DEPARTMENT OF HEALTH AND HUMAN SERVICES
NATIONAL INSTITUTES OF HEALTH
NATIONAL LIBRARY OF MEDICINE
MINUTES OF THE BOARD OF REGENTS
February 13-14, 2018

The 177th meeting of the Board of Regents (BOR) was convened on February 13, 2018, at 9:00 a.m. in the Donald A.B. Lindberg Room, Building 38, National Library of Medicine (NLM), National Institutes of Health (NIH), in Bethesda, Maryland. The meeting was open to the public from 9:00 a.m. to 3:30 p.m., followed by a closed session for consideration of grant applications until 4:00 p.m. On February 14, the meeting reopened from 9:00 a.m. until adjourned at 12:00 p.m.

MEMBERS PRESENT [Appendix A]
Dr. Alessandro Acquisti, Carnegie Mellon University
Ms. Jane Blumenthal, University of Michigan
Dr. Eric Horvitz, Microsoft Research
Ms. Sandra Martin, Wayne State University [Acting Chair]
Dr. Daniel Masys, University of Washington
Dr. Esther Sternberg (via teleconference), University of Arizona
Dr. Jill Taylor, Wadsworth Center, New York State Department of Health

CONSULTANTS TO NLM PRESENT
Dr. Robert Greenes, Arizona State University
Dr. Carlos Jaen, University of Texas at San Antonio

EX OFFICIO AND ALTERNATE MEMBERS PRESENT
VADM Jerome Adams, Office of the Surgeon General, PHS
Dr. Wayman Cheatham, United States Navy Bureau of Medicine and Surgery
Dr. James Deshler, National Science Foundation
Col. Kent DeZee, United States Army
Dr. Joseph Francis, Veterans Health Administration
Mr. Stan Kosecki, National Agricultural Library
Dr. Mary Mazanec, Library of Congress
Lt. Col. Tom Mahoney, United States Air Force
Dr. Dale Smith, Uniformed Services University of the Health Sciences

SPEAKERS AND INVITED GUESTS PRESENT
Dr. John Brownstein, Boston Children's Hospital
Dr. John Lorsch, National Institute of General Medical Sciences, NIH

MEMBERS OF THE PUBLIC PRESENT
Mr. Glen Campbell, BMJ Americas/FNLM
Dr. Lynne Holden, Mentoring in Medicine/FNLM
Dr. Barbara Redman, New York University/FNLM
Mr. Selby Bateman, MedlinePlus Magazine

FEDERAL EMPLOYEES PRESENT
Dr. Patricia Flatley Brennan, Director, NLM
Mr. Jerry Sheehan, Deputy Director, NLM
LCDR Christine Renee Adams, Office of the Surgeon General, PHS
Ms. Anne Altemus, Office of Computer and Communications Systems, NLM
Ms. Dianne Babski, Division of Library Operations, NLM
Ms. Joyce Backus, Division of Library Operations, NLM
Mr. Dennis Benson, National Center for Biotechnology Information, NLM
Ms. Sherri Calvo, Lister Hill Center, NLM
Ms. Hua Florence Chang, Division of Specialized Information Services, NLM
Ms. Heather Collins, Lister Hill Center, NLM
Mr. Ivor D'Souza, Office of Computer and Communications Systems, NLM
Mr. Todd Danielson, Office of the Director, NLM
Dr. Kathel Dunn, Division of Library Operations, NLM
Dr. Dina Demner-Fushman, Lister Hill Center, NLM
Dr. Valerie Florance, Division of Extramural Programs, NLM
Dr. Dan Gerendasy, Office of Health Information Program Development, NLM
Ms. Rebecca Goodwin, Office of Health Information Program Development, NLM
Mr. David Hale, Division of Specialized Information Services, NLM
Dr. Michael Huerta, Office of Health Information Program Development, NLM
Ms. Christine Ireland, Division of Extramural Programs, NLM
Ms. Janice Kelly, Division of Specialized Information Services, NLM
Ms. Elizabeth Kittrie, Office of Health Information Program Development, NLM
Ms. Michelle Krever, Division of Extramural Programs, NLM
Ms. Lisa Lang, Division of Library Operations, NLM
Ms. Mary Ann Leonard, Office of the Director, NLM
Dr. Robert Logan, Office of Communications and Public Liaison, NLM
Ms. Jennifer Marill, Division of Library Operations, NLM
Dr. Clement McDonald, Lister Hill Center, NLM
Ms. Stephanie Morrison, Lister Hill Center, NLM
Mr. Dwight Mowery, Division of Extramural Programs, NLM
Mr. David Nash, Office of the Director, NLM
Dr. James Ostell, National Center for Biotechnology Information, NLM
Dr. Barbara Rapp, Office of Health Information Program Development, NLM
Dr. Hua-Chuan Sim, Division of Extramural Programs, NLM
Dr. George Thoma, Lister Hill Center, NLM
Ms. Victoria Townsend, Division of Extramural Programs, NLM
Dr. Alan VanBiervliet, Division of Extramural Programs, NLM
Ms. Amanda Wilson, Division of Library Operations, NLM
Mr. Peter Wolf, Lister Hill Center, NLM
Dr. Fred Wood, Office of Health Information Program Development, NLM

