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

**MINUTES OF THE BOARD OF REGENTS**
**February 8-9, 2011**

The 156th meeting of the Board of Regents was convened on February 8, 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 4:10 p.m., followed by a closed session for consideration of grant applications until 4:30 p.m. On February 9, 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. 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. Eleanor Frierson, U.S. Department of Agriculture
Ms. Gail Graham, Veterans Health Administration
Dr. Deanna Marcum, Library of Congress
Dr. Charles Rice, Uniformed Services University of the Health Sciences
RADM Boris Lushniak, Office of the Surgeon General, PHS
Col. John Powers, U.S. Department of the Army
Dr. Dale Smith, Uniformed Service University of the Health Sciences
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. Bradley Malin, Vanderbilt University
Ms. Cindy Notobartolo, Suburban Hospital
Dr. Lawrence Tabak, Deputy Director, NIH

**MEMBERS OF THE PUBLIC PRESENT:**
Ms. Eileen Kesselman, Lockheed Martin
Mrs. Mary Lindberg, Public
Dr. Ted Mala, Southcentral Foundation
Dr. Elliot Siegel, Consultant for NLM
Mr. Cody Thornton, Office of the Surgeon General

**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. Kristen Burgess, Division of Library Operations, NLM
Ms. Kathy Cravedi, Office of Communications and Public Liaison, NLM
Ms. Michelle Chronister, Division of Library Operations, NLM
Mr. Todd Danielson, Office of the Director, NLM
Ms. Darlene Dodson, Office of Financial Management, NLM
Mr. Ivor D'Souza, Lister Hill Center, NLM
Ms. Kathel Dunn, Division of Library Operations, NLM
Ms. Gale Dutcher, Division of Specialized Information Services, NLM
Ms. Ebinna Edeh, Office of the Director, NLM
Dr. Valerie Florance, Division of Extramural Programs, NLM
Mr. Michael Gill, Lister Hill Center, NLM
Ms. Kristen Greenland, Office of the Director, NLM
Mr. David Hale, Division of Specialized Information Services, NLM
Dr. Zoe Huang, Division of Extramural Programs, NLM
Ms. Christine Ireland, Division of Extramural Programs, NLM
Dr. Robert Jenders, Lister Hill Center, NLM
Mr. Stephen Kiyoi, Division of Library Operations, NLM
Mr. Sheldon Kotzin, Division of Library Operations, NLM
Ms. Janice Kelly, Division of Specialized Information Services, NLM
Dr. David Lipman, National Center for Biotechnology Information, NLM
Ms. Becky Lyon, Division of Library Operations, NLM
Ms. Wei Ma, Lister Hill Center, NLM
Ms. Jennifer Marill, Division of Library Operations, 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
Mr. David Nash, Office of the Director, NLM
Dr. Stuart Nelson, Division of Library Operations, NLM
Dr. Aaron Navarro, Lister Hill Center, NLM
Ms. Deborah Ozga, Division of Library Operations, MLM
Dr. Arthur Petrosian, Division of Extramural Programs, NLM
Dr. Steven Phillips, Division of Specialized Information Services, NLM
Dr. Barbara Rapp, Office of Health Information Program Development, NLM
Ms. Julia Royall, Office of Health Information Program Development, NLM

Dr. Angela Ruffin, Division of Library Operations, NLM
Dr. Hua-Chuan Sim, Division of Extramural Programs, NLM
Dr. George Thoma, Lister Hill Center, NLM
Dr. Bart Trawick, National Center for Biotechnology Information, NLM
Dr. Alan Vanbiervliet, Division of Extramural Programs, NLM
Ms. Beth Weston, Division of Library Operations, NLM
Dr. Jane Ye, Division of Extramural Programs, 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 156th meeting of the NLM Board of Regents.

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

RADM Boris Lushniak, recently named the Deputy Surgeon General, presented the report for the Office of the Surgeon General (OSG). He is a physician trained in family medicine, occupational medicine and pharmacology, and also holds a master's degree in public health.  Dr. Lushniak reported that the OSG has been reorganized into ten units that report directly to the Surgeon General. The OSG reports to the Assistant Secretary for Health at the Department of Health and Human Services (HHS). The OSG has a new advisory board, which represents all HHS operational divisions. The NIH Director, the FDA Commissioner and the CDC Director serve on the Board and advise the Office of the Assistant Secretary on core matters. The OSG has a civilian medical reserve corps as well. They are volunteers who assist their local communities in times of need.

Dr. Lushniak noted that on December 9, the Surgeon General issued a 700-page report about how tobacco smoke causes disease. On January 20, the Surgeon General issued a call to action to support breastfeeding.

Dr. Lushniak then focused on provisions of the Affordable Care Act dealing specifically with prevention. The Act places a priority on alignment of prevention activities across the nation. It established a National Prevention, Health Promotion and Public Health Council, chaired by Surgeon General Benjamin and including Cabinet level positions or their designees from seventeen federal departments.  In addition, the Act established an Advisory Group on Prevention, Health Promotion, and Integrative and Public Health, which will include 25 non-federal partners.  The Department of Education will look at prevention activities within our school systems, from physical activities to healthy food.  The Environmental Protection Agency will weigh in on toxic substances in our communities. Dr. Lushniak said that the President had recently announced 13 new members of the non-Federal Advisory group. The Council will be charged with developing a national prevention and medical strategy, providing leadership and coordination of the federal prevention and health promotion efforts, and reporting back on the progress of the national prevention strategy.  The Prevention Council's strategy is to develop action items and align them with existing national efforts, such as the Healthy People 2020 objectives and the First Lady's "Let's Move" campaign, which is focused on physical activity as a means to address childhood obesity. The OSG is working across sectors to develop partnerships focused on prevention efforts where people live, work, play, and pray.  The OSG is working to improve the quality of life for individuals and families

by moving from a focus on sickness and disease to one focused on wellness and prevention. The Prevention Council has identified ten strategic directions including healthy social and economic environments, the elimination of health disparities, prevention, and tobacco free living.

The OSG is very excited about the potential of the Prevention Council and about the focus on community participation. This is the first time that there has been commitment at such a high governmental level to speak the same language about prevention from so many different angles.

Mr. James asked why the Surgeon General views smoking, obesity, and alcohol and drug abuse as the three most important problems. Dr. Lushniak said it is important to deal with the future of America. He said the OSG is trying to make sure all kids get in better shape, eat better, never start smoking, and drink in moderation. Mr. James asked Dr. Lushniak how the Board could help. He said that the Board should monitor the activities of the Prevention Advisory Council and provide feedback.

