V. Report of the Educational Resources Committee

A. Finances

The magnitude of the School of Medicine enterprise has changed dramatically since 1999. The revenues, projected in 1999 to be \$392 million, doubled to \$787 million in 2005 and will be over \$800 million in 2006. The Faculty Group Practice (FGP) has tripled in size. Philanthropy has almost doubled, with much of the growth attributable to Campaign pledge payments for the Smilow Research Building, and for over 100 faculty recruits for that building and throughout the campus. Research grants have already grown by 76%. Tuition revenue has grown by 28%.

A royalty revenue stream from Remicade particularly advantages the School of Medicine. In 2005, \$78.3 million of royalties were received. In 2006, approximately \$90 million will be received. \$60M is being used for current operations, recruitments and capital enhancements. \$30 million is being reserved.

REVENUE SOURCES	2005 \$ (millions)	2005%	1999 \$ (millions)	1999%	\$ Variance (millions)	Increase %
PRACTICE PLAN	241.41	31%	78.00	19.90%	163.41	210%
HOSPITAL SUPPORT	113.74	14%	95.00	24.23%	18.74	20%
GRANTS	179.93	23%	102.00	26.02%	77.93	76%
PHILANTHROPY	70.10	9%	36.00	9.18%	34.10	95%
ENDOWMENT	11.09	1%	9.60	2.45%	1.49	16%
ROYALTIES	78.32	10%			78.32	
TUITION	20.50	3%	16.00	4.08%	4.50	28%
RENT	17.60	2%			17.60	
SHARED SERVICE	12.80	2%			12.80	
OTHER	<u>41.87</u>	5%	<u>55.40</u>	14.13%	<u>(13.53)</u>	-24%
	787.37		392.00		395.37	101%

The audited financial statements of the School of Medicine for FY2005 show a \$17.4 million operating profit. This compares favorably to the \$28 million operating loss projected for FY 1999 at the time of the last review.

Schedule A of the LCME Annual Questionnaire for FY2005 shows the School with a \$46.1 million shortfall. The difference between the audited financials and Schedule A is that Schedule A excludes \$28.3 million of depreciation and adds in \$91.8 million of Capital Expense. \$66.4 million of the capital expenditures was for the recently completed Smilow Research Building. The net cash flow for FY2005 was (\$421k) compared to (\$9 million) projected for FY1999. As of August 31st, 2005, the School had \$55.9 million in cash and short term investments. All financial metrics (the operating margin, capital spending and net cash flow) indicate that the School of Medicine is in a much better operating position than it was six years ago, and that it is investing in its future.

For each of the last six years, there has been a revision of the Ten Year Strategic Plan. While the underlying strategy (the Dean's Growth Agenda) hasn't changed, the annual update has provided a discipline to ensure that we stay ahead of adaptations of the strategy (i.e., growth in the number of recruits), accommodate for unforeseen events (break up of the hospital merger) and are current in inflation factors. The projections have stayed balanced. In some years, the additional revenue and additional expense have balanced easily. In other years, institutional efforts have been needed to realign expenses.

Pressures to Generate Revenue

The level of balance in the activities of the faculty to ensure revenue generation and provide the time for scholarly pursuit is reviewed annually during the budgeting process. The School provides support to the academic departments to cover salary of faculty engaged in required teaching activities. In addition basic science faculty are not expected to cover 100% of their own salary through extramural funding; rather they receive support for uncovered salary to ensure the availability of faculty for meeting the educational mission of the school.

The Clinical Enterprise

The School of Medicine has a FGP which now consists of over 550 physicians with total revenue of approximately \$225 million per year. This enterprise generates approximately \$18 million per year for the Dean's Academic Fund, overhead coverage for the School, and academic funds for various Department Chairs. The magnitude of this enterprise has more than tripled since the last LCME site visit. The reason the FGP has increased in size is the dramatic increase in programmatic initiatives, the latest of which is an ambulatory cancer center in which over 50 physicians participate and are now in the practice plan. With multi-disciplinary programs becoming more prominent, an employment vehicle such as the practice plan is of greater interest to physicians. Further, as it becomes more difficult for voluntary physicians to bring on new partners, the availability of the practice plan has been helpful for new recruits.

There has been significant planning related to the clinical enterprise. In addition to the faculty practice, there is also a substantial contract with the flagship hospital of our municipal hospital system in New York, Bellevue Hospital, which employs close to 500 faculty. Additionally, our affiliation with the VA employs over 100 additional faculty. The strategy of the FGP is to partner with physician groups throughout the metropolitan area and to provide onsite specialty care to them that complements what they already provide, with referrals coming to NYU. Further, we are planning to build a new ambulatory care center. All of these ambulatory activities are amenable to medical student clerkships and electives.

Future Capital Needs

The present and future capital needs of the School of Medicine are reviewed annually and incorporated into the NYUMC strategic planning process. Included in the plan are the needs of the clinical enterprise, including major construction and renovations to the hospital, a new ambulatory care center and the renovation and upgrading of current academic and research facilities.

B. General Facilities Teaching Facilities

Alumni Hall and Schwartz Lecture Hall

Alumni Hall includes the 500-seat Farkas Auditorium as well as two smaller auditoriums for lectures, symposia, and conferences. The 3rd Floor also includes a large study space available to students 24 hours a day with large windows and comfortable chairs for study and relaxation.

Completed in 1973, the Schwartz Lecture Hall provides two auditoria, including the Pfizer Foundation Hall for Humanism in Medicine, each with a capacity of 305 as well as two lecture rooms, each of which accommodates 85 students. Equipped with audio-visual systems, these facilities serve as a focal point of the first two years. Schwartz Lecture Hall is very convenient to Rubin Hall and the rest of the Medical Center.

The Geraldine H. Coles Medical Science Laboratory

The Geraldine H. Coles Medical Science Laboratory Building houses the Advanced Educational Systems facility, gross anatomy dissecting suites, the Printing Lab, and the Dr. Martin L. Kahn Teaching and Learning Center on the 2nd and 3rd Floors. The entire facility includes over 16,000 useable square feet of classroom and classroom laboratory space dedicated to small group teaching.

The Kahn Center, completed in 1998, contains six, multi-purpose, teaching labs with movable tables to maximize flexibility as well as computers and audio-visual equipment to facilitate discussion and integrative teaching. The design of this multi-purpose facility fosters student-faculty interchange and also provides medical students with study spaces during the off-hours. While this renovation addressed space requirements, the six laboratories now require more advanced multimedia capabilities. In addition, the computers in the laboratories and small group teaching rooms are outdated and need to be replaced.

The first floor of the building, containing small- and medium-sized conference rooms, and the ground floor, encompassing the Anatomy dissection laboratories, are in need of updating. These two floors are heavily used for teaching our Morphological & Developmental Basis of Medicine module. While Coles 105 was renovated three years ago, other renovations are needed. The ground floor – specifically Coles GO6, GO7, GO8, and G10, currently occupied by the Anatomy Dissection Laboratories and support space – also needs substantial renovation. While adequate, it is over 35 years old and is straining to support the educational mission of the NYU School of Medicine.

Simulation Learning Space

Simulation is growing in importance as a component of the medical curriculum, and its growth has an impact on teaching facilities. Simulation value is enhanced as apprentice-based medical education wanes. The types of simulation currently in use at the School includes virtual patients, OSCEs, partial task training, and human patient simulation.

Computer-Based Simulations

Virtual patients are computer-based simulations which bring patient cases to life. The Surgical Interactive Multimedia Modules (SIMMs) are case-based enactments of interactions with a hypothetical patient. They deliver a core curriculum in a way that reduces variability in exposure and integrates basic science with surgical skills through animation/video of surgical techniques and anatomy. The impact on teaching facilities for SIMMs, however, is not significant.

Clinical Simulations

Clinical simulations, such as the OSCEs, are more widely used than virtual patients. In the first two years, students take a 12-station OSCE on areas such as pain, domestic violence, and nutrition. In the second year, they also take a 3-station OSCE focused on medical interviewing and physical exams. At the conclusion of their third year, all students take an 8-station exam on clinical skills, the CCSE. This exam became a formal requirement of the curriculum in the 2005-2006 academic year. In the clerkships, there are also departmentally-based OSCEs.

Clinical simulations are demanding in terms of facilities and personnel. The preclinical OSCEs and CCSEs have been performed at the VA and at Bellevue Hospital in borrowed spaces. Similarly, the clerkships utilize makeshift and borrowed space. The School is planning a new Clinical Skills Center which will include exam rooms, simulation rooms, conference rooms, and a computer lab. One of the goals of the center is for students to learn and practice new technologies and skills before seeing real patients.

Partial Task Training (PTT)

Many schools also employ PTT in medical education and have labs devoted to this. PTT involves dividing complex tasks into small components followed by intensive concentrated training on each individual component. The aim of PTT is to reduce the magnitude of processing demands when performing multiple complex tasks simultaneously by making certain tasks routine or automatic. NYU's 3,000-square-foot Surgical Skills Lab, located at Bellevue Hospital, utilizes PTT and was dedicated in June 2005. This facility employs three-dimensional models of organ systems and simple task-focused exercises. The main lab has raised flooring, enabling the use of gases, suction, etc. An overhead camera on the instructor's table films the action for display on screens in front of the room. There also is a computer lab where eight computers have connections to SIMMs and patient care systems. The conference room has smart board technology.

Live feeds from Tisch and Bellevue ORs are in the planning stage. Medical students on the Surgery Clerkship participate in four training sessions in the Surgical Skills Lab.

