

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

**MINUTES OF THE BOARD OF REGENTS
May 3-4, 2011**

The 157th meeting of the Board of Regents was convened on May 3, 2011, 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 3:45 p.m., followed by a closed session for consideration of grant applications until 4:15 p.m. On May 4, the meeting was reopened to the public from 9:00 a.m. until adjournment at 12:00 p.m.

MEMBERS PRESENT [Appendix A]:

Mr. Bruce James [Chair], Nevada New-Tech, Inc.
Dr. John Connolly, University of California, Irvine
Dr. Ronald Evens, Washington University School of Medicine
Dr. Carol Friedman, Columbia University
Dr. Katherine Gottlieb, Southcentral Foundation
Dr. Joyce Mitchell, University of Utah
Dr. Louis Rossiter, The College of William and Mary
Ms. Mary Ryan, University of Arkansas for Medical Sciences Library
Ms. Virginia Tanji, University of Hawaii at Manoa

EX OFFICIO AND ALTERNATE MEMBERS PRESENT:

Dr. Michael Corriere, U.S. Department of the Navy
Ms. Gail Graham, Veterans Health Administration
Dr. Simon Liu, U.S. Department of Agriculture
Ms. Kathryn Mendenhall, Library of Congress
Dr. Charles Rice, Uniformed Services University of the Health Sciences
Col. John Powers, U.S. Department of the Army
MGEN Tom Travis, United States Air Force
Dr. Howard Wactlar, National Science Foundation

CONSULTANTS TO THE BOR PRESENT:

Dr. Tenley Albright, Massachusetts Institute of Technology
Dr. Marion Ball, John Hopkins School of Nursing
Dr. Holly Buchanan, University of New Mexico
Dr. H. Kenneth Walker, Emory University School of Medicine

SPEAKERS AND INVITED GUESTS PRESENT:

Dr. Wallace Berger, Mentoring in Medicine, Inc.
Dr. Linda Birnbaum, NIEHS, NIH
Mr. Peter Gabriele, Conservation Specialist/NLM Consultant
Dr. William Griswold, University of California, San Diego
Dr. Lynne Holden, Mentoring in Medicine, Inc.
Ms. Alicia Livinski, NIH Library, Office of the Director, NIH
Dr. Patrick Ryan, Observational Medical Outcomes Partnership

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MEMBERS OF THE PUBLIC PRESENT:

Mr. Shelby Bateman, Vitality
Mrs. Mary Lindberg
Dr. Ted Mala, Southcentral Foundation
Dr. Marjorie Mau, University of Hawaii
Dr. Thomas Scarnecchia, Digital Aurora
Dr. Elliot Siegel, NLM Consultant

FEDERAL EMPLOYEES PRESENT:

Dr. Donald A.B. Lindberg, Director, NLM
Ms. Betsy Humphreys, Deputy Director, NLM
Dr. Milton Corn, Deputy Director for Research and Education, NLM
Ms. Stacey Arnesen, Division of Specialized Information Services, NLM
Ms. Joyce Backus, Division of Library Operations, NLM
Ms. Florance Chang, Division of Specialized Information Services, NLM
Ms. Kathy Cravedi, Office of Communications and Public Liaison, NLM
Mr. Todd Danielson, Office of the Director, NLM
Ms. Darlene Dodson, Office of Financial Management, NLM
Mr. Ivor D'Souza, Office of Computing and Communications Systems, NLM
Ms. Gale Dutcher, Division of Specialized Information Services, NLM
Mr. Steve Emrick, Division of Library Operations, NLM
Dr. Michael Feolo, National Center for Biotechnology Information, NLM
Dr. Valerie Florance, Division of Extramural Programs, NLM
Dr. J. Taylor Harden, National Institute on Aging, NIH
Dr. Zoe Huang, Division of Extramural Programs, NLM
Dr. Michael Huerta, Office of Health Information Program Development, NLM
Ms. Christine Ireland, Division of Extramural Programs, NLM
Ms. Lou Knecht, Division of Library Operations, NLM
Mr. Sheldon Kotzin, Division of Library Operations, NLM
Ms. Janet Laylor, Office of the Director, NLM
Dr. David Lipman, National Center for Biotechnology Information, NLM
Ms. Cindy Love, Division of Specialized Information Services, NLM
Dr. Clement McDonald, Lister Hill Center, NLM
Ms. Melanie Modlin, Office of Communications & Public Liaison, NLM
Mr. Dwight Mowery, Division of Extramural Programs, NLM
Dr. Stuart Nelson, Division of Library Operations, NLM
Dr. Aaron Navarro, Lister Hill Center, NLM
Dr. Arthur Petrosian, Division of Extramural Programs, NLM
Dr. Steven Phillips, Division of Specialized Information Services, NLM
Ms. Shana Potash, Office of Communications & Public Liaison, NLM
Dr. Barbara Rapp, Office of Health Information Program Development, NLM
Dr. Jeffrey Reznick, Division of Library Operations, NLM
Ms. Jane Rosov, Division of Library Operations, NLM
Ms. Julia Royall, Office of Health Information Program Development, NLM

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Dr. Angela Ruffin, Division of Library Operations, NLM
Dr. Hua-Chuan Sim, Division of Extramural Programs, NLM
Dr. Matthew Simpson, Lister Hill Center, NLM
Mr. Suresh Srinivasan, Office of the Director, NLM
Dr. George Thoma, Lister Hill Center, NLM
Dr. Alan Vanbiervliet, Division of Extramural Programs, NLM
Dr. Jane Ye, Division of Extramural Programs, NLM
Mr. Ye Wang, Lister Hill Center, NLM
Dr. Deborah Zarin, Lister Hill Center, NLM

I. OPENING REMARKS

Mr. Bruce James, Chairman of the NLM Board of Regents, welcomed the Regents, alternates, and guests to the 157th meeting of the NLM Board of Regents. He then introduced a new Regent, Dr. F. Douglas Scutchfield, Professor of Health Services Research and Policy at the University of Kentucky, College of Public Health. He also noted that Dr. Regina Benjamin, Surgeon General of the United States, would not be able to present a report at the meeting today.

II. REPORT FROM THE DIRECTOR, NIEHS

Dr. Linda Birnbaum, National Institute of Environmental Health Sciences (NIEHS) Director, began her report by noting that the NIEHS is not located on campus but rather in North Carolina, at Research Triangle Park. The NIEHS mission is unique, she stated, because it focuses on prevention rather than medical research. If we can understand what it is in our environment that is associated with disease, then we can do something about it. The NIEHS has two unusual, problem-solving programs: the National Toxicology Program (NTP) and the Superfund Research and Training Program.

