

Joint Comments by

Medical Library Association (MLA), including members of MLA's Collection Development, HospitalLibraries, and Public Health/Health Administration Sections, and Association of Academic Health Sciences Libraries

In Support of the Request for Information (RFI): Strategic Plan for the National Library of Medicine, National Institutes of Health

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Key Dates

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The following comments were submitted on behalf of the Medical Library Association and Association of Academic Health Sciences Libraries on January 23, 2017. These comments address these four planning themes:

Theme 1: The role of NLM in advancing data science, open science, and biomedical informatics

Theme 2: The role of NLM in advancing biomedical discovery and translational science

Theme 3: The role of NLM in supporting public health

Theme 4: The role of NLM in building collections to support discovery and health in the 21st century

Theme 1: Role of NLM in advancing data science, open science, and biomedical informatics

1. Identify what you consider an audacious goal in your area of interest – a challenge that may be daunting but would represent a huge leap forward were it to be achieved. Include input on the barriers to and benefits of achieving the goal.

MLA, including members of MLA's Hospital Libraries Section, and the Association of Academic Health Sciences Libraries (AAHSL) recommend that:

- The National Library of Medicine (NLM) should be responsible for curating and facilitating discoverability of NIH-funded research datasets and software, both in the developing NIH Commons and elsewhere. Enhancing access to existing datasets increases the return on investment of the original research and helps to more quickly advance scientific discovery.
- NLM's existing suite of biomedical information discovery resources provides an ideal infrastructure of discovery tools on which to base future efforts aimed at data and software. For example, the NLM can facilitate the discovery of data and software by linking them to the related literature in PubMed to create an ecosystem of discovery. In addition, providing mechanisms for easier sharing and reuse could aid researchers in eventually complying with anticipated expansions to the NIH Public Access Policy that will require sharing not only of published articles arising from NIH-funded research, but also the related data and software. In addition, the NLM can improve the description of biomedical data and software by enhancing Medical Subject Headings (MeSH) and other controlled vocabularies, as well as the tools necessary to automate and facilitate the indexing of the literature, data, and software resources. Curating and indexing all NIH-funded data and software is also an important first step in efforts towards develop a standard for data citation in biomedical research, another important goal for which the NLM could provide leadership.

NLM can work to achieve these ambitions in the following ways:

- Collaborating with BioCADDIE and their DataMed index, both during and after their period of active funding. BioCADDIE's creation of the Data Tag Suite (DATS) model, which mimics the JATS model currently employed by PubMed, can serve as a starting point for developing a data tagging standard that can be adopted by publishers and repositories.
- Building on the valuable efforts from BioCADDIE's DataMed project and use the expertise of NCBI to develop a robust data discovery system that can be integrated into NCBI's and other repositories' data discovery systems. Ideally, data and software would be linked to PubMed records for articles describing research in which the data were collected, created, or used. Creating such links would allow users to more easily find data related to a relevant article or vice versa. NCBI's BioProject is one excellent example of how data can be described and linked across multiple projects and NCBI resources. BioProject can serve as a model for a much large data discovery system.
- Developing descriptors that can be used to standardize description and categorization of data and software, as MeSH has done for the scholarly literature. Developing tools like "MeSH on Demand" for data could provide methods for helping other repositories standardize how biomedical data and software is described, thereby making existing data discovery systems more interoperable with a central NLM index.
- Funding research to identify datasets that are deemed the highest value to biomedical research communities (as discussed in the BD2K RFI). Given the exponentially increasing volume of biomedical research data, prioritizing high-value datasets for inclusion in a data discovery system for NIH-funded datasets will make the system more useful.

- Funding research to evaluate best practices in preserving software and systems used to collect NIH-funded datasets. Since many datasets require specific software tools for access and analysis, preserving software and systems is crucial to ensuring long-term access to the data.
- Working with the International Committee of Medical Journal Editors (ICMJE) and other relevant organizations to develop specific requirements for data and software citation. Once finalized, these requirements should be incorporated into *Citing Medicine*, where they will be visible as the gold standard for citing these kinds of resources in biomedical research.