Human Patient Simulation (HPS)

The use of HPS in medical education is growing rapidly. It is being used in clinical training for development of basic skills, anesthesia and airway skills, procedural and team communication skills, as well as for learning how to deal with emergency situations (such as codes and electrical shutdowns). HPS helps develop critical thinking, teamwork, and leadership skills. Currently, the Emergency Care Institute at Bellevue has an HPS for resident and fellow training. Nursing has an HPS for running codes. The Department of Surgery has obtained funding to purchase an adult HPS for use in the Surgical Skills Lab, although the space is suboptimal for authenticity, storage and data tracking. The Department of Pediatrics is planning to purchase a pediatric HPS and is considering using it in the Pediatric ICU for "just in time" training.

Changes in health care delivery and the learning environment have driven these curricular reforms. With more care administered outside of the hospital and patients being discharged more quickly, the concept of a "teaching hospital" is in transition. There is decreased proximity of patients, faculty, and students and less time for learning. The facilities will need to be flexible to adapt.

The Medical Science Building (MSB)

MSB houses most of the medical school's laboratories, conference rooms, and administrative offices, including nearly 6,800 square feet of departmental classroom and conference room space. The ground floor of MSB also houses the student and faculty dining rooms.

The Skirball Institute for Biomolecular Medicine

The Skirball Institute for Biomolecular Medicine, which opened in 1993, features two seminar rooms (one with multi-media equipment) which seat 75 people, three conference rooms that seat 25 people, and one smaller conference room that seats 15 people. These rooms are used primarily for clinical teaching and other educational meetings. The Skirball conference room and seminar facilities are accessible directly from Tisch Hospital, Floors 4 and 5.

The Joan and Joel Smilow Research Center

The Joan and Joel Smilow Research Center is NYU's new, 13-story, state-of-the-art biomedical research center that opened on the medical center campus in April 2006. The 110,000-square-foot facility is primarily dedicated to research laboratories, but more than 11,500 square feet is allocated to conference, meeting, and break-out space. The facility specifically includes a new high-tech lecture hall as well as a large multi-purpose room that is adjacent to the lecture room and suitable for meetings and other large gatherings.

Study Space

The Coles Building was opened in 1971 and, with the renovation of its 2nd and 3rd floors in 1998, it was renovated and renamed the Martin L. Kahn Teaching and Learning Center. The renovation added six small group teaching rooms and six laboratories (five of which can be divided in half to provide 10 additional small group teaching/study rooms). The total amount of space in the Coles Building, however, remains inadequate to meet the study space needs of the student body.

The renovation of Alumni Hall C, by creating seats for approximately 59 students, partially addressed the lack of available student study space. Although the medical library provides a limited amount of study space, students from the other NYU graduate schools (especially the nearby School of Dentistry) and the general medical center community compete with our students for available study space during normal library hours.

The Faculty Dining Room, Student Cafeteria, and Annex also are utilized by a limited number of students after operating hours to study. The large auditoria (Schwartz Lecture Halls E and F) and smaller Schwartz classrooms (Lecture Halls C and D) can also be utilized after hours as study space. The Faculty Dining

Room, Coles laboratories, and small group seminar rooms are accessible with medical student ID after 5 p.m. and on weekends. Alumni Hall C is accessible at all times by medical student ID.

Based on the results of the LCME Student Survey, 46% of student respondents identified their dormitory room as the place where they spend the most time studying; a total of 77% identified their dormitory room as one of the three locations where they spend the most time studying. The Library and Coles were identified with the second and third greatest frequency. The quality of study space in Coles and Alumni Hall C received very satisfactory marks with 89% and 79% of students, respectively, indicating that the quality of space in these two areas was average or better.

The Library also received relatively good marks for quality, with 70% of students rating the space average or better. Marks for quantity of space were noticeably lower, with 39% rating the space poor or unacceptable. While the survey did not ask students in what setting they would prefer to study, the results from the other questions seem to suggest that the Library would be the preferred study location for many students, if there were more study space available there.

Even though they are by nature not confined to a specific location, the growing use in medical education of mobile computing equipment such as laptop computers and personal digital assistants has implications for facilities as well as for information technology. It is very likely that the continuing synergy between an increasingly electronic curriculum and the increasing abundance of the portable devices on which it is conveyed will transform the practice and physical environment of medical education. The School recognizes the need to guide this transformation rather than simply accommodate it after the fact.

Frederick M. Ehrman Medical Library

The Frederick L. Ehrman Medical Library has nearly 25,000 square feet of space on three floors. The basement houses periodicals, journals, book stacks, and copy machines, with desks lined up individually along the wall. On the ground level, there are two rooms equipped with study carrels and access to the most recent reference material and periodicals, as well as access to computers. The reading rooms are quiet, while the computer area offers more peer interaction. The upper level, or mezzanine, consists of more computers and carrels. Ehrman Library is open 24 hours a day from Sunday at noon until Friday at 9:00 p.m. Hours on Saturday are 10:00 a.m. to 8:00 p.m. These hours vary on holidays and school breaks.

At the time of the 2000 LCME self-study, the library had proposed certain modifications to improve security, enlarge the circulation/help desk, and combine the open computer area with the reading room. The bulk of these improvements were made and others are planned.

The library connects MSB to Smilow at the first floor as well as mezzanine levels. At the first floor, the Periodicals Room gained new study seats as a result of the construction and restoration. At the mezzanine level, a new glass partition wall was installed that improved the quality of the pre-existing study space by increasing visual privacy and attenuating noise. The mezzanine level corridor space also received new furniture further improving the quality and comfort of the space for study.

The prior LCME self-study projected that a new library would be built in connection with development of the East River Science Park (ERSP) by NYU. At the time, NYU had been designated developer of the project by the City of New York and had planned, among other things, to build a new health sciences library as part of the project. Unfortunately, for reasons relating primarily to a change in the economic development objectives of the City, NYU no longer has a lead role in the project, and its ability to lease space at the site is in question. The School of Medicine is in steady contact with the newly designated developer. As the developer finalizes its negotiations with the City, the School of Medicine will engage the developer in new set of discussions about opportunities in the ERSP project.

The School, however, remains committed to the vision of a new health sciences library to fulfill the campus needs for health information resources and services in the new century. That vision is one of a library that

supports a range of scholarly activities, with communal spaces for group learning, teaching labs for information courses, small group study rooms, quiet study areas, dedicated faculty study rooms, and, of course, immediate access to the library's total collection of print and electronic resources. The library is now expected to be a center for increased collaboration and remote learning of working among those on this campus and colleagues at other institutions. In addition, the School recognizes the interdisciplinary nature of medicine and acknowledges the importance of integrating collections and services for the entire NYU Medical Center health sciences community.

Ease of access to the knowledge of the past contained in print resources and archives are important to our community. All journals published before 1985 are now in storage, but better access to these resources is essential. At the same time, new scholarly and patient care resources, as well as new types of scientific information systems, are being developed in electronic-format only. These materials need to be integrated with electronic searching tools, easily available for downloading, copying, and printing, and viewable on equipment that provides speed, clarity, and convenience. The new library must not only be able to provide substantial print resources on-site, but also provide state-of-the-art technology for access to these resources on-site and remotely.

The School of Medicine will continue to make incremental investments in the existing facility to demonstrate its commitment to the medical library. Recently, the School received a five-year contract from the National Library of Medicine to establish a Regional Medical Library for the Middle-Atlantic Region at NYU. In support of that contract, the School of Medicine will immediately lease nearly 1,000 square feet of administrative space at the VA and invest in its renovation. The receipt of this very competitive grant makes an impressive statement about the strength of the library and its programs despite its facility and space constraints.

Audio-Visual (AV) and Facility Technology

Like many other institutions, NYUHC and the School of Medicine have traditionally approached AV facilities planning on a per-project basis as was appropriate to a time when AV was largely an in-room, service-based function. Consequently, its classrooms, meeting rooms, and lecture halls have all been designed to function as freestanding facilities dependent on in-room technical support for projection, audio reinforcement, and recording.

However, like almost every other mode of communication, AV has transformed itself over the past decade into a set of digital applications and devices residing on the generic data network. AV is now largely a facilities-based function resting on an institutional infrastructure of routers, cables, display screens, servers, identity management services, etc. Given this, we recognize that it is anachronistic to persist in addressing AV requirements on a per-project, rather than an information system-wide, basis. In response, the offices of Education, Faculty & Academic Affairs, and Real Estate & Strategic Capital Initiatives employed a consultant to assist in determining the School's requirements for the development of an enterprise-wide "electronic commons." The document extensively surveys existing facilities and services.

Research Facilities

Medical research and scientific investigation are critical components of the mission of the School of Medicine. From *The Mission of a Medical School*, a prospectus written by the Faculty of this School in the middle of the last century, articulates that "Progress in medicine, which is medical research, must look constantly to the School for its investigators and to the patient for its problems, whereas the whole future of medical care rests upon a continuing supply of physicians and upon the promise of new discovery." Medical research, therefore, is inextricably woven into the educational fabric of the institution.

The Brookdale Laboratories for Research in Kidney Disease

As noted above, MSB is the largest of the medical school's laboratory facilities. The Brookdale Laboratories for Research in Kidney Disease occupy the 1st Floor on the south wing of the building. Completed in 1975,

this wing includes 10 laboratories, cold rooms, offices, and a conference room.