## III. SEPTEMBER 2010 MINUTES AND FUTURE MEETINGS

The Regents approved without change the minutes from the September 2010 meeting. Dates for the May 2011 and October 2011 meetings have already been agreed upon. The winter meeting was set for February 7-8, 2012.

## IV. REPORT FROM THE NLM DIRECTOR

NLM Director Donald A.B. Lindberg began his report noting that the FY 2012 budget has not yet been released. NLM is expecting, however, to work with a fixed or reduced budget.

Dr. Lindberg announced the appointment of Jennifer Marill as the new chief of the Technical Services Division (TSD). She first came to NLM in the late 1990s and worked on MedlinePlus and Web development. She then went to the Library of Congress, where she engaged in strategic initiatives. She returned to NLM as deputy chief of TSD three years ago and was appointed chief in November. Janice Kelly was introduced as the new head of outreach to special populations in SIS. She spent the last 17 years as the executive director of the National Network of Libraries of Medicine, Southeastern/Atlantic Region at the University of Maryland at Baltimore. Dr. Alan VanBiervliet was introduced as the new user-centered informatics research officer for the Division of Extramural Programs. New staff members from the Lister Hill Center were also introduced. Their biographical information and that of new NCBI staff is at Tab C of the Board book.

Dr. Lindberg updated the Board on legislative and regulatory matters. A list of new House and Senate Appropriations and other pertinent Committee members was available for the Board in the back of the room. Legislation referred to as the "America COMPETES Act" passed the House and the Senate and was signed into law on January 11, 2011. It reauthorized a number of agencies including NSF. Significantly, it requires the establishment of a working group under the National Science and Technology Council to coordinate policies related to the dissemination of unclassified research results, including digital data and peer-reviewed scholarly publications, supported by funding from Federal science agencies. Another bill that did not pass would have required every agency that funds more than a $100 million in research to develop public access policies similar to NIH's, but with embargo periods of not more than six months from the date of publication. With respect to health IT, Dr. Lindberg noted that

the Office of the National Coordinator for Health Information Technology had issued final regulations on certification of electronic health record software for use in hospitals and outpatient settings.

Dr. Lindberg next addressed a current initiative of the multi-agency Networking and Information Technology Research and Development (NITRD) program, the successor to the High Performance Computing and Communication Program, established in 1991, of which he was the founding director. The 2009 ARRA/HITECH Act called for the NITRD Program to address Federal R&D programs related to health IT. In response, the NITRD Subcommittee established a Health IT R&D Senior Steering Group charged with identifying health IT R&D "game changers". The group includes representatives from twelve different agencies. Dr. Lindberg is representing NIH. His goal is to focus NITRD on reforming clinical trials, supporting the maintenance of information technology standards, improving the coordination of information exchanged between the DOD and VA systems, and enhancing the health component of disaster preparedness.

Dr. Lindberg mentioned the ongoing activities of the Trans-NIH Biomedical Informatics Coordinating Committee, which he chairs. Established in 2007 to improve communication and coordination of issues related to clinical and bioinformatics at NIH, the Committee has proven to be an effective mechanism for doing so at the federal and NIH levels. More can be found at Tab E of the Board book.

Adherence to the NIH Public Access Policy continues to improve. PubMed Central (PMC) now receives approximately 65,000 articles per year that have resulted from NIH-funded research. Approximately 40% of these are the final published version of the article that is deposited directly in PMC by a journal publisher. The others come in as author manuscripts via the NIH Manuscript Submission system. The 65,000 articles represent 70% of the total NIH-funded article annual output. The increased compliance rate can be attributed to a greater awareness of the policy, follow-up by NIH extramural program managers, and more journals depositing the final published version of all NIH-funded articles in PMC.

Dr. Lindberg updated the Board about MedlinePlus Connect, a free service allowing electronic health record systems to link to relevant, authoritative consumer health information from MedlinePlus in English and Spanish. MedlinePlus Connect was piloted by the Institute for Family Health and others. In November, 2010, NLM announced its general availability.

Dr. Lindberg introduced board members to NLM's new home page and invited their feedback. He then explained a new partnership with Mount Vernon. The Donald W. Reynolds Foundation has pledged $38 million to support the construction of a national library at Mount Vernon for the study of George Washington. Since NLM owns some important monographs, pamphlets, and broadsides relating to George Washington and medicine in the Revolutionary war period, NLM and the Mount Vernon Library are discussing a joint exhibition at the estate that will include items from the NLM collection. NLM is also providing advice to the Mount Vernon staff on conservation issues.

NLM's Profiles in Science Web site, in collaboration with Howard University, now includes an extensive selection of papers from the African American surgeon Dr. Charles Drew. Dr. Drew, who organized America's first large-scale blood bank, is also the first African American to be featured on the site.

Dr. Lindberg also discussed activities underway to observe NLM's 175th anniversary, previewed the new anniversary Web site and showed a three-minute anniversary overview video. Dr. Lindberg concluded

his remarks by presenting two TV clips illustrating how NLM programs and services benefit the public. One segment was from CNN's "American Morning" and the other from the "FOX & Friends" morning show on Fox News.

## V. NCBI UPDATE

Bart Trawick of the National Center for Biotechnology Information explained how My Bibliography (a component of the My NCBI suite of tools that allows users to customize their use of Entrez databases, including PubMed and PubMed Central) has been significantly expanded and enhanced over the past year. He pointed out that My Bibliography allows researchers to tie into the public access compliance.

While showing Board Members how to use My Bibliography, Mr. Trawick explained that up until recently, My Bibliography was simply a tool users could employ to collect articles they had written by PubMed ID. This tool has now been expanded to allow users to include a wide variety of citation types not included in PubMed, such as books and book chapters, patents, meeting presentations, and articles not indexed in PubMed. Furthermore, the My Bibliography system has been linked to eRA Commons, the system NIH grantees use to submit progress reports, so that Commons users may import their stored citations into grant reporting forms and automatically track compliance with the NIH Public Access Policy.

Mr. Trawick also explained a new service that is currently under development at NCBI called PubMed Author ID. Author ID is intended to serve as an author disambiguation tool, to help uniquely identify the scientific output of a particular author as found in the PubMed database. It will assist in solving two problems that can confound retrieval by author name in PubMed: (1) the use of multiple names or name variants to refer to the same person; and (2) the existence of many authors with the same names and initials. The service will rely on authors or their designees to identify their own articles in PubMed, although there will be tools to assist with this task. The first user group will be NIH funded authors. General users of PubMed will be able to retrieve articles identified as being authored by an individual. Identifiers from external ID systems (e.g., ORCID, Scopus Author ID) may be entered as synonyms to the PubMed Author ID.