For NTP, the NIEHS Director reports to the HHS Assistant Secretary of Health, as opposed to NIH Director Dr. Francis Collins, because the program's objective is to coordinate toxicology testing across the federal government. Program studies range from the long-term studies of biocides to very short-term toxicity testing of reproductive and developmental effects. The NIEHS is supposed to release a report every two years listing compounds that are known to be human carcinogens, or are reasonably anticipated to be human carcinogens. These reports are highly political, so the last biannual report was released in 2005. A new report will be released next month.

The NIEHS is working on the development of new methods for efficient toxicological assessments. There is not enough time or money to test the 65,000 chemicals in commerce that have absolutely no test data to date. These substances were introduced into commerce before any type of test data was required. NIEHS has partnered with the National Center for Chemical Genomics, the Environmental Protection Agency (EPA) and the Food and Drug Administration (FDA) in the development of very rapid screening approaches.

As its name suggests, the NIEHS Superfund Research and Training Program has two components. The worker training program teaches people to perform hazardous waste cleanup and emergency response. The profile for this program is unusually diverse: grantees include unions, state and county health departments, and community colleges. In the last 25 years, NIEHS has trained over 2.5 million workers

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in all 50 states, DC and all of the territories. Last June, Dr. Collins announced that he was giving NIEHS \$10 million to launch a “Gulf study,” to recruit 55,000 workers in the Gulf area and follow their progress for five years. In the process, NIEHS will determine whether there are health risk for these workers, and provide care if needed. (This is an example of the research side of the Superfund program.)

Dr. Birnbaum then reviewed other NIEHS programs. These include a small, but expanding clinical research program carried out in North Carolina, not at the NIH Clinical Center, and involvement in convening numerous conferences and meetings. Topics that NIEHS is addressing include the way the environment affects autoimmune disease, the connections between the environment and breast cancer, the adverse environmental impact of cook stoves in the developing world, the possible impact of the environment on autism, air pollution and brain health, the role of the environment in obesity and diabetes, the increased adverse developmental effects associated with high levels of arsenic, and the health impacts of climate change.

What are the challenges for environmental health research and how does NIEHS think strategically about the goals to study environmental health sciences for the century to come? How does NIEHS create an environmental strategy that provides the data and information needed by multiple audiences? Translation is not only bench to bedside; it is bench to public health, too. NIEHS is in an important planning process now, developing strategies for answering these and other pressing questions. The Institute is developing a new mission and vision statement, and honing its strategic goals.

Asked by Mr. James the size of NIEHS, Dr. Birnbaum responded that the annual budget is \$683 million, plus \$80 million from the EPA Superfund. NIEHS is a mid-sized Institute, with about 700 federal employees and another 600 contractors and postdoctoral fellows. NIEHS awards about 1,000 grants annually in about 40 states.

III. FEBRUARY 2011 MINUTES AND FUTURE MEETINGS

The Regents approved without change the minutes from the February 2011 meeting. Dates for the October 2011 and February 2012 meetings have already been agreed upon. The spring meeting was set for May 8-9, 2012.

IV. REPORT FROM THE NLM DIRECTOR

NLM Director Donald A.B. Lindberg began his report by noting that the NLM still does not have a budget, but does have a continuing resolution. The Congress, he said, has acted, and the bottom line is that NIH’s overall funding was reduced by 1.1%. Non-competing grants, which typically see an annual increase of about 3%, will be reduced by 1%.

Dr. Lindberg announced the appointment of Dr. Michael Huerta as the NLM’s new Associate Director for Health Information Program Development. Departing NLM, he noted with regret, is Becky Lyon, the former Deputy Associate Director for Library Operations. She has had a distinguished career, at the NLM, the Library of Congress, and the Veterans Administration. Dr. Clement McDonald, Director of the Lister Hill Center, introduced two new employees, Dr. Matthew Simpson and Mr. Ye Wang.

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Dr. Lindberg next updated the Board on legislative and regulatory matters. He noted that much of Congress's attention in recent months has been devoted to completion of the appropriation process for fiscal year 2011 and the initiation of budget negotiations for fiscal year 2012. He pointed to the Board book for further information from the 112th Congress on legislation of potential interest to the Library and its Board. The book also contains details about ongoing efforts to implement health IT-related legislation passed in the 111th Congress.

Dr. Lindberg discussed the *Networking and Information Technology Research and Development (NITRD)* Program, the successor to the High Performance Computing and Communication Program (HPCC), which was established in 1991. He noted that he was the founding director of that earlier program. The 2009 ARRA/HITECH Act called for the NITRD Program to include all federal R&D programs related to health information technology (IT). In response, the NITRD Subcommittee established a Health IT R&D Senior Steering Group, charged with identifying health IT research and development "game changers." The group includes representatives from 12 different agencies, including NLM, representing NIH. Among Dr. Lindberg's agenda items for this group are to reform clinical trials, support the maintenance of IT standards, improve the coordination of information exchanged between the Department of Defense and Veterans Administrations electronic health record (EHR) systems, and a greater focus on disaster preparedness.

Dr. Lindberg discussed the results of the recompetition of the 5-year contracts for the eight Regional Medical Libraries (RMLs) in NLM's National Network of Libraries of Medicine (NN/LM). The NN/LM now consists of about 6,000 libraries. The University of Pittsburgh became the new RML for Region 1, which includes New York, New Jersey, Pennsylvania, and Delaware. The contracts were awarded to the incumbents in the other 7 Regions: University of Maryland (Region 2 – Southeastern Atlantic); the University of Illinois, Chicago (Region 3 – Greater Midwest); University of Utah (Region 4 – Midcontinental); the Houston Academy of Medicine Texas Medical Center (Region 5 – South Central); the University of Washington (Region 6 – Pacific Northwest); UCLA (Region 7 – Pacific Southwest); and University of Massachusetts at Worcester (Region 8 – New England)..

NLM's Emergency Access Initiative (EAI), Dr. Lindberg continued, was the result of a meeting between the Library and major journal publishers, who agreed to a plan to provide access to the full text articles from 230 biomedical journals and 86 reference books to emergency responders in the wake of natural disasters. Developed with the US in mind, it was most recently activated to support medical efforts in Japan in the wake of the earthquake, tsunami, and radiation event. It was activated three times last year, following the earthquake and cholera epidemic in Haiti and during flooding in Pakistan.