The Skirball Institute for Biomolecular Medicine

The Skirball Institute opened its doors in the fall of 1993, with its first recruits joining the institute during 1994. The institute, encompassing 60,000 square feet of laboratory space divided over four floors, focuses on basic research but provides both core facilities and interaction between the clinical disciplines and the activities in basic science at the Medical Center. With a strong awareness that most medical breakthroughs originate in basic research, the Medical Center has allocated considerable resources in developing a state-of-the-art, modern, interdisciplinary research unit right in the center of the medical school environment.

The state-of-the-art laboratories attract many of the highest caliber physicians and scientists in the world. Researchers study cancer, genetics, AIDS, malaria prevention, and Alzheimer's disease. The most obvious benefit to students is that they learn to integrate the basic sciences with a multiplicity of clinical specialties to improve patient care.

Medical Science Building (MSB)

The basic science departments occupy 120,000 square feet of space in MSB. This building has undergone major renovations during the last decade and is a modern facility which includes biological containment laboratories, protein chemistry, and nucleic acid synthesis facilities, a fluorescent activated cell sorting core service, electron and light microscopes, image processing equipment, and microinjection instrumentation for the production of transgenic mice. All of the departments are equipped for state-of-the-art chemical and biochemical work and have independent conference rooms, specialized libraries, photography services, and central offices.

Additional Research Space

The School also leases nearly 40,000 square feet of space for research activities and support at the VA, approximately 26,000 square feet at Bellevue Hospital Center, and another 20,000 square feet at the City of New York's Public Health Building. The School of Medicine also conducts certain research at the Hospital for Joint Diseases on the 15th and 16th floors in about 11,000 square feet of space. The space consists primarily of wet labs and support facilities for research in bioengineering and molecular immunology.

Department of Environmental Medicine

Founded in 1947, the NYU Department of Environmental Medicine is one of the nation's oldest and foremost centers for research into the health effects of environmental pollution. Environmental Medicine is both a department within the School of Medicine and an institute within NYU Medical Center. It has two major research and teaching facilities: one on the Medical Center's Manhattan campus and the other in Sterling Forest, New York. The Sterling Forest facilities encompass about 72,000 square feet of lab, teaching, and office space. Its in-house research equipment includes one of the largest inhalation facilities in the country, a whole-body radiation counter, and many other state-of-the-art instruments.

The Nathan S. Kline Institute for Psychiatric Research (NKI)

NKI is a facility of the New York State Office of Mental Health that since 1952 has focused on psychiatric research, especially in the areas of psychopharmacological treatments for schizophrenia and major mood disorders, and in the application of computer technology to mental health services. Located on the grounds of Rockland Psychiatric Center in Orangeburg, New York, NKI has a strong academic collaboration with the NYU Department of Psychiatry.

A broad range of studies are conducted at NKI, including basic, clinical, and health services research. With an emphasis on improving clinical and long-term care, research at NKI focuses primarily on three areas: 1) patient-oriented programs emphasizing the causes, diagnosis, treatment, prevention, and care of severe and long-term mental disorders; 2) clinically-relevant, basic research on physiological and biochemical aspects of mental disease; and 3) the cost, quality, and effectiveness of services for patients in mental health programs certified, operated, and/or funded by New York State.

With the recent completion of a four-year, \$40 million construction and renovation effort, the NKI research infrastructure has been greatly enhanced for the foreseeable future. The new research complex includes 200,000 square feet of modern laboratory, clinical research, and office space – the first in the region to be exclusively devoted to mental health research. The opening of this complex has resulted in the creation of new laboratory facilities for an Alzheimer's Disease and Dementia Research Program and the establishment of a Center for Advanced Brain Imaging (with world-class magnetic resonance imaging capabilities) allowing the detailed study of brain functioning.

NKI also has opened a new inpatient clinical research and evaluation ward. This unit provides a unique setting to discover new treatments for people who do not respond to currently available medications, but who are afflicted by some of the most common mental disorders. NKI's future work is focused on the search for the causes and cure of some of the most costly and disabling disorders including schizophrenia, Alzheimer's disease, and manic-depressive illness.

Growth Agenda

The School unveiled its Growth Agenda in June 2000. The Growth Agenda, the strategic vision of Dr. Robert Glickman, currently calls for the recruitment of 117 new, research-focused faculty within a nine-year time period, FY2000 through FY2009. Since his tenure began, Dean Glickman has been preparing the School to take full advantage of the scientific opportunities in biology and challenges in medicine projected for the new century. Implicit in the Growth Agenda is the recognition of the need for constant innovation and a pledge to the advancement of medicine. The School of Medicine views growth and change as opportunities for further distinction and maintains a deep sense of commitment that has been translated into an action agenda.

To that end, the School is fulfilling its strategic Growth Agenda, a program that will have profound and beneficial effects on the School of Medicine's progressive future. It emphasizes molecular medicine and "bench to bedside research," focusing on the following research program priorities: Cancer, Cardiovascular Biology, Dermatology, Microbial Pathogenesis, Infectious Diseases, Neuroscience and Genetics. The enhancement and increase in physical resources and recruitment of the next generation of research leadership ensures the School's growth in the future, enlarging and enriching its biomedical campus.

Among the 117 targeted recruits, a total of 13 chair positions have been filled in the Cancer Center and the departments of Biochemistry, Dermatology, Anesthesiology, Medicine, Ob/Gyn, Ophthalmology, Otolaryngology, Parasitology, Pediatrics, Pharmacology, Psychiatry, Radiation Oncology, and Radiology. A total of 50 recruits have already been hired, and for the remaining years of the initiative, the School of Medicine plans to hire another 67 faculty. The planned recruits will be varying levels and will fortify the following programmatic and departmental areas: Cardiovascular Biology, Microbial Pathogenesis, Molecular Neuroscience, Genetics/Genomics/Proteomics, Dermatology, Medicine, Parasitology, Pathology, Pediatrics, and Radiology.

The Growth Agenda originally forecast demand for at least 200,000 square feet of additional research facilities to support the new faculty. The most obvious manifestation of this growth is the construction of the Joan and Joel Smilow Research Center, a new 13-story, state-of-the-art biomedical research center with 110,000 net square feet of space for laboratories, conference rooms, and classrooms. Facing the East River adjacent to the FDR Drive, the Smilow Research Center abuts and is entered via MSB, NYU's original research facility. This proximity will foster interaction between researchers, facilitate the integration of new programs with existing ones, and enable sharing of equipment and other resources. Ground-breaking for the Smilow Research Center occurred in October 2002, and the facility began accepting its new occupants in April 2006. It will add to the research laboratories arranged in flexible, open spaces to accommodate close to 50 new recruits.

As stated above, NYU is no longer playing a lead role in the development of the ERSP. Our ability to lease any space at the site, however, is still open for future discussion and the newly designated developer has

reached out to the School of Medicine and expressed interest in pursuing any opportunities that are consistent with its obligations to the City and to the objectives of the project. Specifically, the developer is interested in the development of certain core facilities which would benefit the School as well as the private tenants of the ERSP. A medical library is another facility that might meet these parameters and be viewed favorably by other tenants as well as by the City.

Service Activities

Animal Facilities

The Division of Laboratory Animal Resources (DLAR) provides veterinary services to the medical school's Central Animal Facilities (CAF). Administration of the facilities, with the exception of the Department of Environmental Medicine Satellite Animal Facility (DEMSAF) in Sterling Forest, is centralized under DLAR.

The CAF comprises of those animal facilities for which DLAR has direct oversight of the care and maintenance of the animals. These include the Berg Institute Central Animal Facility (BCAF), the Skirball Institute Central Animal Facility (SCAF), the Department of Medical and Molecular Parasitology Central Animal Facility, and the Kriser Dental Center Animal Facility. The Satellite Animal Facilities include the DEMSAF plus nine (9) small satellite facilities: Physiology Rat Room, MSB Rm. 449B; Physiology Frog and Fish Room, MSB Rm. 441; Zebrafish Ground Floor Room; Zebrafish Fifth Floor Room; Millhauser 5th Floor, Rm. N509, Environmental Medicine Fish Room SF Rm. 127; Environmental Medicine Fish Room SF Rm. 119 & 131; Biochemistry Frog Room MSB 348; and Neurology Rodent Room OBV AB 532.

Accommodations are available at the DLAR animal facilities for the housing and maintenance of all common laboratory animals. DLAR technicians also will assist investigators with routine technical procedures, including phlebotomy, inoculations, necropsies, euthanasia, or monitoring breeding colonies. An aseptic survival surgery suite is available in the Central Animal Facilities. A veterinary diagnostics laboratory is available for assistance in microbiology, immunoserology, chemistry, hematology, and pathology.

The DLAR administrative offices are located in MSB 182. This area houses the reception/business office (where animal orders and requests for services may be submitted) and the operations manager and director. The clinical veterinarian's office is located in MSB 685. The veterinary services office is located in MSB 185. The Institutional Animal Care and Use Committee (IACUC), a committee that provides oversight of the program of animal care and use and is responsible for review of all proposals to use animals in research, is located in Greenberg Hall, SC-2, Room 137.

BCAF is located in MSB and includes 18,468 net usable square feet. Access from MSB can be gained from each of the floors of the animal facility. The ground floor of the facility includes access to a dedicated loading dock on East 30 Street for the receipt of animals and houses the cage wash and autoclave area, as well as the necropsy and cold rooms. Animals are housed on the 4th, 5th, and 8th floors. Individual animal rooms house a single species, although multiple investigators may house their animals in the same room. Other facilities within the BCAF include work areas, cold room, necropsy room, diagnostic laboratory, clean equipment room, quarantine rooms and isolation areas, and survival surgery suite, including an animal prep room and surgeon prep room.

