

**DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH
NATIONAL LIBRARY OF MEDICINE**

**MINUTES OF THE BOARD OF REGENTS
February 6-7, 2007**

The 144th meeting of the Board of Regents was convened on February 6, 2007, at 9:00 a.m. in the Board Room, Building 38, National Library of Medicine (NLM), National Institutes of Health (NIH), in Bethesda, Maryland. The meeting was open to the public from 9:00 a.m. to 5:00 p.m., followed by a closed session for consideration of grant applications until 5:15 p.m. On February 7, the meeting was reopened to the public from 9:00 a.m. until adjournment at 12:00 p.m.

MEMBERS PRESENT [Appendix A]:

Dr. Holly Buchanan [Chair], University of New Mexico
Dr. Jordan Cohen, Association of American Medical Colleges
Dr. O. Wayne Isom, New York Presbyterian, Weill Cornell Medical Center
Dr. Cynthia Morton, Brigham and Women's Hospital
Ms. Eileen Stanley, Former Director of Library Services, Allina Health Care

MEMBERS NOT PRESENT:

Mr. Richard Chabran, California Community Technology Policy Group
Dr. C. Martin Harris, The Cleveland Clinic Foundation
Dr. Vasiliki Karlis, New York University, College of Dentistry

EX OFFICIO AND ALTERNATE MEMBERS PRESENT:

MGEN Bruce Green, United States Air Force
Dr. Deanna Marcum, Library of Congress
Dr. Patrick Malone, Naval Medical Manpower, Training and Education Command
Dr. Kenneth Moritsugu, Office of the Surgeon General, PHS
Col. John Powers, U.S. Department of the Army
Dr. Charles Rice, Uniformed Services University of the Health Sciences
Dr. Sylvia Spengler, National Science Foundation
Ms. Mary Ann Tatman, U.S. Department of Veterans Affairs
Mr. Peter Young, U.S. Department of Agriculture

CONSULTANTS TO THE BOR PRESENT:

Dr. Marion Ball, Johns Hopkins School of Nursing
Dr. Thomas Detre, University of Pittsburgh
Dr. William Stead, Vanderbilt University
Dr. H. Kenneth Walker, Emory University School of Medicine

SPEAKERS AND INVITED GUESTS PRESENT:

Ms. Renee Bougard, RML Associate Director
Dr. Atul Butte, Stanford University
Mr. Stephen Downs, Robert Wood Johnson Foundation

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Dr. Carol Friedman, Columbia University
Dr. Craig Vanderwagen, Assistant Secretary, Public Health Emergency Preparedness
Dr. Elias Zerhouni, Director, NIH

MEMBERS OF THE PUBLIC PRESENT:

Mr. Thomas G. West, The Krasnow Institute

FEDERAL EMPLOYEES PRESENT:

Dr. Donald A.B. Lindberg, Director, NLM
Ms. Betsy Humphreys, Deputy Director, NLM
Dr. Donald King, Deputy Director for Research and Education, NLM
Dr. Michael Ackerman, High Performance Computing & Communication, NLM
Ms. Suzanne Aubuchon, Office of the Director, NLM
Dr. Judith Bader, National Cancer Institute, NIH
Dr. Dennis Benson, National Center for Biotechnology Information, NLM
Ms. Susan Buyer, Office of Health Information Program Development, NLM
Ms. Florence Chang, Division of Specialized Information Services, NLM
Dr. Norman Coleman, National Cancer Institute, NIH
Dr. Milton Corn, Division of Extramural Programs, NLM
Ms. Betsy Dean, Office of the Director, NIH
Mr. Todd Danielson, Executive Office, NLM
Ms. Gale Dutcher, Division of Specialized Information Services, NLM
Ms. Martha Fishel, Division of Library Operations, NLM
Dr. Valerie Florance, Division of Extramural Programs, NLM
Ms. Jeanne Goshorn, Division of Specialized Information Services, NLM
Mr. Alan Graeff, National Center for Biotechnology Information, NLM
Ms. Wendy Hadfield, Executive Office, NLM
Ms. Christine Ireland, Division of Extramural Programs, NLM
Mr. Paul Kiehl, Office of the Director, NLM
Mr. Sheldon Kotzin, Division of Library Operations, NLM
Dr. David Lipman, National Center for Biotechnology Information, NLM
Dr. Simon Liu, Office of Computer and Communication Systems, NLM
Dr. Robert Logan, Lister Hill Center, NLM
Mr. Rodney Long, Lister Hill Center, NLM
Ms. Becky Lyon, Division of Library Operations, NLM
Mr. Bijan Mashayekki, Division of Specialized Information Services, NLM
Dr. Clement McDonald, Lister Hill Center, NIH
Mr. Robert Mehnert, Office of Communication and Public Liaison, NLM
Mr. David Nash, Office of the Director, NLM
Dr. Aaron Navarro, Lister Hill Center, NLM
Dr. James Ostell, National Center for Biotechnology Information, NLM
Dr. Arthur Petrosian, Division of Extramural Programs, NLM

