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

MINUTES OF THE BOARD OF REGENTS
February 5-6, 2013

The 162nd meeting of the Board of Regents was convened on February 5, 2013, 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 4:15 p.m., followed by a closed session for consideration of grant applications until 4:45 p.m. On February 6, the meeting was reopened to the public from 9:00 a.m. until adjournment at 12:00 p.m.

MEMBERS PRESENT [Appendix A]**:**
Dr. Joyce Mitchell [Chair], University of Utah
Dr. Ronald Evens, Washington University School of Medicine
Dr. David Fleming, University of Missouri School of Medicine
Dr. Katherine Gottlieb, Southcentral Foundation
Dr. Henry Lewis
Dr. Trudy MacKay, North Carolina State University
Dr. Ralph Roskies, University of Pittsburgh
Dr. F. Douglas Scutchfield, University of Kentucky College of Public Health
Ms. Gail Yokote, University of California, Davis

EX OFFICIO AND ALTERNATE MEMBERS PRESENT:
Dr. Regina Benjamin, Office of the Surgeon General, PHS
Dr. Steven Brown, Veterans Health Administration
Mr. Christopher Cole, National Agricultural Library
Ms. Kathryn Mendenhall, Library of Congress
Col. Cathy Nace, United States Army
MGEN Kim Siniscalchi, United States Air Force
Dr. Linda Spitzer, Uniformed Services University of the Health Sciences

CONSULTANTS TO THE BOR PRESENT:
Dr. Tenley Albright, Massachusetts Institute of Technology
Dr. Marion Ball, Johns 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. Christopher Austin, National Center for Advancing Translational Sciences, NIH
Mr. James Avallone, Manhattan Research
Dr. Lauren Bishop, Butler Academic Center
Dr. Kenneth Mandl, Harvard Medical School

MEMBERS OF THE PUBLIC PRESENT:
Mr. Jose Luis Andrade, Friends of the National Library of Medicine
Mr. Andrei Komarov, Technical Resources International, Inc.
Mary Lindberg
Dr. Ted Mala, Southcentral Foundation

Dr. Angela Michaud, Southcentral Foundation
Ms. Ronica Lu, Friends of the National Library of Medicine
Dr. Barbara Redman, Friends of the National Library of Medicine
Dr. Elliot Siegel, 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
Dr. Michael Ackerman, Lister Hill Center, NLM
Ms. Stacey Arnesen, Division of Specialized Information Services, NLM
Ms. Joyce Backus, Division of Library Operations, NLM
Dr. Olivier Bodenreider, Lister Hill Center, NLM
Dr. Dana Casciotti, Office of Health Information Programs Development, NLM
Dr. James Cimino, Clinical Center, NIH
Ms. Kathleen Cravedi, Office of Communications and Public Liaison, NLM
Ms. Francesca Crawford, Division of Extramural Programs, NLM
Mr. Todd Danielson, Office of the Director, NLM
Mr. Ivor D'Souza, Office of Computer and Communications Systems, NLM
Dr. Kathel Dunn, Division of Library Operations, NLM
Ms. Gale Dutcher, Division of Specialized Information Services, NLM
Dr. Valerie Florance, Division of Extramural Programs, NLM
Dr. Dan Gerendasy, Office of Health Information Programs Development, NLM
Mr. Daniel Hartinger, Office of Acquisitions and Consolidated Operating Acquisitions Center, NLM
Dr. Michael Huerta, Office of Health Information Programs Development, NLM
Ms. Christine Ireland, Division of Extramural Programs, NLM
Ms. Janice Kelly, Division of Specialized Information Services, NLM
Dr. Halil Kilicoglu, Lister Hill Center, NLM
Dr. Jongwoo Kim, Lister Hill Center, NLM
Dr. Alla Keselman, Division of Specialized Information Services, NLM
Ms. Lisa Lang, Division of Library Operations, NLM
Ms. Kelli Langley, Office of the Director, NLM
Dr. David Lipman, National Center for Biotechnology Information, NLM
Dr. Clement McDonald, Lister Hill Center, NLM
Mr. James Mork, Lister Hill Center, NLM
Mr. Dwight Mowery, Division of Extramural Programs, NLM
Mr. David Nash, Office of the Director, NLM
Dr. Aaron Navarro, Lister Hill Center, NLM
Mr. Duc Nguyen, Office of Computer and Communications Systems, NLM
Dr. Steven Phillips, Division of Specialized Information Services, NLM
Mr. Dylan Rain Tree, Division of Specialized Information Services, NLM
Dr. Jeffrey Reznick, Division of Library Operations, NLM
Dr. Angela Ruffin, Division of Library Operations, NLM
Mr. Jerry Sheehan, Office of the Director, NLM
Dr. Hua-Chuan Sim, Division of Extramural Programs, NLM
Dr. George Thoma, Lister Hill Center, NLM
Dr. Fred Wood, Office of Health Information Programs Development, NLM
Dr. Deborah Zarin, Lister Hill Center, NLM

I. OPENING REMARKS

Dr. Joyce Mitchell, NLM Board of Regents Chair, welcomed the Regents and guests to the 162nd meeting of the Board. She introduced two new alternate ex-officio members: Dr. Steven Brown in attendance for Dr. Robert Petzel, Under Secretary for Health of the Veterans Health Administration and Dr. Linda Spitzer in attendance for Dr. Charles Rice from the Uniformed Services University of the Health Sciences. She then introduced Dr. Christopher Austin, Director of NIH's newest center, the National Center for Advancing Translational Sciences (NCATS). Dr. Austin is leading NCATS in its mission to catalyze innovative methods and technologies that will enhance the development, testing, and implementation of diagnostics and therapeutics across a wide range of human disease and conditions.

II. REPORT FROM THE NATIONAL CENTER FOR ADVANCING TRANSLATIONAL SCIENCES (NCATS)

Dr. Christopher Austin stated that biomedical researchers know more about our health and disease than ever before. But, he added, our ability to produce tangible results is pretty poor. Even if we developed novel interventions for many diseases, we don't have the capacity to test them in humans. The major challenge for our era in biomedical research is to figure out how to take information and deliver on it for patients and for those who fund us.

NCATS was created in December 2011 to address this translational problem. Dr. Austin has been the Director for about 3 months. The budget for NCATS is primarily a reallocation of funds from programs previously located in the NIH Office of the Director, the National Human Genome Research Institute, and the National Center for Research Resources. NCATS, like NLM, is built as a collaborative instrument, a connector to the ecosystem outside of NIH that includes the traditional constituents and patient advocacy groups. NCATS needs to not only develop technology, tools, and paradigms to make the translational process work better but it also needs to demonstrate its usefulness. Dr. Austin discussed the differences between NCATS's clinical, preclinical, and other programs.