2. *The most important thing NLM does in this area, from your perspective.*

- Training and education
 - The Medical Library Association (MLA) recognizes the importance of NLM's efforts in providing training, both for librarians and for the broader biomedical community. The NLM Associate Fellowship program has been outstanding and continues to produce thought leaders in the field of medical librarianship. The opportunity for early-career librarians to gain expertise in medical librarianship and contribute meaningfully to the field while developing and promoting NLM resources and services is a significant contribution. In the future, the NLM should look to include a Data Associate Fellow, who can focus on emerging areas of research in the fields of data science and open science (discussed in Q3). This approach could lead to increased collaboration between the NLM Associate Fellowship and NCBI Bioinformatics Fellowship programs respectively.
 - NLM also provides important support for more established librarians who want to enhance their skills in order to better support the research enterprise at their institutions. Courses like A Librarian's Guide to NCBI and the NLM Georgia Biomedical Informatics Course have helped many librarians enhance their knowledge. The informationist projects that the NLM has funded since 2012 have also been valuable to advancing science and developing librarians' skills in data management and curation. These projects can provide the NLM useful information on the actual costs (e.g. time, resources) of curating and sharing research data and software in different biomedical research fields. The informationist supplements have also helped shape the development of new roles for information professionals in support of scientific research.
 - NLM has been at the forefront of educational efforts related to biomedical information, and such efforts should continue for data and software. Existing NCBI efforts to educate users of their databases and software should continue and also expand to include other types of data and software made available through the NIH Commons. Beyond the use of NLM resources, opportunities exist for the NLM to provide expanded training relevant to data management and data science more broadly. The National Network of Libraries of Medicine is another existing infrastructure that could be expanded to include more data curation, data searching, data science and software offerings for researchers and other end-users, as well as biomedical librarians.

3. *Research areas that are most critical for NLM to conduct or support.*

- Development of Professional Standards
 - The lack of standards in data collection and dissemination is a considerable barrier to data stewardship, sharing, and reuse. While some research communities have succeeded in adopting widely-followed standards, like CDASH or MIAME, making data interoperable and shareable among researchers worldwide, many research communities have not yet reached consensus on a standard. The NLM can play an important role in facilitating the identification or development of standards for biomedical research communities, as well

as encourage widespread adoption by making recommendations on relevant standards for NIH funding opportunity announcements. Research on and development of standards could be led by NLM, but should involve experts from the community to ensure that adopted standards meet the community's needs. Once standards are adopted, the NLM should develop educational programs for in-depth training in standards that will help librarians learn how to facilitate the use of standards within their institutions. NLM informationist projects could also help fund librarians to work within research teams to assist in adopting standards.

- Research on data practices
 - NLM should also fund and conduct research on data practices within specific research communities. While data management, curation, and sharing are widely recognized as crucial activities, additional research is needed to fully understand existing practices and identify efforts that could help improve the state of biomedical research data. Areas for exploration could include the actual cost of curation in terms of time, grant funding, and resources required to prepare data for sharing, potentially aligning with PCORI's Open Science Pilots. This research would help inform how existing NLM/NCBI resources could be used to support data sharing, and what additional resources would need to be developed to support this effort.

4. Other questions, comments

The Medical Library Association (MLA) values scientific evidence, lifelong learning, and evidence-based practice. MLA members work closely with clinicians and researchers and educators in the biomedical sciences to insure they work with high quality information. MLA members depend on the National Library of Medicine for high quality training at a reasonable price. We depend on the NLM to support the work we do to further the healthcare, education, and research missions of our institutions. Training others to find quality information is an important part of health librarianship, and many of our members are already helping with research data management, data curation, data analysis, and reproducibility training. In order for more biomedical librarians to be able to help with this necessary training, the NLM needs to continue their educational programming. Providing biomedical librarians with the training and tools to continue outreach efforts in the new areas of data science, open science (and reproducibility), and biomedical informatics should be an important part of the NLM strategic plan.