SCAF is located on the ground floor of the Mixed-Use Building at 530 First Avenue and includes 9,723 net usable square feet. Research staff may gain access to the facility through the entrance on the Northwest side. Animal facility staff gains access through a separate entrance off the corridor on the east side of the facility.

Both the Kriser Dental School and Parasitology Animal Facilities are within a few minutes' walk of the medical school. Access to these facilities can only be granted through the Operations Manager after participation in the DLAR animal facilities training program.

In order to access any of the CAF, investigators and their staff must participate in the animal care and use training program, and arrange, through the training coordinator, to have their identification badges coded by the Security Department. A coded identification badge is required to gain access to the facility. An individual may be permitted access to only one of the animal facilities.

Housing

The housing portfolio of the medical center consists of 810 owned units and approximately 160 leased units. These units accommodate the needs of the School as well as of the hospital, and they house medical students, graduate students, post-doctoral fellows, faculty, administrators, nurses, and house staff.

Rubin Hall

Built in 1957, Rubin Hall is a medical student dormitory with 14 residential stories that includes 267 single rooms and nine two-room suites. About half of all medical students in campus-owned housing live in Rubin Hall. The singles range in size from 140 to 170 square feet. The suites join two singles through a shared bathroom. The rest of the rooms share a common kitchen, bathroom, and shower facilities on each floor. Each room comes furnished with a desk, chair, bookshelf, wardrobe, bed, and sink. The basement of Rubin Hall contains a 24-hour gym and laundry facilities. Washer and dryers are also located on 12th, 13th and 14th Floors.

The Rubin Lounge has large screen televisions and ample leather seating; pool, ping pong, and foosball tables; a piano; and pantry/vending area. The main space can be divided flexibly for multiple uses and functions. Following up on a significant renovation that was completed in the late-1990s, additional work was done in 2004 that included new floors, window treatments, fresh paint, and seating. Due to its age, as well as the high turnover rate and intensive use of the facility, Rubin Hall is in regular need of steady upgrade and investment. All of the public areas of the dormitory were repainted in 2005. The bathroom partitions also were refurbished last year, and the kitchens received new chairs and freezers as well. A flood in the basement this year necessitated a \$20,000 replacement of the gym floor and other work to remediate mold growth. Finally, all of the residential properties received new laundry facilities this winter. Investment priorities for Rubin Hall include complete renovation of bathrooms and kitchens, new plumbing systems and risers, new heating plant, and replacement of the roof.

Rubin Hall is managed by the Real Estate Department, which hired a tenant coordinator in 2006 to assist in the management of the building. The tenant coordinator is available more directly at the building to assist in repair and maintenance issues and to improve coordination with in-house maintenance personnel and contract vendors.

Greenberg Hall

Greenberg Hall, opened in 1986, accommodates students, post-docs, faculty, nurses, and other staff. This 10-story building contains 215 studio and three-person suites. Each apartment includes a private bathroom and kitchen. About 37% of medical students in the school's housing portfolio live in Greenberg Hall.

The School is in the midst of significant renovation work in the public areas of Greenberg Hall; this will renovate the elevator interiors, restore the bronze lobby elevator surrounds, and resurface certain areas of the main lobby walls. The School of Medicine already has replaced the floors on the upper floor elevator landings, repaired the damaged lobby floor, and will repaint the elevator surrounds on each upper-floor as well. The building also received a new water heater this year. Interior room renovations are ongoing to upgrade the flooring in the apartments. The current schedule addresses about 20% of the building floors each year. This year is the second year of the estimated five-year program.

The School of Medicine also is in the process of developing plans to increase the functionality of the substantial rear courtyard, which is an important student resource for formal gatherings as well as private functions, and improving the appearance of landscape elements in the front of the building as well. Priority

infrastructure investments for Greenberg Hall, as funding permits, include replacement of the roof and new windows throughout the building.

Skirball Residential Tower

Skirball Residential Tower contains 289 residential apartments on 13 floors for faculty, nurses, house staff, and students. Skirball accommodates about 13% of the medical students housed in the School's owned portfolio.

Although it is the newest building in the portfolio, the building is now almost 15 years old and is in need of certain upgrades. Since last year, the School has been overseeing renovations of the public corridors – replacing carpet, removing wallpaper, painting walls, and upgrading lighting – at a cost of about \$40,000 per floor. Seven floors are complete and the remaining six are planned to be done by the end of this calendar year.

The housing portfolio includes 160 units of housing leased at negotiated market rates and subleased to the Medical Center community at subsidized rents. A majority of these units are located at Waterside Plaza, where NYU leases a total of 90 studio, one, and two bedroom apartments. At present, medical students occupy only two units in the entire leased portfolio. Graduate students occupy another 32 units within the leased portfolio. Since the last LCME self-study, the leased portfolio has doubled in size, from just 80 units in 2000. The School is moving forward to net-lease another 30 units in a condominium building on First Avenue. The studio, one, and two bedroom units will be renovated by the School and leased to post-docs, graduate students, medical students, and faculty. The Housing office also provides certain assistance in finding housing off-campus for anyone in the Medical Center community. This assistance is primarily in the form of the Off-Campus Housing Assistance Program website information and broker referrals.

Construction at the Smilow Research Center had a dramatic effect on quality of life and occupancy rates at Rubin Hall. In recognition of the impact of noise, dust, and disruption, students residing in north-facing rooms were allowed to break their housing contracts for the 2003-2004 year. A significant number of students accepted this offer and moved off-campus. This may be largely responsible for the reduction in the number of students housed within the portfolio. Since 2002, the number of students in the portfolio has declined from 576 to 512. It is fair to say, however, that in the past two years, the modest improvements made in Rubin Hall along with completion of the Smilow construction have improved the quality of life for Rubin residents. In last year's housing lottery, 51 students who had lived in medical center housing elected to move off-campus. This year, however, that number fell to 24 students, suggesting that the flow of students away from campus housing may be reversing or at least abating.

The Smilow construction, however, also brought some positive benefits for Rubin Hall occupants and other students, some of which will only be evident in the coming months. First, in order to make way for the new building, a basketball court had to be relocated to the rooftop of Schwartz Hall. As part of that work, a large bike shed also was constructed near the entrance to the Lower Dean's Office. As part of the work on the Alumni Courtyard, the School installed a new, heated, double-glass door entrance vestibule from the Rubin Hall lobby with a new card swipe and proximity card readers. Certain other lobby work was done as well, including marble and metal cleaning, reinstallation and repair of radiator covers, repair of damaged terrazzo floor, installation of new window shades, and general repainting.

The Smilow project would have provided significant new landscaping elements on the Schwartz rooftop, but initial cost estimates forced the landscaping elements to be eliminated from the scope of the work plan. The proposal, however, is getting a second look and being reengineered to reduce the overall cost. Smilow is only funding the design review, but the goal is now to develop a scheme that can be installed in phases as funds are made available. The focal point of the project would be an artificial turf lawn with deck, bench seating, and partial-shade canopy.

A current trend that may affect the portfolio includes the rising popularity of the five-year medical school program. It is not clear, however, what impact an extended program will have on housing demand, as many

of the students opting for the extra year elect to spend it away from the medical school altogether, doing research at another institution or abroad.

Recommendations

- Replace carpeting, seating and lighting in the Schwartz and Alumni Hall rooms and upgrade the multimedia projection facilities.
- Consider establishment of a committee to examine the current use of all of the teaching spaces in the School of Medicine.
- Renovate the first two floors of Coles to support the educational effort going forward.
- Upgrade multimedia capabilities and information technology throughout the Kahn Center.
- Continue to plan for a Clinical Skills Center to keep the School in a competitive position in the utilization of simulated environments.
- Study the quantity of, quality of, and demand for student study space; consider renovating at least one of the following spaces to provide additional student study space: Alumni Hall A, Schwartz Lecture Halls C/D, or the Student Cafeteria Annex; consider increased student access to other spaces and conference rooms in Skirball and Smilow in the evenings and off-hours when such spaces are not being utilized.
- Continue to explore opportunities to meet the library's needs and expand its space.
- Continue to foster a relationship with the ERSP to explore and exploit whatever opportunities may arise to economically and efficiently alleviate space and facility constraints on campus.
- Continue to make reasonable and necessary investments in Rubin Hall, while strongly considering construction of a new dormitory.
- Develop a plan to respond to student housing demand through additions to the portfolio, both owned and leased.

Security

The primary function of the Security Department is to provide the safest possible environment for all members of the medical school community. Security officers are trained in first aid, CPR, patrol procedures, knowledge of the campus, information about the alarm systems, and building evacuation. They are also trained to use citizen arrest procedures if necessary.

The Security Department is aided in its tasks by a computerized, card access, CCTV-alarm system. All entrances and exits, many high security doors and the perimeter of the medical school campus are monitored by closed-circuit television equipment with recorder capability. The card access system is integrated with the existing identification program.

All NYU-owned residential buildings, including Skirball Residential Tower, Greenberg Hall, and Rubin Hall, provide 24-hour security personnel presence and surveillance cameras in lobbies and lounges. Magnetic card-swipe access has been installed in the three NYU-owned residential properties, and upgrades to proximity readers are planned. No one is allowed access into a residential facility unless he or she is a current student, resident guest, or otherwise authorized visitor. All entrants, including staff and faculty, are checked for proper identification.

