

The National Library of Medicine Update MLA 2021

10:15 am – 11:15 am (CT)

Continue the Conversation!
11:15 am – 12:15 pm (CT)

NC_045512.2, 29903 bp ss-RNA, linear, 30-MAR-2020
Severe acute respiratory syndrome coronavirus 2 isolate Wuhan-Hu-1,
complete genome.
NC_045512.2
NC_045512.2
BioProject: PRJNA485431
RefSeq
Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2)
Severe acute respiratory syndrome coronavirus 2
Rhabdovirales; Coronavirineae; Coronaviridae;
Orthocoronavirinae; Betacoronavirus; Sarbecovirus.
1 (bases 13476 to 13503)
Baranov, P.V., Henderson, C.M., Anderson, C.B., Gesteland, R.F.,
J.F. and Howard, M.T.
Programmed ribosomal frameshifting in decoding the SARS-CoV genome
Virology 332 (2), 498-510 (2005)
MED 15680415
ENCE 2 (bases 29768 to 29768)
Baensch, R., Haussler, D., Ares, M., and
W.G.
The structure of a previously unobserved RNA element within the SARS
records that exclude: Homo sapiens (taxid:9606), models (XM/XP) | Full Entrez Query
Homo sapiens chromogranin A (CHGA),...
MED 15630477
ENCE 3 (bases 29609 to 29657)
SARS-CoV-2
Homo sapiens chromogranin A (CHGA), transcript variant 1, mRNA
non-coding RNA primarily conserved hairpin
MED 10482585
SARS-CoV-2
Significant alignments
man Coronavirus Genomes
hang, Y.-Z.
Hubei province, China

The National Library of Medicine (NLM) of the National Institutes of Health (NIH) is a multi-institutional effort to improve the response through new initiatives with the global publishing community and artificial intelligence researchers. NLM is expanding access to digital papers in coronavirus for researchers, providing a digital archive and for text-mining research. This work makes the NLM's PubMed Central (PMC) digital archive of peer-reviewed biomedical and life sciences literature. PMC currently provides access to nearly 6 million full-text journal articles.

PA
ERECT

COVID-19
New Zealand
COVID-19 in
The Lancet

LitCovid DATA Download

Bibliography
Download LitCovid citations for reference management or to process with automated software

Text and Data Mining
Download the text available from LitCovid articles, with automatic annotations by PubTator

How to CITE LitCovid

MeSH

NIH NLM

Gene and exon navigator

Presenters



Patricia Flatley Brennan, RN, PhD
Director, National Library of Medicine

Directions for the Future



Dianne Babksi
Associate Director,
Library Operations

Current Directions and Engagement



Olivier Bodenreider, MD, PhD
Acting Director,
Lister Hill National Center for Biomedical Communications