## VI. ELECTRONIC PATIENT TRACKING DURING DISASTERS

Mr. Ivor D'Souza, Acting Director, Office of Computer and Communications Systems, introduced himself and Ms. Cindy Notobartolo, Division Director ED/Trauma, Safety & Security Services at Suburban Hospital. He noted that they would brief the Board about an electronic patient tracking technology that NLM is using as part of the Bethesda Hospital Emergency Preparedness Partnership (BHEPP). This partnership includes Suburban Hospital Healthcare System, the NIH Clinical Center (NIH CC), the National Naval Medical Center (NNMC) and the NLM. The goal of the partnership is to create a scalable model to track and treat patients during disasters that could be used by other hospitals.

In late 2009, the BHEPP decided to pursue the implementation of a Radio Frequency Identification (RFID) system to directly support the initiatives of three of its members. NLM, also a BHEPP member, was assigned the lead role for selecting and acquiring related technology and services, and for managing the implementation. The goals of the project were to: (a) track the location of disaster victims within each of the Partnership facilities, and the location of stable medical/surgical patients being transported among

facilities during mass casualty situation; (b) manage/track critical high-value assets purchased by the partnership to ensure easy location and mobilization during mass casualty situation; (c) support collaborative disaster exercises to demonstrate the effectiveness of locating technology in patient tracking and inventory management during mass casualty situation; and (d) develop necessary application programming interfaces to integrate the locating technology with BHEPP disaster response applications.

As NLM began evaluating the use of RFID technology in hospitals, it became readily apparent that radio frequency was not the only option available for locating patients and assets. NLM came across many successful cases of hospitals using infrared or ultrasound technologies as well. Some hospitals used a combination of locating technologies to meet their own unique business requirements. NLM realized that the marketplace has shifted from being purely RFID-based to one where locating systems were mostly technology-agnostic and could locate patients and assets in real-time. These systems are commonly known as Real-Time Locating Systems (RTLS). As a result, the implementation focus shifted from RFID to RTLS.

After going through the acquisition process, NLM selected three RTLS vendors, with competitively different technologies and service offerings, to survey the partner hospitals, gather business requirements and propose a technical solution for implementation. After evaluating the three vendor proposals, NLM selected Versus Technology to implement the RTLS system for the Partnership. The project deployment will occur in two phases. Phase 1 included deployment in Suburban Hospital and the NIH CC. Phase 2, to be completed in 2011, will include the NNMC. Phase 1 began in August 2010. In less than two months, NLM deployed all hardware and software at both hospital locations and integrated the system with existing BHEPP patient tracking applications.

Ms. Notobartolo then reported on Surburban Hospital's experience with the system during the Collaborative Multi-Agency Exercise 2010 (CMAX 10) on October 14, 2010. Suburban's first-time Incident Commander found the RTLS technology very helpful in his decision making. Since incoming patients were being fitted with RTLS tags upon arrival, the RTLS technology could track their location in the hospital. The Incident Commander could determine the counts of patients arriving at the Hospitals in real time and no longer had to depend on the accuracy of patient counts being relayed to him through other hospital personnel. Knowing how many patients had arrived, the Incident Commander and other emergency management personnel were in a better position to determine if the hospital had adequate resources to handle the surge, or if a contingency plan needed to be invoked.

## VII. LISTER HILL CENTER UPDATE

After a brief tour of the exhibition on Dr. James B. Herrick, who in 1910 gave the first documented case report on sickle cell anemia, the Board heard from Lister Hill Center Director Dr. Clem McDonald. He began with a definition of a Personal Health Record (PHR) system — a family PHR for patients and their dependents, which gives them an easy way to learn about the things they record in their PHR and also prods them towards preventive care and a healthy lifestyle. What makes the NLM PHR unique is that it uses NLM-developed consumer resources (such as MedlinePlus) and is built on NLM-supported vocabulary standards, which are also US national standards. It also includes links to ClinicalTrials.gov, for those who want to learn more about clinical research studies. It differs from other PHRs by featuring one main page for data entry, improving efficiency. It also issues patient-specific reminders, to encourage healthy behavior and improve outcomes. It can also capture almost any kind of structured health care

data. To make things as easy as possible, there is an autocomplete feature, which suggests medical terms as the user types. The system also brings up alternative spellings for terms it cannot recognize. The PHR project is already showing research benefits, too, as it allows testing and improvement of NLM vocabulary standards. It also serves as a helpful platform for studying how consumers use PHRs and whether PHR interventions can actually improve health. This system is also a potential recruitment instrument for clinical trials. The software is all open source. Dr. McDonald then demonstrated the various features of the system.

NLM has a tentative agreement with Suburban Hospital, Bethesda, Maryland, to host the NLM PHR. The NIH Office of the General Counsel is reviewing that policy and Suburban must do same. Later, NLM looks for wider deployment of the system via open source and other users. The first version does not include data imported from hospitals and clinics, but the next version will.

Dr. McDonald then gave an update on vocabulary and message standards for Newborn Screening (NBS). Tests performed in newborns measure conditions that can be ameliorated if caught early and treated. Previously, there were no standards for electronic reporting of the results of such tests. Also the cut-off values used to decide "normal" or "abnormal" have been inconsistent in different states. In addition, the false positive rate for such conditions is up to 25-fold or more in some jurisdictions. The goals of this project are to speed reporting through electronic delivery, to provide understandable structured content for decision support and computer filing, and to establish a basis for collaborating and improving the quality of newborn screening, including clear communication to health professionals and parents and rapid treatment if appropriate.

The development of NBS standards is a collaborative effort begun under the auspices of the American Health Information Community (AHIC), a former advisory committee to the Secretary of HHS. The project includes NLM, the Centers for Disease Control and Prevention (CDC), and the Health Resources and Services Administration (HRSA), among other organizations. NLM has responsibility for identifying, maintaining, and disseminating the standardized code sets and vocabulary to be used in exchanging newborn screening data. They include: LOINC for test codes, SNOMED CT for the categorical answers (conditions), and UCUM for units of numerically valued tests. The standard format for transmitting newborn screening test data is an HL7 version 2.x message with the specifics defined by a table of variables with their codes, definitions, answer lists and units of measure. Each state can choose the subset of tests it needs, but it should report results the same way. There's also an NBS Web site, which NLM hosts, with much more information. This effort toward standardization is already meeting with success. There are 50 newborn screening laboratories run by three major vendors; all have complied with HRSA/NLM guidance. Several states are already testing this new system, or plan to do so very soon.