The School also has made other recent security improvements, including the installation of new security window gates at the first floor of Rubin Hall and other improvements along the 30th Street corridor, including new lighting and cameras. The 30th Street entrance is closed after hours to limit traffic at that location.

Transportation Services

NYU operates a free campus transportation service that is available year-round with modified summer and holiday schedules. The service runs along five fixed routes connecting the various campuses from 7:00 a.m. to midnight weekdays and from 10:00 a.m. to midnight on weekends. A free, on-call van service is provided for overnight transportation to and from NYU facilities as needed.

In addition, there is a free Intracampus Shuttle that runs every 20 minutes between 9:00 a.m. and 3:00 p.m. from the Medical Center to the Cancer Center and One Park Avenue. A Commuter Shuttle between the Medical Center and the major commuter terminals, including Pennsylvania Station and Port Authority Bus Terminal is available, with pick-up offered at four scheduled times between 6:00 a.m. and 8:00 a.m. and drop-off between 3:00 p.m. for \$1.00 per ride.

Recommendation

• Undertake an outside assessment of student security in conjunction with an evaluation of overall security at the Medical Center.

C. Clinical Teaching Facilities

Bellevue Hospital

The clinical resources available to the medical school are extraordinarily rich. First, Bellevue Hospital is an 800-bed hospital with just under 30,000 discharges a year and over 500,000 out-patient visits. Medical students are able to do clerkships, sub-internships, ambulatory rotations, in-patient rotations, and clinical research electives at this site. The patient mix is extraordinarily diverse from demographic and pathophysiological perspectives. Bellevue's in-patient unit is in excellent condition, and a state-of-the-art intensive care unit was recently opened. Equipment is generally excellent and support services, always a concern in a municipal hospital, are continually improving. Phlebotomy is provided on a regular basis, IV teams are present and transport is much improved. Bellevue recently opened a 208,000 square foot ambulatory care facility to which medical students are assigned. There are close to 500 NYU faculty on site at Bellevue through a professional services contract that provides patient care and trainee supervision.

VA New York Harbor Healthcare System (VA)

The New York Campus of the VA provides another rich clinical resource. The VA has inpatient services in acute medicine, surgery, acute psychiatry, neurology, and rehabilitation medicine. The New York Campus is affiliated with many schools of higher education, but its primary clinical affiliation is with the School of Medicine. Medical students routinely rotate on these services, and the VA residency programs are fully integrated with those at NYU and Bellevue Medical Centers.

Additionally, the VA New York Campus provides just under 400,000 annual outpatient visits. In total, therefore, there are approximately one million ambulatory visits between Bellevue and the VA New York Campus, with another 400,000 ambulatory visits at Gouverneur Diagnostic and Treatment Center, which is also an ambulatory site for teaching. The VA also has an ample supply of NYU faculty members who are on site and full-time through an affiliation. Over the past year, the federal CARES Commission studied its allocation of capital assets, including the VA. Although the School undertook planning efforts to determine its course of action should the VA close, the decision to keep the New York campus fully funded and operational was made in September 2006.

Tisch Hospital

Tisch Hospital is a primary teaching hospital which also abounds in extraordinary opportunities for medical students. There are 37,000 discharges per year with an excellent mix of patients. Recently, through the addition of hospitalists and full-time chiefs of service, the teaching activities have been enhanced to supplement the excellent work of voluntary attending physicians. One limitation of the Tisch Hospital clinical teaching resource base is its relative lack of small group teaching conference space. Tisch Hospital recently opened a clinical cancer center, a 100,000 square foot ambulatory cancer care facility building which is free standing and will provide further opportunity for ambulatory care activity for medical students.

Other affiliates, including Lenox Hill Hospital and North Shore-LIJ, provide clerkships in selected areas for medical students.

Recommendation

• Continue to advocate for teaching space in all clinical facilities.

Administrative Cooperation and Communication

The interactions between the medical school administration and the hospitals or clinics used for teaching are extensive. One of the Vice Deans of the School of Medicine has responsibility for managing these affiliations. On a weekly basis there is a joint operating committee meeting between the School of Medicine and Bellevue Hospital; on a monthly basis there is an affiliations meeting with the Veteran's Administration. There are virtually daily meetings with the Tisch Hospital administration. Above and beyond these meetings, there are multi-site committees under the auspices of GME which frequently discuss medical student education. The level of cooperation between the School and its affiliates is extraordinarily positive and interactive. Conflict negotiation and resolution, when needed, are undertaken between the Dean of the School of Medicine and the appropriate Chief Executive Officer of a particular hospital or clinic.

Faculty and Staff-Level Cooperation and Communication

We are fortunate that most of our clinical sites are staffed by NYU faculty members. In two sites, namely Lenox Hill Hospital and North Shore-LIJ, clinical staff may not be core faculty members, but members of the voluntary faculty. Representatives from these institutions participate on the Curriculum Committee, and site directors communicate regularly with their respective clerkship directors.

In summary, the primary affiliations at Tisch Hospital, NYU Hospitals Center, Bellevue Hospital/Gouverneur, and the VA, supplemented by relationships at Lenox Hill Hospital, North Shore-LIJ and others, provide a rich, well-integrated opportunity for medical education.

D. Information Resources and Library Services (IRLS)

The IRLS Subcommittee reviewed the charge to the Educational Resources Committee and laid out a paradigm for evaluation of the adequacy of resources devoted to the educational mission of the School. As a group, the subcommittee updated the status of the findings of the 2000 Committee with respect to Library and IT issues. As a mode of focusing and stimulating discussion, the subcommittee reviewed about a dozen questions posed to it by the Senior Associate Dean for Education and Student Affairs. The written response to these questions was then cast in the format of strengths and challenges with respect to the resources, both personnel and infrastructure, in support of education.

Not surprisingly, the subcommittee identified a broad array of strengths and challenges. All of the faculty, staff and management involved in supporting the educational mission are motivated and effective. There have been an impressive number of significant improvements and accomplishments since the 2000 LCME review. However, the bar continues to rise, along with expectations of faculty, staff, and students. In balance with the notable accomplishments, there are a few areas for targeted improvement. The subcommittee believes that there are adequate resources in information technology; however, the subcommittee also believes that these resources may not be used in the most efficient and effective manner.

There were several confounding variables: the distribution of technical resources across various departments in a decentralized model, and most notably, the lack of a central strategic plan for the Medical Center and of an oversight body to direct and coordinate efforts in the support of the education, research, and patient care missions of the School of Medicine. For these reasons, the subcommittee stressed the importance of having a coordinated approach to information technology resources and felt that the recent consolidation of various IT groups into Medical Center Information Technology (MCIT) begins to address these issues. With respect to the Library, the major issue remains an insufficient amount of space, next to which any other shortcomings pale. Despite that, the Library has accomplished a number of innovative projects to make its resources available to students, faculty, practicing clinicians, and staff. The AES group has built ground-breaking

software to simulate various clinical situations and, therefore, to significantly transform the educational experience. Their challenge is striking the correct mix between research and development on one hand and production on the other.

Advanced Educational Systems (AES)

The School of Medicine was one of the pioneers among medical schools in the application of personal computers, the Internet, and the World-Wide Web to medical education. In 1987, an interactive multimedia development unit of the Dean's area, the Hippocrates Project (HP), was established. Its charge was to identify and develop ways in which information and communication technologies (ICT) could be applied to medical education. Headed by Martin Nachbar, MD, the unit worked closely with the course directors from several of the visually intense basic science disciplines. The HP soon created a series of multimedia programs that became essential resources for the basic science curriculum. In 1989, following this "proof of concept" period, a budget for a small, permanent staff was provided by the School of Medicine.

In addition to the production of multimedia modules for medical education, in the period from 1989-1997, the HP collaborated with the Research Computing Resource (RCR) to introduce the new e-mail systems and to provide access to the Internet and World-Wide Web. In 1997, recognition of the growing importance of technology in all aspects of undergraduate medical education led to the expansion of the HP to a division of the Dean's Office called Educational Computing (EC). In addition to continuing to develop educational multimedia projects and materials, EC expanded to include interactive physiologic simulations and began to provide service components such as elements of a computing infrastructure for administrative aspects of medical education, computerized grading for undergraduate medical school courses, tailored statistical reports of examinations, and automated course survey results. EC and the RCR soon combined resources to form Academic Computing (AC). AC expanded activities to include the development of databases for clinical research and began development for mobile platforms.

With the splitting off of Tisch Hospital from the School of Medicine in 1997 and as the requirements for the planning, construction, and maintenance of a modern ICT infrastructure for the School of Medicine assumed greater importance, a new IT department (School of Medicine Information Technology – SoMIT) within the School of Medicine was formed. Organizationally, this new unit was housed under Administration, and the new Chief Information Officer (CIO) reported to the Vice Dean for Administration. SoMIT took over many of the service tasks which had previously been provided by AC (e.g., e-mail, the School of Medicine website, and building of new applications and databases to support administrative functions, including certain administrative aspects of education of the School).

In 2001, coincident with a new effort to design and develop a surgical electronic core curriculum consisting of rich-media (i.e., video, audio, 3D animation) modules, AC was separated into two independent units: AES, a division of the Deans' Office, and the RCR, a molecular biology research resource. AES's focus was exclusively on education and, as such, AES was responsible to the Vice Dean of Education, Faculty & Academic Affairs but now reported directly to a new position, the Assistant Dean for Advanced Applications. AES assumed responsibilities for the creation and initial maintenance of innovative, educational, IT applications which included both educational learning resources (i.e., learning modules) and service and administrative applications for undergraduate medical education (i.e., curriculum website, test score reporting, online course evaluations, etc.).