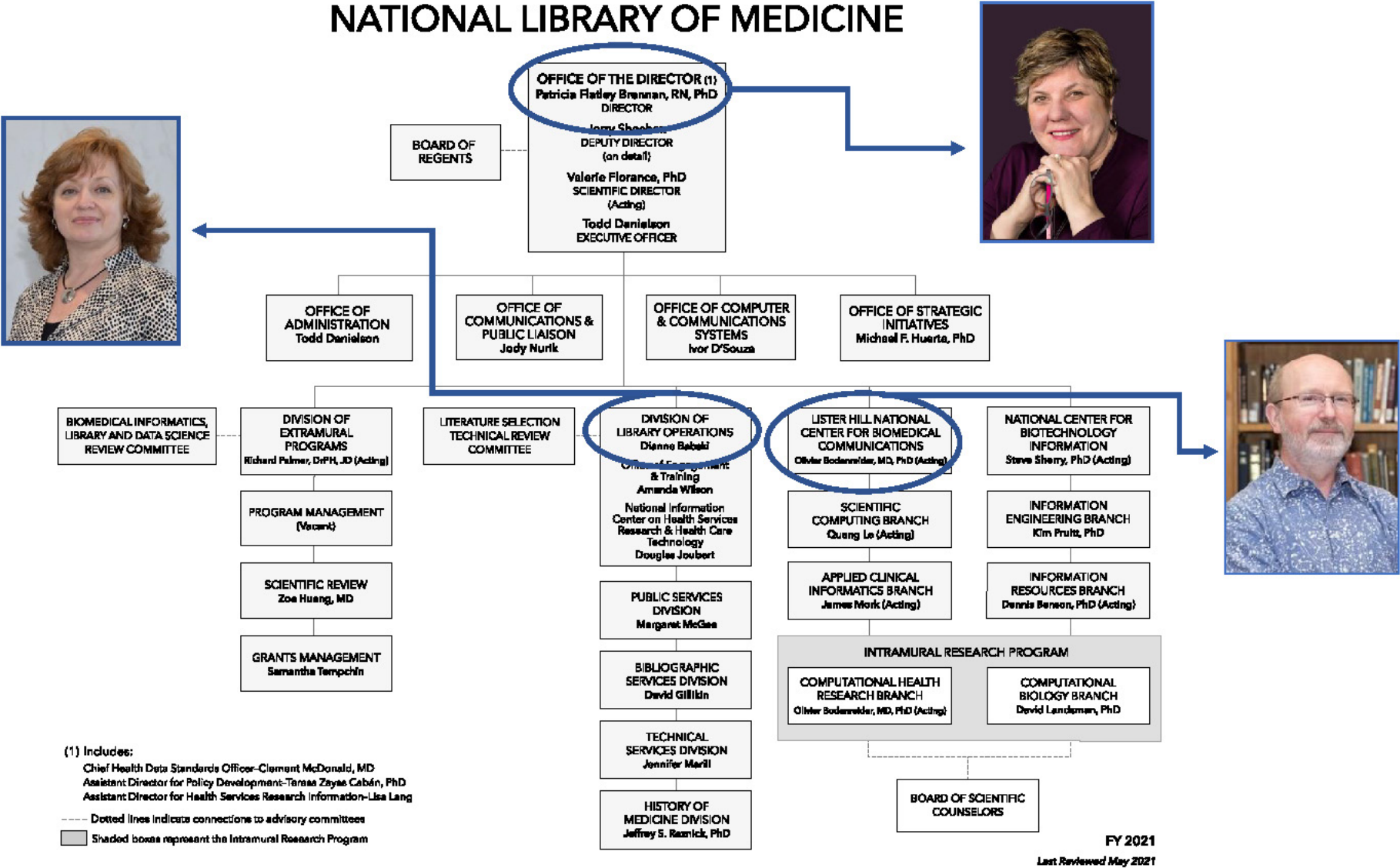
Health Data Standards

Directions for the Future

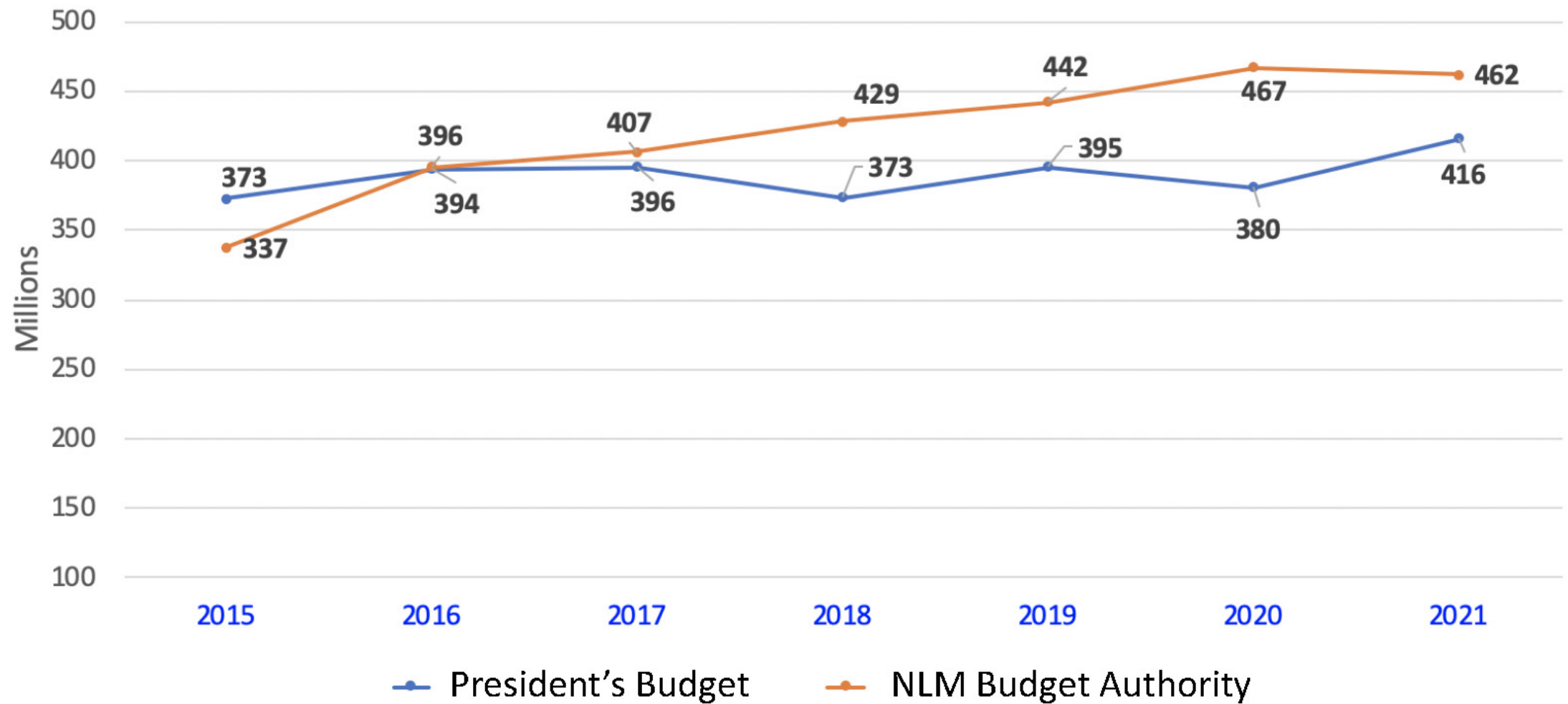


Patricia Flatley Brennan, RN, PhD
Director, National Library of Medicine

NLM Organizational Chart



2015 – 2021 NLM Budget Authority vs President's Budget



Accelerating Discovery and Data-Powered Health



**Accelerate
discovery and
advance health
through data-
driven research**



**Reach more
people in more
ways through
enhanced
dissemination
and engagement**



**Build a workforce
for data-driven
research and
health**

Progress Toward the NLM Strategic Plan



Data-Driven Research

- TRACE variant report
- Open Data Program (ODP) by Sequence read Archive (SRA)
- Sequence-based protein folding



Engagement

- Community Engagement through the NNLM - All of Us, PASC Initiative
- ClinicalTrials.gov Modernization webinar
- New MEDLINE web site launched
- Desirable Characteristics of Data Repositories



