

Statement of Work for Linked Data Consulting Services

A. Background Information

The [National Library of Medicine](#) (NLM), in Bethesda, Maryland, is a part of the [National Institutes of Health](#), [US Department of Health and Human Services \(HHS\)](#). Since its founding in 1836, NLM has played a pivotal role in translating biomedical research into practice. It is the world's largest biomedical library and the developer of electronic information services that deliver trillions of bytes of data to millions of users every day. Scientists, health professionals, and the public in the US and around the globe search the Library's online information resources more than one billion times each year.

MeSH is the National Library of Medicine's controlled vocabulary thesaurus maintained by the staff of the Medical Subject Headings Section. It consists of sets of terms naming descriptors in a hierarchical structure that permits searching at various levels of specificity. The MeSH thesaurus is used by NLM for indexing articles for the MEDLINE®/PubMed® database. It is also used for the NLM-produced database that includes cataloging of books, documents, and audiovisuals acquired by the Library. Each bibliographic reference is associated with a set of MeSH terms that describe the content of the item. Similarly, search queries use MeSH vocabulary to find items on a desired topic.

At present, NLM publishes datasets on the web using a variety of methods and formats. While the publishing of NLM data has required a great deal of cooperation among areas of the library, NLM has not undertaken any broad efforts to publish data using the W3C web standard for linked data, Resource Description Framework (RDF).

The NLM Linked Data Infrastructure Working Group (LDIWG) was formed in February 2014 with the goal of developing and building an infrastructure for transforming, storing and publishing NLM linked data. LDIWG will research best practices in publishing linked data, recommend NLM-wide policies and guidelines for linked data publishing, publish MeSH or other vocabulary dataset as a linked data pilot, document guidance for maintaining the established linked data infrastructure and recommended process for future data linking projects, and prioritize other NLM datasets for future publication as linked data.

B. Purpose and Objectives

The purpose of this purchase order is to acquire consulting services in the areas of linked data and the semantic web with the goal of assisting NLM to publish the MeSH vocabulary in RDF. Specific areas requiring consultation may include: data modeling and architecture, stakeholder engagement, analytic and usage statistics, and developing user studies.

The consultation activities on the project to publish MeSH as RDF can be broken down into 2 major phases. The base period of performance shall be for 4 months upon award

of the purchase order. An optional period of another 8 months may be awarded upon completion of the base period.

Phase 1 (base period = approximately 200-250 hours)

- Kickoff meeting
- Review existing MeSH RDF data model and assist with necessary technical adjustments needed to produce Beta version
- Assist with stakeholder engagement
 - Identify 3-5 key stakeholders in the medical, health, library and cultural heritage arenas who will test beta version and provide constructive feedback
- Develop methods for promoting awareness of MeSH RDF
 - Promote/publicize MeSH RDF at relevant conferences and meetings
- Assist with mechanisms for collecting feedback
 - Develop mechanisms for soliciting feedback
 - Develop analytics to provide usage data at the most granular level
- Workshop on developing analytics and generating use cases

Phase 2 (optional period = approximately 250-300 hours)

- Participate in testing of beta MeSH RDF by incorporating it into already existing services
- Perform impact analysis based on feedback received
 - Assess the data collected and identify patterns
- Develop use-cases based on usage and feedback collected
- Provide technical guidance on further development of the data model
- Provide technical guidance on the tools and infrastructure needed for deployment of MeSH RDF in a production environment
- Assist with presentation to NLM staff on impact of MeSH RDF in the larger semantic web environment

C. Vendor Requirements

- The contractor shall visit NLM for a kickoff meeting at the start of the project. During this meeting the vendor shall meet with the COR, the NLM Linked Data Infrastructure Working Group, as well as other staff members at NLM involved with this project. The goal of the kickoff meeting will be to allow the contractor to become familiar with the staff involved as well as the current status of the project.
- The contractor will develop and present an on-site workshop to selected NLM staff on developing analytics to evaluate use of MeSH RDF and how to utilize the data gathered to generate use cases.
- The majority of all other communication between the contractor and NLM shall be performed via email or conference call.
- The contractor must have demonstrated expertise in the areas of linked data and the semantic web specifically in the medical/health and library and cultural heritage arenas.

D. Government Responsibilities

The government shall provide access to the MeSH RDF prototype and any other systems deemed by NLM staff necessary to complete this project. The government will also provide access to remote conferencing software and/or onsite meeting space when necessary.

The government will provide for travel expenses for the contractor to visit NLM for the kickoff meeting, the workshop on developing analytics and generating use-cases and the presentation to NLM staff on the impact of MeSH RDF in the health information and library/cultural heritage communities.

E. Reporting Requirements and Deliverables

The contractor will provide the following deliverables as part of this project:

Deliverable	Method of delivery	Estimated hours	Phase
Kickoff Meeting	In-person at NLM	24	1
Review of data model	Email/Phone	40	1
List of Key Stakeholders	Email/Phone	8	1

Methodology for promoting MeSH RDF	Email/Phone	24	1
Methodology for collecting feedback	Email/Phone	28	1
Methodology for performing analytics	Email/Phone	28	1
Workshop on developing analytics and generating use cases	In-person at NLM	48	1
Results from testing MeSH RDF in existing services	Email/Phone	48	2
Impact analysis of feedback received	Email/Phone	48	2
Develop use-cases	Email/Phone	48	2
Suggested technical approach to building infrastructure	Email/Phone	48	2
Presentation to NLM staff on impact of MeSH RDF	In person at NLM	24	2
Monthly updates/status reports	Email/Phone	24	1 & 2
Remote participation in biweekly meetings of the NLM LDIWG	Phone	36	1 & 2

F. Program Management and Control Requirements

This project will be managed at NLM by Barbara Bushman, Chair of the NLM Linked Data Infrastructure Working Group who will serve as the COR for this project. Other technical experts at NLM may be present for various meetings and conference calls depending on the specific topics being discussed.

G. Inspection and Acceptance Requirements

All monthly reports, guidelines and/or documentation developed during the project will be submitted in electronic format and reviewed by the Project Manager/COR. In addition, a copy of all invoices should be submitted to the COR for review prior to submission for payment.

All electronic reports submitted shall be compliant with Section 508 of the Rehabilitation Act of 1973. Additional information about testing documents for Section 508 compliance, including guidance and specific checklists, by application, can be found at: <http://www.hhs.gov/web/508/index.html> under "Making Files Accessible."

Other Reports/Deliverables

Section 508 Annual Report: The contractor shall submit an annual Section 508 report in accordance with the schedule set forth in the ELECTRONIC AND INFORMATION TECHNOLOGY ACCESSIBILITY Article in SECTIONH of this contract. The Section 508 Report Template and Instructions for completing the report are available at: <http://www.hhs.gov/web/508/contracting/technology/vendors.html> under "Vendor Information and Documents."