Members of MLA's hospital library section believe that access to biomedical databases and datasets (NCBI), support for research in biomedical informatics, and training for librarians and researchers who access these resources demonstrate NLM's commitment to advancing the fields of data science and informatics.

Areas of opportunity that would benefit the hospital library community include:

- Improving access to public health data sets
- Increasing research into open source bioinformatics software and interaction with non-profit bioinformatics foundations, including more education for librarians on bioinformatics workflow management systems
- Researching exploring the efficacy of the librarian's role in data management and curation

Theme 2: Role of NLM in advancing biomedical discovery and translational science

1. Identify what you consider an audacious goal in your area of interest – a challenge that may be daunting but would represent a huge leap forward were it to be achieved. Include input on the barriers to and benefits of achieving the goal.

MLA, including members of MLA's Hospital Libraries Section, and the Association of Academic Health Sciences Libraries (AAHSL) recommend:

- Integrating analysis tools into existing NCBI databases. One of the greatest challenges to biomedical researchers is the interpretation and analysis of data after the data are gathered, particularly from sequencing experiments in a patient population. Many researchers conduct sequencing on patient/subject data (particularly RNA-seq), but do not have the skills to analyze the data into understandable or usable formats. A solution for this roadblock is the integration of analysis tools into existing NCBI databases. Similar to the GEO2R tools in GEO Datasets, an integrated analysis pipeline to Galaxy would be valuable for researchers, or an NCBI-dedicated Galaxy instance. This would provide researchers with a user-friendly platform to analyze their data and share workflows publicly, thus speeding the process from data collection to data interpretation and clinical relevance.
- Reinstating the Informationist Fellowship (F37). This fellowship allowed for a librarian to pursue graduate education in an informatics field (most often master's level). The impact on career path and opportunities with this fellowship was substantial. In the training arena, NLM is already doing much with the NLM Fellowship program, post-doctoral fellowships, and with the various NCBI training sessions for librarians, but the former F37 award gave a librarian the opportunity to obtain an extra degree in informatics while still working as a practicing librarian.
- Finding new or hot topics in the literature and possibly utilize the same mechanism they use to find new MeSH terms. Where are concept terms in the literature within the translational spectrum? For example, in small molecule and drug development/device development, where is a certain drug/compound/device in the bench-to-bedside spectrum? Like PubMed records display MeSH terms and PubChem substances, perhaps information could be added to the PubMed record or the PubChem record to display where the substance is in the development process. This way, researchers can see which substances or devices have heavy activity and which others need more development. This requires more of an interactive interface and possibly heavy text mining on the part of NLM. What other concepts are linked from the record (besides the links on the right side of the PubMed record to Gene)? Phrased another way, other NCBI databases have extensive cross-links between gene, protein RNA, dbGaP, dbSNP, etc. Incorporate more obvious links to ClinicalTrials.gov: where are these concepts in the testing process and how can we find the links to the related data? Links to record in FDA databases? Why doesn't PubMed display these links to all concepts in a manuscript record when they are all under the domain of NCBI? (except FDA and ClinicalTrials) The goal of this type of functionality is to allow researchers to discover new areas of research or areas that are ripe for development.
- Developing train the trainer model for NCBI databases and other areas of interest, possibly Coursera-like modules for UCSC and Computational Biology skills. Have NCBI/NLM develop their own modules in translational concepts for librarians. Webinars are helpful but there's very

little interaction. Courses require homework, exercises and interaction with fellow students, which is incredibly helpful in the learning process. They could also recommend existing courses - that are found in Coursera and other online places, but they should develop their own series. There would also be a certification at the end of it.