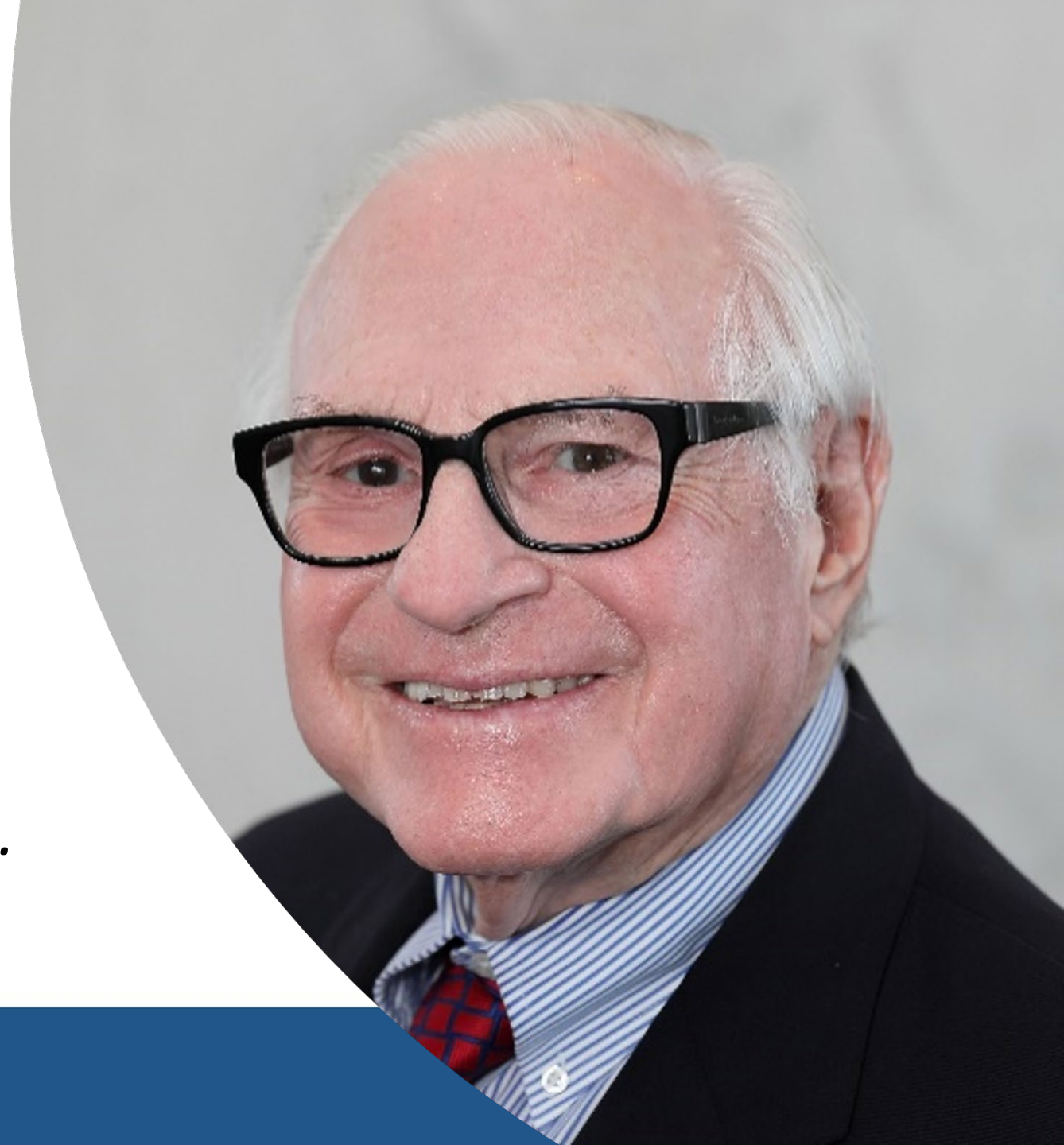
Workforce Development

- Data Science @ NLM Training Program
- Infrastructure Improvements
- Data Science Education: NLM Center for Data Science and Services

In Memory

Milton Corn, MD

*A moment of
thanks and recognition
for our colleague and dear friend.*



NLM Personnel Appointments 2021



Dianne Babski
Associate Director,
Library Operations



Teresa Zayas Cabán, PhD
Assistant Director,
Policy Development



Valerie Florance, PhD
Acting Scientific Director,
NLM Intramural
Research Programs



Richard Palmer, DrPH, JD
Acting Director,
NLM Extramural Programs

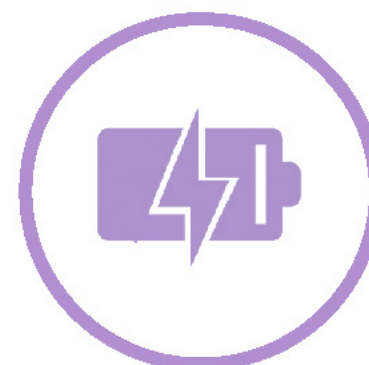
NLM: Building on the Three R's



Reflect



Reimagine



Reenergize

Reflect



How It Started and How It's Going



Work-Life Balance

Life



Health



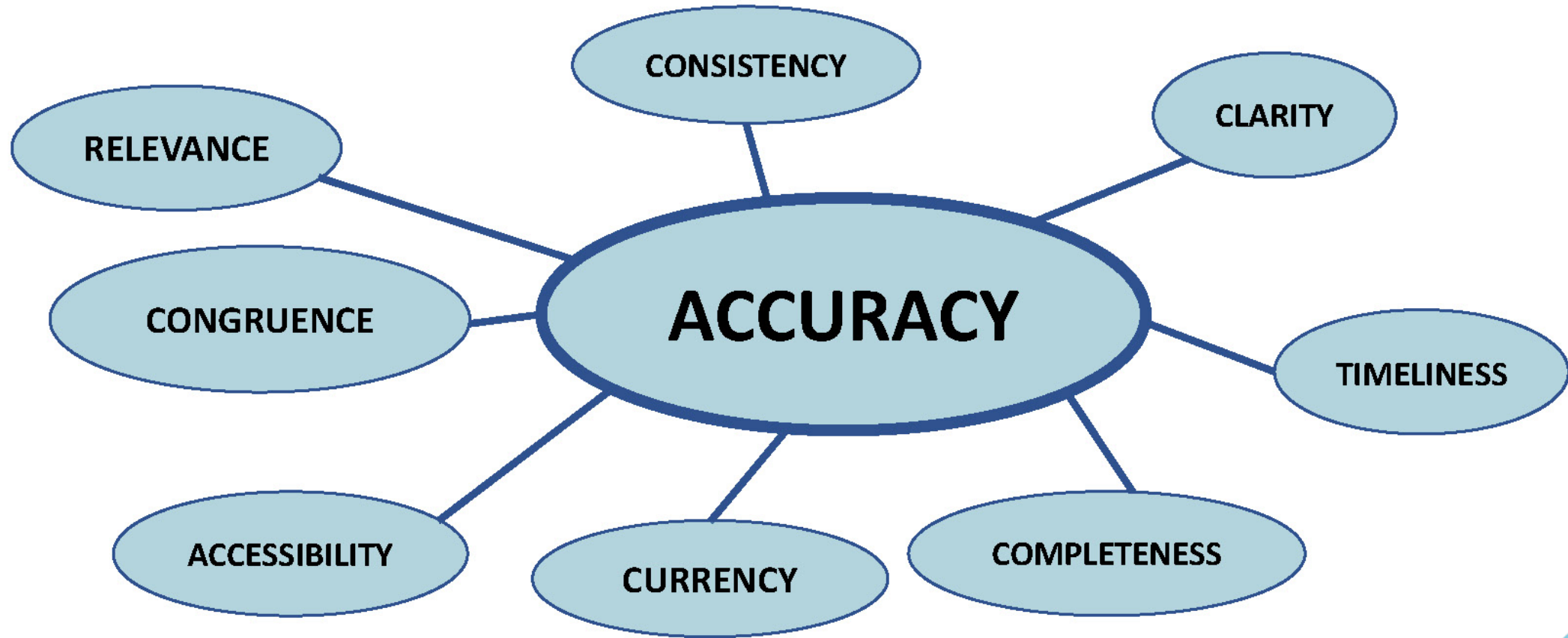
Family



Work



Getting It Right: The Importance of Information Accuracy (Reflect)



