognizes that imaging specialists use a very limited number of words that can be recognized through natural language processing. Major improvements should be seen in 2005 in the overall speech recognition accuracy afforded by available technologies.

The emergence of computer-assisted diagnosis (CAD) in CT detection of lung nodules was widely

noted in 2004, and several articles in the nuclear medicine literature cited the promise for CAD in this application with PET/CT. It is likely that CAD for lung nodule and pulmonary embolism detection will become commonplace among CT and PACS vendors in the near future, first as a second reader and later as a decision support mechanism to be used during interpretation.

Preparations for the impending requirements for compliance with Health Insurance Portability and Accountability Act (HIPAA) security regulations (April 2005) have had an effect on nuclear medicine departments in increased awareness of security issues, an interest in fault tolerance and disaster recovery readiness, and in the secure maintenance and generation of electronic teaching files.

As the rest of medical imaging joins nuclear medicine in “going digital,” the emphasis on the importance of imaging informatics has increased. Several institutions, including my own, have formed dedicated imaging informatics research teams that bring physicians, physicists, information technology specialists, and others together to focus on emerging issues at this exciting intersection of medical practice and cutting-edge digital technologies.

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From the SNM Academic Council

The Academic Council provides a forum for members involved in nuclear medicine training and for those interested in the career development of young professionals during and after their educational programs. The council fosters education in nuclear medicine and provides outreach to other professionals and organizations whose work affects education and career development. The council also acts as a resource for SNM leadership and provides a forum for all who have involvement or interest in education and early career development of the next generation of nuclear physicians and scientists.

At the June SNM annual meeting in Philadelphia, PA, SNM leadership endorsed a plan for the Academic Council to become an “umbrella organization,” including both the Nuclear Medicine Program Directors Association (NMPDA) and the Young Professionals Committee (YPC). I assumed the presidency of the Academic Council in June, and Darlene F. Metter, MD, became vice president. We have been charged with developing an active board of directors and a full slate of officers and with implementing plans for a revitalized Academic

Council. The first council objective was to create a new organizational structure and update the Council Standard Operating Procedures (previously known as bylaws). A business plan was developed and submitted for funding approval. Part of this plan centered on better communication, and an online newsletter on the SNM site was launched in the fall. Three new list server e-mail communities have been developed through the SNM for the Academic Council, the YPC, and the NMPDA.

Both the YPC and NMPDA are quite active in their respective spheres. The NMPDA, which Michael M. Graham, PhD, MD, will continue to chair after completing his dedicated service as president of the Academic Council, has recently completed defining the requirements for the 3-year training program in nuclear medicine. The group will also devote attention to increasing meeting attendance by residency program directors and addressing areas such as teaching and evaluation of the 6 clinical competencies that will soon be an integral part of all medical training.

The YPC, under current chair Richard G. Lucas, MD, was formalized as an organizational part of the Academic