NCATS is addressing the toxicology problem via a collaboration with the National Toxicology Program, the EPA, and the FDA. Currently, in toxicology testing, you expose a human or an animal and determine whether toxicity exists, like liver cancer. But, you have very little way to predict it. The Cures Acceleration Network (CAN) part of NCATS is addressing the toxicology problem in a different way. The idea here is to develop microfluidic systems otherwise known as CHIPS that mimic human physiology. This joint initiative, the NIH Tissue Chip for Drug Screening, is a partnership between the Defense Advanced Research Project Agency (DARPA) and NIH. In the next five years, the goal is to develop human tissue chips that accurately model the structure and function of human organs, such as the lung, liver and heart. Researchers can then use the tissue chips to test drug candidates and help predict safety in human studies more rapidly and cost-effectively than current methods.

Dr. Austin discussed the clinical side of NCATS as the national consortium of institutions that received Clinical and Translational Science Awards (CTSAs). The goal of this program is very similar to what was described on the pre-clinical side. Clinical trial recruitment, IRB harmonization, diagnostic criteria, and endpoint criteria, are critical elements. There is also a

huge effort in training, focused on team science. The mission of NCATS is different from the mission of NCRR, the previous Institute where this program existed. We are working with PIs to evolve the CTSA program over time from its original purpose to its new purpose.

Lastly, there is the Office of Rare Diseases, which was started 30 years ago and was previously in the Office of the NIH Director. There are 7000 rare diseases and only about 200 of them have "any treatment" associated with them. If we quadruple that over the next few years, still 85% of rare diseases will have no treatment. This is a huge problem that NCATS is very interested in. The assumption is that the genes and pathways that are affected in these 7,000 rare diseases are all in the same cells, and they may be connected to one another. In thinking about this problem, you need common data elements. If you are going to describe disease A and disease B, you cannot use different vocabularies to describe them. We have been working with NLM's Dr. Clem McDonald to develop core common data elements that will apply to registries for rare diseases so that we can have a common vocabulary to talk about them. This program is leading to the Rare Disease Clinical Research Network, also funded by the Office of Rare Diseases.

During the discussion, a Board member asked how NCATS is quick to respond. Dr. Austin said they are working on a model where funding is not strictly allocated to existing projects. There are currently 300 collaborations that are ongoing with folks all over the world. If something new has to get done, existing projects can be scaled back and later resumed once the new priority has been accommodated.

Dr. Austin was also asked if there is a shift away from research by PhRMA to the academic community that will affect the amount of research investment PhRMA will make? Dr. Austin said it definitely will. For example, he said, if you look at Pfizer, they are cutting a third out of their research budget, moving from $9.5 to $6.5 billion. Because their return is decreasing, and they fund research out of their profits, they are cutting things. There is a sort of no-man's land – between initial research and product development - that NCATS needs to fill in the academic sector.

III. REPORT FROM THE OFFICE OF THE SURGEON GENERAL (OSG), PHS

Dr. Regina Benjamin reported that the OSG held a press conference with Secretary of Education Arne Duncan and Environmental Protection Agency Chief Lisa Jackson to talk about healthy homes. In 2009, HHS issued a Surgeon General's "call to action" to promote healthy housing and to raise public awareness about the impact of unhealthy and unsafe homes. Yesterday, the OSG released "Advancing Healthy Housing," a strategy for action that the Obama administration has in the agenda to help Americans stay healthy and live longer and to thrive.

Dr. Benjamin chairs the national committee established by the Affordable Care Act to talk about prevention. She released the National Prevention Strategy to move our healthcare system away from a focus on sickness and disease to one of wellness and prevention. Staying healthy is a compilation of other factors including healthy housing, transportation, education and affordable foods. We support a holistic view of health in the community. She noted that Housing and Urban Development announced it is going to test multi-family units for radon, an odorless and colorless gas. If tests are positive they are going to address the situation. This will save lives for decades to come. The OSG is also trying to get homes tobacco free. She noted that hazards,

such as those caused by smoking, are preventable and the OSG is working to help the public understand the dangers of these preventable contributors to disease. The OSG is also sponsoring a campaign on physical fitness and encouraging the public to walk more. In coming months, the OSG will be issuing reports on prescription drug misuse, youth violence, and the need to curb tobacco use.

A Board Member asked the Surgeon General if there are any initiatives that relate to prevention and health literacy. The Surgeon General responded that they are working with the Office of Minority Health and the National Alliance for Hispanic Health to empower people in the community to increase understanding of how to improve health.

Dr. Benjamin was asked if the OSG would release a report on tobacco use. She said a report documenting tobacco use over the last 50 years would come out the week of January 11, 2014.

Other Board Members asked the Surgeon General about the issue of keeping physical education in the high school curriculum and when the OSG would release its report on substance abuse. She reported that Secretary Duncan wants to keep physical education in high schools and reinstate it where it has been removed. Duncan wants to tie receipt of federal grants to the addition of these programs in the high school curriculum. She said that a report on underage drinking would be out later this year.

IV. SEPTEMBER 2012 MINUTES AND FUTURE MEETINGS

The Regents approved without change the minutes from the September 2012 meeting. It was agreed that the winter meeting will be February 11-12, 2014.

V. REPORT FROM THE NLM DIRECTOR

Dr. Lindberg opened his remarks by informing the Board about a September fall and some subsequent related issues that prevented him from attending the September Board meeting. He then reported on what was known about the FY 2013 budget, i.e., that NLM was funded through March on a continuing resolution at the FY 2012 budget level.

With respect to personnel changes, Dr. Lindberg noted the retirement of Stuart Nelson, the head of MeSH who led the creation of RxNorm clinical drug vocabulary, now a US national standard for electronic health records. He then announced the appointment of Joyce Backus as the Associate Director for Library Operations, Joyce Backus. Joyce came to NLM as an NLM Associate and rose through the ranks, playing a critical role in the development of MedlinePlus, among other important contributions. Daniel Hartinger is the new Director of the NLM Office of Acquisitions and Consolidated Operations Acquisitions, returning to NLM after service elsewhere at NIH. Dr. Lindberg called upon Ivor D'Souza and Dr. Clem McDonald to introduce new employees in OCCS and in the Lister Hill Center, respectively. Ivor D'Souza reported that Duc Nguyen was appointed Chief of Medical Language in OCCS. Dr. McDonald reported that Halil Kilicoglu was appointed staff scientist with the Cognitive Science Branch, and Dr. Jongwoo Kim joined the Communications Engineering Branch as a Staff Scientist. Mr. James Mork was also appointed to a Computer Scientist position in the Cognitive Science Branch.