I. OPENING REMARKS

Acting Board of Regents (BOR) Chair Sandra Martin welcomed members, alternates, and guests to the Board meeting, in the absence of Chair Dr. Esther Sternberg, who joined the meeting by phone.

NLM Director Dr. Patricia Flatley Brennan introduced the new U.S. Surgeon General, VADM Jerome M. Adams, MD, MPH, who would address the BOR on wellness and the economy. Dr. Brennan noted that Dr. Puckrein would not be attending the meeting, due to a case of the flu.

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

U.S. Surgeon General Dr. Jerome Adams said that his goals for this meeting were to: (1) discuss the Office of the Surgeon General's 2018 priorities; (2) provide an update on the U.S. Public Health Service Commissioned Corps; and (3) provide an update on Public Health Reports. Under the slogan of "Better Health Through Better Partnerships," Adams said that the 2018 priorities for the Surgeon General's office are: (1) opioids; (2) health and the economy; (3) health and national security; and (4) reimagining the Corps.

Noting that each day 91 Americans die from some form of opioid abuse, Adams articulated a five-point strategy adopted by the U.S. Department of Health and Human Services (HHS):
- Improving access to prevention, treatment, and recovery services;
- Targeting availability and distribution of overdose-reversing drugs;
- Strengthening our public health data and reporting;
- Providing support for cutting edge research on pain and addiction; and
- Advancing the practice of pain management.

Adams said that "we must reference health in economic terms," noting the following:
- Every year, U.S. businesses lose more than $225 billion because of sick and absent workers;
- Obesity and related illnesses cost the nation over $153 billion per year in lost productivity;
- People going to work when they are sick accounts for two-thirds of the total costs of worker illness;
- A population with poor health results in workforce shortages, absenteeism, presenteeism, work-related injuries and illnesses, profitability, and issues with workforce recruitment and retention; and
- The Office of the Surgeon General (OSG) must find opportunities for collaboration, seek funding partnerships, and make better use of subject matter experts.

Adams also pointed out that 71 percent of young adults ages 17-24 are ineligible for military service—many because they can't meet the physical requirements. The top three reasons are obesity, educational deficits, and criminal or drug abuse records.

III. MINUTES AND FUTURE MEETINGS

The Regents approved without change the minutes from the September 2017 meeting. The next meeting will be held on May 8-9, 2018, and the fall meeting will be held on September 25-26, 2018. Future meetings for 2019/2020 that were also approved were February 12-13, 2019, May 14-15, 2019, September 10-11, 2019, and February 4-5, 2020.

IV. REPORT FROM THE NLM DIRECTOR

Dr. Brennan opened her remarks by noting that we now live in a "visual society." She spoke of the many digital platforms, pathways, and discoveries that are changing the ways we learn, conduct research, and handle information in many forms.