Tab G, Dr. Lindberg noted, is the description of contests hosted by the NLM to further its mission during its 175th anniversary year. One, "NLM & You: The Video," invited people to create 30-60 second videos describing how they have been helped by an NLM product or service. Dr. Lindberg showed the Board the first place winner, "James and the Peanut Allergy." The other contest is "Show Off Your Apps: Innovative Uses of NLM Resources." Winners of this contest, which invites people to create innovative software applications using the Library's extensive freely available data, will be announced at a November 2, 2011 ceremony and will be promoted via links on the NLM Web site as well.

Encouraged by Board Subcommittee on Outreach member and Board consultant Dr. Marion Ball, NLM was a presenter and first-time exhibitor at the annual Healthcare Information and Management Systems

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Society (HIMSS) conference, February 20-24, 2011 in Orlando, Florida. While initially a venue for those involved in hardware and software for administrative systems, over time HIMSS has emerged as a key venue for presentations and deal making in the fields of health data standards for interoperable exchange of health data and administrative data.

Dr. Lindberg discussed the 10th anniversary meeting of NLM's Environmental Health Information Partnership (EnHIP), held March 14-15, 2011 at NLM. This successful collaboration began in 1991 as the Toxicology Information Outreach Pilot Project. The current program includes representation from Historically Black Colleges and Universities, institutions serving Hispanic students, and tribal colleges. This year, an Alaska Native-serving institution was added. In addition to working with these institutions to promote the use of and access to electronic health information and related technology, EnHIP brings attention to scientific research related to health issues that disproportionately affect minorities.

Dr. Lindberg also highlighted a special display of a item from NLM's collection in the Smithsonian National Museum of American History in Washington, DC, in the Small Documents Gallery on the second floor. The display showcases the diary of Civil War nurse Amanda Akin, who served at a hospital on the National Mall, not far from where the museum now stands. This joint project with the National Museum of American History is a result of suggestion made by Board Chair Bruce James.

Lastly, Dr. Lindberg pointed out that Health and Human Services Secretary Kathleen Sebelius named MedlinePlus Connect a "Secretary's Pick" at the HHS *Innovates* award ceremony on March 31. Introducing the winners, Secretary Sebelius said, "We're recognizing some of the most powerful new ideas we have."

V. SCIENCE AND HEALTH CAREERS EXPLORATION PROGRAM

Before introducing the next panel presentation, Mr. James welcomed Dr. Taylor Harden, assistant to the director for special populations at the National Institute on Aging. Dr. Harden announced that she is working with NIH Director Dr. Francis Collins on a trans-NIH committee focused on youth in biomedical careers. In that capacity, she is involved with a particular group focused on women of color in biomedical careers. She expressed to the Board an interest in having additional collaboration with the speakers and the NLM.

Dr. Lynne Holden, president and executive director of Mentoring in Medicine, Inc., established an all-volunteer organization that encourages and nurtures disadvantaged students from Harlem and the South Bronx to enter the health professions. Her work has motivated and supported nearly 6,000 students, and engages nearly 500 volunteers. Dr. Holden began her discussion by showing a video produced by Dr. Sanjay Gupta, CNN chief medical correspondent, on the work of Mentoring in Medicine.

Founded in 2006, Mentoring in Medicine (MIM) pairs more health care professionals with students from third grade through health professional schools. The students come from socioeconomically disadvantaged communities. MIM's mission is to ignite an interest in a health career for students and help them execute a plan for success, support students currently enrolled in health professional school to graduation and early career development, and to teach healthy living. The most widely attended event is the "Yes, I Can be a Healthcare Professional" conference. Each year, this event attracts over 1,850 students and parents from the entire New York City metropolitan area. The conference features

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exhibitors from local educational institutions, health professional societies, community health services, and health information providers, including NLM. There are workshops geared to the interests of the students, and presentations on education and training requirements for over 100 health careers.

Dr. Holden discussed MIM's new Science and Health Career Exploration Program, which is funded by NLM and co-sponsored by the Friends of the NLM. Six minority high schools located in Harlem and the South Bronx were selected to participate in this after-school program. Over a two-year period, principals, science teachers, and guidance counselors oversee 40 sessions led by visiting health professionals who provide biology instruction in 12 organ systems. During its two years in operation, the program has exposed over 600 minority students to health science instruction and related career information.

Evaluation findings, presented by Wallace Berger, PhD, revealed an impressive gain in health care knowledge. Even students with lower grade point averages successfully learned the course material. The course motivated the students to explore health care information and careers and it received high scores on all evaluation dimensions. The evaluations showed that active learning is the trick, Dr. Berger concluded. Students like the active and participatory course environment.

VI. PRESENTATION OF OUTGOING BOR CERTIFICATES, NLM DIRECTOR AND FRANK B. ROGERS' AWARDS

Dr. Lindberg presented two NLM Director's Awards: to Florence Chang of the Division of Specialized Information Services (SIS), "in recognition of substantial contributions for the successful coordination, supervision, and development of the many SIS IT products and services including collaborations with ASPR, NCI, and CDC to develop REMM"; and to Jane Rosov, Division of Library Operations (LO), "for substantial efforts that have led to improvements of the licensing programs at NLM, and for leadership that effects widespread use of NLM-supplied data."

The Frank B. Rogers Award recipients were then announced. Dr. Michael Feolo of the National Center for Biotechnology Information (NCBI) was recognized for "expert project management skills in establishing dbGaP as the most comprehensive single source of information from NIH-funded genome-wide association studies." He will receive his award later in the proceedings. Marina Rappoport of the Index Section, Library Operations, was recognized for advancing the use of automation to assist in the MEDLINE indexing process through significant contributions to the 2010 Medical Text Indexing Experiment. Rebecca Stanger accepted the award on behalf of Ms. Rappoport.

Dr. Lindberg closed by presenting certificates and thanking the departing Mr. James for his excellent chairmanship of the Board of Regents and Dr. John Connolly, Dr. Carol Friedman, and Dr. Louis Rossiter for their service.

VII. DISASTER INFORMATION OUTREACH

Ms. Stacey Arnesen, head of the Disaster Information Management Research Center (DIMRC) in NLM's Division of Specialized Information Services (SIS) was the first of three speakers to address how libraries and librarians can be involved in disaster preparedness, response and recovery.