With respect to Congressional actions, Dr. Lindberg said that Barbara Mikulski is the new chairwoman of the Senate Appropriations Committee following the death of Daniel K. Inouye (D-HI). Senator Tom Harkin (D-IA) remains the chairman of the Subcommittee on Labor-HHS-Education, as well as chairman of the Health, Education, Labor and Pensions (HELP) Committee. Senator Lamar Alexander (R-TN) is expected to serve as its Ranking Member in the House, Rep. Jack Kingston (R-GA) is the new chairman of Labor/HHS Appropriations Subcommittee.

Dr. Lindberg announced new trans-NIH initiatives: Big Data to Knowledge (BD2K) and NIH IT Infrastructure and called upon Dr. Michael Huerta to explain the initiatives to the Board. Mike Huerta said that one initiative is focused on information technology and administrative data. The information technology on the NIH campus is called Infrastructure Plus. The idea is to provide a collaborative environment and an approach to planning and implementing high performance computing on the campus, storing and hosting data, networking and the use of large scale computing. Another part involves expanding informatics research in the Clinical Center. The other initiative, according to Dr. Huerta, is the larger of the two and is called Big Data to Knowledge (BD2K). This initiative will have 4 parts: 1) sharing and standards 2) software development 3) workforce development and 4) centers of excellence. More information about all of them will be released over the coming months. Dr. Lindberg mentioned the trans-NIH initiative on the research workforce found under tab E. He asked Dr. Valerie Florance to discuss that later on in the meeting.

Dr. Lindberg observed that a growing number of NIH ICs are identifying sets of common data elements (CDEs) for investigators to use in clinical research, patient registries and other human subject research to improve data quality and to enhance opportunities for combining and comparing data from multiple studies and, ultimately, with data contained in electronic health records. He said that the Trans-NIH BioMedical Informatics Coordinating (BMIC) Committee, which he chairs, saw the need to improve awareness and coordination of these efforts as a step toward increasing their use. BMIC has established a CDE working group that will be chaired and supported by NLM staff and a Presidential Management Fellow.

The success of NLM's use of social media, said Dr. Lindberg, is reported under Tab H of their Board books.

Dr. Benjamin observed that February is Heart Health month. She noted that she did her first twitter chat last year for heart month in partnership with the Heart Association and the National Heart, Lung, and Blood Institute. Their twitter chat lasted 45 minutes and resulted in 16 million impressions. In support of the use of social media, Dr. Benjamin observed that there is no way the OSG could reach that many people through a TV show. Dr. Lindberg agreed and mentioned that NLM has a former associate, Yani Yancey, handling NLM's social media outreach.

Under Tab I, said Dr. Lindberg, is a discussion of NLM's MedPrint Shared Print Preservation Project. While many libraries, particularly in academic institutions, have transitioned to electronic subscriptions, there is widespread belief that holding onto retrospective print collections is an important part of preserving the archival record. Based on recommendations from the National Network of Libraries of Medicine (NN/LM), NLM launched MedPrint in

September 2011. Two hundred and fifty widely held and highly requested MEDLINE titles made up the initial target corpus of MedPrint. The period of commitment is 25 years, or to 2036, and 12 copies is the target number to be held by libraries.

Lastly, Dr. Lindberg described a joint exhibit of NLM and Mt. Vernon on the topic of George Washington and Medicine. This exhibit is one result of a Board recommendation to work with outside educational organizations to make NLM's exhibits more accessible to the public.

VI. NCBI UPDATE

Dr. David Lipman, Director of NLM's National Center for Biotechnology Information (NCBI), described NCBI's Pathogen Project, which aims to facilitate the rapid identification of pathogens involved in outbreaks of foodborne illness. The project is part of a collaborative effort with the Food and Drug Administration (FDA), food safety organizations, and the private sector.

Dr. Lipman explained how identifying bacteria is not as simple as identifying individuals for forensic purposes through DNA fingerprinting, which can uniquely connect an individual to the scene of a crime. In the forensic setting, DNA analysis is done using a small number of markers that are highly variable in humans; the markers are amplified, and analysis of the combination of those regions provides a genetic fingerprint. Because bacteria are so variable and there are many different strains of pathogens, we need to use the entire genome as the fingerprint of a pathogen.

The Centers for Disease Control and Prevention (CDC) connects cases of foodborne illness across the country using its PulseNet program. PulseNet, a national network of public health and food regulatory agency labs, currently uses pulsed-field gel electrophoresis to identify the DNA fingerprint of foodborne disease-causing bacteria. The DNA data is then submitted electronically to CDC databases, allowing participants in the network to compare DNA patterns of bacteria. The problem, Dr. Lipman explained, is that the pulsed-field gel electrophoresis technology is not always sufficiently specific, resulting in ambiguous classifications that make it more difficult to quickly and accurately find the source of an outbreak.

Because of the continuing reduction in the cost of sequencing, it is now feasible to sequence the whole genomes of bacteria, which eliminates the specificity problem that can occur with pulsed-field gel electrophoresis. With whole genome sequences, if two isolates from different patients have the same genome or only a few changes, there is a high degree of confidence that they are from the same outbreak. Making the sequence data available in NCBI databases will enable rapid comparison of sequences and faster identification of outbreaks.

Dr. Lipman stated that NCBI has already made significant progress on building the system and has developed a workflow. FDA also has made progress in implementing a pilot where approximately 20 public health state labs will have sequencers. The system is expected to be running soon and will involve the labs sending NCBI sequence data as isolates come in. NCBI then will analyze the data and provide a report back to the submitting state lab as well as to FDA.

Dr. Lipman noted that NCBI has a framework in place for sharing data with Europe and Asia, which could be useful in implementing an international system for monitoring foodborne pathogens. Development of an international network would offer opportunities for other research

resources. For example, if metadata was collected and there was information about the location and some context as well as full genomes, there would be the potential for a research resource for looking at a range of things, such as the impact of weather changes and agricultural pollutants.

Once the system for foodborne pathogens is in place, Dr. Lipman said, an obvious new use would be for antibiotic resistance and outbreaks of infection in hospitals.

Board member Dr. Douglas Scutchfield asked how to get greater participation in the program. Dr. Lipman replied that more groups will want to collaborate once the value of the system is seen. Also, as sequencing costs drop, commercial groups may see a market opportunity.