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Dr. Steven Phillips, NLM Consultant
Ms. Julia Royall, Office of the Health Information Program Development, NLM
Dr. Angela Ruffin, Division of Library Operations, NLM
Dr. Mark Schiffman, National Cancer Institute, NIH
Mr. Jerry Sheehan, Office of the Director, NLM
Dr. Elliot Siegel, Office of Health Information Program Development, NLM
Mr. Mark Siegal, Division of Extramural Programs, NLM
Dr. Hua-Chuan Sim, Division of Extramural Programs, NLM
Mr. Kent Smith, NLM Consultant
Dr. Jack Snyder, Division of Specialized Information Services, NLM
Ms. Marti Szczur, Division of Specialized Information Services, NLM
Dr. Neil Thakur, Office of the Director, NIH
Dr. George Thoma, Lister Hill Center, NLM
Dr. Frederick Wood, Office of Health Information Program Development, NLM

I. OPENING REMARKS

Dr. Holly Buchanan, Chair of the NLM Board of Regents, welcomed the Regents, alternates, consultants, and guests to the 144th meeting of the Board. She welcomed especially three new Regents: Dr. Jordan J. Cohen, Dr. O. Wayne Isom, and Ms. Eileen Stanley (Dr. C. Martin Harris was unable to attend). She noted the presence of Dr. Patrick Malone, new alternate ex-officio member from the Navy. Dr. Buchanan said that Regent Dr. James Gray has not been heard from since January 28, when he set sail in his boat out of San Francisco. We are hopeful that a massive search by the Coast Guard and others will be successful. The Regents observed a moment of silence.

II. REPORT FROM THE OFFICE OF THE SURGEON GENERAL, PHS

Dr. Kenneth Moritsugu, Acting Surgeon General of the U.S. Public Health Service, said that the latest Surgeon General's Report, "Health Consequences of Involuntary Smoking," released last June, has been followed by much activity by cities, counties, and states that have aggressively moved forward to create non-smoking areas and non-smoking communities. He said that his office was tracking this activity and would be able to provide an analysis at a future meeting of the Board. Dr. Moritsugu said that at the next Board meeting, he hoped to be able to give a report about two "calls to action" by the Surgeon General's Office: Preventing Underage Drinking and the Relationship between Community Health and Correctional Health. One of the areas of concern both to NLM and to the Office of the Surgeon General is to improve the level of health literacy in the nation. One example is a Surgeon General's initiative on family health history—an online "take-home" health history that lets people research their individual family health history and be able to share it with health providers. He invited the Regents to take a look at it and comment (www.surgeongeneral.gov). Following his presentation, Betsy Humphreys commented that NLM has publicized the family health history site both through health science

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libraries across the country and featuring it on MedlinePlus. It has also been the subject of an NLM MedlinePlus PodCast.

III. CONSIDERATION OF MINUTES FROM PREVIOUS MEETING

The Regents approved without change the minutes from the September 2006 meeting.

IV. DATES FOR FUTURE BOARD OF REGENTS MEETINGS

The Board of Regents will meet next on May 8-9, 2007. The Board meeting next fall is September 18-19, 2007. The dates of February 12-13, 2008, were adopted for the following meeting.

V. REPORT FROM THE NLM DIRECTOR

Dr. Donald Lindberg reported that the NLM is still operating under a continuing resolution that will soon expire. There are several hopeful signs however: the Congress intends to fully fund the NIH Roadmap initiative; also the Congress may add funds for half the salary increases. In the area of personnel, the Director noted that Dr. Andrew Fire, a member of the NCBI Board of Scientific Counselors received this year's Nobel Prize in Physiology or Medicine. Dr. Clem McDonald (a past Regent) has been appointed Director of the Lister Hill National Center for Biomedical Communications. Another former Board member, Dr. Steven Phillips, has been named a consultant for NLM's plan for a disaster information management center. Martha Fishel has been named to head the Public Services Division in Library Operations. Paul Kiehl has been appointed NLM Deputy Executive Officer. Dr. McDonald introduced two new staff members of the Lister Hill Center: Dr. John Hurdle and Dr. Siyuan Chen. NLM's Assistant Director for Policy Development, Jerry Sheehan, reported on several items of legislation: two bills on Health Information Technology passed both chambers in the last session but were not sent to conference; no further action has been taken yet on bills relating to public access; no further action has been taken on bills relating to drug safety and clinical trials, although two were recently reintroduced; there is legislative activity in the area of genetic non-discrimination; and the National Institutes of Health Reform Act of 2006 was passed in December which would increase the NIH budget for 2007 and 2008 and which introduces a number of recommendations about NIH organization and funding. Mr. Sheehan distributed a sheet that summarized the provisions of this legislation.