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Ms. Arnesen updated the Board on a number of DIMRC efforts in this area. NLM has funded Disaster Information Specialist pilot projects at four institutions to explore how librarians can help in disaster preparedness and response. DIMRC has also developed a community of practice for librarians, including a listserv where roughly 600 members share information and monthly conference calls with guest speakers. NLM's National Network of Libraries of Medicine is encouraging libraries to prepare for floods, fires, and other threats and to plan for continuity of operations at their facilities in the event of a disaster. Ms. Arnesen also noted that the Stafford Act, which governs how the United States Federal government responds to disasters in the US, now names public libraries as a key community resource. That makes libraries eligible for temporary relocation if their building is damaged or destroyed so they can keep serving the public. To build upon its efforts, DIMRC is working with the Medical Library Association to create a disaster information specialization providing continuing education opportunities for librarians. In addition, DIMRC recently sponsored a Disaster Information Outreach Symposium for librarians and information specialists.

Ms. Cindy Love, a disaster information specialist with DIMRC, provided more information about the symposium held March 29-30. More than 200 people from 29 states, Canada and Costa Rica attended the symposium at NLM while another 250 to 350 watched the live videocast of the event. About two-thirds of the attendees were librarians. Other fields represented included public health, academic research, emergency planning, government officials and policy analysts. There were about 20 speakers and the response from attendees was overwhelmingly positive. Ms. Love noted some conference highlights including: the keynote address by Dr. Nicole Lurie, Assistant Secretary for Preparedness and Response with the U.S. Department of Health and Human Services; the American Red Cross presentation on its use of social media and lessons learned; and presentations by librarians on their disaster-related activities.

Ms. Alicia Livinski, a librarian in the National Institutes of Health library and one of the symposium presenters, talked about her work assisting the Assistant Secretary for Preparedness and Response (ASPR). Ms. Livinski gave a brief overview of ASPR, which coordinates the HHS public health and medical emergency preparedness and response activities. Then she explained her job, which includes conducting traditional literature review; editing for manuscripts; identifying opportunities for the staff to publish in journals; identifying apps for the iPad, iPhone and Android phones that might be used in response. Topics she's researched include H1N1, crisis standards of care, allocation of scarce resources. One major project was assisting with the *Disaster Medicine and Public Health Preparedness* March 2011 supplement on scarce resources and nuclear preparedness, which included 11 manuscripts, involving 47 authors. In closing, Ms. Livinski noted the role that librarians could play in disasters would depend on a variety of factors such as the needs of the community, the groups served by the librarian (do they work in a community library, hospital library, etc); the comfort level and time of a librarian (do they want to work 24-7 and be on call); the librarian's willingness to learn a lot and become immersed in the topic. Based on her personal experience, librarians can play important roles in the preparedness, planning and recovery phases as they know a lot of the groups involved and are good at bringing people together. Ms. Livinski outlined the roles that NLM can play: encouraging collaboration between librarians; piloting programs for outreach; encouraging research; developing tools and materials; assisting with sustainability and measurement of librarian impact; and helping to make connections among relevant groups.

After the presentations, Board member Ms. Mary Ryan commented that it's hard to know what type of information people may need in different emergencies, and it would be valuable for NLM to continue to look at that. She also suggested that NLM make sure schools of public health know about NLM's

disaster resources. Board member Dr. Ronald Evens suggested reaching out to state agencies and groups involved in disaster drills and disaster prep. Ex-officio member Dr. Charles Rice said NLM and libraries generally are ideally suited for identifying the competencies that will be needed for various disasters.

VIII. WIISARD SAGE: SELF-SCALING SYSTEMS FOR MASS CASUALTY MANAGEMENT

NLM grantee Dr. William Griswold of the University of California, San Diego, told the Board about his latest NLM-funded project, WIISARD Sage. Dr. Griswold described the “Golden Guardian” disaster drill his team participated in last month to test WIISARD. The scenario was a blast with chemical or radiological dispersions. Law enforcement and medical personnel established a hot zone where people are contaminated or could become contaminated, and a cold zone where first responders worked and moved people off the field. First responders went into the hot zone, identified and triaged patients, and put a tag with an RFID on the patients. Responders used a smart phone with a miniature RFID scanner to scan the patient’s tag and enter “start triage.” Triage supervisors with clip-board like devices managed the overall triage—moving patients from the hot zone to the cold zone to be decontaminated and moved off the scene to nearby hospitals. All the action was monitored at a command center. Dr. Griswold then summed up the exercise: the responders operated naturally and intuitively with no change to the work practice because of the technology his team introduced; the information was broadcast instantaneously and reliably with no additional effort; the responder and patient locations were tracked accurately and affordably; responders used the same equipment they would use for everyday smaller instances, which is critical because when you have a system you only use once in a lifetime, you may not remember how to use it. Dr. Griswold noted the current state of practice is paper and radio, which can be inaccurate and slow and doesn’t track the locations of victims and responders. He then detailed the advantages of WIISARD, which is designed around role-tailored displays and a natural mapping for first responders. To achieve instantaneous communication, they used a variant of an 802-11 wireless system.

Dr. Griswold also described another UCSD disaster-related research project that explores the value of drills versus classroom training, given that drills can be very expensive. He said they found that people got different things out of the drill and classroom training. Future project concepts for WIISARD include crowdsourcing—finding ways to get valid information from the local people, regular citizens, who tend to be the first people on the scene of a disaster. They also want to explore disaster telemedicine.

In concluding thoughts, Dr. Griswold noted that the medical response in disasters needs to be fast, effective and affordable. IT can be a huge accelerator, but off-the-shelf solutions fall short. He said off-the-shelf hardware is used for cost reasons but new software solutions that allow us to scale up and down are needed. Drills show effectiveness over classroom training, but many questions remain. The future lies in finding ways to interface with local communities (through crowdsourcing) and with experts (through telemedicine).

Discussions following the presentation included the differences in network configurations based on the type of disaster; the possibility of using a portable cell tower for communications; and the future of disaster management—to which Dr. Griswold said he thinks the really big effort could be telemedicine.

IX. JOINT USUHS/NLM TRAINING PROGRAM IN HEALTH INFORMATICS

Dr. Milton Corn, NLM deputy director for research and education, presented a new NLM project for concept review by the Board. NLM would like to work with the Uniformed Services University of the Health Sciences (USUHS) to develop and operate a joint training program in biomedical informatics. Dr. Corn outlined the different needs that could be addressed in a training program and the types of degrees or certificates being considered. There is a need for medical informatics professionals in clinical care as more IT enters into the healthcare system. Examples include: electronic health records systems; management of organizational IT; public health, epidemiological informatics relevant to the military. This possibly could be addressed in a master's program. There is a need for health professionals to have some informatics sophistication—to lead the adoption of technology in clinical practice—helping people to accept it and use it efficiently. A certificate program might be useful here. There is a need for informatics research and development relevant to the military. Examples include decision support; human-computer interface; needs in combat and disaster situations. A PhD program might address this.