Board member Ms. Mary Ryan asked whether NLM's PHR included family health history. Dr. McDonald replied that it could accommodate family history. It might be easiest to ask specific questions about that topic on the first page. Family health histories take a while to compile. Ms. Ryan then asked whether a pop-up message could appear on the PHR, if the user missed the deadline for a screening or something. Dr. McDonald replied that, yes, the system could do that and might also be able to send an e-mail to the patient.

Board member Dr. Joyce Mitchell asked whether the PHR testing would include transfer of data from Suburban Hospital to NLM. That will happen in time, Dr. McDonald replied. The first step is for them

host it on their system.  Dr. Mitchell said that she thought the long-term value of such a product, however, is being able to receive data into the system from multiple health systems.  The main challenge there, said Dr. McDonald, is standardization of the data received from multiple providers.

Board member Dr. Ronald Evens commented that Washington University developed a PHR and gave free access to it, but few took advantage.  Patients said they'd rather have their doctor or health system input the data.  Also, they preferred to download a paper form like the one you fill out at the doctor's office, update it and send it to any provider.  That could work, Dr. McDonald said, as long as the provider was able to download the form and read it.  Again, standardization is critical.

Board member Dr. Carol Friedman asked whether users could enter any information in the fields. Yes, Dr. McDonald answered. They can simply override the "autocomplete" suggestions.

Dr. Lindberg said a targeted group for this system is family members who have to keep writing down elderly patients' medication list. This system could make that process easier and much more accurate, Dr. McDonald told the Board.

Board member Dr. Katherine Gottlieb asked whether drug interaction checking was built into the NLM PHR system. No, said Dr. McDonald. Interactions can vary from patient to patient.  Many interaction alerts are nuisances, not serious threats to health. It's a challenging task to provide effective drug interaction checking although some PHR systems attempt to do it.

Consultant Dr. Kenneth Walker asked whether population subsets could have tailored features included in the system, such as patients undergoing chemotherapy, who need certain medications, reminders, etc. Absolutely, said Dr. McDonald. There are many such subsets.

Mr. James asked whether this system could notify the patient's primary care doctor, too.  Would the patient want it, Dr. McDonald asked, and what about encryption, for privacy? Dr. Lindberg remarked that one hurdle has been getting approval of a memorandum of understanding for this product with NIH.  A staff member at NIH Legal Counsel told NLM staff, when you figure this out, could you give me a Personal Health Record?  There is definitely a need for a good model, Dr. McDonald concluded, but there are many details left to work out.

## VIII. REPORT FROM THE DEPUTY DIRECTOR, NIH

Mr. James next introduced Dr. Lawrence Tabak, Principal Deputy Director of the National Institutes of Health.  Dr. Tabak wished NLM a happy 175th anniversary and proceeded to discuss the NIH Scientific Management Review Board (SMRB) and its activities.

SMRB was created by the NIH Reform Act of 2006 to advise the NIH Director through reports to Congress on issues relating to organizational authorities.  It has more external than internal members.  Despite rising investments in research and development by PhRMA (the Pharmaceutical Research and Manufacturers of America), FDA approval of new medical entities has continued to decline.  Currently, about 95% of compounds prove ineffective, and the trial process takes an average of 13+ years and about a billion dollars.  Clearly, it is not an efficient system.

With that as background, NIH Director Dr. Francis Collins in 2010 asked the SMRB to determine how NIH could better support translational and therapeutic sciences. In December 2010, the board recommended the creation of a new center on translational medicine at NIH. The group also endorsed NIH's commitment to evaluate the impact of such a center on existing programs at NIH, including the National Center for Research Resources (NCRR). The board requested that NIH report its findings to the SMRB at its next meeting, scheduled for February 23, 2011.

As a result, NIH is developing plans for a proposed National Center for Advancing Translational Sciences (pNCATS). An Institute Director group is working on this, reviewing its draft mission, primary functions, legal authorities, organizational design, ties to the NIH Clinical Center, relationship to the Cures Acceleration Network (CAN), and how to get out the word about its creation.

Dr. Tabak then showed a diagram of the proposed center, and which programs and functions at NIH may populate it. From NCRR, Clinical and Translational Science Awards (CTSAs) may be transferred to pNCATS. Other programs under consideration for transfer are the CAN (which has been authorized but has no appropriation yet); the relatively new FDA-NIH Regulatory Science program, which aims to apply a more scientific approach to all of the areas over which FDA has oversight; the Molecular Libraries Program, a collection of small molecules (from NIH intramural and extramural research); a Therapeutics for Rare and Neglected Diseases program (not appealing to PhRMA); and Rapid Access to Interventional Development (RAID), which examines pharmacology, toxicology, synthesis of materials that are appropriate and safe to put in humans. There is already a tremendous amount of ongoing translational research at NIH. Not all of that is going into this proposed center—it would be too unwieldy. As a major research-only hospital, the NIH Clinical Center will also be an important partner.

A second group under the Advisory Council to the Director of NIH is also working on pNCATS. Their charge complements that of the first group: where can NIH best contribute to streamlining therapeutic and diagnostic development? How can pNCATS tap the strengths of extant programs? This group will also propose new models for building partnerships with biotechnology and drug companies, and suggest metrics and timelines by which the success of pNCATS can be measured.

There is also an NCRR Task Force, which recommended that the CTSA program be shifted to pNCATS. It constitutes 40% of the NCRR budget. The choice then was whether to recreate what's left at NCRR or to start anew. The task force received input from NCRR leadership and subject matter experts selected by NCRR. Since a "straw model" of the proposed structural change was posted online January 18, 2011, over 1,200 comments have come in. The task force has also had lengthy conference calls with stakeholders.

For now, NCRR staff will continue working on current programs. The NCRR Task Force will make recommendations to the NIH Director this month. The pNCATS Working Group will report its findings to Dr. Collins in March. If the proposed changes are accepted, they will be implemented October 1, 2011, the first day of Fiscal Year 2012.

On November 16, 2010, the SMRB recommended the creation of a single NIH Institute on substance use, abuse and addiction research, and related public health initiatives. It would integrate portfolios from the National Institute on Drug Abuse (NIDA), National Institute on Alcohol Abuse and Alcoholism (NIAAA) and work on those topics conducted at other NIH Institutes and Centers (ICs). A new Substance Use and

Abuse (SUAA) Task Force has been appointed to review this matter. Its final recommendations are due to the NIH Director in spring of 2011. Feedback is being sought from all relevant stakeholders. If approved, the new Institute would be created October 1, 2012 (the first day of Fiscal 2013). On these and other matters, you are welcome to send comments to the NIH Director, at FEEDBACK@NIH.gov, said Dr. Tabak.