Dr. Lindberg, responding to a question from Dr. Stead, said that NIH is aware that the resources available to the National Center for Biotechnology Information will have to grow at a rate that will allow the Center to create and maintain the genomic and other information resources that the NIH Institutes will ask of it. To make this happen, Dr. Zerhouni has created a trans-NIH "NCBI Resource Committee." A serious problem for NLM, Dr. Lindberg said, is that of space. To help avert the time (2010) when the collection will run out of room in Building 38, NLM has looked

into the possibility of installing compact shelving on the B2 level (as exists now on B3) that would almost double the capacity of that area. He briefly described the work done to test the strength of the B2 level and what might be done to strengthen it and make it suitable for compact shelving. Dr. Lindberg also said that NLM is facing a total of about \$50 million of deferred maintenance—for its current buildings. He noted that there have been several recent additions to Profiles in Science: Harold Varmus, former NIH Director and Nobel Laureate, and Rosalind Franklin, British chemist and crystallographer best known for her role in the discovery of the structure of DNA. Documents relating to their life and work are on Profiles (www.profiles.nlm.nih.gov). He said that the international PubMed Central centers are progressing; the U.K. PubMed Central was launched in January 2007. On another matter, Dr. Mike Sappol of the History of Medicine Division recently had a “Cartoon Medicine Show” at the National Academy of Sciences featuring rarely seen animated medical cartoons from the NLM historical collections.

The last subject discussed by Dr. Lindberg was NLM’s future plans for exhibitions. An exhibition titled “Against the Odds: Making a Difference in Global Health” is projected to open in 2008. There will be six traveling versions launched simultaneously. Outside funding sources are being sought. “Native American Concepts of Health and Illness” is a major NLM exhibition slated to open at NLM in 2010. There would also be both a Web version and a traveling version. Dr. Lindberg said that NLM has had a number of recent contacts with Hawaiians, Alaskans, and Native American Indians, and there is general enthusiasm for the exhibition. Most recently there were meetings with representatives of native cultures in Santa Fe. Dr. Lindberg thanked Dr. Buchanan for her role in setting them up. Dr. Lindberg showed the Board a brief videotape of an interview he conducted with a native healer in Santa Fe. There was a discussion among the Regents of the plans for the exhibition on Native American health and the various sensitivities involved.

VI. LHC BOARD OF SCIENTIFIC COUNSELORS REPORT IMAGING TOOLS FOR CANCER RESEARCH

Dr. Carol Friedman of Columbia University, Chair of the Lister Hill Center Board of Scientific Counselors, reported on the April and September 2006 meetings. The first meeting was devoted to discussing the long range challenges to the Lister Hill Center and a consideration of the kind of research the Center should be engaged in. The Board had three working groups that then met to formulate “grand” challenges and research opportunities for LHNCBC to pursue over the next decade and to determine how best to adapt the NLM Long Range Planning model to the Center’s R&D initiatives and staff contributions. The working groups were: (1) Information Resources and Infrastructure, (2) Health Information for Underserved and Diverse Populations, and (3) Clinical and Public Health Systems. The recommendations covered a number of topics, including expanding the Unified Medical Language System, serving as a national clearinghouse for clinical decision support rules, enhancing clinical decision making (including research linking Electronic Medical Records to NLM information resources), expanding

ClinicalTrials.gov, developing user interface innovations for NLM resources, continuing to seamlessly integrate NLM information resources, promoting information mining, enhancing the Visible Human repository, and supporting health professional training. At the September meeting, Dr. Friedman said, the Board reviewed the Center's work in: (1) the Advanced Library Services project and (2) biomedical imaging R&D. The objectives of the Advanced Library Services project are to enhance seamless access to online information across the biomedical spectrum and to develop a Web portal called Semantic Medline with enhanced access capabilities. In the area of biomedical imaging, the object is to integrate existing technologies for high impact medical information problems, retrieve images by direct use of image content, and to establish data sets and metrics for the evaluation of image-derived knowledge from multiple observers. She concluded that to accomplish this work, the Center should seek collaboration within NIH and broader biomedical community. Also, the Center should set a timeline to implement this work that is consonant with, and in support of the NLM Long Range Plan (2006–2016).

Following Dr. Friedman's presentation, Mark Schiffman, M.D., of the HPV Research Unit, National Cancer Institute Hormonal and Reproductive Epidemiology Branch, described the work by him and Jose Jeronimo, M.D., in collaborating with the Lister Hill Center to develop imaging tools for cancer research. He showed slides of cervical cancer and how such images were traditionally viewed by colposcopists. HPV infection is a great problem, and the current histologic distinctions in viewing it are problematic. Dr. Schiffman described how the NCI is collaborating with NLM and the American Society of Colposcopy and Cervical Pathology on novel, rigorous, large-scale studies. They are using 100,000 digitized images with a wealth of accompanying clinical data in 10 studies underway or planned. All the work is open source and will be available.

Mr. Rodney Long of the Lister Hill Center's Communications Engineering Branch described how the data were obtained from two NCI projects—one involved 10,000 women in Guanacaste Province, Costa Rica, the second is the ASCUS-LSIL Triage Study ("ALTS Study") with data from 5,000 women in four medical centers in four states in the U.S. Mr. Long described how the high quality images were obtained, digitized, and processed. The datasets are extremely large—some of the images are 10 gigabytes in size. He described how a boundary marking tool (for visualization), multimedia database tool (for distribution), and teaching tool (for training and testing in colposcopy) were developed. Mr. Long showed a number of examples of the images. A "virtual microscope" that replaces or augments a physical microscope and allows histology images to be viewed over the Web is being used in two NCI studies. Mr. Long showed examples of how such images look. As for the teaching tool, it is expected to become the major tool for colposcopy training and testing in the United States. Mr. Long concluded by outlining the next steps for the NLM/NCI collaborative project, including applying the boundary marking tool to dermatology and other different types of images.