Promoting Diversity, Equity, and Inclusion in Biomedical Careers

UNITE



- U**nderstanding stakeholder experiences through listening and learning
- N**ew research on health disparities, minority health, and health equity
- I**mprove the NIH culture and structure for equity, inclusion, and excellence
- T**ransparency, communication, and accountability
- E**xtramural Research Ecosystem

[Ending Structural Racism](#)



The NIH Strategy: Improve Science through Diversity

Indexing

- How we **acquire, define, and locate** the literature



Reimagine



Live Poll 1



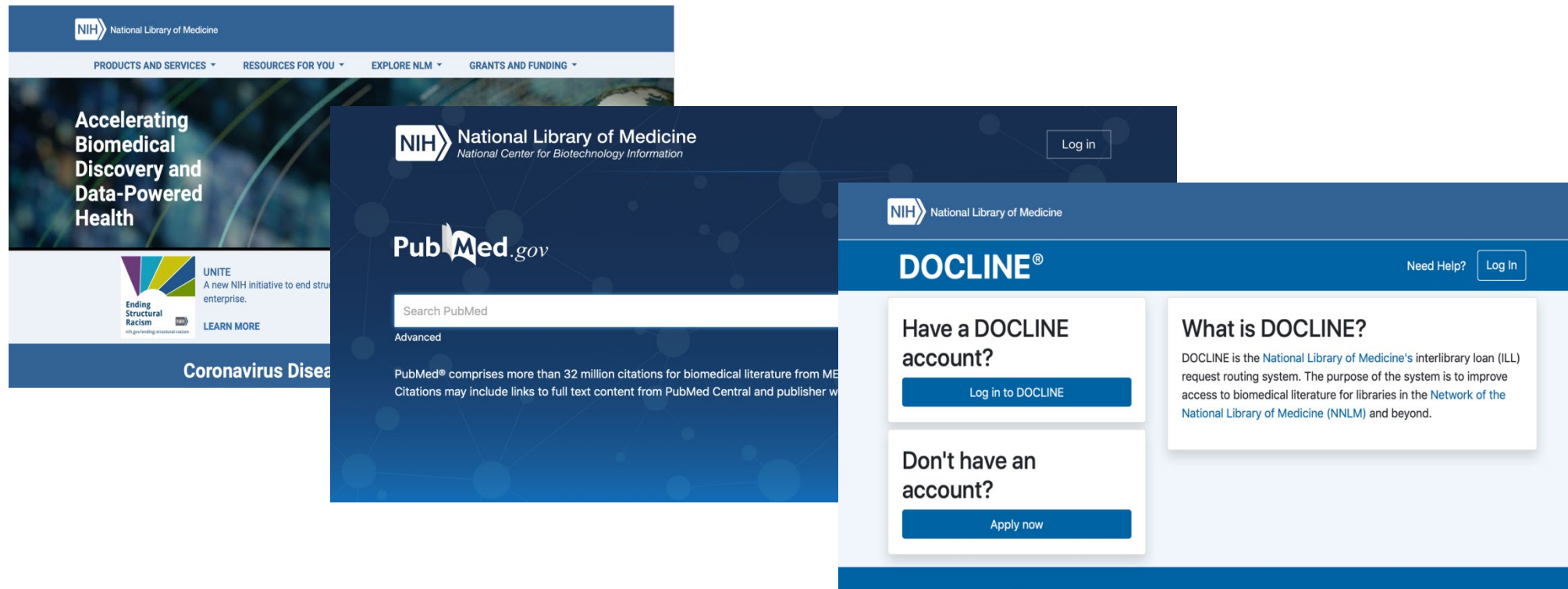
REFLECT

How is your current practice different than a year ago and what modification(s) have you made?



How Do We Best Serve the Needs of Our Public?

Rebuilding the public face of NLM's offerings

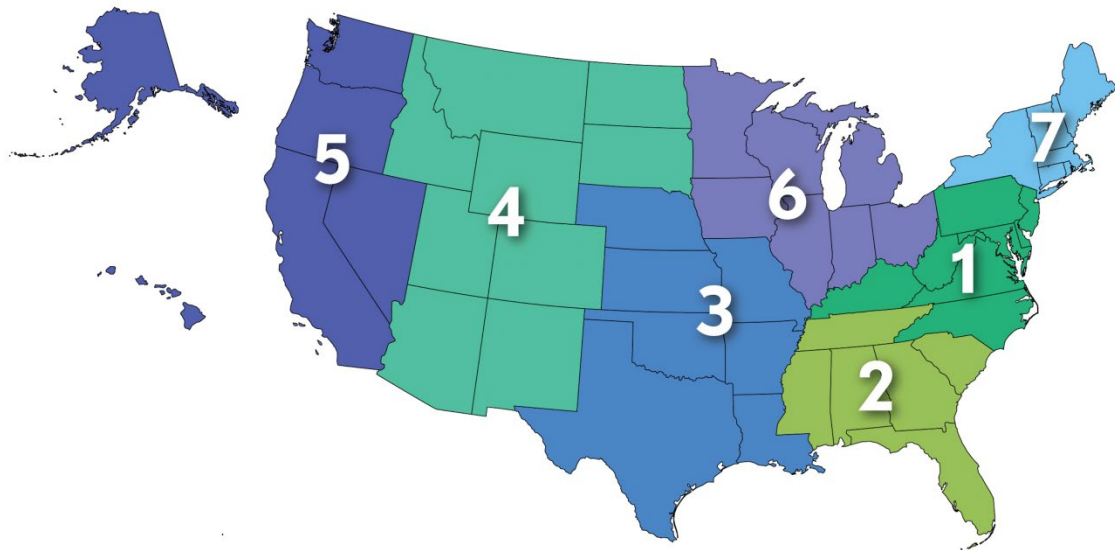


What is the Future of Work?