- Collaborating with other federal institutions and state health departments or state legislatures to create a meta-search interface for guidelines, policies and data available across these institutions. It's like a Google or WorldCat for official institutions' data, policy, statistics and documents. It may not be as popular as Google, but it would be much more focused. We know how difficult this is, but a good start would be to develop this across federal institutions.
- Facilitating discovery between PubMed and the National Guideline Clearinghouse (NGC). NCG includes a feature that allows for browsing by MeSH tag: <https://www.guideline.gov/browse/mesh-tag>. As an example, "Practice Parameters for the treatment of sigmoid diverticulitis" is found in both PubMed and NCG ([NGC:010240](#) and [PMID:24509449](#)). There is a link to the PubMed record in the NCG record but no NCG link in PubMed (at least from what I can find). The idea is to promote interoperability among NIH resources to allow for discovery from multiple resources.
- Assisting NIH in developing the centralized data discover index that was addressed in the NIH RFA on "data discovery index." There are many institutions that are developing their own data catalogs, but the NIH BD2K initiative pushed for a centralized [data discovery index in 2014](#). Where is the progress in that project? NLM takes the lead in discovery and cataloging of vast quantities of literature and genomic data, so a data(set) discovery index seems to be a good fit for fast-tracking by the NLM.
- Providing funding for encouraging partnership between libraries and patient advocacy or community groups for patient recruitment for clinical trials. There is so much mis-information about clinical trials and research studies (even observational), so this would encourage a baseline literacy about clinical trials and research that would benefit the public, nurse practitioners, librarians, etc.
- Making educators aware of NLM's databases and tools to positively impact education at the high school, community college and undergraduate level (thereby increasing health literacy later in life). We suggest reinstating the budget for outreach and increasing consumer health literacy and awareness of NLM's own consumer databases such as Genetics Home Reference, MedlinePLUS, Toxnet/LactMed, GenEd, and many of the other educational and training-related databases that are listed at: https://wwwcf.nlm.nih.gov.nlm_eresources/eresources/search_database.cfm
- Considering the development of a funding program for research or project grants for librarians to assist development dissemination plans for research findings to consumer populations that are the focus of investigators' research studies. For example, how do you disseminate the results of your diabetes research to 40 year old men at risk for diabetes? NLM already has great [dissemination information at HSRIC](#), but very few people are aware of it. Librarians can help investigators be aware of these resource and can also contribute to them.

- The use of administrative data for clinical and outcomes research is a promising use of advancing translational science. “*Administrative data (also known as claims data or secondary data) are data collected for nonresearch purposes (often for billing) that can be analyzed retrospectively for research.*” See: Johnson EK, Nelson CP. [Utility and Pitfalls in the Use of Administrative Databases for Outcomes Assessment](#). J Urol. 2013 Jul; 190(1): 17–18. Also see: Bradford MA, Lindenauer PK, Walkey AJ. [Practice patterns and complication rates of thrombolysis for pulmonary embolism](#). J Thromb Thrombolysis. 2016 Oct;42(3):313-21. The investigators used administrative data to obtain ‘real world’ complication rates’ about practice patterns associated with thrombolysis for acute PE in clinical practice as clinical guidelines are lacking. Can these data be collected by NIH/NLM to shed light on gaps?
- Another direction is the use of MEDLINE data as a supplement to Systematic Reviews. See: Ji X, Yen PY. [Using MEDLINE Elemental Similarity to Assist in the Article Screening Process for Systematic Reviews](#). JMIR Med Inform. 2015 Aug 31;3(3):e28. Dr. Yen is doing some promising research in this area. Systematic review services are a growing area of service for medical libraries.
- Likewise MEDLINE data can be used to identify gaps in the translational science spectrum. See: Tao C, et al. [Optimizing semantic MEDLINE for translational science studies using semantic web technologies](#). Proceedings of the 2nd international workshop on Managing interoperability and compleXity in health systems. 2012. “*Semantic MEDLINE provides comprehensive resources with structured annotations that have a potential to facilitate translational studies in the biomedical domain. It is computationally challenging, however, to perform queries directly from the data in the current Semantic MEDLINE database. In this research, we propose a domain pattern driven approach to optimize the Semantic MEDLINE data organization and representation for translational science studies using the Resource Description Framework (RDF) and Semantic Web technologies.*”
- Identification of potential interdisciplinary collaborations is critical for translational research. Semantic metadata methodologies/applications have the potential to identify potential research teams. See: Kothari CR, Payne PR. [A metadata based knowledge discovery methodology for seeding translational research](#). Stud Health Technol Inform. 2015;216:1071, for an example of this type of project.