She then discussed her key accomplishments since September:
- Launched Blue Ribbon Panel review of our Intramural Program;
- Initiated direct deposit of data in support of PMC (PubMed Central) articles;
- Developed new guidance on publication for dbGaP (the database of Genotypes and Phenotypes);
- Presented the draft NLM strategic plan to National Institutes of Health (NIH) leadership;
- Survived her first government shutdown; and
- Rearranged the BOR seating convention.

Dr. Brennan then provided updates on several NLM offices and divisions:

Specialized Information Services (SIS):
- Migration of TOXNET into NCBI platform
- AIDSource in Spanish website
- AIDS*info* will release shortened clinical practice guidelines
- HealthReach includes information on opioids and HIV/AIDS in low literacy format
- A Memorandum of Understanding with the National Institute of Environmental Health Sciences (NIEHS)

National Center for Biotechnology Information (NCBI):
- PubMed Labs open
- Partnership to create cloud services, identity management, and support the Commons Pilots

Office of Computer and Communications Systems (OCCS):
- AccessGUDID transitions to the Amazon Cloud
- Data Center redesign (electrical and cooling infrastructure)
- FHIR (Fast Healthcare Interoperability Resources) implementation for VSAC (the Value Set Authority Center), with LO Medical Language Branch (MLB)

Office of Health Information Programs Development (OHIPD):

- Strategic Plan completed
- Trans-NIH data science training survey

Library Operations (LO):
- MEDLINE Goals and Strategies (2018-2022)
- NNLM partners with NIH *All of Us* program
- Hosted two exhibitions, *Viral Networks: Advanced in Digital Humanities*, and *Fire and Freedom: Food and Enslavement in Early America*

Extramural Programs (EP):
- 88 non-compete grants funded under continuing resolution (CR)
- Novel data science curriculum
- 50-75 percent increase in applications

The Lister Hill National Center for Biomedical Communications was not covered in this report.

The Director discussed the *All of Us* Research Program Request for Information (RFI). To add a use case, go to: https://allofusresearchpriorities.ideascale.com.

Use cases are hypothetical studies designed to answer important research questions and include the following requirements:
- **Data** needed;
- **Methods** to obtain and analyze data; and
- **Specifications** about the methods (e.g., measurement taken once a year, every month, continually during waking hours, or at some other interval).

Dr. Brennan next outlined seven challenges ahead for NLM:
  1. Devising NLM's unique contributions to data science in an atmosphere that *data science is done everywhere*.
  2. Defining NLM's contributions to NIH's response to the opioid crisis.
  3. Aligning investments in curation across the NLM.
  4. Optimizing information technology support and services.
  5. Assuring that resources are robust and resilient.
  6. Organizing outreach efforts.
  7. Revitalizing the physical plant, including:
- Updating and modernizing Building 38 (the main library) and 38A (Lister Hill Center);
- Upgrading Levels B1, B2, and B3 in Building 38;
- Improving access and increasing usability; and
- Expanding the workspace—to that end, NLM's Lindberg Room, the BOR's meeting room, will become a collaboration space.

Dr. Brennan noted that NLM recently completed its strategic plan for 2017 to 2027: *A Platform for Biomedical Discovery and Data-Powered Health*. The Board will have a chance for further discussion later.

She included in her presentation recommendations for budget, personnel, and legislation planning:

NLM & NIH Budget
Enacted (FY17), CR & Proposed (FY18), Proposed 2019

	NLM		NIH
FY 2017 Enacted	$406,604,000		$33,900,000,000
FY 2018 CR	$406,604,000		$33,900,000,000
FY 2018 Proposed House Bill	$413,848,000 *+1.9 % Over FY 2017*		$35,184,000,000 *+3.6 % Over FY 2017*
FY 2018 Proposed Senate Bill	$420,898,000 *+3.8 % Over FY 2017*		$36,084,000,000 *+6.9 % Over FY 2017*
FY 2019 President's budget	$395,000,000 *2% down from FY2017* *** For Illustrative purposes*		$33,846,000,000 *Includes $9B for OD*