The year 2001 represented a watershed in educational development for AES and the School of Medicine. Prior to 2001, AES projects were almost exclusively rooted in the preclinical curriculum and involved either the creation of some interactive learning modules which sought to make particular, difficult concepts within a single discipline more understandable (i.e., how the stomach secretes gastric acid for the physiology course), or sought to facilitate the learning of biologic structures from image archives for the histology, pathology, and microbiology units of the curriculum. Beginning in 2001, the collaboration among the Department of Surgery, numerous faculty members from other departments, and AES produced a set of new learning tools, the SIMMs. SIMMs are rich-media applications; that is, they rely heavily on informationintense media such as video, 3D modeling, animation and audio. Thus, SIMMs were, and still are, expensive in terms of financial costs, man-hours to produce a finished product and the bandwidth necessary to use them.

It was recognized from the outset that a project of this magnitude needed to be guided by continuous assessment of the educational impact of the SIMMs. Moreover, to support the construction, distribution, and assessment of SIMMs, a new infrastructure was required. These two new elements dictated that AES move in two new directions. First, there was a need to tightly couple educational research to technological development and to bring additional informatics and educational research expertise into AES. This was accomplished by creating two part-time faculty positions within AES and filling these positions with Marc Triola, MD, who became the Director of Research for AES, and Adina Kalet, MD, MPH who became the Director of Education for AES. AES also moved to develop a robust infrastructure to handle the complexities of rich-media – in essence, AES moved to create a new electronic learning environment for medical education.

Most significantly, all of these changes accelerated a shift of emphasis of AES activities from service functions to research activities and resulted in a decision, in 2004, to shift responsibility for all service for undergraduate medical education from AES to SoMIT with the exception of legacy survey instruments that AES had created and maintained for the OME. Commensurate with its focus on research and the development of innovative educational ICT applications and in parallel with the divestiture of service, AES sought to reduce its reliance on the School of Medicine's budget for personnel. In the year 2005, three grants in which AES was a participant were awarded to the School of Medicine (two awards from the National Science Foundation and an award from the Health Resources and Services Administration). These grants reduced AES's dependence for funds for "development/production" personnel derived from the School by approximately 15% in the current budget year (2006) as compared to 2005 - with the expectation of further reductions in future years through additional grants.

Medical Center IT

Until approximately 1997, the School of Medicine and Tisch Hospital were one administrative entity. While the School received some IT services from Hospital IT, the School and its components were generally independent. Several centers of excellence stepped up, but with limited resources and mission:

- Skirball built a small, well-managed, desktop support function, along with a central server to store and access files, and some support of research computing. These resources were not routinely made available in other physical locations.
- A Web group also formed in the Skirball environment, providing significant web presence for the School, although this did not evolve in pace with changes in the Internet.
- There was essentially no help desk.
- The Library provided some software training services administered their Library Management Systems and provided online electronic resources through its proxy server.
- There were a small number of people doing custom software development, but their efforts were not linked to any central strategy.
- Limited network services were provided by the Hospital organization. This meant limited service on campus, and none at Bellevue or the VA .

This led to a high degree of fragmentation of IT providers within the School, with the Library and AC providing some services and many departments hiring "jack of all trades" staff to serve local needs. There were no central direction and no standards.

In 2000, a consulting engagement led to the creation of a CIO role and the rudiments of a School of Medicine IT department (SoMIT). Since then and during the period encompassed by this self-study, this group grew and made great progress in a number of infrastructure areas as detailed below.

In order to more efficiently provide IT services across the Medical Center, SoMIT and Hospital IT departments were consolidated, creating a Medical Center IT (MCIT) in January of 2006, with the appointment of Paul Conocenti as Medical Center CIO. This has opened the door to unprecedented levels of cooperation and information flow across the Medical Center. The IT groups have been reorganized to more seamlessly support infrastructure and support the School of Medicine and Hospital along the lines of mission, rather than along corporate boundaries. There are initiatives under way to make hospital clinical data more available to both teaching and research activities, and AES, Library IT, and University IT are collaborating to develop an architecture capable of integrating didactic and clinical software at the object level to form an Advanced Learning Exchange (ALEX) platform. IT infrastructure must catalyze the fusion of the education, research and clinical care portions of the tripartite mission of the Medical Center.

Recent consolidation of School and Hospital IT into one MCIT group is beginning to demonstrate economies of scale and the development of a collaborative systems strategy that closer aligns, leverages, and integrates the many systems across the medical center. The ALEX collaboration project and the introduction of data warehousing and executive dashboard technology are just a few of the many opportunities being made available.

Accomplishments Since 2000

AES

- The group achieved national recognition for the quality of the instructional and educational resources it produces.
- AES made significant contributions to this effort, and the School of Medicine has twice received citations of excellence from the LCME (1992, 2000) for the development and the use of educational IT.
- The SIMMs (see http://simms.med.nyu.edu) have gained a national reputation for excellence. They have received the highest award from a peer-reviewed database (MedEdPortal of the AAMC) of electronic resources for medical education, led to at least ten peer-reviewed publications, and facilitated the formation of a national surgical education consortium created by the School.
- AES has also teamed with Felice Aull, PhD of the Department of Physiology and Neuroscience, to create a leading resource in the medical humanities, the Literature, Arts, and Medicine Database (see http://endeavor.med.nyu.edu/lit-med

MCIT

- A strong, central Help Desk. This provides dial-in and e-mail accounts, assistance in desktop computing (i.e., purchasing, setup, repair, and establishment of standards for computers), support for office software functions and custom-built applications and desktop services to both School and Hospital Macs. Equally important, it provides hiring, screening, and co-management to departments that have local IT staff.
- Central Network and Server Group. This group provides e-mail, network project and support across physical environments and numerous organizations. They liaison with no fewer than three other IT organizations: Bellevue, the VA, and the NYU Washington Square campus. They have established connectivity to all desired locations in the School, Bellevue, the VA, and numerous off-site locations. This group also has established wireless access to curriculum materials and are expanding the infrastructure capacity along the 1st Avenue corridor. In addition, they provide a secure, managed, backed-up server room as a utility to numerous departments and support several critical applications.
- Applications Group. Although small compared to the demands placed upon it, the group has made significant gains in developing and supporting systems to support the residency programs, online recruitment of faculty, management access to HR information, high-impact management reporting such as Time and Effort, and Research Dollar Density. The Professional Development Portfolio, built by SoMIT, has achieved national recognition and has been presented at numerous conferences.

- A team to support the administrative computing needs for clinical research. Through a set of jointlyselected packages and custom programming, the Research in Medical Science subgroup has been rolling out system support to the Sponsored Programs Administration department, Cancer Institute, Office of Clinical Trials, and the IRB. Much work is yet to be done and there is as yet little coordinated support for research computing.
- The web group was consolidated with the Hospital IT web group in 2003 and has done an outstanding job in more than tripling the number of visitors to the School web site (from 300,000/month to over 1 million/month). They have formed a network of internal webmasters across the organization and coordinate on standard look-and-feel, navigation, and content. Much of this is database-driven, so that web pages are generated dynamically, and current information displayed. This group has been very successful and develops and supports the web sites for the entire Medical Center.

Library Resources

The Ehrman Medical Library

With a holdings list of 12,000 electronic journal titles and over 10,000 electronic books, we rank in the top 10% of U. S. medical libraries in e-holdings. The Ehrman Medical Library retains 197,000 print volumes and subscribes to 1500 print titles, of which one third are available only in print. In addition, we continue to purchase books every year at a higher than average level, and list 187 electronic databases and clinical and research support resources, i.e., UpToDate, MD Consult, Biomedical Protocols. We are able to continue to purchase at this level (top 20%) because we share purchasing power with the main university library and a partner medical school.

The 2006 LCME Student Survey shows that the students perceive the collection to be adequate, with only 6% rating the books collection poor or unacceptable, 3% rating the journal collection poor or unacceptable, and 2% rating the electronic journals in those categories. Based on a survey of all library users conducted in 2005, the rating for the e-journal collection was at 94% good to excellent on a 5-point Likert scale.

The primary complaint about our library holdings, from students, faculty and residents, is that, due to space shortage, the entire journal collection dating before 1985 is in remote storage, and accessible within 48 hours only by request. Shortly, we will have to put all titles published before 1990 in remote storage. Although we make every attempt to purchase electronic back-files when we can, budget limitations do not allow us to purchase everything that is available. Materials from 1970-1985 are still in demand for teaching, clinical care, and research. Although remote storage is increasingly common for many libraries, it is usually for materials published before 1950. This is a weakness in library support.

Recommendation

• Develop a strategic plan for the Medical Center, a major component of which should address the library and information technology.

Adequacy of Information Technology

Strengths

The three main groups supporting the educational mission are AES, Library IT, and MCIT. These groups are rich in technological knowledge and ability, and they have generated some extremely innovative solutions and products.

AES

This is an extremely innovative R&D group. There is rich technology talent in unusual depth for educational applications in multiple technology areas. Their premier achievement is the creation of the SIMMS (see above). This team has significantly advanced the possibilities of computer-based instruction.