Network of the National Library of Medicine (NNLM)

NNLM Regions May 2021 – April 2026



6 National Coordinating Centers

NNLM Web Services
Office (NWSO)

NNLM Public Health
Coordination Office
(NPHCO)

NNLM Training Office
(NTO)

NNLM Evaluation
Center (NEC)

NNLM *All of Us*
Community
Engagement Center

NNLM *All of Us* Training
and Education Center



Reenergize



Co-creating the New Normal



Reaching NLM



Current Directions and Engagement



Dianne Babski
Associate Director,
Library Operations



The 3Rs: Our Guiding Force in 2021



REFLECT

- Maximum telework
- New skills and virtual capabilities



REIMAGINE

- Workforce flexibilities
- Digital solutions for servicing our patrons



REENERGIZE

- Forward thinking
- Growing and learning

Library Operations: Who We Are

VISION to be a leader in global health information to improve public health

MISSION to collect, preserve, and make accessible biomedical literature and other resources

VALUES



Library Operations: What We Do

Collect

Acquire and preserve unique and trusted collection of biomedical information

Connect

Link our global audience to biomedical data and resources to make informed health decisions

Curate

Make biomedical information findable through data normalization, metadata and data standards




Our Leaders



Retired





Over 30 new staff
joined the NLM LO
family in 2020

NLM Associate Fellows 2020 - 2021



BRIANNA CHATMON

*University of Missouri -
Columbia*



ALLISON CRUISE

*University of North Carolina -
Greensboro*



LEVI DOLAN

*University of Missouri -
Columbia*



AMANDA SAWYER

University of Pittsburgh

NLM/AAHSL Leadership Fellows Program



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NLM/AAHSL Leadership Fellows Program

[Program Overview](#) | [Program Graduates](#) | [Reports](#) | [Program Evaluations](#)

Apply Today!

Apply by June 15 to be considered!

The National Library of Medicine (NLM) and the Association of Academic Health Sciences Libraries (AAHSL) is pleased to announce the opening of applications for the 2021/2022 fellowship. The [application information](#) has full program details, and details about [past years' cohorts](#) and [program reports](#) are available. Submit your [application](#) by **June 15th** to be considered for the 2021/2022 cohort.

The Leadership Fellows Program recognizes and values the importance of diversity and inclusion in enriching and supporting the mission of academic health sciences libraries, and actively seeks applications from individuals with varying identities and backgrounds.

Instructions for applying can be found starting on page 7 of the [application information](#). Potential fellows should complete the [Fellows Online Information Form](#) and upload the supporting document with the form OR submit them electronically to AAHSL by **June 15, 2021** by emailing packets to office@aaahsl.org. *Please note: If you are a "New User" to the AAHSL Website and email lists, you will need to "Register" to access the form.*

Information for *potential mentors* is also available in the application [information brochure](#) on page 11. Letters/emails of interest in becoming a mentor should be sent electronically to plthibodeau@gmail.com by **June 15, 2021**.

Quick Links

[Fellows Program](#)[Membership](#)[My Profile](#)[See All Director Openings](#)[Our Member Institutions](#)

Join AAHSL

AAHSL membership is composed of academic health sciences libraries whose medical schools hold member or associate member status in the [Association of American Medical Colleges](#). AAHSL membership categories are full members and associate members. Associate members are libraries whose institutions or organizations have an interest in the purposes and activities of AAHSL.

Apply by
June 15!

[NLM/AAHSL Leadership Fellows Program](#)

Advice and Guidance from the Library Community



Anne Seymour, MS
*Welch Medical Library
Johns Hopkins
University*



Kristi Holmes, PhD
*Galter Health
Sciences Library
Northwestern University*



**Neil Rambo, MLS
(Retired)**
*Health Sciences Library
New York University*



Marissa Conte
*Taubman Health
Sciences Library
University of Michigan*



Pamela J. Bagley, PhD
*Biomedical Libraries
Dartmouth College*

Data Science Training Program



NLM Intramural Research Program



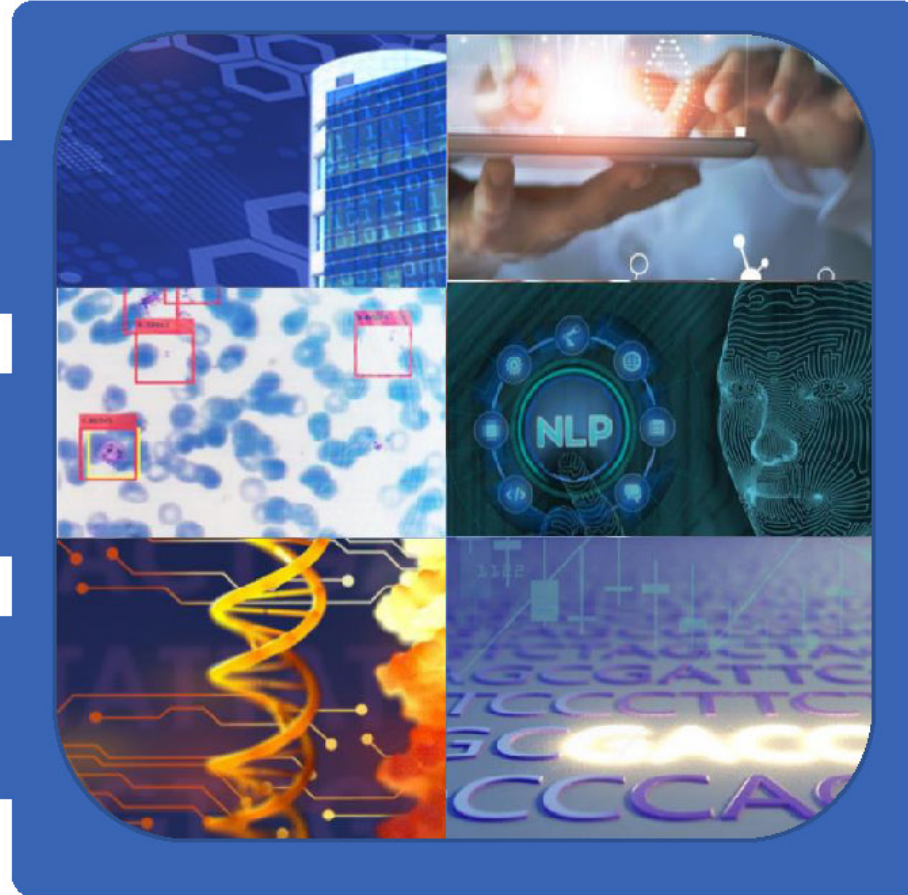
Evolutionary Genomics and
Biomolecular Structure