Mr. James asked whether all comments were anonymous. No, Dr. Tabak said. Some people identify themselves. Many people want to save their programs; others discuss the benefits of keeping things separate.

Dr. Mitchell remarked that the benefits to a combined SUAA seem obvious. However, there are benefits to CTSAs being in NCRR: they have made medical informatics central to the daily work of all of the NIH ICs. She hopes the focus on informatics is not lost — it enables transformative technology. The seat of informatics for NIH is here at NLM. Dr. Tabak said that a strong relationship between the ICs and the proposed pNCATS was built in to the plan.

Dr. Evens asked whether NIAAA and NIDA would be abolished and a new IC created. Yes, Dr. Tabak replied, and that would keep the NIH IC count at 27.

NLM Deputy Director Betsy Humphreys noted that, of all the aspects of pNCATS, the molecular biology lab is of greatest relevance to NLM. One of its components, PubChem, was built by NCBI.

Dr. Lindberg discussed the upcoming match between two great "Jeopardy!" champs and IBM's Watson computer, February 14-16, 2011. This is reminiscent of the IBM last big public exercise in artificial intelligence (AI) — Deep Blue beat chess master Gary Kasparov in 2004. Question answering is a pretty mainstream function in AI, although it requires some natural language understanding. A group of 20 full-time people has been working five years on this challenge. The strategy is massively parallel computing, using 1-2,000 simultaneous CPUs. This challenge is especially daunting because it's done in real time. For Watson, the challenge is to buzz in first and then answer correctly. To be successful, it has to catch 50% of the questions, and get 80% right. However, a champion like Ken Jennings buzzes in 62% of the time and answers 90% of questions correctly. Dr. Mitchell asked how they feed questions to the computer. Dr. Lindberg said that they are spoken, and there are no images. Consultant Dr. Marion Ball said that there should be a "Dr." Watson version, for medical questions, in celebration of NLM's 175th anniversary. It would mean great visibility for the Library.

## IX. ELECTRONIC IS NOT FREE:  TRENDS IN ACQUIRING AND INDEXING BIOMEDICAL JOURNALS

NLM Associate Director for Library Operations Sheldon Kotzin next introduced some backbone services of NLM. Acquisition of journals is a core function of NLM, and indexing has been an important function since 1879 with the advent of *Index Medicus*. Many other services at NLM and around the world are built upon the indexing of the journal literature, its quality and value. Acquisition and indexing have changed significantly in the last 15 years, with the licensing of electronic journals and the receipt of electronic data from publishers. NLM has also started indexing from journal Web sites. The transition has been smooth, and performance and productivity have improved, but most electronic information is not free and its processing does not save money.

Head of the Serial Records Section Beth Weston discussed how scientific publishing is currently transitioning from print to electronic format. As part of its mission to acquire and preserve the biomedical literature, NLM currently subscribes to over 18,000 journals in print and has added electronic versions of over 6,000 titles. About 1,700 are electronic-only. NLM continues to acquire print copies to fulfill its archiving function, since in most cases it can license, but not actually acquire and store the electronic copies. NLM's PubMed Central archive for electronic journals, while a valuable resource, is not an attractive option for all publishers. It therefore has a limited number of titles compared with the scope of the overall NLM collection. In addition, some of the unique titles in NLM's serials collection are not yet available in electronic format. There is an NIH-wide strategy for paying for electronic access to journals. All NIH ICs are assessed a fee annually that goes toward purchasing access for the NIH community. NLM collaborates with the NIH Library to license e-journal packages. NLM continues to be the primary source of payment for print versions.

Publishers, meanwhile, are trying to keep their revenue stream going even as more titles are converted to electronic-only publications. Some have flipped their pricing model, so that the electronic version is premium priced, while the print version is a discounted add-on. The "big deal" is a common term for a library's license to a bundle of one publisher's publications for a set fee, with a set annual cost increase. Many libraries are trying to get out of these deals, which may forbid cancellation of specific titles within the bundle.

There are many tasks involved with making electronic journals accessible. These include negotiating license agreements, maintaining links to the electronic titles and maintaining access to "ceased" titles—staff must continue to monitor these titles to make sure the content is still available online. The cost of biomedical serials continues to rise; a diagram showed that in FY2010, NLM had fewer titles than in 2006, because of cancellations, but expenses were 28% higher. The open access movement is expanding, but even the inclusion of hundreds of open access titles in the NLM collection hasn't significantly reduced costs. The increase in electronic journals has allowed the Library to cancel duplicate subscriptions, however. We no longer need two copies—one for indexing and one for general use in the collection. With fewer hard copy issues being checked into the collection, there is some savings in binding and shelving costs. Cancellations of duplicate subscriptions and some titles considered peripheral to the Library's scope saved about $2 million in recent years.

Dr. Mitchell asked whether Ms. Weston thought the Library still had a broad scope, with the cancellations. Many cuts have been duplicate print copies, Ms. Weston noted. After five years of cutting, there are few duplicates left. After that, NLM will have to cut unique substantive holdings. Currently, 60% of NLM's serials expenditures is for MEDLINE titles. There is also the need to leave room for new titles. Selectors identify 300-500 new titles or more each year.

Ms. Weston then showed that the average price of a MEDLINE title is over three times that of a non-MEDLINE title. NLM Associate Fellow Kristen Greenland conducted research on FY2006 holdings: if a journal had been accepted for indexing in MEDLINE, the subscription price rose 165%. If not, the price rose 105%. Dr. Evens asked whether this was a new phenomenon. No, said Ms. Weston, but since 2006, the gap in price has actually doubled. Ms. Weston said that, until NLM feels confident with electronic archiving models, it will continue to acquire print and maintain electronic access. E-publishing, unfortunately, is not cutting costs. Budget constraints may put the uniqueness of the NLM collection at risk, sacrificing non-MEDLINE titles.

Head of the Index Section Deborah Ozga next talked about trends in indexing journals.  A chart showed the growth in number of MEDLINE journals and citations indexed since 2000.  Her office is currently indexing about 5,500 MEDLINE journals and 700,000 articles a year.  This growth reflects the Library's commitment to receive and make available the biomedical literature on all topics. With the expansion of research and the creation of new journals, Ms. Ozga doesn't expect the number of titles to go down.

She briefly described the indexing process, including data creation (formatting citations for PubMed) and additional processing. Indexers assign MeSH headings for 94% of articles for which citations are added to PubMed  (The other 6% represent out of scope articles in journals that are selectively indexed and journals that are in PubMed Central, but have not been selected for indexing.) Indexers also do gene indexing and chemical indexing, and quality assurance. All of the resulting information goes into PubMed.