2. *The most important thing NLM does in this area, from your perspective.*

Hospital librarians identified PubMed/MEDLINE, ClinicalTrials.gov and Human Genome Resources as the most important services NLM currently provides to their audiences in this area.

Areas of opportunity include:

- Increased research and integration with collaborative scientific platforms and networks including CTSciNet and VIVO.
- Continued support and improvement of ClinicalTrials.gov to make the resource more comprehensive and representative of the current clinical trial landscape.
- Research on skills needed by information professionals to support translational science, open access mandate outcomes (NIH or otherwise) and the librarian’s role in this arena (i.e., publication, data management services).

Theme 3: Role of NLM in supporting public health

1. Identify what you consider an audacious goal in your area of interest – a challenge that may be daunting but would represent a huge leap forward were it to be achieved. Include input on the barriers to and benefits of achieving the goal.

MLA, including members of MLA's Hospital Libraries and Public Health/Health Administration Sections, and the Association of Academic Health Sciences Libraries (AAHSL) recommend that NLM could support public health efforts in the United States by:

- Incentivizing partnerships and collaborations between the library community and public health workforce
 - It is difficult for librarians to understand public health needs until librarians participate in the public health environment. “We don’t know what we don’t know and we don’t know it until we are there.”
 - Currently, academic librarians could provide outreach to health departments, but this comes at a cost to the university. There is no mechanism to support this.
 - NLM could support librarians in gaining on-the-ground experience in public health practice environments. This could be achieved through establishing programs that would offer part-time, long-term placements of librarians (like med students in long-term rotations) in health departments.
 - One organization that currently provides opportunities for librarians to be embedded in public health organizations is the Sewell Fund (<http://www.sewellfund.org/>) through its Learning Partnerships program. Participants in this program are embedded within a public health organization for a year, ideally to return to their libraries at the end of the placement with knowledge about the information needs of public health professionals. However, it is often not realistic or feasible for librarians to take a year off from their jobs to do this. In all likelihood their jobs would not be available to them when they completed the fellowship, and anecdotally, several of the librarians who have completed such programs have remained working in the public health organizations where they were placed and not going back to work in libraries. Offering funding or other support for librarians to spend part of their time working in health departments or other public health organizations could enable learning about public health information needs, while not removing librarians from their existing jobs.
- Focusing on efforts NLM can take to support the public health workforce and public health workforce development
 - Efforts focusing on the public health workforce would ideally begin before they enter the workforce. Therefore, academic health science libraries and librarians would be critical components in this endeavor.
 - Additionally, both library and public health academic program faculty and staff can benefit from better understanding real world public health information needs and practice.
 - However, while public health professionals in academic settings typically have direct access to library resources, public health professionals in practice settings tend to have more limited information resources. Key to supporting public health will be strategies for better serving the public health practice community working in state, tribal, local, and territorial health departments; community-based organizations; membership associations; and other non-profit organizations.