Dr. Isom commented that that this is an exciting project and a major advance from both a

diagnostic and training standpoint. He can envision other applications outside of cancer—for example, using these visualization tools to train surgeons in other applications. There was a discussion of the HPV vaccine: it is not therapeutic, nor is it effective in all cases. Dr. Walker said that the tools described are very applicable to medical education and that they can be applied to the “learning portfolios” now being developed in medical schools. Dr. Stead commented that we are approaching the point where we each have our own personalized library of pictures that can be managed. Dr. Friedman said that because this important project has such a variety of potential applications it should be given publicity so that it can be picked up by other scientific groups. Dr. Detre commented that one problem is how to improve the reliability of interpretation by different viewers of what is being seen in the image.

VII. REPORT FROM THE NIH DIRECTOR

Dr. Elias Zerhouni said that the NLM continues to develop in a strategic direction. There have been extensive discussions, particularly about databases and health IT, and NLM’s continuous wave of initiatives in these areas is of strategic importance not only for the rest of NIH but for the entire community. The efforts of NCBI, for example, in creating databases such as PubChem and the new dbGaP for the genome wide association studies have captured attention across the scientific community. Integrating and networking these databases, including NIH Public Access, is really a transformation—the creation of a new world of information—that will help scientific discovery. He said he is a strong proponent of these efforts by NLM and he noted that there is a special allocation to the NCBI by the Congress to encourage the continuation of this visionary approach.

Dr. Zerhouni said that it is clear that we are in a difficult historical period—not only are there difficult external influences on society, but we are now seeing the results of the 5-year doubling of the NIH budget. Congress believes that NIH should emphasize effectively funding and managing trans-disciplinary and trans-institutional research. We are now being more proactive in explaining the relationship of NIH’s investment and public health improvement and the ability of our country to transform health and medicine in the next decade. This has led to a gelling of opinion with our stakeholder communities, the Congress, and the Administration. The Reauthorization legislation, one of the last acts of the last Congress, is a statement of confidence in NIH, Dr. Zerhouni said. For the last 30 years, the annual investment in medical research has been about \$4 per American. In return, mortality from both heart disease and stroke has been lowered by 60%. The economic return on that investment has been \$1.5–2.5 trillion dollars. This year NIH hosted a visit from President Bush to highlight the fact that total mortality from cancer is decreasing. The Reauthorization legislation endorses current recommendations and activities to create a “common fund” that will result in increased cross-institute initiatives and research. He said that as a result of many high-level discussions among the NIH OD and Institute directors, it was decided not to build an inflation factor into existing grants at the expense of reducing opportunities for vulnerable areas like new investigators and competing grants. Another vulnerable area to be protected is the scientist who has been funded once and

who is now coming in for a first renewal. A third area is to look at the totality of funding for a scientist so that important research capacity will not be lost. Dr. Zerhouni said that the Congress has decided to increase NIH funding by more than \$600 million. He discussed briefly how NIH would be apportioning its budget.

In answer to a question from Dr. Walker about NLM's role, Dr. Zerhouni said that one area that needs improvement at NIH is communication—with the public and with policy makers at the local, regional, and national level. NLM has done a “terrific job” in creating the new *NIH MedlinePlus Magazine*, which was introduced on the Hill in September. We need to use modern technology to create “social networking” in more effective ways to reach the public with the message that NIH exists and affects their health. Health literacy on the part of the public is another major problem, and one in which NLM can play a role in seeking solutions. There was a discussion about the need to make a strong case for improved infrastructure, for example, for a new NLM building. However, Dr. Zerhouni said that the emphasis today is “away from bricks and mortar.” Dr. Lindberg noted that although NIH has been supportive in helping NLM find ways to accommodate more staff and library materials, the Library's space problem is going to get worse. Dr. Stead said that we need help framing the role of informatics, which helps researchers by increasing the speed with which they can learn what is happening and giving them the capability of collaborating. We need to get the message out that informatics is both an “accelerator” and a “magnifier.” Dr. Zerhouni agreed with the importance of informatics and said that the appointment of Dr. Clem McDonald as Director of the Lister Hill Center will help provide the leadership and expertise NLM seeks. In response to a comment by Dr. Ball about the neglected state of nursing training and curricula, the NIH Director agreed that the projected shortfall in the nursing profession is enormous. He said that the fastest growing component of higher education is in “virtual universities,” and that their effectiveness for continuing education is impressive. In its own training, NIH may want to look at how to “virtually distribute” the “star” instructor. In response to a comment from Dr. Detre about peer review, Dr. Zerhouni said that at a Director's retreat last September, the peer review process was put at the top of the agenda for review. “At the end of the day, the quality of what we do depends on the quality of peer review,” he added. He cited several aspects of the system that are candidates for change; for example, how re-applications are evaluated vis-à-vis first applications. A faster cycle of review, and a shorter application form, has been identified as high on the list of desirable changes.