A USUHS/NLM partnership would give USUHS the strength it needs to run an informatics program. The preliminary concept would give students three options. There would be a Master of Science in Medical Informatics degree that would have two tracks—chief medical information officer and clinical and translational research. There would be a graduate certificate in medical informatics. A PhD program would have a clinical informatics concentration and a public health informatics concentration.

Dr. Corn also outlined how specific tasks would be divided by USUHS and NLM. Both institutions would handle curriculum development, mentoring, evaluation of student performance. USUHS would select the students and award the degrees. There would be no exchange of funds between NLM and USUHS and NLM and/or NIH faculty would not be paid.

The Board also heard from Dr. Charles Rice, an ex-officio member of the Board and the President of USUHS. He said the University is very excited about the potential partnership. The University exists to meet the needs of the military medical service and the commission corps of the public health service. With the investment in electronic health records for the military healthcare system, and the complexity of getting information from the battlefield, the need for skilled people in informatics is clear. There are about 9.6 million beneficiaries in the military health system, so there's an enormous amount of data to be mined. The three military surgeons general are keenly interested in this concept. Dr. Rice said he has not formally presented it to the University's Board of Regents.

In discussion following the presentation, Dr. Lindberg said he envisions the project will progress gradually to see what works. Ex-officio member Ms. Gail Graham noted that there is a dearth of informaticians and she thinks it's a great idea. The Board unanimously approved the concept.

X. EXTRAMURAL PROGRAMS REPORT

Dr. Valerie Florance, Director of NLM's Extramural Programs, began her presentation with a brief history of the NLM grant program, which she said is fairly young. The first grants were awarded in 1965; the first grants for informatics training for physicians were awarded in 1972; the first IAIMS planning grants were awarded in 1982; in 1995, NSF gave NLM authority for Internet connection grants and the money was used to connect numerous hospitals to the Internet; and the first career transition awards were

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given in 2004. Between 1965 and 2010, NLM put more than \$546 million into research and more than \$224 million into training through its grant program. There are five types of grants: research, resource, training, career development; and small business research and development. About 50% of EP's funding goes to research grants; 25-29% goes to training; and the other categories each get about 12%. Grants fall into six thematic areas: basic informatics; basic biology; translational; health care; public health; and user science. Health care and public health informatics are typically the bigger parts of NLM's research portfolio.

Dr. Florance then profiled four current research projects, the first two of which are traditional R01 research grants. The first project she described is a three-year grant to Dr. Qing Zeng at the University of Utah, who is hoping to improve discharge instructions with automated pictographs—images that could help people understand the instructions and hopefully improve their adherence. The scientist and her team have built a library of images that could be inserted into discharge instructions. Natural language processing would identify the concepts for which pictographs would be inserted. The team's next step is to work with patients to evaluate the images.

A second project, headed by Dr. John Brownstein at Children's Hospital in Boston, looks at modeling the global impact of climate change on infectious disease. Dr. Brownstein has captured real time events of a Dengue virus outbreak that occur outside the areas where it is endemic, and is trying to develop tools to make the information available on the Web in real time for use by public health officials.

The last two projects are exploratory developmental grants—two-year, proof of concept grants. Dr. Dominik Aronsky at Vanderbilt University wants to develop a system to identify patients eligible for guideline-driven care—specifically to develop a real-time asthma detection system and incorporate it into an Emergency Department information system to prompt adherence to treatment guidelines. The prediction tool worked at expected levels during a randomized trial. The work did reduce the median disposition time and users found that it improved communication among members of the health care team.

The last project, headed by Dr. Joan Broderick at SUNY Stony Brook, looks at psychogenic disease—physical and mental symptoms due to perceived exposure to a biologic or toxic agent when there is no bona fide exposure. Could a communication message by a public health department make the problem worse? The researchers found that media intervention did not make things worse, but they did find that people who had traumatic events in their lives earlier were more likely to have psychogenic symptoms.

XI. REPORT OF NOMINATING COMMITTEE FOR BOR CHAIR

Dr. Rice said the nominating committee recommends that Ms. Virginia Tanji be the next chair for the NLM Board of Regents. The Board unanimously approved the nomination.

(Dr. Lindberg presented the Frank B. Rogers Award to NCBI's Dr. Michael Feolo “for expert project management skills in establishing dbGaP as the most comprehensive single source of information from NIH-funded genome-wide association studies.”)

XII. OBSERVATIONAL MEDICAL OUTCOMES PARTNERSHIP

Mr. James then introduced Dr. Patrick Ryan, associate director of analytical epidemiology at Johnson & Johnson, and a research investigator at the Observational Medical Outcomes Partnership (OMOP), a public-private collaboration initiated by the non-profit Foundation for the NIH (FNIH). OMOP is working to evaluate the safety and efficacy of current pharmaceutical products and in so doing employs many of the health data standards NLM supports or develops. OMOP, which has existed for two and a half years, conducts methodological research to explore using electronic health records (EHR) databases and administrative claims data to proactively explore and study the effects of medical products. NLM resources have played a major role in enabling this research.

The Food and Drug Administration Amendments Act of 2007 (FDAAA) mandated that the FDA develop an active post-market risk identification and analysis system (RIAS) for using automated health care data to identify risks of medical products. The ambitious goal was that, by July 2012, FDA would establish a national network of observational databases containing 100 million lives of patient-level data. This enterprise could then study these products and begin to systematically and proactively identify disease patterns and unanticipated side effects.

If OMOP's goal is to create this RIAS, how do they do that? What are data sources and methods? Key words are systematic, reproducible and efficient. Of course, an infrastructure is required. Along the way, they've developed tools, which they take and leverage to identify true associations. OMOP created a proof-of-concept model of this national system. It is a public-private partnership chaired by the FDA and managed by FNIH and has broad stakeholder participation, across government, industry and academia. In addition, OMOP also needed to establish a research lab, where community of scholars could work on this problem. Problem and its solution cut across many disciplines—epidemiology, bioinformatics, etc. OMOP has worked to create a network of disparate data sources—something easier said than done. In the process, the group has leveraged several NLM databases as standards and developed new tools as well.