Image Processing



Networks, Gene Regulation,
and Chromatin



Health Information
Standards and Discovery



Natural Language Processing



Statistical Methods

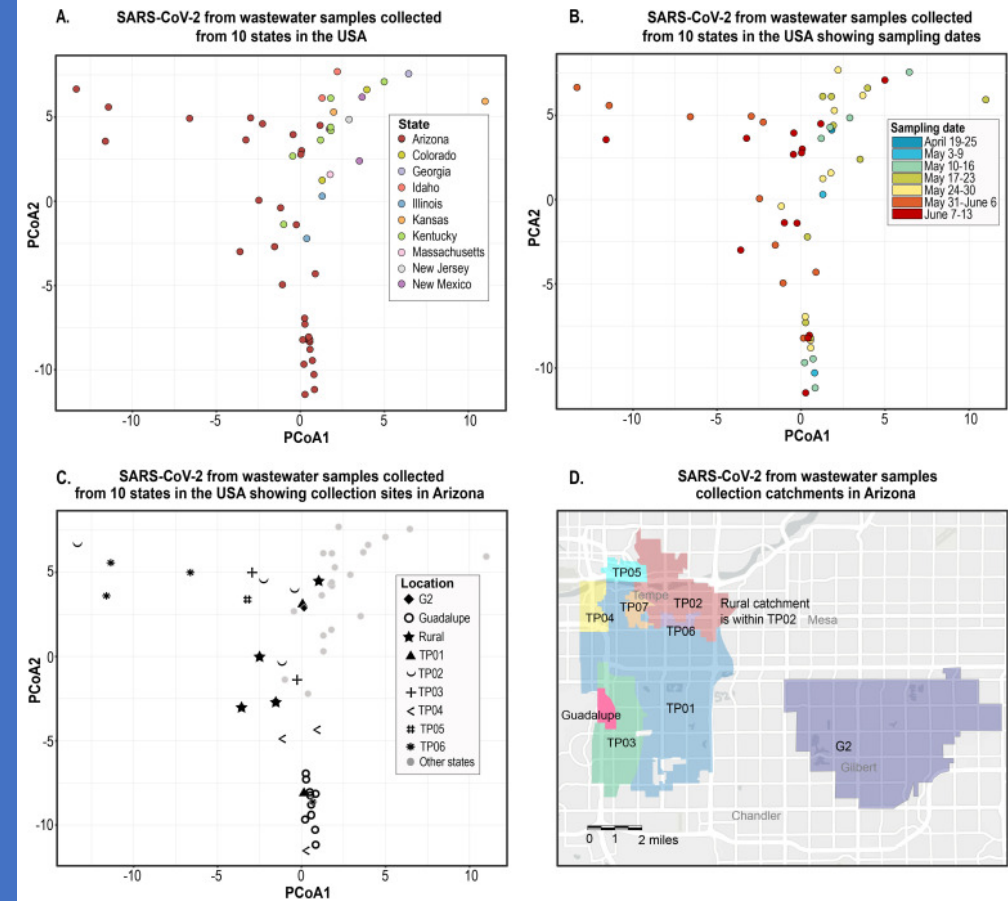
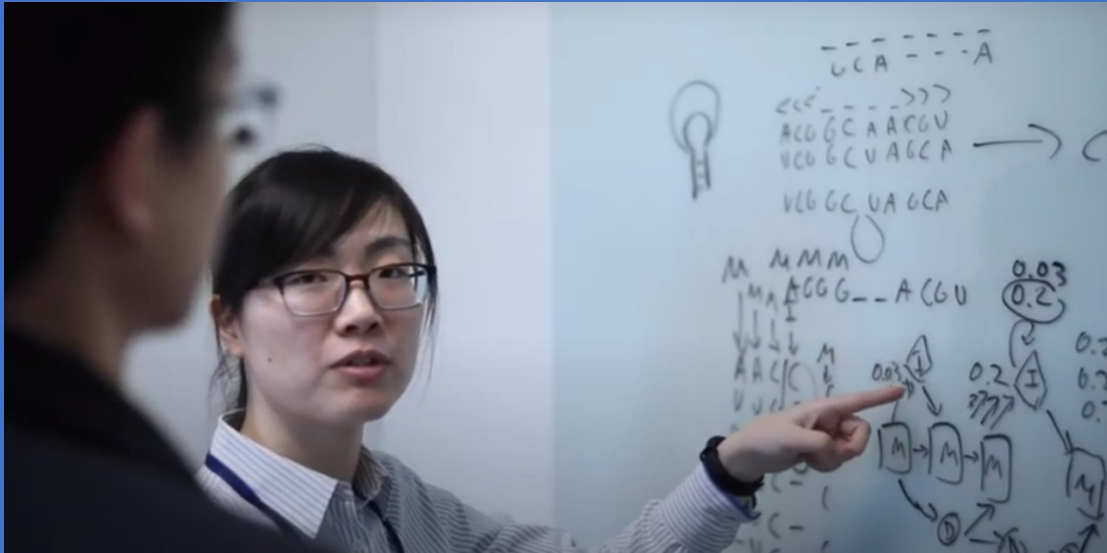