The costs of this process are rising.  The total cost of indexing and data creation costs for 2010 was $8.4 million. Why is this happening?  One reason is that more articles are being published in journals NLM indexes: a 36% increase from 2000 to 2009.  With e-publishing, you don't have the constraints of print. Ms. Humphreys commented that the pattern of an increasing number of articles per indexed journal predates e-publishing. Once a journal is accepted in MEDLINE, it typically gets a flood of high-quality papers.  Dr. Evens said that the *Journal of the American Medical Association* plans to trim the size of its articles, because people don't want to read longer ones.  Ms. Ozga noted that some journals include over 100 articles in one issue.  Another reason for the increasing volume of articles is that we add about 130 more journals for indexing each year —about 19,000 additional articles, for a cost of $181,000.

NLM has taken a number of steps to reduce or contain the per article cost of indexing and data creation. One significant success was the gradual replacement, beginning in 1997, of the use of double-keyboarding for data creation with two other less expensive data creation methods: an optical character recognition (OCR) system, developed in house, and direct submission of electronic citation and abstract data in XML format by publishers. The Library has worked diligently with publishers to encourage submission of citations and abstracts in XML, which is by far the cheapest method for NLM. In 2010, NLM received 91% of citations in XML.  A 2006 study showed that XML submissions saved the Library over $8 million from what would have been spent if the OCR method was used for everything. Improvements in the journal indexing system, which have streamlined workflow have also reduced costs.

An important cost containment plan in the works is the expanded use of MTI (Medical Text Indexer), an AI system developed by Lister Hill Center. MTI suggests MeSH headings, which the indexers can then select. The system has been in use to train and assist indexers for some time, but beginning in 2011 it will actually perform the initial indexing of selected journals.  The final review will be done by trained indexing revisers, as is also the case for articles indexed by human indexers.  Early test results show significant time savings. Ms. Ozga said that her office would give a full report to the Board at a future date.

Board consultant Dr. Holly Buchanan commented that medical librarians have a lot of empathy regarding this subject. There are pressures for cost containment, while trying to preserve the scope of collections, and many libraries in the field, like hers at the University of New Mexico, look to NLM for print journals. They're not saving, archiving or preserving those themselves. Ex officio Board member Dr. Deanna Marcum said the Library of Congress is facing a similar situation. They request print copies of the

journals but also license electronic content for onsite use, because their users want immediate access. Some publishers, such as Springer, prefer to send journals in an electronic format only. LOC can accept the titles, then forward those to NLM.

Dr. Ball asked how reprints are delivered to users. NLM Public Services Director Ms. Martha Fishel said that less than 5% are delivered in hard copy. Some licensing agreements force the Library at times to print an e-copy, scan it, then e-mail that copy, so there's not much cost saving.

Dr. Mitchell said she had lots of memories of meetings in the NLM Board Room, discussing artificial intelligence and its capabilities for indexing. Indexers are apparently getting comfortable with MTI and having computers assist them. The MTI project began in 2000, Mr. Kotzin noted. Ms. Ozga said that her office will test 14 journals specifically suited to the capabilities of MTI this spring. MTI may be able to handle other formats than just journal articles. Dr. Mitchell asked what the criteria were used to determine MTI's effectiveness. Ms. Ozga said that the match rate was as high as 90% and above. It's not perfect, but the process is still carefully monitored by indexers. Board member Virginia Tanji asked whether MTI could also handle MeSH subheadings. Yes, Ms. Ozga replied.

Ms. Ryan remarked on the steep rise in the price of journals. Does NLM have any "big deals?" Ms. Weston replied that NLM does have some "big deals" with the NIH Library. Its head, Suzanne Grefsheim, does the negotiating.

## X. EXTRAMURAL PROGRAMS REPORT

Extramural Programs (EP) Director Dr. Valerie Florance said that every February, the Board is asked to review and approve the NLM grants operating procedures. EP can make adjustments upward or downward, in terms of budgets or length of time. At some point during the year, EP will announce these adjustments to the Board, with reasons given. Downward adjustments might occur because activities can be accomplished at a lower cost or a policy requires the elimination of certain items or expenditures. Upward adjustments are limited to administrative matters, such as salary levels, project periods, and facilities and administrative costs. She requested a motion to accept the current guidelines for adjustment. It was made, seconded and unanimously approved.

Every other year, Dr. Florance presents to the Board about inclusion reporting. Each grant application with human subjects must describe the composition of its study population in terms of gender and racial and ethnic groups. NIH tracks that data across all ICs, and issues a report every other year. NLM funds few clinical trials but supports human subject research relating to biomedical informatics. Over the past review period, NLM had no discrepancies in its human subjects. Dr. Florance asked for a motion to accept the NIH report on inclusion guidelines. It was made, seconded and unanimously approved,

Finally, Dr. Florance gave a report on assessing the impact of NLM grants, which had been suggested by Board Chair Bruce James at the September Board meeting. The topic was discussed in yesterday's meeting of the Board's Extramural Programs Subcommittee. She began with several assumptions. First, grants funded with taxpayer money should deliver a public benefit. Questions for assessment are: Did the grant meet its stated goals? What was produced? What difference did it make? Are the benefits worth the costs? NLM EP does a lot of work to monitor achievement of stated goals. The judgment of the NLM program officer is the first step. If a grantee seems to be missing the mark, EP may ask for more frequent

progress reports than the annual report to assure goals are met. Lackluster performance may affect future funding decisions. Mr. James asked whether a sub-par performance was a common occurrence. Dr. Florance said it happens for less than 5% of all NLM grants.

Outputs come in many forms: articles, patents, algorithms, knowledge bases, software tools, trainees, program income, etc. Grantees' annual progress and financial reports list these products. The program officer reviews these lists, but there are no objective standards of success defined by NIH. Anyone can track with ease the number of publications, patents, etc. if the grant number is listed in a publication. As far as impact assessment for research grants, NLM looks at intermediate measures such as citation of published work, new grant awards (from NLM, other NIH organizations, the National Science Foundation and other public or private organizations). For training, career progress can be tracked.

In informatics, most impact assessments have been cost/benefit to an organization or patient, or the satisfaction of users. This would include the use of tools and techniques by others, the licensing of patents, and awards and honors for the grantee or trainee. It's challenging to devise a yardstick for this. Most researchers don't list tools and techniques used when they compile bibliographies and journal articles, so it's hard to measure grantees' impact.