At its core, OMOP is conducting a single research experiment: If one could have available a network of observational databases and if one developed methods that could be applied to those databases, how reliably would those methods generate accurate information about the effects of medical products when applied to those data sources? In order to find out, OMOP brought together 10 data sources from claims and EHR systems, covering over 200 million patients. What would the research community do if they had access to such data? Fourteen methods were chosen, with epidemiological designs and statistical approaches adapted for longitudinal data. Then there was, in effect, a bake-off to determine which method applied to which database could most accurately predict real effects of medicines and discern them from false positives. Many real effects of medicines are already known but, if we had this system and we didn't know medical truths, how well would algorithms predict these effects and generate new information about medical problems? The tools for the research experiment are open-source and standards-based, and many come from NLM, including UMLS, RxNorm, PubMed and DailyMed. Also, Lister Hill Center director Dr. Clement McDonald is on the OMOP Advisory Board and Dr. Marc Overhage, [then] director of medical informatics at Indiana University's Regenstrief Institute and a good friend of NLM's, is a principal investigator on the OMOP project. NLM has been the cornerstone of OMOP's work so far.

Dr. Ryan then showed how OMOP could ask questions across different data sources. Even with patient data from such diverse systems as Thomson, GE, the Veterans Administration, the Public Health Service and England's General Practice Research Database, with diverse data formats, it would appear easy to ask something like, "Which patients are actually taking Warfarin?" Each system codes that data differently. RxNorm has laid the foundation for allowing us to answer such a question across the array of databases, which is so vital. We can then, potentially, ask those questions across data platforms around the world. This would complement data gleaned from clinical trials and the journal literature in PubMed.

One health outcomes of interest was acute liver injury. OMOP is working on standardized tools that would give a clear picture of the larger populations represented in the records analyzed and also the various treatment subgroups. Some drugs have consistent rates across the databases, but use of some drugs varies widely. It's important to know this prior to generating evidence about what happens to patients when they take these various medical products.

OMOP's goal was to develop an open-source library of statistical and epidemiologic algorithms that would allow them to study the effects of various products. All programs are made publicly available to promote transparency. No one's really done this problem before. There is no systematic study of how reliable these observational studies are, and how their data can be used in a systematic and reproducible fashion.

In effect, OMOP is generating evidence of safety of medical products. This is not meant to replace data and systems already there. Instead, OMOP endeavors to establish a coordinated system that leverages a network of observational health care databases to do active surveillance. Among its ongoing research priorities, OMOP is pursuing continuation of its mission to improve its ability to monitor drug safety. It will continue to leverage NLM resources, and foster expanded partnerships with NLM, NIH and other federal entities. OMOP is setting the floor for this work and also pushing up the ceiling, as NLM Deputy Director Betsy Humphreys observed at last night's event. A standardized approach to representing medical knowledge can enable active medical product safety surveillance and comparative effectiveness research. There is a significant opportunity for a sustainable model for generating evidence about medical products using observational healthcare data. NLM will undoubtedly be the cornerstone and foundation for this effort moving forward.

Dr. Evens asked about the issue of truth. His university did a study of the pattern of CT scans in lung cancer. Only 20% of cases deemed "cancer of the lung" showed pathological evidence. For 80% there was none. This could be of great commercial use, to companies like GE, Siemens, etc. Where are people being sent to get their x-rays?

The truth is unknowable, Dr. Ryan replied. Even the experts can only make their best guess. When OMOP started, they had to test drugs for which they knew there were clear, understood risks, for example, Warfarin causes bleeding. Surprisingly, they found methods missing effects we thought they'd see, and some that confirmed what they knew. They will never have certainty, but they hope to get closer to the right answer. Another consideration is the appropriate use of this data. Dr. Ryan hopes that, by working as a public-private partnership, they can establish best practices for privacy and responsible use. These same data sources are licensed by academia and industry, too. All around, these diverse groups need to establish ground rules for use of data.

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Board member Dr. Carol Friedman asked about binary relationships. In her experience, 50% of adverse events include interactions; these aren't always a binary relationship; it could be a triple relationship. Could you be missing some findings?

Dr. Ryan thought that was a great point. What are the potential risk factors for concomitant interactions and problems? Some algorithms try to adjust for those concerns. At this point, OMOP isn't looking at drug-drug relations. Recently, the Heritage Prize (\$3 million) was announced, to reward anyone for correctly predicting hospitalization in the coming year, based on available medical data. This is a very complicated problem and can't be solved by one project, group or discipline. No drug in isolation causes a problem.

Board member Dr. Louis Rossiter hailed this as one of the best presentations he's heard during his service. Kaiser and the U.S. Veterans Administration have huge research enterprises, using their own data. However, OMOP is unique and important because it's using all the data together. He'd rather "let all the flowers grow," he said, not standardizing all health records but, instead, standardizing terms.

OMOP doesn't want to, and can't, standardize billing systems, Dr. Ryan reported. Having standards allows them to ask a single question across all sources, at least. For better or worse, there's still no standardized EHR on the horizon. A major revelation for him is that there's a lot of great work underway, but no standardized study of how effective the various health records are.

Dr. Ryan said that OMOP functions like NLM, producing and making technology and data available publicly. There is currently a collaboration of the University of Colorado, University of Tennessee and University of Utah, looking at comparative effectiveness. They're using some of the open-source information from OMOP.

Board member Dr. Douglas Scutchfield remarked that EHR and claims data differ significantly. Claims data is sometimes driven by amount of money that is paid. Dr. Ryan noted that some think clinical data is superior, while other researchers go with claims data. Regenstrief has great data, GE's is very different. Dr. Scutchfield said that billions are being spent on comparative effectiveness research (CER). Is OMOP working with the CER centers established by the Agency for Healthcare Research and Quality (AHRQ)? Dr. Ryan noted that, if one took out the words "drug safety" and substituted "CER," the results would be the same. Actually, drug safety is easier than doing CER. If OMOP or any other entity can solve drug safety, they will also learn a lot about CER. The two do need to be coordinated, however.

Lister Hill Center director Dr. Clement McDonald pronounced OMOP a Manhattan Project for health database research. He asked Dr. Ryan whether he thinks that, by avoiding certain databases and certain methods, he and OMOP will do better. Yes, said Dr. Ryan, but they have no empirical method for making those decisions. OMOP is providing a level playing field, to let everybody try different things out. Ideally, they'd say that, for a certain problem, go to Humana or Regenstrief for data. The quality of research would be greatly improved if we had a right way to generate and analyze data.

Dr. Lindberg said that he has always been interested in drug interactions. Forty years ago, at the University of Missouri, they built a drug database. It was a major undertaking, but turned out to be useless. Is 200 million the right number of patients to look for a three-way drug interaction? No, said Dr.

Ryan, but he flipped the question somewhat: If you can't find a condition or interaction in the entire U.S. population of 330 million, is it worth it? It's probably not a significant public health issue.