VIII. NEW NCBI PROJECTS BRIDGE GENOMICS AND CLINICAL PRACTICE

Dr. Lipman, NCBI Director, introduced to the Regents a new Staff Scientist at the Center, Dr. Kerry L. Zbicz, who will be working on the PubMed Central International project. Dr. James Ostell of NCBI showed the Regents a new database launched in December, dbGaP, which stands

for database of Genotype and Phenotype. The database was prompted by the new Genome Wide Association Studies (GWAS) initiative at NIH, which seeks to correlate specific genes with specific diseases. Dr. Ostell said that dbGaP has two studies in it at this time: the NEI macular degeneration and the NINDS Parkinson's and stroke study. Using "systolic blood pressure" as an example, he demonstrated the many kinds of information that could be found in the database. He also searched using NEI's macular degeneration data, showing how the clinical data and molecular data can be tied together. There is much information in dbGaP that is available to users unrestricted: descriptions of projects and studies, protocols, questionnaires, summary measures of the phenotype and genotype, and a link to the NIH component that can then give authorized access to qualified searchers to the individual-level data. Dr. Ostell listed a number of current partnership activities: Genetic Association Information Network (GAIN), Genetics and Environment Initiative (GEI), Framingham Genetic Study, National Institute for Neurological Disease and Stroke (NINDS), NHGRI Medical Sequencing, and NEI Macular Degeneration. He closed by showing briefly how the system can be used to search for mutations in genes that cause disease. The dbGaP database is at <http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?db=gap/>. The goal is to "close the loop" between research activities through the genome information to the process of publication (PubMed) and then back to the research framework.

Dr. Morton said that she is hopeful that this effort will give datasets for replication—this is the biggest problem—what constitutes a really believable replication. The other crucially important aspect of this project is the phenotyping. Dr. Ostell agreed and said that this project provides an infrastructure for a level of transparency that has never existed before. The Regents discussed the ethical and legal issues surrounding the matter.

IX. 2006-2011 NN/LM: CONTRACTS AND EMERGENCY PREPAREDNESS

Dr. Angela Ruffin, Head of NLM's National Network Office, said that the mission of the National Network of Libraries of Medicine has always been to advance the progress of medicine and public health by providing equal access to biomedical information to health professionals regardless of where they are located. Since 2001, that mission was expanded to include serving the general public. The Network does this by developing collaborations among network members and other organizations and by promoting and improving the use of health information resources by both professionals and the public. In 2006, NLM completed the recompetition of the contracts for Regional Medical Libraries (RML) and eight contracts for the period 2006–2011 were awarded. Dr. Ruffin highlighted some of the accomplishments of the RMLs over the previous contract period (2001–2005), including the growth in membership (especially in the "affiliate" category for libraries not in a hospital or academic setting), conducting more than 9400 outreach projects to reach health professionals and the public, and sponsoring and staffing exhibitions at more than 800 conferences and meetings. She described the extensive recompetition process, which began in April 2005 and was completed one year later. Several Regents and Board consultants were generous with their time in helping in the review. The result was the funding of seven RMLs in academic health sciences institutions and one in an

academy of medicine. There was a change in Region 1, where New York University was designated the RML. She showed a national map with the eight RMLs identified. Also funded by NLM were three national centers: National Training Center and Clearinghouse (New York Academy of Medicine), Outreach Evaluation Resource Center (University of Washington), and Web Services Technology Operations Center (University of Washington). In 2006–2007 there will be a special NN/LM emphasis on contributing to the *Healthy People 2010* goal of eliminating health disparities. In addition, the RMLs will put a high priority on expanding the MedlinePlus Go Local service, community partnerships, Regional emergency preparedness plans, and e-licensing agreements. Dr. Ruffin briefly described the new emphasis on disaster preparation, including the RML meeting that recently took place on the subject, and she showed images of a number of the libraries hit by Hurricane Katrina. She said that the NLM and the NN/LM responded quickly to that disaster, as will be described by the following speaker. A comprehensive plan on the NN/LM and emergency preparedness will be presented at the May 2007 meeting of the Medical Library Association. Information about the NN/LM is at www.nlm.nih.gov/network.html/.

Following Dr. Ruffin's presentation, Renée Bougard, Associate Director of the South Central Regional Medical Library at the Houston Academy of Medicine–Texas Medical Center Library, related the experiences in the South Central Region in the aftermath of Hurricane Katrina. She said that Region has had more than its share of disasters: the Oklahoma City bombing (1995), Tropical Storm Allison (2001), Hurricane Katrina (2005), and Hurricane Rita (2005). In the case of Katrina, she gave a timeline of actions, beginning with conference calls and progressing through the provision of emergency library services (such as free interlibrary loans) to the affected areas, to special funding from NLM and the RML for Katrina-affected libraries (there were 33 NN/LM member libraries in the South Central area). She discussed how establishing communication within the affected areas, throughout the Region, and beyond was a high priority. Because of downed lines and interrupted communication it took about 60 days to make contact with all 33 affected libraries. Ms. Bougard said there were many lessons learned from the Hurricane Katrina experience: communications and mail service were problematic; remote access to electronic journals and databases was complicated by licensing agreements and Internet Protocol issues; RML assistance in reference services and document delivery was needed for a short time; free interlibrary loans and funding assistance were greatly appreciated; an emergency cache of computers for deployment should be considered; user needs shift—FEMA forms, contacts with family and friends, etc., become more important; the health sciences library community needs to consider a health information provider role in the First Responder community; NLM should consider expanding the MedlinePlus Go Local service to include emergency preparedness; and the preservation of historical and unique collections has to be addressed.