Lauren Porter: The Study of Fold-Switching Proteins



LAUREN PORTER
STADTMAN TENURE-TRACK
INVESTIGATOR

Xiaofang Jiang: COVID Wastewater Project

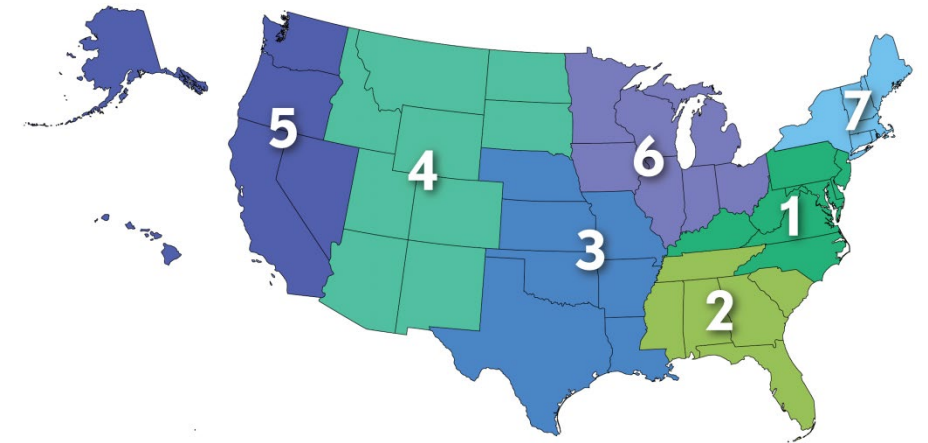




NNLM

Network of the
National Library of Medicine

Advance health equity through
information with a focus on serving
underrepresented populations.

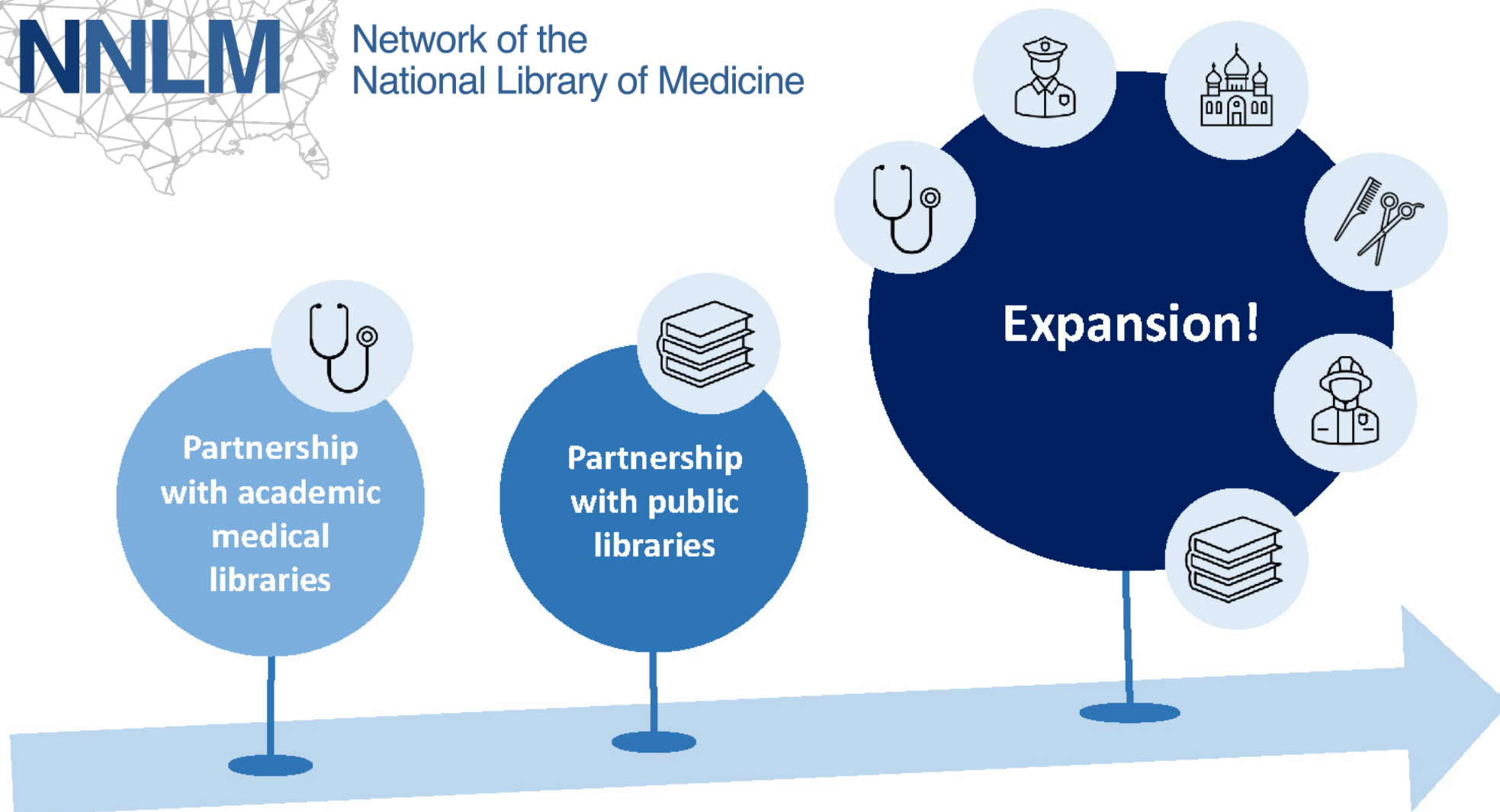




NNLMM

Network of the
National Library of Medicine

NLM Expansion



The Unaccompanied Children Program



NLM@MLA21: Collaboration and Partnering

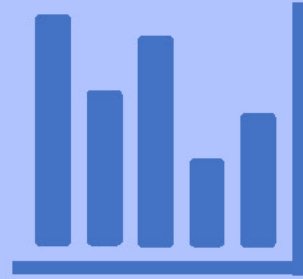
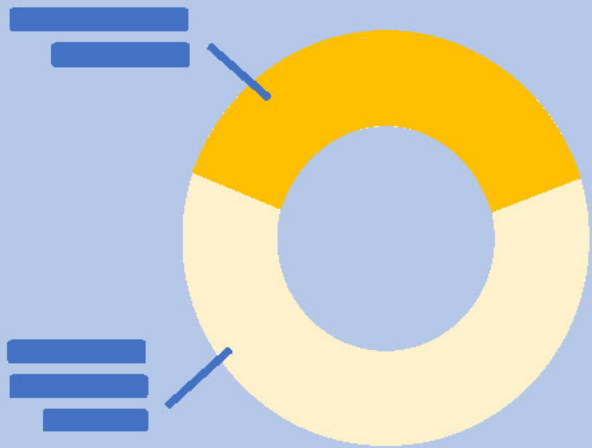
New activities now available at MLA