Dr. Scutchfield noted that many organizations are involved in food safety and asked about the coordination effort. Dr. Lipman responded that while the coordination is not perfect, there is engagement across organizations, a willingness to share data, and an interest in pushing forward.

VII. TAKING THE PULSE SURVEY OF PHYSICANS' USE OF IT AND HEALTH INFORMATION PRODUCTS

James Avallone, a Principal Analyst with Manhattan Research, LLC, presented information about "Taking the Pulse," a survey of how physicians use digital resources. It is a benchmarking survey that's been going on for about 11 years, and is one way NLM can better understand trends in health information use. The 2012 online survey included 3,015 practicing physicians across 22 specialties.

The 2012 survey found that physicians spend about 11 hours a week online, using multiple screens for professional purposes. Desktop/laptops are most used, followed by the smartphone and tablet. Smartphones are used for quicker activities while the desktop/laptop and tablet are used for more long-term activity. Mr. Avallone called tablets the big story, as they combine the mobility of a smartphone with the computational power and larger screen of a desktop. Two out of three physicians who own a tablet use it during the workday.

Between patient consultations, most physicians use a desktop/laptop for electronic health records and online journals; smartphones are used for quicker activities; and tablets are a hybrid. During patient consultations, online activities are physician-facing, but Mr. Avallone said he thinks in time doctors will turn around a tablet to face the patient as well.

Looking at how physicians get information, this survey found online sources on par or surpassing those offline. Online is more efficient given that physicians already are centered in front of a computer screen because of electronic health records. WebMD was the top Web site visited, followed by NIH sites. Of the NIH sites, PubMed was highest, followed by MedlinePlus, ClinicalTrials.gov, the NLM homepage and NCI/cancer.gov. Two thirds of physicians visiting PubMed do it weekly or more often. Seven out of 10 physicians watched an online video in the past year so Manhattan Research sees this as a viable medium for interacting with physicians.

With regard to mobility, e-readers have flat lined and tablets are taking off. Reading news, articles or abstracts are the top activities done on a tablet. Physicians use smartphones to read news, articles and abstracts and to look up drug reference databases. Eighty-five percent of

physicians use apps on their smartphones. Evocates and WebMD are the most used. About one in ten use an NIH app. Four of five physicians look at mobile-optimized Web sites. NIH Web sites come through with one in five physicians having visited them on their smartphones.

Manhattan Research survey key takeaways: digital resources are playing a more important role for physicians than they ever have before; three-quarters of physicians go to a digital source over print to look up clinical information (which is a huge deviation from prior years); physicians use multiple screens--smartphones, tablets and desktop/laptops--throughout the workday; more screens overall equals more access. As for NIH: it is among the top digital properties seen in 2012, with basically half of physicians having visited NIH Web sites in the past three months; PubMed has a very active user base; articles and abstracts are seeing strong use on both smartphones and tablets, which plays well for PubMed.

Following the talk, Ms. Gail Yokote asked how Manhattan Research is funded. Mr. Avallone said it is an independent company. The study has a number of clients from various sectors: government, publishers, physician-based Web sites and the pharmaceutical industry. The companies pay into a pool to receive the research and no client has more preferential treatment. Dr. Ronald Evens asked if there's any difference between young physicians and old physicians. Mr. Avallone said the age gap is less of an issue than it was five years ago. Dr. David Fleming asked about differences between other demographics such as rural vs. urban, or the type of practice. Mr. Avallone said urban tends to be more digitally savvy than rural, but it's not a primary factor. Type of practice and specialty are bigger factors. Mr. Christopher Cole asked how many physicians interact in a meaningful way electronically with their patients. Mr. Avallone said this year 38% of physicians interact with patients electronically and that tends to be straight email. Dr. Kenneth Walker asked what patients think of physician use of digital information. Mr. Avallone said there's no bias against it. If it improves care, patients are on board. Dr. Lindberg asked for clarification on use by specialty. Mr. Avallone noted use depends on what the physician is looking for. For example, 90 percent of surgeons say they watch online videos. Ms. Yokote asked how trend lines compare with consumers versus the physicians with regard to the different types of devices. Mr. Avallone said physicians are significantly more advanced in terms of mobile devices.

VIII. NEW RESOURCES FOR K THROUGH 12 EDUCATION

Gale Dutcher, Deputy Associate Director of the Division of Specialized Information Services (SIS), outlined her office's K-12 initiative. Its goal is to provide educators and students with Web sites and programs that contain useful, reliable, and free information related to life and health sciences. Materials are intended for elementary, middle and high school students and teachers. Offerings include Web sites, lessons plans, and a book. Content covers biology, chemistry, environmental health/science, and general health and medicine. SIS created a portal to provide a central entry point for K-12 resources developed by areas throughout NLM.

One of the newer resources is GeneEd, done in collaboration with the LHNCBC, the NCBI, the NHGRI, and the Genetic and Rare Disease Information Center.

The newest resource is an environmental health curriculum for middle school called

"Discovering the Connection: Your Environment, Your Health." Ms. Dutcher noted the middle school science curriculum includes environmental science, chemistry and earth science, but doesn't cover environmental health. So, SIS worked with local English, social studies and science teachers to develop a curriculum that has six units, each with four-to-five specific lessons. There are experiments and hands-on activities as well as a community activity or social action such as writing PSAs about something they've learned. Pilot programs are in place in six schools using the curriculum in either an after-school or classroom situation. The schools settings are varied—some are sci-tech, while others are general schools in rural or urban settings.

Ms. Dutcher then introduced Dr. Lauren Bishop. She teaches physical science and biology in the maximum-security units in the Juvenile Justice Center in the Alameda County Office of Education and is testing the curriculum. Dr. Bishop said the facility where she works averages about 200 students a day. The student population is about 54% African American and about 30% Hispanic. They have limited academic English skills; there's a history of failure; they have no geography knowledge; almost every one of them uses multiple substances; and all have PTSD. They also have a loyalty to their community and to people who treat them well; street smarts; curiosity; competitive spirit and hope. Dr. Bishop said when she saw the environmental health curriculum she thought, "This has to do with issues in their community, their block. Their families have been affected. I thought this would give me a powerful hook, and it has."

Dr. Bishop said her students described ToxTown as "awesome," and comments included "I understand what to do," and "This is the first time I used the Internet and the links and stuff and I felt like I could research something." Some of the topics have personally affected her students. One student's entire family was killed by a carbon monoxide leak in their house. Multiple students have had cases of lead poisoning in their families. The students feel they are developing the vocabulary, the skills, and getting information to protect their families.