Following these presentations, Eileen Stanley said she was involved in the contract review process for the Regional Medical Libraries. The RML program continues to play an extremely important role in the life of health science libraries—for providing basic services, for outreach to

the various communities, and for the sharing of experiences that help all. Ms. Stanley said she has found that blogs are very important in alleviating fears in an emergency situation. Dr. Walker said that he wholeheartedly supported the recommendations being made as a result of the Katrina experience. The NN/LM gives the NLM a presence at the grass roots that is unique among NIH Institutes and we should try to capitalize on that advantage. He complimented the competent management of the NN/LM program by Dr. Ruffin.

X. GENOMIC NOSOLOGY: MODERNIZING OUR 300 YEAR DESCRIPTION OF DISEASE

Dr. Atul Butte of the Department of Medicine (Medical Informatics) and Pediatrics, Stanford University School of Medicine, and the recipient of an NLM's Early Career Transition Award, presented to the Board his work on "Translational Bioinformatics"—translating discoveries using genomic and biological data and technologies into diagnostics and therapeutics for the clinician. He gave several examples, for example, building a genome–phenome network by relating all genes to all aspects of the environment and to all phenotypes. By doing this we might find novel roles for genes, drug targets, or diagnostic biomarkers. The data are there to allow this, Dr. Butte said, and he cited a number of pertinent statistics from NCBI information resources. They are able to undertake this because of NLM's Unified Medical Language System, which makes it possible to integrate hospital and patient databases. Dr. Butte discussed how classical scientific naming systems evolved, promoting binomial nomenclature for taxonomy. Today, because we can sequence DNA, we commonly re-organize species in taxonomy based on their genome. NCBI's Gene Expression Omnibus (GEO) is now so vast that we can think about downloading all the data and building the first gene expression classification scheme for diseases. He showed how they have started doing that in his laboratory. One outcome is the development of a new type of pharmacogenomics: genes that suggest novel uses for drugs. Dr. Butte summarized the "take-home" points: (1) Genome-wide measurements are here—managing the data and relating them to medicine is the challenge. Bioinformatics plays this role. (2) The patients, samples, and data are there to make an impact across medicine. Bioinformatics plays this role. (3) Teaching interns, residents, and physicians in all disciplines will be the future rate-limiting challenge. Bioinformatics can play this role. He emphasized that in fact computational medicine is truly trans-NIH, involving many Institutes.

Following Dr. Butte's presentation, Dr. Stead commented that one of the things that plagues the medical record effort is that people view it as a data processing problem rather than an informatics problem where you are putting things together that were not designed to be put together. He agreed with the statements of Dr. Butte on nosology; however he believes that more attention should be paid to "causology" rather than just association. Is that incorporated in your system? Dr. Butte said that in fact they were all associations. The next step isn't to "launch a clinical trial" but to find a "friendly collaborator," for example with a cellular model or mouse model, and ask "would you be willing to test this?"

XI. EXTRAMURAL PROGRAMS REPORT

Dr. Milton Corn, NLM Associate Director for Extramural Programs, noted that the Robert Wood Johnson Foundation has made an important contribution to NLM's 30-year-old training program by funding an expansion in training informatics researchers in public health. He introduced Mr. Stephen Downs, Deputy Director of the RWJ Health Group. Mr. Downs, who made his presentation to the Regents by videocast, discussed the interest of the Foundation in public health and public health informatics, the arrangement made with NLM to have the Foundation support tracks in Public Health Informatics at four of NLM's training programs, and the Public Health Informatics day held in November for the entire cohort of public health informatics trainees.

Following Mr. Downs's presentation, Dr. Corn explained Tab VII b., Affirmation of Operating Procedures and Tab VII c., Biennial Report: Compliance with NIH Policy and Guidelines. Approval for each was requested of the Board. Both were approved unanimously.

Dr. Valerie Florance, Deputy Associate Director for Extramural Programs, presented a brief review of NLM's University-based Informatics Research Training Programs. These programs are selected through an open competition every five years; the most recent competition was held in 2006. Eighteen programs will be funded for a new 5-year period in FY 2007. There are two consortium programs (Rice and Harvard) and two new programs (University of Colorado and University of Virginia) in that group. More than 250 trainees will be supported by NLM's 18 informatics training programs in FY 2007.

Dr. Florance also briefly presented findings from the series of site visits NLM extramural program staff made to the training programs during 2003–2005. Academic backgrounds of NLM trainees are fairly equally divided among three domains: health professions (26%), biological and physical sciences (35%), and computer science/engineering (29%). Close to 30% of the graduates of NLM's informatics training programs work in academic medical centers, but private industry, private practice and non-profit careers are also common work settings for the trainees. Dr. Florance noted that since the 1980s, the scope of NLM's informatics programs has evolved from solely clinical informatics to a diverse range of themes, including clinical informatics, bioinformatics and computational biology, public health informatics, imaging, clinical research informatics and systems engineering.