Transitions
- Office of the Director
  - Budget Officer—Darlene Dodson retired
  - Interim Budget Officer Dwight Mowery appointed
- Lister Hill Center
  - Five new Fellows named

Plans
- New hiring authority
- Three positions approved:
  - Chief Data Architect
  - Investigator
  - Budget Officer
- Requests for additional 20 scientific, scientific support, and contract support filed

Assessment of the BOR Structure and Process
Background:
- Ten appointed members, nine ex officio members, meets three times a year
- Advises the HHS Secretary, NIH Director, and NLM Director
- Self-assessment recommendations:
  - Increase Board engagement in key NLM issues earlier in development process
  - Retain narrative record of the meetings
  - Serve as ambassadors for the NLM goals

Actions:
- Increase the use of subcommittees and working groups
- Rebalance meeting time between open and closed sessions
- Work within the NIH Committee Management Structure

Two Options for Reconfiguring Board Meeting Schedules — Vote to Come in May!

Option 1: Two-day meeting
Day 1:
- Closed session (3:00-6:00 p.m.)
- *En bloc* approval of grants
- Subcommittee and working group time

Day 2 (8:00 a.m.-3:00 p.m.)
- Closed session (8:00-9:00 a.m.)
- Open session (9:00 a.m.-3:00 p.m.)
- Reports of the subcommittees and work groups
- Report of the Surgeon General
- Director's report
- Intramural research report
- Extramural Research report
- Key initiatives report
- Awards and other Regents activities as warranted

Option 2: One-day meeting (8:00 a.m.-5:00 p.m.)
- Closed session (8:00-11:00 a.m.)
- Open session (11:00 a.m.-5:00 p.m., with content as in Day 2, above)

Alternative proposals?

V. MEDLINE UPDATE

Joyce Backus, Associate Director for Library Operations, gave the report.

"MEDLINE is at a crossroads," noted Backus. Today, PubMed comprises more than 28 million citations for biomedical literature from MEDLINE, life science journals, and online books. And, Backus

added, 92 percent of PubMed is MEDLINE. To that end, she posed the following key questions for consideration:
- Is the scope of MEDLINE too broad, too narrow, just right?
- Whom should MEDLINE of the future seek to serve? Researchers? Health care professionals? Patients? Public health workforce? What others?
- Should MEDLINE continue to emphasize "reports of original research" or adjust this emphasis to other types?
- Should MEDLINE be a filter of the "best" as it now intends or be "as complete as it can be made" with little or no filter?

The Board of Regents of the Library sets policy for the Library. The Literature Selection Technical Review Committee (LSTRC) has been established to review journal titles and assess

the quality of their contents. Journals whose contents consist of one or more of the following types of information will be considered for indexing:

      1. Reports of original research
      2. Original clinical observations accompanied by analysis and discussion
      3. Analysis of philosophical, ethical, or social aspects of the health professions or biomedical sciences
      4. Critical reviews
      5. Statistical compilations
      6. Descriptions of evaluation of methods or procedures
      7. Case reports with discussions

With tables showing the trends, Backus mentioned that, in the past eight years, API (application programming interface) searches have grown faster than PubMed web searches. PubMed has also greatly expanded the number of links to full-text articles.

MEDLINE Snapshot
•Primary component of PubMed
•Over 26 million citations to biomedical and life sciences journal articles
•Over 5,300 scholarly journals published worldwide
•Articles indexed with MeSH (Medical Subject Headings) and curated with genetic, chemical, and other metadata
•Journals reviewed by Literature Selection Technical Review Committee (LSTRC) an NIH-chartered advisory committee

The MEDLINE application process:
Step 01 – Publisher or editor submits application to MEDLINE
Step 02 – NLM staff reviews application
Step 03 – Advisory committee reviews application
Step 04 – Advisory committee recommends to NLM

Literature Selection Technical Review Committee (LSTRC)
•NIH Federal Advisory Committee that reviews and recommends journals for MEDLINE
•Meets three times a year: February, June, and October
•130-170 journals are examined at each meeting
•Recommend ~14 percent of journals reviewed for inclusion in MEDLINE

LSTRC MEDLINE Recommendations

The number of journals indexed has grown from just over 2,000 in 1965 to more than 5,500 in 2017. More than 800,000 MEDLINE citations were added last year, for a total of more than 26 million citations.