Dr. Bishop noted that because the content is rich visually, even students with low-level reading skills can get information. She and the students also appreciate the hands-on tasks that relate to the environment—Dr. Bishop called it "empowering." She also showed a power point presentation the students did based on household chemicals. Dr. Bishop described lessons learned: respect their future and give them standards-based material; connect to something that they know; expect student success and work towards it; reflect and encourage student reflection on the curriculum. Dr. Bishop shared a success story about a student named Cameron, who was one of the first people in his family to graduate high school. He is a young father, and he was very engaged with ToxTown because he felt like it gave him some information for keeping his young son safe even though he can't be there. He was forwarding the information to his family. After the presentation, Ms. Dutcher introduced Dr. Alla Keselman who led the curriculum development.

Dr. Katherine Gottlieb asked which curricular tools effect the most change in behavior. Dr. Bishop said she thinks an engaging curriculum can help with behavior. She gives her students a lot of avenues to compete with each other and opportunities to succeed. Dr. Holly Buchanan asked about a contest for K-12 students on using these resources. Ms. Dutcher said that possibility was addressed at the last team meeting. Dr. Bishop said she thinks it's a great idea nationally but would have some limitations at her facilities. Dr. Walker asked for follow up

information about the recidivism. Dr. Bishop said in her facility 1,000 out of 3,000 students a year return. Dr. Walker asked if she has any personal follow up with the students and does she see them on the streets. Dr. Bishop said "absolutely." She lives in Oakland. There are some heartwarming stories of kids who made it. Dr. Gottlieb asked what the next round of curriculum is going to look like—especially given how children are using iPhones and iPads. Ms. Dutcher said they'd welcome ideas and suggestions and would talk with their teachers about where the needs are. Dr. Lindberg asked if dyslexic students can be identified in that setting. Dr. Bishop said there is a very active special education component. She suggested the more common diagnosis is ADD, ADHD, and ED, which is "Emotionally Disturbed."

IX. THE APP STORE FOR HEALTH: CO-OPTING THE POINT OF CARE FOR A LEARNING HEALTH SYSTEM

NLM grantee Dr. Kenneth Mandl is an Associate Professor at Harvard Medical School and Director of the Intelligent Health Laboratory of the Children's Hospital Informatics Program in Boston.

Dr. Mandl described a rapid learning network (RLN) or learning health system. In the past, he said, evidence was clinical trials and experimental studies—with the results of a paper applied to the patient. Now, with electronic data, there's the opportunity to move into a more observational set of studies where the health system can be leveraged in real time to learn about patients. Dr. Mandl said he thinks there's going to be a shift from purely relying on extrapolated clinical trials on small populations to turning the health system into a machine for discovery.

Dr. Mandl said a rapid learning network can identify both effective and problem therapies. He described a study done after Vioxx was taken off the market to determine if something could have been detected problems in advance. Using data from the I2B2 system, researchers graphed myocardial infarctions over time at two leading hospitals. A rise and fall of 18% was identified. Other graphs linked that to medications. Dr. Mandl noted that work was done with the retrospectroscope. The rapid learning network can be prospective. He highlighted a network analysis that looked at statins, comparing each one against the other to determine if one of the members of the class is causing side effects. All comparisons point to Cerivastatin as causing a muscle breakdown, which is the reason this ended up with a black box warning. Dr. Mandl said this problem could have been detected years before the black box warning.

The rapid learning network can provide population-level context for population decisions. He described a study that started before September 11th and looked at whether you can detect things like anthrax and track the flu using really simple data such as chief complaints from emergency departments. For example, he plotted out chief complaints for respiratory illness and produced a perfect map of the flu season. More tracking found that three and four year olds drive the flu epidemic every year and the paper published provided a tipping point—the CDC added the influenza vaccine for that age group to the schedule. The rapid learning network can use population-level context for clinical decisions. Researchers took data from Minute Clinics all over the country to look at whether there's strep in a region. Dr. Mandl said this simple idea of knowing the strep rate in your region in approximate real time would save hundreds of thousands of unnecessary antibiotic courses per year.
Rapid learning network also can be used for individual surveillance. Dr. Mandl and his team

wanted to know whether people will take their medications in the future. The team developed a model where they can predict adherence one year from now based on pharmacy fill patterns. In another study, researchers used data from emergency department visits across Massachusetts to understand an individual's patterns of visits and whether for the pattern may indicate physical abuse.

The rapid learning network engages the patient. Personal health records let you store data; report-patient reported outcomes, share data with a learning health system or with other providers. Dr. Mandl also noted the NLM-funded system, INDIVO personally controlled health record. Our source code and our model had a big impact on the industry. Microsoft HealthVault actually took our source code. Google Health took the model and a bunch of large employers, Wal-Mart, Intel, and others contracted with us to build out this NLM-funded product to deploy to hundreds of thousands of their employees.

Then, he described the App Store for Health. He and colleague Dr. Isaac Kohane raised the question of whether EMRs can behave like iPhones or Androids—in that innovators readily create, and widely distribute, apps across thousands of installs? In other words, "if a company is spending $1.5 billion on its electronic health record system, and the obstetricians want an app that shows the prenatal data the way they want to see it, shouldn't you be able to download that app from something like an app store, and run it." To demonstrate it could be done, they created an Application Programming Interface, and used Challenge.gov to encourage developers to create apps. He highlighted some of the apps, such as a blood pressure app to help physicians manage hypertension by age; and a medication reconciliation app.

Following the presentation, Dr. David Fleming initiated a discussion about using this approach for decision support. Dr. Mandl said he thinks that challenge can be met with modern ways of displaying data. Board member Dr. Douglas Scutchfield asked about working with the CDC. Dr. Mandl said the interest of the current CDC administration in heavily informatics-based approaches to public health is limited. He is focusing his conversations with the CDC on the interface between public health and the point of care. Dr. Marion Ball brought up the issue of the difficulty of working with vendors to allow this kind of overlay onto their systems. Dr. Mandl said they will have to engineer around it. Dr. Lindberg asked if the best strategy to do all this stuff based on I2B2, or vendors? Dr. Mandl said he thinks both conversations need to happen in parallel.

X. EXTRAMURAL PROGRAMS REPORT

Dr. Valerie Florance, Associate Director for NLM's Division of Extramural Programs, delivered the Extramural Programs report. She started by asking the Board to review and approve NLM's 2013 human subjects inclusion report. The Board gave unanimous approval.