The Ehrman Medical Library

The Library is a repository of advanced digital resources and expertise. Over the past seven years, the Library has made great strides in the amount of curricular and clinical reference material available on-line. It has greatly expanded its scope and now manages the medical libraries at Bellevue, the VA, and the NYU Dental School. This has allowed for a breadth and consistency of content that would otherwise not have been possible. The advent of the Web proxy server has allowed access to Library materials from virtually anywhere with an Internet connection.

MCIT

This group has made significant advances in the realms of stable infrastructure, custom applications, web and general technology support since the last LCME evaluation. Some representative accomplishments (see Appendix ER-12A), are:

- A professional Help Desk, including trained staff and featuring a ticketing system to track all requests for assistance, has been built.
- Dozens of applications have been written to support the educational functions and mission. These range from student assessment and instructor evaluation system to a Student Portal to a curriculum management system tied to the master calendar.
- The Clerkship Evaluation System, an extremely powerful tool for use in student assessment is fully operational.
- Dozens of web sites have been created to support curricular needs and student life.

The Education Committee

Because of significant competition for IT resources, most notably for custom software development, the Education Committee was formed in 2004. Among its other tasks, the Education Committee assesses and prioritizes the large number of projects that are requested of IT. A process was created to evaluate each request from the many groups involved in the undergraduate, graduate and post-graduate educational missions, estimate the scope of effort required, and put forth the qualitative and quantitative benefits to be realized from the project. The group votes on the ranking of projects, and IT then maps the top projects out into a project plan with timeline. This serves as the mechanism for periodic review by the Education Committee of the efforts and progress of the projects. This process has alleviated much of the tension around unmet needs and has made strides toward assuring that IT's efforts are aligned with the priorities of the senior Education leadership.

Integrated Advanced Information Management Systems Grant (IAIMS)

A two-year IAIMS planning grant was funded in April 2006 to develop a systematic approach to implementing technologies developed at NYUMC in the domain of cancer. This will involve training medical students, residents, nurses, allied health and physicians in point of care and point of need education.

The Campus Network

The network, which covers the School and the Tisch/Rusk complex, is robust and stable. Substantial improvement has been made to the network infrastructure. Since 2001, all on-campus housing has been wired and connected to the NYU network. A faster and more dependable fiber-optic connection to the University was brought on line in 2005, thereby enhancing access to the specialized resources of Internet I and II. Hundreds of network connections have been added to Bellevue and a smaller number to the VA. This increases the accessibility by faculty and students to all online curricular material, evaluations, and reference materials. Wireless network access has been deployed in dozens of locations throughout the School, as prioritized by the students.

Access to network resources from off-campus is well-established. Access to the network is through e-mail ID and password. An integrated identity management system (PIMS) for the entire campus is well established and supports library, e-mail and curricular web sites. A robust modem pool for dial-in access has

been established and maintained. This technology is aging out, and while still in place, it is being supplanted by secure Web access to online curricular and reference materials. MCIT is in the process of implementing Virtual Private Network (VPN) access, which should eliminate the need for dial-in and provide high speed web-based connection to virtually all electronic resources and systems.

Educational and Classroom Technology

Computers are available in most classrooms in the Coles facility. This, along with numerous units in the Library, gives students many access/work points to study using a rich complement of online resources.

The Library is developing an archive of electronic materials for teaching. It continues to add to its digital collections, making education and clinical reference materials deeper, broader, and more easily available.

AES has a national reputation for innovation in digital educational materials. SIMMs are multimedia teaching software that create a virtual clinical experience.

MCIT has custom-developed the Curriculum Materials Management System, which provides easy upload of and access to lecture materials.

HELP Desk

There are multiple entities providing this function:

- Library help lines are well used, and Library staff are highly available to support students and faculty. Feedback shows that the users are satisfied.
- Project faculty and students have direct access to the AES staff and director for support in electronic teaching tools and methods.
- The MCIT Help Desk is staffed Monday through Friday, from 8 a.m. to 6 p.m., and provides professional technical support services.

In addition to developing the applications enumerated in the database, MCIT staff are constantly enhancing and furthering the functionality of these systems.

Media Services

Designed to foster the rapid and cost-effective dissemination of scientific research information, the School's Media Services Department is tightly integrated with data storage systems of the Skirball Institute. Media Services supports a wide range of activities related to the production of both quantitative and presentation imagery. The center's facilities are generally user-operated and are supported by an extensive set of webbased instructional and administrative resources.

Media Services began operations as the Digital Media Center in February 1995 and currently includes the following facilities:

- A public area providing around-the-clock access to scanners, printers, CD-ROM burners, imaging software, and other tools used in digital image and document production. The center can quickly and inexpensively generate digital photo prints, color or large high-resolution B&W laser prints, overhead transparencies, posters or slides from computer files.
- A separate area equipped with a non-linear video editing system and an array of videotape recorders and support equipment permitting footage in any major format or standard to be edited, annotated, format-converted and duplicated.
- The Jacob Bleibtrau seminar room on the third floor of the Skirball Institute, which has been equipped with a sophisticated but user-friendly electronic presentation system controlled by simple, touch-screen commands.

Challenges

Governance

The principal shortcoming found by this Committee is the lack of a clearly articulated vision for the NYUMC, and consequently an IT strategy to support that vision. Thus, there is not:

- an effective, over-arching body or individual to articulate and be responsible for adherence to a general or particular IT mission;
- a set of well-defined comprehensive charges to the various IT units;
- robust mechanisms for coordinated planning.

It is therefore difficult to efficiently and adequately harness our talents. This leads to a perception of a lack of formal planning and communication at both the highest administrative level and at the primary constituency level. Efforts are perceived as occurring on an ad hoc basis.

The current governance system for educational IT, as embodied in the Education Committee, is a significant improvement over the prior lack of structure and process. However, each of the three units covered in the committee's deliberations reports to a different arm of the organization, and the Education Committee only reviews and prioritizes the efforts of MCIT.

Due to the lack of central vision and oversight, the three main IT providers (i.e., MCIT, Library IT, AES) operate cooperatively, but independently. There is no mechanism to assure that efforts are transparent to all, synchronized across groups, and serve the same agreed-upon set of priorities.

While significant progress has been made in centralizing "commodity" IT services (i.e., network), there is still some redundancy of such services within IT groups supporting the educational mission. For example, local e-mail servers abound throughout the organization. As School and Hospital IT groups are consolidated into MCIT, such infrastructure also should be centralized across all IT groups at the Medical Center, thereby allowing each group to concentrate on its subject matter expertise.

In the absence of a common vision and plan, many efforts are undertaken in reaction to requests by various constituents. While much good work has been done to meet such needs, this process occurs in response to "pain points", and prioritization often occurs via the "squeaky wheel" method. This does not always work efficiently, especially with respect to capital funding.

It is clear to the constituents in the education arena that insufficient resources are dedicated to the central service providers (SoMIT, now MCIT). Software development projects are backlogged, and several systems problems have occurred due to the lack of resources to properly deploy and support both systems and utilities. There also are varying degrees of risk in having numerous critical School systems or infrastructure supported by single individuals. The consolidation of School and Hospital IT will alleviate some, but not all, of this.

Benchmark data available from AAMC is difficult to use to determine adequacy of IT resources, as almost every medical school is configured differently in terms of IT. The largest confounding variable is that while there is a central MCIT group, there are as many FTE's outside the central group as there are within it. This raises the question of whether these resources are deployed in the most efficient model.

While the AES group is innovative and productive, the production of SIMMS modules and other educational software is extremely labor-intensive for both technical staff and faculty. The proposed strategic plan would govern the extent of these efforts, but all projects moved into production must identify the ongoing operating needs to support the system.

Network and Infrastructure

There has been a diversity of IT service providers, including certain network and related services provided by Tisch Hospital IT (initially Mount Sinai/NYU Health, then NYU Hospital IT). In the course of the dissolution of Mount Sinai/NYU Health, many basic services were outsourced to IBM. Having yet another service provider in the mix added to the complexity and confusion. IBM's execution of service in the Network, Exchange E-mail, and Help Desk/Desktop Support areas has been a source of frustration. The recent consolidation of School and Hospital IT, and the proposed "insourcing" (take-back) of many of these services from IBM, holds the promise of improvement.

Wireless Coverage

There has been an initial deployment of wireless access in Coles, Farkas Auditorium, Alumni Lecture Halls, Schwartz Lecture Halls, Lower Deans' Offices, Student Cafeteria, Student Lounge, Faculty Dining Room, and all areas of the Library. The new Smilow Research building will have wireless access points in most public areas. More pervasive access is needed, driven by the increased availability of online curricular materials.

Unifying Identification

There has been a historical problem with unifying identification between the School and the University. Much progress has been made in making the Kerberos ID and the NetID congruent to about 95%. There are efforts under way to unify identity across the School and Tisch Hospital through the use of LDAP and Active Directory.

File Storage

There is a pressing need for online file storage for individuals. The lack of such a utility has led to many problems and significant risks, such as the informal use of e-mail as a "storage' facility (leading to ballooning of the e-mail database).

Popmail

The main e-mail system for the School is known as Popmail. Statistically, it has been reliable, with better than 99% up-time over its 10-year life. However, the size of its database has grown substantially as e-mail has become a common communication medium and also used as storage (see above). In 2005, there were two lengthy outages due to file corruption in the disk drives. This imposed a great inconvenience on faculty, students, and staff as the restoration of data took several days. This has been addressed with deployment of a large SAN to house the Popmail database in a high-availability storage medium and installation of a high-capacity tape backup system. There are still some lingering issues of sporadic slowness of performance, especially in the web access to Popmail. The School has invested in an anti-Spam gateway that filters over 80,000 high-confidence Spam messages per day. The next phase is to deploy filtering and quarantine of moderate-confidence Spam, for user review and disposition.