VI. NLM STRATEGIC PLAN

Dr. Brennan noted that this period is a busy time for both NLM and NIH. The Library has just released NLM's strategic plan, *A Platform for Biomedical Discovery and Data-Powered Health*.

At the same time, NIH announced a draft *Strategic Plan for Data Science*. She added that the intersection of these two important documents demonstrates the alignment of the NLM vision within the overall thrust at NIH to transform discovery into health. She stated that the strategic plan represents the work of hundreds of NLM staff, national experts, and commenters from around the world.

"The NLM strategic plan lays out our current challenges and positions us to address these and emerging issues in biomedical research and public health …. From the need to be present in all environments where health and health care occur—and not just in structured, clinical settings—to the changing nature of libraries and how people pursue information, NLM is ready to embrace the spirit of open science and deliver on the promise of data-driven discovery."

She said that NLM will get there by building on three pillars:
- Establishing NLM as a platform for data-driven discovery and health;
- Reaching new users in new ways; and
- Enhancing workforce excellence from citizens to scientists.

To do this, she said, "we've already begun making data more accessible by allowing researchers to deposit data files as supplements to manuscripts they submit to PubMed Central," she said. "We're helping to build the NIH Data Commons and working across NIH to improve identity and access management.

"We've launched a new research program (https://grants.nih.gov/grants/guide/pa-files/PAR-17-159.html) to devise ways to bring the power of data science into the hands of patients, and we'll be investing further in data science training for librarians, biomedical researchers, and the bioinformatics community."

Dr. Brennan said that NLM is also envisioning new research horizons: "We will be investing in novel approaches to curating data and literature, so we can make both more accessible more quickly and efficiently. We're working with investigators to build needed analytical and visualization tools that can be applied to many different data types. We will be stimulating research in how health information can be presented to the public in fresh and innovative ways. And we will be devising new methods for exploring the literature and linking the key research elements: proposals, data, literature, models, and pipelines."

But that, she added, is just the beginning: "As stakeholders and the public read the NLM Strategic Plan, we want them to see themselves in it. Are your needs around health information and data represented? Does NLM's vision of a data-driven future sound like something that will energize your research or simplify your work? Will the Library be delivering something you need and can use—whether that's:
- Genomic databases and the tools to interrogate them;
- Open resources for citizen scientists;
- Clear, interactive interfaces for librarians and their patrons; or
- Insights into health care's technology future for students?"

And, she said in conclusion, what more might NLM do?

BOR members commented on the Strategic Plan:
- It charts the transformation of NLM in the digital age, and shows it as a proactive force for good in society. One example is NLM's work on resources and activities to combat the opioid crisis;
- The Plan shows a library that is practical and pragmatic;
- The Plan charts the right direction for NLM, preserving its strengths and moving it forward.

Acting Chair Martin called for the vote, to approve the Strategic Plan. The BOR unanimously approved the motion.

Dr. Brennan then noted that NLM will not be responsible for implementing the plan by itself. All of NIH will have a say, and the NLM plan will be closely intertwined with the NIH Strategic Plan for Data Science," which NIGMS Director Dr. Jon Lorsch will discuss next.

The NLM Director discussed first steps for implementation of the NLM Strategic Plan:
- Foster a culture of innovation, within NLM and beyond;
- Recruit and NLM data architect and expand the IRP (intramural research program) scientific investment;
- Expanding the extramural research program; and
- Gaining efficiencies:
  - Aligning outreach efforts;
  - Streamlining services (IT, AV, resources);
  - Automating indexing; and
  - Linking literature, data, models, and results.