Dr. Florance shared highlights of a talk by Dr. Richard Nakamura, the new head of the NIH Center for Scientific Review (CSR). CSR is looking at the pros and cons of face-to-face meetings and various electronic review platforms. NLM has its own study section that reviews about 80% of NLM's grants, but some NLM grants go through the Center for Scientific Review. CSR currently holds about 20% of its meetings using an electronic format. CSR anticipates significant annual savings by holding electronic meetings; it's more convenient for reviewers to

participate; and most reviewers have provided positive feedback. The big question is whether there's a loss of something important if you switch from face-to-face to more electronic review—there's a value to sitting together and talking about science. Face-to-face is still the gold standard for review meetings and is socially rewarding. However, it's subject to disruptions because of weather, cancelled flights and it's the most expensive option. CSR estimated the cost of review per application for each format—phone cost $33, video assisted was $226 and face-to-face was $524 (minus the honorarium).

In FY 2012, NLM conducted two of its own review pilots. With CSR providing help and covering the cost, NLM used videoconferencing for a small meeting and reviewers liked it. NLM also did a large-scale telephone meeting. Dr. Florance said the phone meeting provided an eight-fold saving per application; the reviewers said it worked well; and the quality of the review was the same as in person. Dr. Florance said EP will explore a hybrid meeting combining face-to-face with VAM. Dr. Lindberg noted and Dr. Florance agreed that NLM has never had a problem getting reviewers to participate on its study sections. Dr. Corn asked if changing the technology changed the quality of review. Dr. Florance said she's heard no specifics on that.

Dr. Florance also told the Board about two working groups of the Advisory Committee to the Director - the Working Group on Diversity in the Biomedical Workforce and the Working Group on the Biomedical Research Workforce. The diversity group made recommendations to repair "leaks" in the educational pipeline in order to have a diverse scientific workforce. Recommendations include building a national mentoring network and addressing implicit or unconscious bias in peer review. The biomedical research workforce committee recommends that NIH work with universities to address a broader range of career options for scientists beyond academic centers. The group suggests diversifying and improving graduate training by establishing an independent development plan for each graduate student working on a research grant; soliciting new ideas to broaden training such as including grant writing and lab management; offering individual fellowships; shortening the path to independent careers for postdocs; and implementing a system to track the successes of all the NIH-supported students and postdocs.

Dr. Florance then gave an overview of NLM's Extramural Training Program and the possible impact of the recommendations. NLM has 14 university-based programs, offers career transition awards but does not offer individual fellowships. Predoctoral trainees get stipend support, have development plans and get broader training of the type being recommended. Thirteen NLM programs offer short-term training slots to enhance diversity. With EP's support, NLM's programs are implementing the trainee tracking system called Career Trac that makes it easy to track career outcomes of NLM trainees across time. Changes NLM may have to consider in light of the 2 sets of recommendations: participating in review pilots relating to bias; issuing a target number of career awards annually; offering individual fellowships again; and increasing stipend and benefits for postdoctoral trainees.

After the discussion, Dr. Lindberg noted he thinks the bigger problem with regard to recruiting minorities is in college, high school, prep school, and junior high. He said we have to get into those schools to recruit minority candidates. Dr. Scutchfield suggested looking into public-private partnerships. Dr. Henry Lewis noted that NCRR had a Scientific Partnership Program

that went into the high schools. Dr. Joyce Mitchell said that program went over to the Office of the Director in the Office for Strategic Planning and Program Coordination.

XI. NLM VALUE SET AUTHORITY CENTER

Chairman Mitchell introduced NLM Deputy Director Betsy Humphreys, the first of three speakers to provide an update on NLM tools and services designed to help developers of electronic health records (EHR) systems implement use of clinical vocabulary standards.

NLM's work on health data standards and standard clinical vocabularies is part of its strategy to aid the development of integrated biomedical, clinical and public health information systems that promote scientific discovery, speed translation of research into practice and enable effective decision support at the point of care. The Board's current strategic plan encourages this activity.

NLM's standards efforts are designed to promote semantic interoperability—meaning, to enable computer systems and people to interpret correctly the meaning of electronic data produced by a different system. Achievement of this goal across the US healthcare system will require standardization in a number of different areas.

NLM's health data standards agenda was established in a 2009 report produced by this Board's Working Group on Health Data Standards. It came out shortly after the passage of the Health Information Technology for Economic and Clinical Health (HITECH) Act, mandating "meaningful use" efforts. The creation of the NLM Value Set Authority Center (VSAC) responds to two Board recommendations: that NLM (1) partner with other organizations to explore the potential of value sets in conjunction with other standards; and (2) provide new tools and services to help EHR vendors and users implement terminology standards for positive impact.

Using existing resources, the Library has produced useful new tools, such as subsets, mappings, and APIs, designed to make facilitate use of standard vocabularies in EHRs.   However, on the heels of HITECH, HHS special advisory committees were calling for an authoritative source of all vocabulary value sets needed to achieve "meaningful use" and sending strong signals that NLM should host it. In FY 2012, NLM received funding from the Centers for Medicare and Medicaid Services (CMS) to undertake this effort, in partnership with that agency and the Office of National Coordinator for Health IT (ONC).

Next, Dr. Olivier Bodenreider from the Lister Hill Center discussed clinical quality measures, which are the source of the initial set of vocabulary value sets in NLM's new Value Set Authority Center (VSAC). CMS defines clinical quality measures as tools to help measure and track quality of both ambulatory and hospital healthcare services. Clinical quality measurement has traditionally been a labor-intensive process involving sampling and manual review of charts. The goal is to generate data for the measures from queries made directly to EHR systems. The US healthcare system is beginning its journey from paper to digital quality measurement, said Bodenreider. NLM and its partners are currently working with the 29 measures for hospitals and 64 for ambulatory care defined in the 2014 Meaningful Use Criteria. As an example, he presented the hemoglobin A1c test for diabetes, which assesses glycemic control.

A critical component in the process of defining a clinical quality measure so that it can be computed from EHRs is the value set or list of codes from a standard vocabulary, such as SNOMED CT (Systematized Nomenclature of Medicine — Clinical Terms), that defines all or part of the denominator or the numerator for the measurement.

The NLM team's first challenge was to ensure that all of the codes in the value sets produced by measure developers were valid, i.e., actually appeared in standard vocabulary and had the same meanings as the terms to which they were attached in the value sets.. We received hundreds of values sets containing many thousands of codes in June 2012 and, from then until the VSAC site's launch in October, performed 15 rounds of curation, to perfect the product. This is the first step, albeit an important one, in a much longer process, Dr. Bodenreider observed, that will be required to ensure that electronic clinical quality measures work as desired in the EHR environment.