Using outputs to assess impact, NIH studied 140 people who got Career Transition (K22) grants, across all Institutes and Centers. The goal of the program is to help these grantees move from post doctoral work into a successful research career. In this case, specific successful outcomes were determined, involving number of publications, future research grants and securing of a tenure track-like position. NIH developed a control group that didn't get the K22 grants, then measured them with the same criteria

NLM had several awards in the K22 group. They publish a lot, but the range is wide—between 0 and 48 articles for a grantee in three years. Fifty-five per cent of them received a new grant after the end of their K22 grant. Fifty-five per cent attained assistant professor status and 45% had another academic designation at the time of application.

Dr. Florance shared the results of a 2008-9 study by an NLM Associate, comparing bibliometric tools that could be used for citation analysis as a measure of impact. The researcher compared Web of Science, Scopus and Google Scholar and found features of each that were useful for tracking citations of NLM grantees. However, using citations to assess impact also requires attention to other issues too, such as self-citation, the journal impact factor. Citation tracking does not address how to assess the value of software "downloads" or patents. The study also showed that publishing patterns differ for clinical informatics and bioinformatics researchers.

NLM Deputy Director of Research and Education and former EP Director Dr. Milton Corn and Board member Dr. Louis Rossiter directed a study by students at the College of William and Mary, comparing 15 research grants each from the National Cancer Institute (NCI) and NLM. It showed that there are techniques for removing self-citation and some other confounding factors. It also identified interesting questions to ask about research, such as: What constitutes failure? The study pointed out a wide gulf between the size and duration of NLM and NCI grants.

EP does examine the impact of its training grants for careers in biomedical informatics through periodic review of data received from the training programs. EP doesn't track the people once they leave the NLM

training programs, but is considering how this could be done. For example, longitudinal studies would help NLM track trainees as they obtain positions in variety of fields, or move in and out of fields. Lots of NLM grantees go on to win awards, serve on prestigious panels, etc, and EP might want to consider factors like these in assessing training success.

In closing, Dr. Florance laid out a list of next steps for EP: Define a success measure for each grant type (research, career transition and training); test that approach using retrospective data, and talk to NIH colleagues; gather information prospectively for each active program; and establish and refine approaches for impact and longitudinal tracking. She thanked the EP Subcommittee for its helpful input. As an example of what might be done in the future, she shared a graphic that showed clearly how the products of NLM grants over a number of years had been used to create Personally Controlled Health Records.

Mr. James praised her presentation. He suggested that the Library get the RAND Corporation to do a study on the impact of NLM grants.

Dr. Florance referred Board members to a handout outlining an NLM Advanced Informatics Challenge grant program. Two years ago, the Board gave approval for EP to approve RFAs on advanced information topics. NIH has a multi-IC grant program called EUREKA, housed at the National Institute of General Medical Sciences (NIGMS) and EP used this program for 2 years to explore its utility for this purpose. NLM EP wants to establish an NLM-based program of its own and call it the NLM Advanced Informatics Challenge Grant. The handout provided a statement of the topic for a 2011 RFA in this new series, in the area of artificial intelligence for personal health records. The EP Subcommittee discussed and approved the scope of the idea. Mr. James noted that Ms. Tanji has left the EP Subcommittee to chair the Outreach Subcommittee. Dr. Mitchell has joined the EP Subcommittee.

## XI. TECHNOLOGIES TO ENABLE PRIVACY IN BIOMEDICAL DATABANKS

Dr. Bradley Malin of Vanderbilt University discussed his NLM grant, "Technologies to Enable Privacy in Biomedical Databanks." Dr. Malin's expertise is in biomedical informatics and computer science. He came to Vanderbilt to build privacy and security technologies around a research biomedical databank tied to electronic medical records. Vanderbilt created a completely de-identified copy of the electronic medical record systems, which is updated weekly and used in conjunction with a collection of discarded blood samples taken in an outpatient setting. The samples are sequenced and used for genome wide association studies to explore, for example, how to tailor particular drugs to individuals' phenotypes. The project has been replicated at other institutions.

Dr. Malin described the three concerns his NLM grant is addressing: the potential for hacking and disclosure which can compromise data; the potential for duplication and fragmentation when using biomedical data with no identifiers; the potential someone will misuse or abuse the system.

To securely manage data and keep it from being compromised, Dr. Malin's group is using two methods—cryptography and secure hardware. They encrypt data using traditional means, but decrypt and run computations in tamper-resistant hardware (a co-processor that flushes the memory and shuts down if someone tries to crack the system). Duplication and fragmentation can be a problem with de-identified data, for example, when a patient is treated in multiple institutions and each institution submits data to the databank. Dr. Malin said a lot of his research is focused on "privacy preserving record linkage." In

wrapping up, he told the board he strongly believes that formal security can be put into biomedical data management fragments and it would be a "smart thing to do."

After the presentation, Dr. Clem McDonald and Dr. Malin engaged in a discussion of environments where you do not need to have data in an encrypted form before it goes to a third party.  Ms. Ryan asked if patients are notified that their blood and tissue samples could be used for research and if so, can patients opt out.  Dr. Malin stressed that Vanderbilt consulted with the community before starting the project. Vanderbilt uses an opt-out, not an opt-in, model. Ex-officio member Mr. Howard Wactlar asked Dr. Malin for thoughts on making data available to individuals, who then through social media can find others like themselves and form support groups. Dr. Malin noted that privacy in an interactive community and social environment has different problems than what his team is working on—sharing data for reuse purposes in a passive environment. After complimenting Dr. Malin on his work, Dr. Lindberg made the point that good encryption is only trusted if the mechanism is made public and everyone understands it.

## XII. NLM IN HAITI UPDATE

Dr. Steven Phillips, NLM Associate Director for Specialized Information Services (SIS), updated the Board on the Library's efforts to help Haiti recover from last year's massive earthquake. He showed photographs of the devastation—damage to hospitals and the ministry of health where all of Haiti's health records are stored—and said the Library's response to the earthquake and cholera outbreak was swift.

Dr. Phillips highlighted some of the Library's actions: Dr. Lindberg devoted two podcasts to Haiti; MedlinePlus translated health information into Haitian Creole; a Health Resources for Haiti widget was created; information pages were created; the Emergency Access Initiative  was activated to provide free, full-text articles to a collection of materials; the network of disaster information specialists swung into action—one of the librarians in the network downloaded information translated into Creole and gave it to the staff on the USS Comfort.