Dr. Evens noted that it's worth asking, how important is the answer? In clinical trials, is a complication a result of medication or the disease? Sometimes, they get five experts to have a videoconference, because they can't always agree. Dr. Ryan said that, if you get five clinicians in a room, you'll get six opinions. OMOP's goal is to get as much empirical evidence as possible, and get reliable information (like MedlinePlus) into the hands of patients. If they know that information is reliable, they would count on it more.

XIII. UMLS TERMINOLOGY SERVICES (UTS): TODAY AND BEYOND

Suresh Srinivasan from the Office of Computer and Communications Systems (OCCS) and Steven Emrick from the MEDLARS Management Section of Library Operations (LO) co-presented on the recently developed UMLS Terminology Services (UTS). UTS is a Web site and back-end services to help users access information in the UMLS Knowledge Sources and related tools and subsets. It's a replacement for the Knowledge Sources Server, developed by OCCS in collaboration with LO and with input from the Lister Hill Center. 2011 is 25th anniversary of UMLS, a longstanding NLM project to develop knowledge sources and other resources to help computer systems behave as if they "understand" biomedical meaning. Mr. Srinivasan thanked Dr. Lindberg and Ms. Humphreys for their continued support and thanked current National Agricultural Library Director and NLM ex-officio Board member Dr. Simon Liu, who, as director of OCCS, initiated the UTS project.

Among the motivations for UTS was the ARRA HITECH Act and its Meaningful Use incentives and the recommendations in the 2009 report of the Board of Regents' Health Data Standards Working Group. The Board Working Group report recommended that NLM improve the tools and services available for vendors to help them implement the clinical vocabulary standards supported or developed by the Library, including SNOMED CT, LOINC, and RxNorm. UTS is also in line with the Library's long-range plan goals for promoting use of standardized terminologies in electronic health records. In addition, UTS is a response to increasing user interest in the UMLS vocabulary resources and health care vocabulary standards. UMLS contains all the terminologies required for use in US health information exchange and health care billing transaction and the UTS provides a standard way to access them.

As background, Mr. Srinivasan provided a brief overview of the content and structure of the UMLS Metathesaurus, the largest UMLS KnowledgeSource, with some 2.4 million concepts from 160 biomedical vocabulary sources, with names in a total of 21 languages. NLM has made 43 releases of the UMLS Metathesaurus since 1990, when the first experimental edition was issued. Currently, the Library makes two a year: spring and fall. The UMLS Metathesaurus is organized by concept, so that synonyms from different source vocabularies are identified as having the same meaning. Each concept is assigned at least one semantic type or category from the UMLS Semantic Map. Within the Metathesaurus, the many different source vocabularies are available in a single standard distribution format, which is a boon for developers and users of the system.

Given the scope and size of the UMLS, it's important to customize and subset it. NLM provides a tool, MetamorphoSys, for that purpose.

The purpose of the UTS web site is to make access to the UMLS and related vocabulary content easy, quick, and reliable. It allows users to browse, search, display and download UMLS content. It also features links to other information sources at NLM. UMLS users can apply here for the free license that is required to use the UMLS Metathesaurus and obtain authenticated access to UMLS and related resources. External web sites can use the UTS to validate that a user of their services has a UMLS license (which incorporates a license for use of SNOMED CT). NLM hopes the UTS will become a one-stop access to important tools and data relating to terminology and applications. The Web services component provides access to all the content in a very extensive way. Mr. Srinivasan demonstrated the UTS home page and the range of information and services available from it.

Steven Emrick next described redesigned UMLS licensing and user accounts. A license gives users permission to search, download files and perform Web Service calls to UTS. The license covers terms of use of each of the 160 sources. It also protects the intellectual property of content providers. The main goal of the redesign is to make licensing easier. Actions to that end include combining license application/account creation on the same system, allowing only one account per license code, allowing licensees to complete their annual report from their profile, and to provide more user education on source code. Users can customize their own profile with various filters. A new mechanism will also compel them to complete an annual report, so NLM will have more complete information about UMLS users and usage. Data is already available that 30% of US UMLS users are for-profit entities. Non-U.S. licensees are primarily from academic institutions.

Ex-officio Board member Dr. Simon Liu said they had done a great job, since this was only a concept one year ago. He asked about NLM plans for merging the tool set and work bench from the International Health Terminology Standards Development Organisation (IHTSDO) with this interface? Mr. Srinivasan said the team would customize the IHTSDO work bench so that the power of the UMLS, which understands, for example, that lung mass and pulmonary mass refer to the same concept, is also available to those searching SNOMED CT within the IHTSDO workbench. There will be tight integration of the UTS capabilities with those of the workbench.

Dr. Friedman has followed UMLS progress since 1990 and is a user herself. These are very important resources. Is the UTS also an API? It's very new and are people using it? They're testing it out, Mr. Srinivasan said. They support Web Services in a legacy mode. Going forward, they're working on between 150 and 200 functions. Great job, said Dr. Friedman, commenting on how quickly NLM had moved to implement key recommendations from the Board WG report.

XIV. REPORT FROM THE SUBCOMMITTEE ON OUTREACH AND PUBLIC INFORMATION

Subcommittee Chair Virginia Tanji recognized new Subcommittee members Ms. Mary Ryan and Dr. Katharine Gottlieb. Ms. Tanji said how gratifying it was to hear Dr. Lynne Holden and Dr. Wallace Berger address the Board yesterday on the science and health careers exploration program. To hear them report was very exciting, after the Subcommittee had been hearing about that program for some time. Ms. Humphreys reported to the Subcommittee on two contests; Ms. Tanji asked the Board to help publicize the "apps" contest to students, professionals and all contacts. Deadline is August 31st. The Subcommittee is always searching for new ways of reaching different audiences about NLM products and services. Ms. Tanji said that the HHS *Innovates* award for MedlinePlus Connect was creating a lot of

excitement among librarians, at the Medical Library Association conference, in Hawaii and elsewhere. Board consultant Dr. Marion Ball had suggested at previous meeting that NLM have a presence at HIMSS. Betsy Humphreys and MedlinePlus Connect project manager Stephanie Dennis made it happen. (Lisa Lang, director of National Information Center on Health Services Research and Health Care Technology (NICHSR), coordinated NLM's activities at the meeting, added Ms. Humphreys.) The Subcommittee has encouraged NLM to make health benefit managers at major corporations a special focus of outreach activities. It's an especially important group to reach out to regarding MedlinePlus and MedlinePlus Connect. IT services managers at hospitals are another great group to contact, Ms Tanji added. Finally, she expressed sadness that former Subcommittee chair and Board chair Bruce James was departing. She credited him with many excellent ideas and urged him to keep in touch.