**MEETING CLOSED FOR THE REVIEW OF GRANT APPLICATIONS
February 6, 2007, 5:00 P.M. to 5:15 P.M.**

XII. LONG RANGE PLAN BUDGET REQUIREMENTS

Dr. Thomas Detre said that the Long Range budget projection that was prepared and presented by the NLM staff at the request of the Regents addresses all of the issues raised at the last

meeting. He said he had only two comments after reviewing the budget projections: (1) is the projected amount adequate in the area of homeland security and (2) should there be more emphasis on the centrality of the NLM in the supporting the development of the Electronic Medical Record. Dr. Detre complimented the Regents and the staff who have guided the whole Long Range enterprise, especially Dr. Elliot Siegel, Susan Buyer, and Betsy Humphreys.

Dr. William Stead said that the Regents had extensive discussions on the matter and that they believe the budget projections reflect a realistic view of the world as we see it today. He cautioned that there will most probably be things that NLM will need to do that, although captured conceptually in the plan, will be done in a way that no one can now project. Ten years from now we may well discover something new that will grow at a rapid rate just as NCBI did. He believes that the present estimates, during a time of flat budgets, are reasonable and conservative. Dr. Stead said that subjects that might benefit from subsequent, more detailed long range planning are key research opportunities in informatics and the intersection of those opportunities with the training programs. Dr. Jordan Cohen asked how the budget projections relate to the Congressional appropriation “process.” Dr. Lindberg said they are useful when he is asked (as he will be) “What are the Library’s budgetary requirements?” Dr. Stead said that NLM has to get across three things if progress is to be made in any specific disease domain: (1) an investment must be made in IT infrastructure; (2) an investment must be made in basic informatics research that allows the IT infrastructure to scale and that allows discoveries in one domain to leverage and relate to discoveries in others; and (3) an investment must be made in making the results available. If NLM can frame an issue in this way, and each of those areas can be increased, the NLM base would grow commensurately.

A motion was made and unanimously passed by the Regents to accept the report on the Long Range budget projection.

XIII. MEDICAL CARE & CASUALTIES IN IRAQ VS. PREVIOUS WARS

Dr. Charles L. Rice, President of the Uniformed Services University of the Health Sciences and an ex-officio member of the Board of Regents, made a presentation based on his recent Alan Gregg Lecture at the Association of American Medical Colleges. He noted that one important difference today is that we have an all-volunteer force and that there is a much longer average length of service. The current conflict is termed “trans-national,” that is, it is across traditional nation-state boundaries. As a result, the actual battlefield is much different from previous wars—it is “non-linear”—and Dr. Rice described how this resulted in numerous differences in how activities are conducted. He discussed the extremes in weather and environment, from Afghanistan down to the horn of Africa, and their effect on personnel and equipment. He said that the casualty rates in Iraq are the lowest of any previous U.S. war. The most important factor contributing to this is the personal protective equipment that has been introduced. Also contributing are much more extensive training and greatly improved evacuation procedures. Dr. Rice described the rapid evacuation system that has been introduced and the Joint Theater

Trauma System that efficiently routes casualties to the destination best able to care for them. There are regular scheduled teleconferences among the surgeons in Iraq, behind the lines in Germany, and at Walter Reed, where each patient is discussed. He described (and showed pictures of) how even those critically injured can be put on life support and treated in an aircraft en route to facilities better able to care for them. Transportation back to the U.S. now happens within one to two days, as compared with 43 days during Vietnam. Dr. Rice showed pictures of patients being cared for back at Walter Reed. Among future areas of emphasis are doing research on blast injury, resuscitation, and limb salvage versus amputation. In total, more than 23,000 service members have been injured; astonishingly, more than half have been returned to duty.

Following his presentation, Dr. Walker, who served in Vietnam, discussed some of the differences in the medical problems faced in the two theaters. For example, infectious disease was a much bigger problem in the earlier conflict. Dr. Rice said there are still infectious diseases, but they can be managed for the most part in the theater. Dr. Isom asked whether there was a sufficient supply of doctors, nurses, and physicians' assistants; and whether FEMA was prepared to provide care in a Katrina-like disaster. Perhaps there should be a much closer relation between FEMA medical capabilities and those of the military. Dr. Rice said that during Katrina, the PHS Commissioned Corps and the military worked together effectively. He admitted that it was a challenge for the Army and the Navy to have sufficient numbers of medical personnel. The national shortage of nurses is also affecting the military. Dr. Lindberg asked about how the military's electronic health records and tracking system worked. Dr. Rice described how they developed their electronic health record and how a handheld device puts the service member and his record directly in touch with the remote hospital. The quality of the data and the ability to retrieve it from anywhere are "astonishing," he said.

XIV. RADIATION EVENT MEDICAL MANAGEMENT (REMM) WEB SITE

Dr. Jack Snyder, NLM Associate Director for Specialized Information Services, showed a video about exposure to radiation prepared by the CDC. He said that the Radiation Event Medical Management (REMM) system is the result of the cooperative work of a number of HHS agencies, led by the HHS Office of the Assistant Secretary for Preparedness and Response. He introduced Rear Admiral (and HHS Assistant Secretary for Preparedness and Response) Craig Vanderwagen, M.D., and Dr. C. Norman Coleman and Captain Judith Bader, MD, of the Office of Emergency Preparedness and Response. Dr. Vanderwagen said that his office, at a national level, seeks to fill gaps in preparedness at the local, state, and regional level. He described three goals of his office as fostering community preparedness and prevention, public health partnerships, and federal response capability. Dr. Vanderwagen said that he believes that the Radiation Event Medical Management (REMM) system will be an important tool for the nation. Providing tools such as REMM, which can be used both in preparation for a radiation event and for response to an actual event, is an important part of their mission.