The current data center housing critical servers for the School is not up to standards of best practice. It has experienced intermittent cooling problems, necessitating some shutdowns. Also, there are no redundant offsite servers for critical School systems. There are reasonable data backups in place, but a significant problem with the data center could result in protracted loss of use of systems.

Educational and Classroom Technology

Technology in classrooms is in need of improvement and the responsibility for it, specifically in the Coles Building, is distributed. There is a need for a holistic view of the deployment and support of technology and multi-media in the teaching spaces. Specifically, technology must be integrated into facilities planning, so that it is not an afterthought, but part of the conceptual whole.

With a single network and no gradations of security into zones, videoconferencing requires much planning and specialized resources. Through segmentation of the network, this can be achieved more easily with low-

security "zones." There also is an inability to systematically record standardized patient encounters. This will be addressed in Clinical Skills Center planning.

Use of and experimentation with new educational technologies (i.e., PDA, applications developed at other medical schools) are difficult. We lack some of the basic network and server infrastructure to make these applications easy to test and deploy.

There is a lack of a true curriculum database, but we have made numerous advances in this area. Virtually all of the course transcripts are available online as PowerPoint files and other documents. This past year, we made a great stride forward in building a custom application to manage the curriculum (CMMS) which greatly facilitates the uploading of new material by the faculty and ties the material to the course calendar. However, this is not a full "industrial strength" application, able to interoperate with other schools' curriculum systems and incorporated into the strategic architecture.

The Student Printing lab has been problematic and a major source of dissatisfaction for the medical students. A lab with PC and Mac access and medium-capacity printers is maintained in the Coles teaching facility. However, the volume of printing generated by the students now overwhelms the capacity of the facility. Also, the service provided by IT has been below acceptable levels. There has been a recent effort to clarify and meet needs, and to smooth out the "seams" between support groups.

The School lacks a concerted effort to educate and support the faculty in the use of technology in teaching. An organized plan to assist the faculty in the use and incorporation of technology into courses must be developed.

While historically researchers have been very independent in their computing efforts, there now is a much greater need for central services to eliminate redundancy and take advantage of economies of scale. Moreover, as scientist/teachers become more dependent on technology for their work, a coherent approach to basic through advanced services is needed to remove barriers to doing research. Much progress has been made in administrative areas such as submitting proposals and tracking grant funds, and many useful software packages are available via a central "library" (keyserver, RCR GeneTraffic Server). However, fundamental support services are organized in only a few areas, and have led to equal access not afforded to all faculty.

Numerous systems have been developed to facilitate admissions, teaching, evaluation and other activities in the education area. They share a common technical platform, but work must continue to make the administrative systems interoperable and facilitate the aggregation of data across systems. There is a project in the "concept" phase to build an education Data Warehouse with appropriate analytic software to meet these needs.

Great strides have been made across the Medical Center in developing hundreds of web sites which did not exist before are rich in function and content. However, the paradigm is that content upkeep is distributed outside of IT. This works for most, but not all, of the content managers. A central content management system with features for use by completely non-technical staff would be helpful in keeping information current.

There are several calendaring systems in use across the organization, which do not integrate (WebEvent, MeetingMaker, Exchange). As a result, there is not a systematic way to schedule/calendar resources, such as classrooms, meeting rooms, or other resources.

Recommendations

• Appoint a formal IT Steering Committee to direct efforts and allocate resources across the medical center, and to forge technological integration of education with research and clinical care.

- Establish an Education IT Subcommittee with appropriate representation and subcommittees to address its major constituencies.
- Carefully review IT requests during the capital budgeting process.
- Review the decentralized IT resources and consider centralizing some of these resources under common IT management.
- Make wireless network access pervasive throughout the Medical Center physical space.
- Deploy full Web access on all public Tisch/Rusk workstations and make selected Web access to education sites available on clinical patient desktops.
- Provide a robust, external access method for easy access to all server-based files and applications.
- Establish unity of identity across the Medical School, Tisch Hospital, and to the extent possible, the clinical and teaching affiliates such as Bellevue.
- Allocate space to faculty and staff on a recently-acquired mass-storage device known as a SAN and work out details of sharing and managing that space.
- Continue to work on improving the availability and performance of Popmail, while looking at the feasibility of unifying e-mail systems across the Medical Center.
- In concert with the Hospital, utilize a professional outsourcer's data center capability, with appropriate disaster recovery services; to the extent possible, upgrade the current data center to professional standards.
- Evaluate and obtain technology that makes videoconferencing, webcasting, etc. simple for the lay person.
- Move to a searchable, shareable, "industrial strength" curriculum database.
- Streamline service of the Student Printing Facility.
- Develop, through the IT Steering Committee, a strategy for evaluation of computer-based exams and for "teaching the teachers" how to integrate developing technology into standard and novel curriculum.
- Evaluate the feasibility of an Enterprise Agreement for Windows Operating System and Office applications, as well as for analogous offerings for Apple equipment.
- Pursue an integrated architecture strategy of data collection and warehousing.
- Continue to improve the appeal, ease of navigation, and search-ability of the Medical Center's web sites.
- Pursue a strategy of integrated calendaring that addresses personal, facility, and course calendaring.

Library Usability and Functional Convenience

The 2005 questionnaire of the School of Medicine community indicated a high satisfaction level with all service measures: circulation staff, interlibrary loans, reference, literature searching, etc. by a rating of good to excellent (Likert 4-5) by 82-90% of respondents. In the 2006 LCME Student Survey, the rating for the library overall was 12% poor or unacceptable; 25% average; and 57% good or excellent. Sixty-eight percent rated the helpfulness of the library staff as good or excellent. The library is open 24 hours, Sunday noon through Friday 9:00 p.m., and open Saturday from 10:00 a.m. to 8:00 p.m.. There is a 24 hour study area with 6 computers and 16 study seats that is open 24 hours a day every day. During major exam sessions the student representatives and library staff work out an extended set of hours for Friday and Saturday evenings and Sunday morning coverage. Assistance is available during these hours for 96 hours a week.

The library contains a graphics area which includes audiovisual equipment for the few resources not on the web. There are no queues for these resources. In addition, a sophisticated set of graphics software including scanners, video-editing, digital cameras and color printing is available in the library graphics area. Starting September 2006, this equipment will be jointly managed by the School of Medicine's Media Services Department and the library.

The public access computers are used at capacity. Related to the shortage of study space, there are not enough to fulfill the need. However, there also is need for quiet study space without computers; and the balance set by the library staff to accommodate this has received only comments that there is neither enough quiet space nor computer availability.

There has not been a regularly scheduled, capital replacement plan for computers in the library, and therefore the current set of computers range in age from 2-5 years. However, there is planning for the development of a three-year replacement cycle, which would be appropriate.

The Ehrman Library ranks 100 out of 120 US and Canadian libraries in square feet available. It ranks 5th in overall usage by comparative gate count. The universe of possible users on campus is over 20,000. Pressure for seating and computer use is intense. In the 2006 survey, 39% of students rated the amount of library study space as poor or unacceptable, and 24% rated the quality of the space as poor or unacceptable.

Recommendation

• Continue to address library space issues in accommodating resource needs including study space, group learning space, computer access and appropriate staff space for its clientele; establish a specific plan and prioritization of overall facilities upgrades.

Library Staff Contributions to Education

The library staff maintains an extensive education program for both medical education and general user education for faculty and staff. The undergraduate teaching program uses a building block approach to teaching literature research skills for clinical information in an evidence-based medicine environment. Beginning with a voluntary skills assessment during orientation and moving to at least one curricular experience a year, each session builds on the skills taught in the previous class. Integration into the curriculum, including various clinical experiences, inculcates an understanding of the importance of information skills throughout the student's career and creates a foundation for life-long learning. This model is exemplary and is a strength of the curricular program. Student ratings for library classes compare favorably to general curriculum ratings.

The library also works to integrate evidence-based medicine skills into the resident instructional program through attendance at morning report or rounds in medicine, pediatrics, ob/gyn, and the cancer service. At these training opportunities, the librarians demonstrate on site how to rapidly find and choose the appropriate information to shed light on the case under discussion.

The library offers an extensive selection of professional development classes (453 contact hours with 3,500 attendees in 2004-2005) which are given during the day and early evenings at no charge. All members of the NYU community are welcome to attend. The classes emphasize skills in using the knowledge-based resources of the library for patient care and research needs, and also instruct in management of bibliographic information using bibliographic management tools available through NYU. These classes are well attended and uniformly ranked highly. The library also encourages and hosts classes in conjunction with other departments, partnering with the Digital Media Center on instruction in presentation software and SPA, the grants administration office, on searching for grant support.

Karen Brewer, PhD, as Chair of the library is a member of the Curriculum Committee. As of September 2006, the Library's Coordinator for Undergraduate Education became a participating member at monthly preclinical and clinical course directors meetings. The library also is a partner in the design of curriculum support tools such as the curriculum repository and SIMMS modules.

Recommendation

• Continue to have library faculty work with course and clerkship directors in both formal structures such as the monthly unit/module and clerkship director's meetings and informally to

ensure the most appropriate integration of library resources into the course materials delivered over the internet.