VII. REPORT FROM THE SCIENTIFIC DATA COUNCIL

Jon R. Lorsch, PhD, Director of the National Institute of General Medical Sciences (NIGMS), spoke on "Developing an NIH Strategic Plan for Data Science." He noted that this strategic plan has been requested by Congress. He said that the plan focuses on four key goals:

- Modernizing the data resource ecosystem to increase its utility for researchers and other stakeholders and to optimize its efficiency of operation;
- Enhancing data sharing, access, interoperability;
- Improving ability to use electronic health record (EHR), clinical, and observational data for research while ensuring data confidentiality; and
- Modernizing infrastructure, increasing capacity.

Dr. Lorsch observed that "Data science is an interdisciplinary field of inquiry in which quantitative and analytical approaches, processes, and systems are developed and used to extract knowledge and insights from increasingly large and/or complex sets of data." He reinforced the "FAIR" principles, which ideally apply to data:

FINDABLE
ACCESSIBLE
INTEROPERABLE
REUSABLE

Organization of the Strategic Plan:
Lorsch presented the five overarching goals of the strategic plan, including the strategic objectives, implementation tactics, and milestones and performance measures:
Overarching Goal 1: Support Highly Efficient and Effective *Data Infrastructure for Biomedical Research*
Overarching Goal 2: Promote the Modernization of the *Data Resources* Ecosystem
Overarching Goal 3: Support the Development and Dissemination of *Advanced Data Management, Analytics, and Visualization Tools*
Overarching Goal 4: Enhance *Workforce Development* for Biomedical Data Science
Overarching Goal 5: Enact Appropriate *Policies* to Promote *Stewardship and Sustainability*

Next Steps:
- Obtain stakeholder feedback (RFI, Council presentations);
- Set short-, medium-, and long-term priorities;
- Establish performance measures and milestones; and
- Deliver final strategic plan to Congress in May.

Lorsch delineated the individual Strategic Objectives within each of the Overarching Goals.

VIII. DIGITAL PHENOTYPING AND THE FUTURE OF PUBLIC HEALTH

John Brownstein, PhD, professor, Harvard Medical School, and chief innovation officer, Boston Children's Hospital, addressed the BOR. He noted that he has worked with NLM across multiple research grants over the years, and the Library has had a foundational impact for him and his work. He presented to the BOR a wide-ranging, 91-slide PowerPoint landscape of current digital phenotyping—all of which can be shared digitally in a variety of ways.

Challenges in Building the Artificial Intelligence (AI)-Driven Patient Information Commons:
- Access—wild variation in availability and costs to researchers;
- Storage—ability for researchers to utilize can be limited by access to funds and developers;
- Methods—limited scientific progress in the appropriate analysis (methods for sampling, processing, associating, etc.);
- Ethical Challenges—unclear rules on how these data should be treated and de-identified; and
- Integration—massive opportunity to integrate online data (social, crowdsourced, sensors) with clinical data streams.

IX. EXTRAMURAL PROGRAMS

Extramural Programs (EP) Director Dr. Valerie Florance spoke about operating procedures for NLM's grant programs. Each year, NLM asks the BOR to approve these, which relate to adjustments made to grants at the time of grant awards that are made after the *en bloc* concurrence vote made by the Board. All adjustments that result in an increase of more than $40,000 over requested direct costs are reported at the next meeting.

NLM makes additional adjustments, such as downward adjustments based on recommendations that the work can be done in a shorter time or with a smaller budget. Sometimes budgets are revised upward if salary levels or Facilities and Administration rates have changed. In these cases of grant budget adjustment, the scientific context or scope are not altered.

An additional operating procedure is the Special Council Review. Following NIH policy, at each meeting, EP staff check for applications from investigators who already have $1 million or more in direct costs from NIH for research. Such applications are brought to the BOR's EP Subcommittee, with a staff recommendation on whether to allow consideration for funding; the EP subcommittee makes a recommendation, and a vote of the full Board is taken. The Operating Procedures were reaffirmed for 2018.