- Supporting national public health accreditation efforts by becoming an official partner organization of PHAB (Public Health Accreditation Board) and providing technical assistance (TA) to help public health departments in achieving accreditation. NLM could focus its TA provision on PHAB Standards and Measures Domain 10: Evidence-Based Practices. A list of current partners (listed at <http://www.phaboard.org/education-center/other-resources-for-technical-assistance/>) includes:
 - [Association of State and Territorial Health Officials](#) (ASTHO)
 - [National Association of County and City Health Officials](#) (NACCHO)
 - [National Association of Local Boards of Health](#) (NALBOH)
 - [National Indian Health Board](#) (NIHB)
 - [National Network of Public Health Institutes](#) (NNPHI)
 - [Public Health Foundation](#) (PHF)
 - [Public Health Quality Improvement Exchange](#) (PHQIX)
- While some partner organizations provide TA to specific types of organizations – for example, ASTHO serves state health departments and NACCHO serves local health departments – other organizations provide TA focused on specific topics. For example, PHF provides TA to any public health department for Domain 8: Workforce and Domain 9: Quality Improvement.
- NLM could be similarly named as a partner for assisting health departments with Domain 10: Evidence-Based Practices: “Contribute to and apply the evidence base of public health”. Specifically:
 - Standard 10.1: Identify and Use the Best Available Evidence for Making Informed Public Health Practice Decisions.
 - Standard 10.2: Promote Understanding and Use of Research Results, Evaluations, and Evidence-based Practices with Appropriate Audiences.
- PHAB domains are listed at http://www.phaboard.org/wp-content/uploads/StandardsOverview1.5_Brochure.pdf.
- The NLM should share their expertise with NNLM RMLs and librarians in network libraries so these librarians can provide this assistance at the local level in addition to NLM’s help.
- Ross Brownson would say “start with administration”. Evidence-based decision-making is a cultural thing and needs to be implemented and encouraged at the highest level within health departments to begin to make its way down to the day to day operations. A small set of literature/studies that help guide practice that is known and utilized by administrators is more feasible than asking all public health workers to become expert searchers.
- Assisting in completing synthesis of evidence for more topics in The Guide to Community Preventive Services (The Community Guide; <https://www.thecommunityguide.org/>).
 - The Community Guide is a collection of evidence-based findings issued by the Community Preventive Services Task Force to help public health and other professionals select interventions to improve health and prevent disease. Findings contained in The Community Guide are based on systematic reviews of effectiveness and economic evidence.
 - Practitioners in health departments, other public health organizations, and preventive medicine refer to The Community Guide for synthesized guidance to best practices and examples of how to implement best practices.
 - A primary limitation of the Community Guide that affects its use in practice is the limited number of topics covered. The Community Guide team at the Centers for Disease Control and Prevention (CDC) has identified additional topic areas that could benefit from Task Force findings, but completion of systematic reviews is limited by funding available.