OCCS Director Ivor D'Souza discussed the technology platform created to support NLM's VSAC activities. Major tasks were: (1) development of an API, to render the value sets in XML output; and (2) creation of a Web User Interface. The API is already seeing widespread use in the public and private sectors, and the Web site (vsac.nlm.nih.gov) is gaining in popularity. He then demonstrated the site. The system codes are owned and protected by NLM's UMLS license agreement. UMLS accounts are free and easy to obtain. Once users establish an account and log in, they will see two tabs: "Search Value Sets" and "Download." They can narrow their searches by applying filters in five different ways, and can then download results.

A second release of the VSAC site, allowing enhanced authoring, will debut in June. An efficient workflow is essential, because authors, reviewers and approvers are all involved in authorship. Another milestone will be an update to the 2014 Meaningful Use quality measures for Eligible Professionals in June. September will see further enhancements of the authoring system and integration of VSAC with the Measure Authoring Tool (MAT), housed at CMS.

Dr. Scutchfield said he'd been reading HHS's *2012 Progress Report to Congress: National Strategy for Quality Improvement in Health Care*. In it, they identify a very small EHR set of across-the-board quality improvement measures. Is NLM actively involved? Yes, Betsy Humphreys replied. The challenge is that virtually all quality measures have to be reengineered and reevaluated for use in EHRs. LHC Director Dr. Clem McDonald discussed the new rules for EHRs, some of which are lengthy and complicated. The capability that NLM is putting together, Ms. Humphreys observed, to deliver value sets, correctly define them and have information about them come in a standard way, is needed for broader purposes in EHRs. NLM began with a focus on quality measurement because CMS thought that an important starting point.

Ex-officio member Dr. Steve Brown from the Veterans Health Administration commented that this is a great development. He's in charge of implementing the new federal system, but many of his colleagues and customers don't know about UMLS or standardization, so it's a hard sell. More educational outreach about VSAC would help a lot. Dr. Mitchell concurred that more publicity about VSAC could be done. She suggested that, in time, NLM distribute a scenario on how VSAC can be used for the NIH Institutes and other prospective users. Something similar has been done for ClinVAR, a database of genotype and phenotype compiled by NCBI and the

National Human Genome Research Institute (NHGRI). Consultant Dr. Kenneth Walker said he'd welcome a future Board presentation on clinical quality measurement standards—what's the overarching philosophy and goal, and how will they be determined? Dr. Scutchfield thought that would be important to explore, as clinical quality measures are popping up all over the place. EHRs, Ms. Humphreys observed, provide a strong incentive for uniformity, a fact that CMS understands well. The purveyors of EHRs will drive the standardization process, too, noted Dr. Scutchfield.

XII. CLINICALTRIALS.GOV UPDATE

Dr. Deborah Zarin began by thanking her staff for their hard work. There are now over 140,000 trials in the registry. Over 80% are interventional studies but there are also over 25,000 observational studies. Interestingly, half of the trials in the registry have non-US sites, meaning they're either conducted outside of the US, or have locations in the US and abroad.

A recent online user survey showed roughly 30% of respondents reported they were patients seeking trials. Many said that they were helping someone else find a trial. She next presented a graph of the number of new registrations received per week, over time. Currently, staff handles around 400 new trials and 70 new results—a challenging workload. Processing registrations of new trials takes 1-3 business days, Dr. Zarin reported, with the computer system and staff performing quality assurance. Results pose more challenges, such as missing or erroneous data, vague protocols or, in the worst case, the fact that no one involved in the study knows what's going on. The legal requirement is that results be posted within 30 days of receipt. Currently, about 40% of initial results submissions can be posted without revision—a great improvement over the early days.

How do results reported in ClinicalTrials.gov fit into the medical journal landscape? Obviously, journals provide background discussion, peer review, etc. ClinicalTrials.gov ensures complete reporting, including earlier and more complete data for trials that are eventually published, as well as results for trials that may never be submitted or accepted for journal publication.

Under the leadership of Dr. Rebecca Williams, ClinicalTrials.gov Assistant Director, the site recently underwent a complete refresh, with improved navigation and the addition of training materials and other resources. Staff has done "train the trainer" workshops about the site for NIH Clinical and Translational Science Award (CTSA) institutions and collaborated with the National Network of Libraries of Medicine (NN/LM), developing online training.

ClinicalTrials.gov data are widely used by other organization to provide value added services. For example, breastcancertrials.org takes the data, curates it and uses it to promote a trial matching service for patients. The World Health Organization (WHO) takes data from the site and combines them with data from many other registries. Data from ClinicalTrials.gov currently provide about 90% of the WHO listing of clinical trials.

ClinicalTrials.gov has accomplished its three primary goals: to (1) help the public find out about trials; (2) protect against publication bias; and (3) provide transparency. The site has also offered a glimpse of the clinical research enterprise in a way that used to be difficult, if not impossible.

For example, a recent study coauthored by Dr. Zarin revealed that many NIH-funded studies weren't published up to four years after trial completion.

ClinicalTrials.gov staff continues to provide technical assistance and advocate for the development of global trial registration and results reporting standards. A new rule by the European Medicines Agency (Europe's FDA equivalent), mandating posting of trials, calls for compatibility of the US and European databases, and is a step in the right direction. A lively international debate is underway, said Dr. Zarin, about how much patient data to make public. Some are calling for an "All Trials Initiative," to mandate publication of all data (including patient data) from all trials. PhRMA (Pharmaceutical Research and Manufacturers of America) strenuously object, saying it would deter patients from enrolling in trials.

She ended her talk with a slide showing the "informational chaos" of publicly available clinical trial data. ClinicalTrials.gov, however, can serve as a scaffold, organizing that untidy world for its users and pointing them to reliable, well-organized information with the power to help them.

One problem, Dr. Evens noted, is that companies want to keep their unfavorable research results hidden—something that flies in the face of transparency. Ms. Humphreys agreed that industry often doesn't report results, but the problem of non-publication of results also exists within academia and NIH. Consultant Dr. Kenneth Walker suggested that all journals indexed in PubMed have to pledge that their authors will file results in ClinicalTrials.gov. Dr. Scutchfield asked whether it was a problem that some authors don't publish, and therefore don't feel they should have to file their results. Dr. Zarin responded that she thought almost all study results held lessons for other researchers, even if the sample size was small or the study seemed boring or arcane. Ms. Humphreys commented that several NIH Institutes have done research on whether trials with negative results are less likely to be published than those with positive results and found that it doesn't matter. If the question addressed is interesting and important and the methodology is good, then journals will publish the results.