Florance then turned to the topic of Grant Investment Reporting. A decade ago, the BOR Chair asked EP staff to consider representing grant awards as investments rather than just funding categories. At the time, six areas were defined as areas of investment: Basic Informatics (e.g., retrieval, modeling); Basic Biology Informatics; Translational Informatics; Health Care & electronic health records (EHRs); Public Health Informatics; User Sciences (e.g., cognitive sciences, health literacy); and Scientific Communication (e.g., text-based hypothesis generation and PubMed tools). Pilot coding was done by EP staff, based on titles and abstracts of funded grants. The definitions were revised in 2012 and, beginning in FY 2014, all grant applications assigned to NLM as primary receive one of six investment codes. In 2016, a sixth category was created for data science, which will be combined with other codes as appropriate.

Florance presented summary data for NLM's 2012-2017 grant investments, showing trends of shift in emphasis from bioinformatic to translational, and from information science to data science. Clinical informatics continues to be the largest area of investment across these years, with translational and data science growing in importance.

At the September BOR meeting, members suggested looking for indexing tools that could help characterize the grant portfolio in new ways. Florance reported on initial testing of three tools: NLM MeSH on Demand; NIH Index on the Fly RCDC; and NLM OPEN-*i* text analysis. Her conclusions: expansion categories need to be defined, such as by methods terms or biomedical application domains. Further testing is needed to see whether the specific aims would be a better source for coding. Considerations of staff time are also an issue. EP will look for other text mining services available at NLM that could help.

In closing, Florance presented a summary of NLM's grant award decisions in FY2017, showing applications and awards for R01 research project grants (RPGs). Success rate for R01 grants was

21.5 percent in FY2017, compared to 16.2 percent in FY2016. Success rate for all RPGs was also better in FY2017 than in 2016.

X. NLM OUTREACH FUNCTIONAL AUDIT

Dianne Babski, Deputy Associate Director for Library Operations (LO), and Janice Kelly, Acting Deputy Associate Director, Specialized Information Services (SIS), are the co-chairs of the Library's Outreach Functional Audit.

Ms. Kelly presented the objectives and components of the outreach audit process, activities, and findings. Dr. Brennan noted that the outreach activities are an important way that NLM makes clear that it is a health communications agency, not a health care organization. BOR chair Dr. Sternberg noted that the NLM exhibitions had reached an audience of 257,000 people. Brennan pointed out that there are dozens of traveling exhibitions on tour at any given time. In further discussion, BOR member Dr. Masys asked whether the BOR could be provided a unit cost per exhibition. Brennan said that NLM will provide the BOR more information on the History of Medicine exhibitions in the future.

Babski took the Board through outreach recommendations for aligning with the NLM strategic plan: creating an organizational home for outreach; improving data capture, metrics, and evaluations; and implementing communities of practice. Subsequent discussion among BOR members centered on the possibility of partnering with other organizations on the functional audit process and the role of NLM's social media program. The NLM Director noted, "We have adopted self-exploration as a mode of operation."

XI. NCBI TWO-PRONGED CLOUD COMPUTING STRATEGY

National Center for Biotechnology Information (NCBI) Director Dr. Jim Ostell explained to the BOR aspects of NCBI's approach to cloud strategy.

Two Use Cases for Cloud Platform
To Deliver NCBI Services to the Public
- PubMed 2.0
- Modernize technology stack
- High availability, scalability
- Similar to other commercial sites (e.g., Netflix, Amazon)

To Provide Access to Data for Others
- Access to NCBI data
- No need to copy
- No need to update
- Convenient use without requiring NCBI servers/costs
- Access to non-NCBI data
- NCBI can provide indexing and access permissions without "owning" the data

All New Apps Enabled for Agile Development — Google Optimize for User Interface (UI) A/B tests

- UI changes can be done via Google Optimize interface
- Development and deployment cost is low
- Easy to create targeting audiences (particular percentage, etc.)
- Targeting is sticky – same users will see the same UI variant when they come back
- Plan running ads on PubMed and PubMed Mobile via Google Optimize in the future