- NLM could support The Community Guide by incentivizing collaboration with CDC to support completion of systematic reviews, as well as dissemination and implementation activities associated with The Community Guide.
 - Incentivizing collaboration could include providing funding or in-kind resources for completion of systematic reviews. NLM can do more to collaborate directly with CDC.
- NLM could become a liaison organization to the Community Preventive Services Task Force, participate on the teams that conduct the systematic reviews, and assist with dissemination activities. Information about liaison organizations is available at <https://www.thecommunityguide.org/task-force/liasons-community-preventive-services-task-force>.
- Helping to produce products that are friendly for the health department/public health practice environment
 - Having access to resources is not a sufficient condition: public health departments in general are underfunded and understaffed, and public health practitioners do not have the time to navigate complex information resources or search multiple databases to find the information needed.
 - In addition, primary research literature may often be of limited usefulness in addressing an immediate need. More useful may be brief summaries with actionable items. A 1-page summary of the evidence in an area with policy or implementation recommendations would be more likely to fit into existing workflows. Examples of “synthesized” information:
 - The Community Guide (<https://www.thecommunityguide.org/>)
 - County Health Rankings (<http://www.countyhealthrankings.org/roadmaps/what-works-for-health>)
 - NLM could help produce more digested/recommendation-oriented literature.
 - Public health version of Dynamed/UpToDate/Clinical decision-support tools for burning questions that need to be answered quickly would be a great resource.
 - Public health version of PubMed for questions that have time to be researched in-depth would also be helpful. While PubMed is a phenomenal resource for medicine, public health is not as well served by PubMed. MeSH lacks terms important for public health practice, and public health practice-focused journals may not be represented or indexed completely in MEDLINE. A PubMed-style resource focused on public health and available at no cost would be an excellent resource for the public health community.
 - Three key considerations for any resources developed for the public health practice community would be free or very low cost, ease of use, and comprehensiveness, and would require cross-discipline collaboration to develop.
- Helping to improve indexing of gray literature
 - Much of the knowledge within public health practice is contained in gray literature, if it is recorded in written form at all: people tend not to write journal articles about their work. Outside of an academic environment, there is little incentive to engage in the time-consuming publishing process. Practitioners do not have time to do it even if they were given training on how to. Writing articles on “how we did this public health intervention here” is often not part of public health practice culture. Information about successful public health efforts is often exchanged through reports, model practice descriptions, peer-to-peer networks, and other informal means, and public health practitioners needing information often seek it through these same sources. NLM could better support the capture, description, retrieval, and exchange of information and knowledge within public

health by creating or supporting resources that better capture and catalog gray literature relevant to public health practice.

- Incentivizing health departments to communicate with each other about what they are doing and provide avenues for practitioners to exchange information in ways that fit into existing workflows.
 - Public health resources are shared through a variety of email listservs, but the emails from these listservs are not always archived and these lists may be closed to a select group of people.
 - For example, on a listserv for public health improvement professionals working on PHAB accreditation there are often requests for sharing of resources – “I’m trying to do X. Does anyone have any examples I can see?” Other listserv members seem to generally be very willing to share what they have done in response to these requests.
 - This is useful for people on that list, but not people not on the list.
 - Enabling more open searching and aggregation of the body of knowledge from existing listservs and databases could facilitate the sharing of information in a way that is already part of individuals’ workflows rather than trying to create entirely new websites.
 - What do we do with all of the projects that are not published and how do we/health departments know what is going on?
 - There is no centralized resource we could think of that lists out all the projects that states and other municipalities are doing. The best we can do is say “Here is what NACCHO’s best practices are for addressing this public health issue” or to direct people to a variety of different resources that may or may not have information relevant for their work.
 - A more robust HSRProj would be a step in the right direction. Right now HSRProj tends to be underutilized and limited to grant funded projects. It would be extremely useful to figure out why HSRProj tends to be underutilized.
 - How do you incentivize information sharing in a way that makes sense for public health practitioners’ workflows?
 - How do you capture this information in some way to create a centralized resource that could provide this information on “what are states (or counties or cities) doing on X public health issue?”

2. The most important thing NLM does in this area, from your perspective.

- Hospital librarians believe that the consumer health resources made available in multiple formats and languages via MedlinePlus are a valuable resource for patients and the public. Increasing awareness of these resources and integrating consumer facing health information into new tools were the biggest opportunities identified by these librarians.

Other areas of opportunity include:

- Continuing research and development into new ways to support meaningful use and integrate consumer health resources into online tools and platforms including EMRs and wellness apps for mobile devices.
- Improving visibility via advertising campaign to promote awareness of free and reliable health information and research to consumers, with a focus on the benefits of PubMed and MedlinePlus

versus for profit sites. Promotional efforts could also focus on improving public/lay understanding of evidence based medicine and personal health advocacy.

- Developing plain language education and information on personalized medicine.

Theme 4: The role of NLM in building collections to support discovery and health in the 21st century

1. Identify what you consider an audacious goal in your area of interest – a challenge that may be daunting but would represent a huge leap forward were it to be achieved. Include input on the barriers to and benefits of achieving the goal.