XIII. APPOINTMENT OF NOMINATING COMMITTEE FOR BOR CHAIR

Dr. Mitchell announced that the Board would receive the report of the nominating committee at its May 2013 meeting. Ex-officio alternate Kathryn Mendenhall from the Library of Congress has agreed to chair and the other members will be Dr. Simon Liu, ex-officio member from the National Agricultural Library, and ex-officio alternate Dr. Cathy Nace from the U.S. Army OSG.

XIV. REPORT FROM THE SUBCOMMITTEE ON OUTREACH AND PUBLIC INFORMATION

Dr. Katherine Gottlieb presented highlights of the previous day's Subcommittee meeting. Gale Dutcher, SIS Deputy Director, and Elliot Siegel, NLM consultant, reviewed the results of an evaluation, conducted by researchers at Columbia, of NLM's community-based AIDS outreach program, which began in the early 1990s, when AIDS was greatly misunderstood. In 1994, the Library began offering funding to community-based organizations across the nation for AIDS outreach. These projects helped break the silence about AIDS with trustworthy information delivered in local settings. A review of the AIDS outreach program shows 294 community-based activities to date. Based on the results of the evaluation, SIS will continue funding these projects,

which can receive up to $60,000, over the next two years.

The traveling version of the *Native Voices* exhibition is in production. History of Medicine Division Chief Dr. Jeffrey Reznick shared a pictorial representation of it with the Subcommittee, along with a progress report. Dr. Gottlieb expressed excitement about the prospect. People will be able to physically connect with the exhibition, and glean information from it that they can incorporate into their lives. She opened the floor for questions.

Asked whether the sites for the traveling exhibition had been selected, Dr. Reznick said no, but pilot locations will be selected in Alaska, Hawaii and the Lower 48, to gauge how the structure can be used and also to test the iPads and other components. NLM is hoping to interest external organizations to become underwriters and extend the show's reach to Native communities that may not be able to afford shipping of the exhibition themselves. Ms. Humphreys added that museums, libraries and places that have typically taken NLM traveling exhibitions should still be in the mix, as well as new venues in Native communities.

Dr. Mitchell suggested that the NN/LM become an active partner in identifying venues for the traveling show. She suggested the new Natural History Museum of Utah be considered as a site. Asked by the Board whether NLM needed financial support for this endeavor, Dr. Lindberg said yes. Tribes with casinos might welcome the exhibit, but casinos aren't appropriate for all audiences. He hopes they'll consider assisting tribes without casinos, too. His goal is to raise sufficient funds that the exhibition can be left with the Native groups, as a permanent display.

Dr. Henry Lewis expressed appreciation of this project and requested an overview of all NLM outreach efforts at a future Board meeting. Ms. Humphreys promised that an overview would be presented at an upcoming meeting. Dr. Gottlieb stressed the importance of sharing the traveling exhibition with the public at large, to enhance their understanding of the cultures and portrayed. Others on the Board concurred.

XV. HALO COUNTERTERRORISM SUMMIT

SIS Director Dr. Steven Phillips described this event, attended by over 800 people from law enforcement, homeland security, border security, government agencies and the military. NLM provided a full-day course on NLM disaster-related activities and products, including an overview of the Bethesda Hospitals' Emergency Partnership Program (BHEPP).

The course included an overview of: WISER (Wireless Information for Emergency Responders), which assists first responders in hazardous material incidents; REMM (Radiation Emergency Medical Management), which offers guidance to health professionals and first responders during radiation events; CHEMM (Chemical Hazards Emergency Management), designed to aid emergency responders and healthcare providers in large-scale chemical incidents; and the Lost Person Finder (LPF), which helps family and friends locate missing people in a disaster event. OCCS demonstrated the Digital Pen, a system which records disaster patient data and uplinks it to a computer database for use at an aid station or hospital. They also discussed the tracking of patients using radio frequency identification (RFID) tags in a real-time location system (RTLS).

In addition, NLM staff took part in the twice-daily disaster drills, staged by a movie studio to realistically simulate chemical/biological mass casualty events. The take-away message, Dr. Phillips said, was that there is great benefit in making the training environment as true-to-life as possible. In such an environment, as the scientific evidence shows, you're testing not only your knowledge but also your mental and physical reactions to the situation.

Next, Dr. Phillips discussed efforts by SIS's Disaster Information Management Research Center (DIMRC) to organize the disaster literature. The non-commercial or "grey" literature on disaster preparedness and response is being centralized into a new NLM Resource Guide. Staff continues to create specific disaster topic pages related to current events such as Hurricane Sandy.

SIS recently converted the All Hazards Playbook, from the HHS Office of the Assistant Secretary for Preparedness and Response (ASPR), into an interactive tool for research and decision making. Collaborating with the University of Maryland Center for Health and Homeland Security, SIS staff has been using virtual reality (Second Life) to conduct Hospital Incidents Command Training. A program with Suburban Johns Hopkins Hospital involves use of ham radios, which can stay in operation and allow e-mails when other networks fail.

Dr. Phillips also briefly reviewed NLM's work related to development of the disaster information specialization as a new focus within librarianship and its related collaboration with the Medical Library Association, which was previously presented to the Board. Clips from two disaster drills at HALO showed Navy Seal paratroopers on a mission to rescue a downed and injured pilot. NLM products were employed: the Digital Pen, for example, helped the Seals relay the pilot's injuries and WISER quickly identified a mystery gas as hydrogen sulfide. In a chart, Dr. Phillips showed the Board how the many NLM products function together in a mass-casualty disaster. It's an impressive suite of products that have gone from research to deployment in roughly five years. (Dr. Phillips added that HHS Secretary Kathleen Sebelius awarded a 2012 HHS*innovates* award to NLM staff for the Patient Tracking and Locating System, of which the Lost Person Finder is a component.)

Several technical suggestions came out of HALO, like adding a light source to the Digital Pen and streamlining its accompanying triage form, and merging information in the Lost Person Finder with EHRs. These and other ideas will be carefully considered. Dr. Phillips commended the hardworking trans-NLM team that made the HALO conference such a success.

XVII. ADJOURNMENT

Dr. Mitchell adjourned the Board of Regents meeting at 12:00 p.m. on February 6, 2013.

ACTIONS TAKEN BY THE BOARD OF REGENTS:
- Approval of the September 11-12, 2012 Board Minutes
- Approval of the February 12-13, 2014 Future Meeting Dates
- Approval of the 2013 Human Subjects Inclusion Report

Appendix A - Roster - Board of Regents

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

_____   _____
Dr. Donald A.B. Lindberg   Joyce A. Mitchell, Ph.D.
Director, National Library of Medicine   Chair, NLM Board of Regents