NLM has a long history of helping during disasters. When Hurricane Mitch devastated Central America in the 1990s, the Library helped rebuild the health information infrastructure in partnership with the Pan American Health Organization (PAHO).  The Central American Network for Disaster and Health Information (CANDHI) was created. Based on NLM's experience in Central America, NLM staff went to Haiti to see if they could reproduce a specialized information center like those in the Central American network in Haiti.  NLM partnered with PAHO to assess health information collection, sharing, and management by "responders" and the government. The team learned there weren't many records left— just a bunch of cartons and handwritten notes.  After that visit, and a September 2010 meeting with Haitian officials, the team decided to base the Haiti project on the Central American experience.try to rebuild the IT infrastructure, train people, and provide information services. Dr. Phillips said it's still a work in progress—they are trying to decide how much effort and how many resources to put into each of the areas.

SIS swung into action again in November 2010 after the cholera outbreak and PAHO asked NLM to help. Victor Cid, a computer scientist with SIS, helped design and implement a practical health cluster information management strategy; supported technologies to collect, organize and disseminate information; helped them organize a health cluster web site; and helped design their on-site  emergency operations center.  Dr. Phillips also spotlighted two other NLM projects and the people behind them: the

Haiti Lost Person Finder and the digital pen project. In wrapping up, Dr. Phillips noted how the role of libraries is evolving and that librarians are becoming more proactive in disaster preparedness and response. The Federal Emergency Management Agency (FEMA) recently recognized libraries as essential community organizations.

After the presentation, Dr. Walker asked Dr. Phillips to outline what he would like libraries to be able to do if, for example, a disaster were to happen in New York in ten minutes. Mr. James then asked Dr. Phillips to define where he'd like to see the effort go and what the board can do to help achieve it.

## XIII. SELECTION OF NOMINATING COMMITTEE FOR BOR CHAIR

Mr. James announced that ex-officio member Dr. Charles Rice has agreed to chair the nominating committee. Dr. Deanna Marcum and Ms. Gail Graham also will serve on the committee.

## XIV. REPORT FROM THE SUBCOMMITTEE ON OUTREACH AND PUBLIC INFORMATION

Subcommittee Chair Virginia Tanji reported on the Outreach and Public Information meeting. She noted that NLM Deputy Director Ms. Betsy Humphreys gave the subcommittee a new charge—to help identify specific actions that Board members can take to help with outreach. Ms. Tanji said in her mind that means making NLM, MEDLINE and MedlinePlus household words. The subcommittee came up with a list of ideas that include: expanding joint activities with the Smithsonian Institution; working with large employee benefits programs to provide access to good health information; working with network librarians to do consumer health information presentations to community groups such as rotary clubs; and provide links to apps that use NLM resources. Ms. Tanji said it was a productive meeting, gathering ideas, but not yet prioritizing them.

## XV. NLM MOBILE HEALTH/HANDHELD APPLICATIONS UPDATE

Dr. Stuart Nelson of the Division of Library Operations and David Hale of the Division of Specialized Information Services updated the Board on the growth of new NLM applications for mobile devices. With more and more people using handhelds, Dr. Nelson projected his presentation from a handheld device, an iPad, and demonstrated two mobile projects. DailyMed is available as a web service that can run on a variety of handhelds including the iPhone, Droid, and Blackberry. The DailyMed Web site, which started in 2005, provides information on more than 20,000 marketed drugs and gets between 7 and 8 million page views a month. A version for handhelds went into production about three weeks ago and Dr. Nelson said he's already heard from users who are happy with it. The second product is an application that enables people to carry their medication list with them wherever they go. Dr. Nelson showed how a user might update the medication list—adding and subtracting medications—filling in information such as number of pills to take and when. Right now the app is a prototype; it hasn't been approved by Apple at this time.

Ms. Humphreys noted that it's fine to have mobile products that are mobile optimized Web sites and not apps, but there must be a way for those products to show up when people search for apps. She said that problem was addressed successfully with mobile MedlinePlus. Consultant Dr. Tenley Albright made two points about using mobile applications for health and medicine. She said to be aware that there may be

times when people can't get reception. She also suggested creating something along the lines of an app that would index NLM's mobile products so the material would be identified as being associated with NLM and thereby having credibility.

Mr. Hale gave an overview of the mobile space for health information. He compared mobile optimized Web sites versus mobile applications. From an architecture point of view, a mobile Web site is a Web site that's been optimized for display on a mobile device, while an app is a computer program that has to be coded, written and installed on a particular device. In terms of online/offline use, mobile optimized Web sites generally require an Internet connection for access, while apps can work online or offline. Mobile optimized Web sites are accessible on all mobile platforms with a web browser. Mobile apps must be programmed separately for each platform, which increases cost and development time.

Mr. James inquired about the cost of both establishing and maintaining apps, asking what NLM face in five years if it were to have 200 apps out there. Both Ms. Humphreys and Mr. Hale made the point that NLM evaluates the platforms based on the goals of going mobile, to decide whether to use mobile optimized Web sites or applications. Ms. Humphreys also said NLM believes that in order to understand a field and its issues, you have to put your foot in the space to figure it out—and that's what NLM is doing now. Mr. Hale added that NLM also can connect with other government agencies and learn from their experiences.

Mr. Hale demonstrated a relatively new mobile application for the AIDSinfo HIV Glossary. It's a glossary of more than 850 HIV/AIDS-related terms defined in plain language. The glossary is available in English and Spanish and can be downloaded as a PDF. It's also available as a mobile Web site. But there are opportunities to innovate. There's an iPhone app and versions for the Droid and Blackberry are in development. The apps allow for offline use, so if someone is without Internet connectivity or is in a rural area, the app still functions. He also noted users can choose an option titled "random" that will call up random terms from the database. Mr. Hale said gaming elements like that are becoming more prominent in the mobile space to engage users and promote the acquisition of information.

In wrapping up, Mr. Hale noted more of NLM's recent developments in the mobile space. NLM launched an API Web page that is one stop shopping for software developers. It serves as a marketing tool for NLM's information. APIs about to go live include: ToxNet, DIRLINE, and a chemical spell check. LactMed and Pillbox are two more apps in the works.

## XVI. ADJOURNMENT

The Board of Regents meeting was adjourned at 12:00 p.m. on February 9, 2011.

**ACTIONS TAKEN BY THE BOARD OF REGENTS:**
➢ Approval of the September 14-15, 2010 Board Minutes
➢ Approval of the February 7-8, 2012 Future Meeting Dates
➢ Approval of Grant Operating Procedures
➢ Approval of Inclusion Guidelines for Women and Minorities
➢ Selection of Nominating Committee for New Board Chair

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.                          Bruce James
Director, National Library of Medicine              Chair, NLM Board of Regents