MLA, including members of MLA's Hospital Libraries Section, and the Association of Academic Health Sciences Libraries (AAHSL) recommend that NLM:

- Develop new way to evaluate and promote integrity of research.
- Build public trust in science and research, and the value of public funding of science and its results
- Develop and promote science literacy of the public BROADLY
- Archive the world's biomedical knowledge and be a central clearinghouse to supply documents (content) to U.S. academic and research institutions. (Recapture fee for service, Document supplier) *Legitimate version of Sci-Hub. (<http://sci-hub.cc/>)
- Expand indexing of serials to all published peer-reviewed biomedical literature regardless of language. Consider creating a PubMed index that acts like a discover tool to all the world's biomedical recorded knowledge. The PubMed database is too small currently, compared to Scopus, EMBASE and Google Scholar.
- Make content and data "social" so it's findable. Be able to search the full text of articles, beyond MeSH and keyword. Be able to analysis word usage and portions of text for trends in the literature.
- Provide metric data on PubMed citation, such measures as Altmetrics, h-index, Scientific Journal Rankings - Scimago SJR, JCR/Impact factor, and referring Google Scholar link to Web of Science citing articles, and require publications to provide an author identification number
- Consider creating a PubMed index that acts like a discover tool to all the world's biomedical recorded knowledge.
- Indexing supplemental data so that it's social and findable.
- Harvesting online lab notebooks from NIH grant recipients. Depositing into PubMed Central.
- Repository of posters from NIH grant recipients, sort of what F1000 Posters is currently indexing.
- Reporting of retractions, funding relationships, and published correspondence to the author.

2. The most important thing NLM does in this area, from your perspective

- PubMed. Plus, the new PubMed Health and ALTBIB
- Basically acts as center of gravity for communication and products of US biomedical research
- Reliable source of consumer health information resources in an overwhelming world
- PMID numbers
- NLM catalog source for records and structured metadata.
- PubMed Central
- History of Medicine Collection - Open digitize history of medicine collection.
- Docline! Lonesome Doc, etc.

From the hospital library community perspective, NLM's leadership and management of PubMed Central, the Collection Development Manual, MeSH index and NLM Classification provide support to information professionals as they build and maintain biomedical collections.

Areas of opportunity include:

- Expanding consumer facing information about genetics, genomics and personalized medicine.
- Providing core MedlinePlus resources in more languages and accessible formats. Current options available via HealthReach are not comprehensive enough for populations served.
- Exploring how NLM historical collections can contribute to discussions surrounding social justice issues and movements.
- Improving vocabulary mapping and other usability tools for existing collections.
- Continuing research on open peer review models and open access publishing.

2. Research areas that are most critical for NLM to conduct or support

MLA, including members of MLA's Hospital Libraries Section, and the Association of Academic Health Sciences Libraries (AAHSL) recommend that NLM ensure the:

- Means to assure and promote accuracy and trustworthiness of data and research product.
- Means to promote NLM's political and economic independence
- Means to overcome flaws of peer review and to develop alternative methods to validate research
- Research Interconnectivity/operability of information and data
- Means to develop accurate and provide bibliometric data on published peer review; such measurements as assorted altmetrics, Web of Science citing articles, Google Scholar's h-index, etc., and
- Methods of preservation of published content/gray literature/image content (MRI, etc)

4. Other comments, suggestions, or considerations, keeping in mind that the aim is to build the NLM of the future.

MLA, including members of MLA's Hospital Libraries Section, and the Association of Academic Health Sciences Libraries (AAHSL) recommend that NLM:

- Require all authors to use ORCID; ensure that PubMed metadata includes all associated ORCID for entries
- Add any non-NIH grant identification markers as part of PubMed entry metadata
- Make online collections and databases mobile user friendly; full text linking in PubMed mobile is problematic
- All web services go beyond ADA-Compliance to be assistive-technology friendly and follow current best practices

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