Dr. Norman Coleman described the phases of Acute Radiation Syndrome (ARS) and Delayed

Effect of Acute Radiation Exposure (DEARE) and their effects on humans. How do you deal with it? How do you communicate to the people who will have to manage an event of radiation exposure? The REMM, created with the help of NLM information system experts, is based on the concept of pre-scripted “just in time” information. He described how triage was built into the system, with doses of radiation ranging from obvious injury to lesser amounts. Dr. Judith Bader described how the system was an interagency collaboration and how they worked to create a useful and robust system. Dr. Jack Snyder then went online and, using an imaginary scenario of a health provider being confronted by a radiation event, demonstrated how the REMM system (<http://remm.nlm.gov>) could be used to retrieve a variety of pertinent and useful information. He noted that the information comes from a number of Federal sources, notably the CDC, the FDA, and the NIH.

Following these presentations, Dr. Buchanan commented that REMM is a wonderful model of interagency collaboration that might be emulated in other areas. Dr. Rice said that the designers of the REMM Web site have done a “terrific job” in providing just-in-time evidence-based usable information. An important feature of the system is that the information is downloadable. He applauded the inclusion of the references and the links to the emergency contacts. He said that some familiarity with the site in advance of an event would be needed to best navigate the system. Dr. Rice noted that they have incorporated the REMM into the course they teach at USUHS on the medical effects of ionizing radiation. Dr. Stead asked whether this system would be a good “test case” for NLM making information both accessible on the Web and importable by various provider organizations. Dr. Snyder agreed with this and said they have been talking to organizations such as VISTA about how REMM data might be incorporated into their electronic record systems. However, the decision was made to concentrate first on getting REMM into the hands of emergency providers. There was a general discussion about electronic medical records databases, the involvement of DOD, the VA, and the HHS Office of Emergency Preparedness and Response, and the impetus given by Hurricane Katrina to developing an Electronic Health Record. Dr. Stead said that what we are missing is the formulation of a “grand challenge problem” that can focus our energies. One target would be to develop a system that could respond to a Katrina with the same efficiency as the system developed for the troops in Iraq. Dr. Lindberg said NLM should consider carefully what its role in the Electronic Health Record should be—what is it important for us to do in this matter? Dr. Isom asked how responders would get REMM information if the Web is down. Dr. Bader said that, after having made a “soft launch” of the Web REMM, they are now working on an extensive marketing plan to distribute REMM to the groups that would need it. Ms. Humphreys said that the National Network of Libraries of Medicine is a part of the solution to this problem—hospital and academic librarians would be able to ensure that the latest REMM was always available at their institutions.

XV. REPORT FROM THE SUBCOMMITTEE ON OUTREACH AND PUBLIC INFORMATION

February 6-7, 2007- Board of Regents

Dr. Marion Ball, who chaired the meeting of the Subcommittee, invited the Regents to attend the meetings of the Outreach Subcommittee. Among the topics covered at the meeting were the *NIH MedlinePlus Magazine* (the third issue is about to come out); the Information Rx program in cooperation with the American Osteopathic Association; the NLM Director's PodCast; and the Environmental Health Information Outreach Program (enHIOP) managed by the Specialized Information Services (SIS). Ms. Gale Dutcher of the SIS briefly described to the Regents the enHIOP and said that there would be a formal presentation on the program to the Board at a future meeting. Dr. Ball said there was a discussion among the Subcommittee members about the possibility of using more online games to spread health literacy and health education, much in the way of the Tox Mystery program that was demonstrated at the last Board meeting.

XVI. NOMINATING COMMITTEE FOR BOARD OF REGENTS CHAIR

Dr. Buchanan named a committee to nominate a chair for 2007–2008. The committee, consisting of Mary Ann Tatman (chair), Dr. Charles Rice, and Dr. Deanna Marcum will report at the next meeting.

XVII. ADJOURNMENT

The Board of Regents meeting was adjourned at 12:00 p.m. on February 7, 2007.

ACTIONS TAKEN BY THE BOARD OF REGENTS:

- Approval of the September 19-20, 2006 Regents Minutes
- Approval of February 12-13, 2008 Meeting Dates
- Approval of the Board Operating Procedures
- Acknowledgement of 2007 Biennial Report on Inclusion Guidelines
- Approval of EP Subcommittee Recommendations and Conducted En Bloc Grant Concurrence
- Approval of the NLM Long Range Plan Budget Document

Appendix A - Roster - Board of Regents

I certify that, to the best of my knowledge, the foregoing minutes and attachment are accurate and complete.

Donald A.B. Lindberg, M.D.
Director, National Library of Medicine

Holly Buchanan, Ed.D.
Chair, NLM Board of Regents