XV. WHEN HISTORY FADES: THE PERMANENCE AND STABILITY OF WRITTEN DOCUMENTS

Conservation scientist Peter Gabriele currently works with the History of Medicine Division. A responsibility here at NLM is examining the 13-15 charts by Nobel Laureate Dr. Marshall Nirenberg to determine their condition and advise on how they can be stabilized to slow further deterioration. He brought one representation to the Board Room. This is, in effect, one of first Excel charts, long before spreadsheets. It contains a wealth of important information, but in ball ink, fountain ink, pencil and other media.

Why do things fade? Permanence and stability are like a "cure" in medicine. We can never make things completely stable, but we can try to mitigate forces of nature. Today, there is a convergence of science, culture and heritage. The outgrowth is "forensic conservation," a new concept, integrating analytical chemistry, spectroscopy, art history and other disciplines. David Pogue, writing in the April 2011 *Scientific American*, has warned, "Beware the digital world." Images and files in digital formats are fleeting. Preservation is a very important thing today. Everything happens in a cycle. The Caves of Lascaux, discovered in 1940, were a conservation faux pas. Artificial lighting was added, and algae started growing. They sprayed biocides, then discovered fungal infection. The Caves are now almost entirely closed down by the French government. Scientists should have tried to understand light in the Lascaux situation. All of spectrum can be used in a non-destructive way.

Mr. Gabriele then discussed a number of factors – light, ink, paper – that contribute to the deterioration of hand-written documents. There are 15 causes of color. Light interacts with matter. We can take a lot of the principles of forensics and medicine and apply them to the process of degradation. The human eye has a limited perspective. It has limited resolution and a limit in spectrum of color. Shorter wavelengths have greater energy.

The ballpoint pen was invented in 1888 and has changed very little since. It's essentially a small ball bearing. Oxidation drives fading. Ballpoint pens constitute a \$20 billion market. To improve margins, manufacturers use cheaper materials.. Fading is a combo of heat, light and mechanical action. Paper (the topography) is made up of cellulose, binder and sizing agents, metal oxide fillers. The US paper industry has tanked in last 15 years. Most of it has moved offshore, with reduced quality. The timber comes from genetically enhanced trees, so they'll grow faster. The fiber is not nearly as good. From the 1950s on, the ink changed and degrades more quickly.

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Mr. Gabriele then discussed how spectroscopy can be used to examine documents and determine the materials they contain. A contemporary weather map uses spectroscopy. Taking a chip from a weather satellite, we can get full infrared imaging. Moisture patterns are read by the chip. Infrared imaging gives us a chance to watch the degradation in a document. Red squares denote something important, but it's hard to read what's under the red. HMD uses infrared to read what's beneath that red ink. Pigments and dyes have different chemical make-ups and principles. This becomes a very complicated game. Black is usually a combination of different dyes, which is complex to analyze. A UV-Vis Absorption Chart shows the chemical activity going on with different levels of light. This can end in destruction of paper and other matter. This is oxidative "photo-bleaching."

He urged the group to put on the 3D glasses he had provided to look at the mechanical complexity of ink and paper. This revealed a 3D backscatter, showing the texture of metal and cellulose fiber. This paper is loaded with calcium carbonate. If the paper is recycled, short fibers may clog the pen. Cheap copy paper from Staples has flat fiber. It's been flattened, but includes lots of organic junk. That will also start the degradation of the ink and paper. Ball ink and gel are different. Gel ink is water-based. It gets absorbed into the fiber. A ballpoint can be very hard, like a diamond. Lead sloughs off with writing; the ions begin to meld with the paper. Government-issued Skilcraft pens goop. The ball tends to leak or ooze. The Bic pen is more tapered and rolls more smoothly. There's less chance of getting a "hairball" on the pen.

Into this triad of interaction, we need to understand where in the process of degradation the document is. Dr. Nirenberg was the first federal employee to win the Nobel Prize. DNA translates to RNA to protein. Nirenberg deciphered the language from DNA to RNA. May 27, 1961, he and a post-doctoral student made the discovery. NLM has his charts. The Library is using high-tech today to ensure that these can be "high-touch" in the future, enjoyed by others. Color is a "triplet code"—red, green and blue. Mr. Gabriele is now working on Photoshop-assisted chromo-spectroscopy. It will help deconstruct the Nirenberg charts.

Norma Heaton, Dr. Nirenberg's technician, has amazingly precise and accurate notes. Science has been kept very well. There are two messages: an exciting story to tell about deciphering the genetic code—bringing Dr. Nirenberg's story to light—and learning more about using evolving techniques to preserve the great masterpieces of medical science. Mr. James asked whether Mr. Gabriele's company has been vetted by the US Government Printing Office. Yes, he replied.

Mr. James also worked on long-term preservation of digital materials at GPO. What is perpetuity? Top managers at GPO said that it would be as long as the US exists—500 years, by their estimate. How do you apply these lessons to digitized materials, he asked Mr. Gabriele?

The key is formats, he replied. Floppy disks are a relic. The big problem is the commercial world. He worries that we're all moving to an Apple/Mac system; his work was all done on a PC. There are no laws to establish a common format. We're not going to get much faster in how we process data. We're clearly in a rush to go digital, but we should be mindful that our nation and the many things we need and should preserve may need to be here in 500 years.

Mr. James reflected how, almost nine years ago, he walked through this doorway. He was the brand new Public Printer of the United States. He met Dr. Lindberg and was struck by how he looked at the overall

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NLM operation. It's truly a unique place in government, and the credit goes to Dr. Lindberg, Betsy Humphreys, and all the NLM managers. The NLM Director sees the future at the 50,000-foot level. He identifies and hires top-notch folks, identifies the tasks and then lets them go. He said he was very proud to have been here to serve in the effort, and again saluted Dr. Lindberg.

XVI. ADJOURNMENT

The Board of Regents meeting was adjourned at 12:00 p.m. on May 4, 2011.

ACTIONS TAKEN BY THE BOARD OF REGENTS:

- Approval of the February 8-9, 2011 Board Minutes
- Approval of the May 8-9, 2012 Future Meeting Dates
- Concept Approval for a Joint Program with the Uniformed Services University and NLM to Develop and Operate a Training Program in Biomedical Informatics
- New BOR Chair Nomination and Approval

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

Bruce James
Chair, NLM Board of Regents