All New Apps Monitor Feature Usage

PubMed Labs Launched in October 2017

PubMed Labs is a test site where NCBI is experimenting with new features and tools that eventually may be incorporated into PubMed, in a current or a revised form, based on the input received. Please try the site (https://www.ncbi.nlm.nih.gov/labs/pubmed) and share your comments:
https://www.research.net/r/PYB8PM3?a=labs_pubmed&from=https%3A%2F%2Fwww.ncbi.nlm.nih.gov%2Flabs%2Fpubmed%2F&p=home&s=F4FC50C392F736F1_0132SID
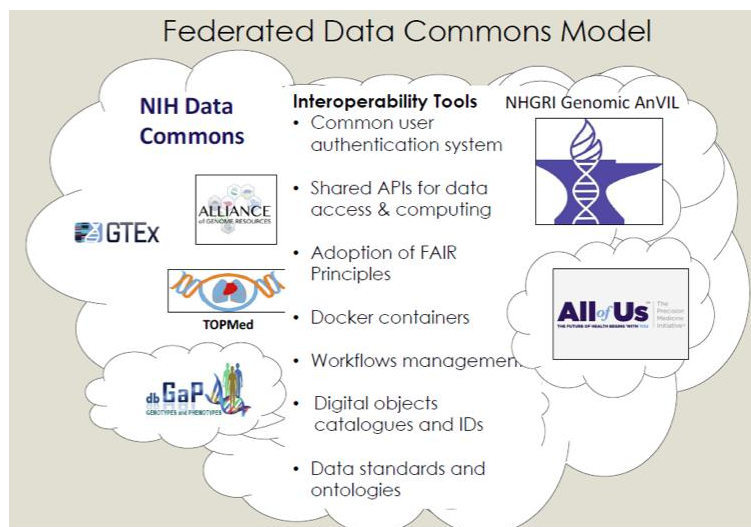
XII. GENETICS HOME REFERENCE UPDATE

Stephanie Morrison, MPH, from the Lister Hill Center, discussed making data-driven decisions to improve an NLM consumer health resource. Morrison gave BOR members an overview of the Genetics Home Reference website content and traffic, the content review process, the site's audience, and the 2016 website redesign.

Data-driven Decision Making
Example 1: Increasing website traffic
Morrison noted that traffic to the website declined after the redesign. She said that page load time turned out to be the (main) culprit.

"Even a few seconds' delay is enough to create an unpleasant user experience. Users are no longer in control, and they're consciously annoyed by having to wait for the computer. Thus, with repeated short delays, users will give up unless they're extremely committed to completing the task."
Reduced page load time = the site traffic has started to rebound

Data-driven decision making
Example 2: Improving discoverability of page elements
Morrison: "We added hundreds of educational images during the redesign. Users were not finding these images."
Usability testing: None of the 10 participants understood or assumed that the dotted underline was a link to an image. Customer satisfaction survey: Users were still asking for images. Usability testing showed that using a camera icon to indicate an image was more effective. Almost three times as many users clicked on the links with the icon than those without.

Data-driven decision making
Example 3: Prioritizing content development
Morrison: "We solicited feedback via our customer satisfaction survey to help us prioritize new content initiatives after the redesign. Based on user feedback, we have decided to focus on:
- Adding more images, particularly images of people with specific conditions.
- Adding links to diagnostic criteria and treatment protocols, when available.
- Creating new pages about the genetics of common, complex diseases:
    - Type 2 diabetes
    - Shingles
    - Leprosy
    - Opioid addiction

"By asking our users what they want, we have been able to focus our efforts on content that will be the most interesting and useful to them." Morrison concluded with an overview of lessons learned, strategic initiatives, and remaining challenges.

XIII. ADJOURNMENT
Acting Chair Sandra Martin adjourned the Board of Regents meeting at 12:00 p.m. on February 14, 2018.

ACTIONS TAKEN BY THE BOARD OF REGENTS:
Approval of the September 12-13, 2017 Board Minutes
Approval of the February 12-13, 2019, May 14-15, 2019, September 10-11, 2019, February 4-5, 2019 Future Meeting Dates
Final Approval of the NLM Strategic Plan 2017-2027

Appendix A - Roster - Board of Regents
Appendix B - NLM Strategic Plan 2017-2027

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

Patricia Flatley Brennan, RN, PhD   Sandra I. Martin, MSLS
Director, National Library of Medicine   Acting Chair, NLM Board of
                                                                              Regents