- The Electronic Fund Transfer System ([EFTS](#)) for DOCLINE
- MLA Data Services Specialization ([DSS](#))
- Disaster Information Management Specialization ([DIS](#))



Feedback and Data-Driven Decisions

Audits, Evaluation & Analytics

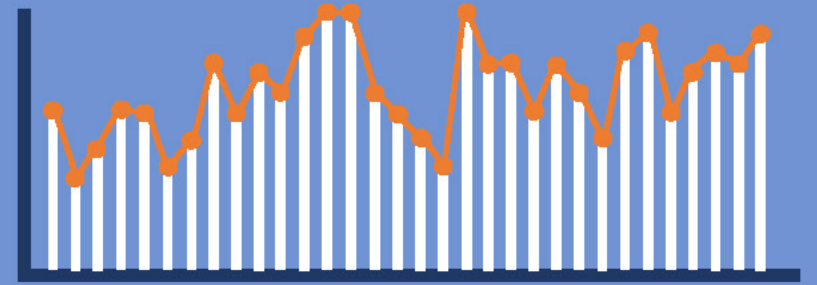


Webinars

Conferences

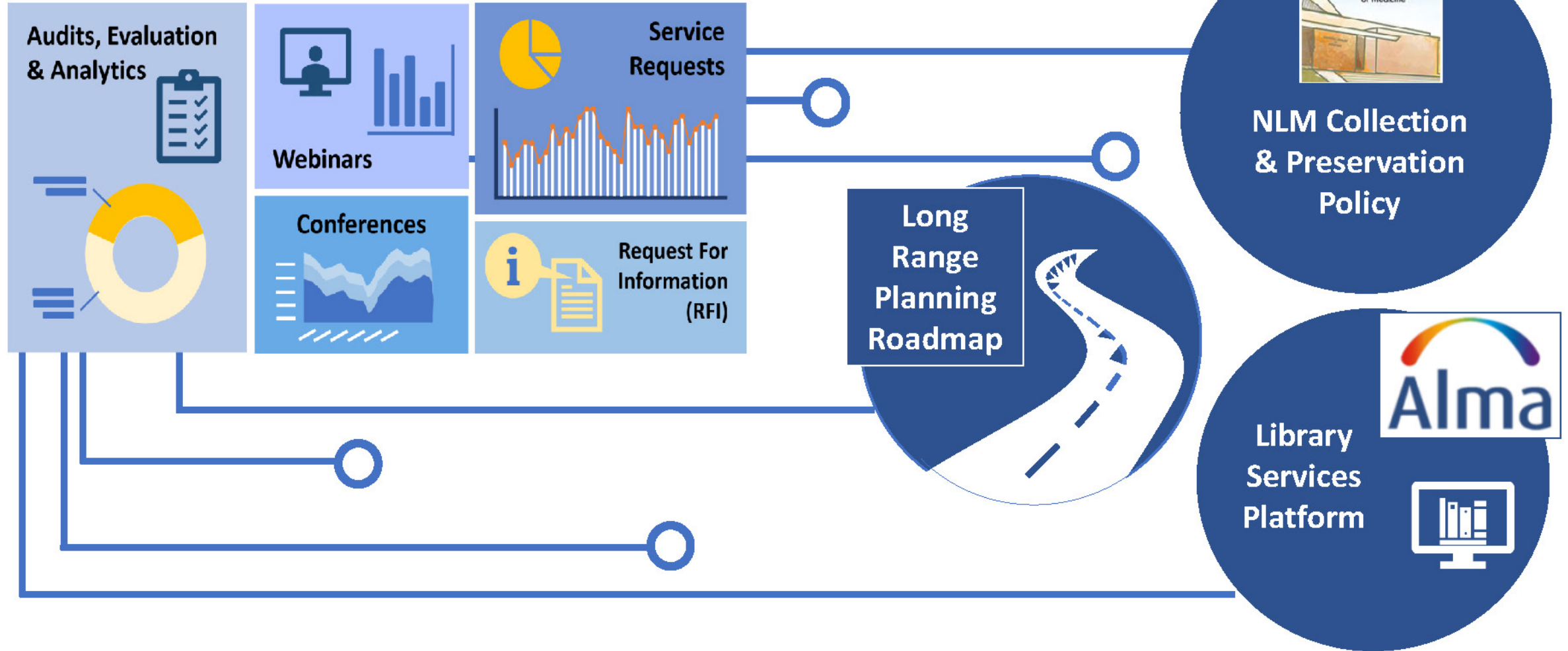


Service Requests



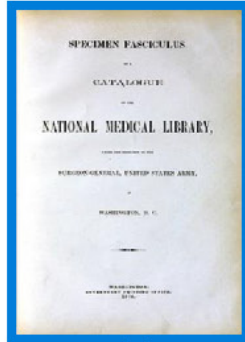
Request For Information (RFI)

Improving Our Products and Services



1879

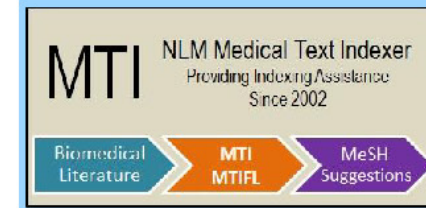
Index Medicus is published, establishing the Library's groundbreaking role in systematic indexing of medical journal articles



1971 MEDLINE launches!



2002 MTI (Medical Text Indexer) is created, with continuous updates based on indexer feedback



2022 MEDLINE 2022 Initiative implemented

patients methods medicine
science virus research findings
health cure biology
innovation experimentation
discovery observation

MEDLINE 2022

0100101001001001001
010011011100100011001
010001110011110100100101
0100100101010100
100101001010010100101

Circa **1870** John Shaw Billings indexes medical journals at his home in Washington, DC



1960 MeSH introduced as a controlled vocabulary used for indexing, cataloging, and searching biomedical information

1997 PubMed Begins, allowing Internet access to MEDLINE data



2021 New MEDLINE Website launches



Library Renovation



BEFORE



AFTER



**Compact
Shelving
+3,300
Linear Ft.**

Call to Action



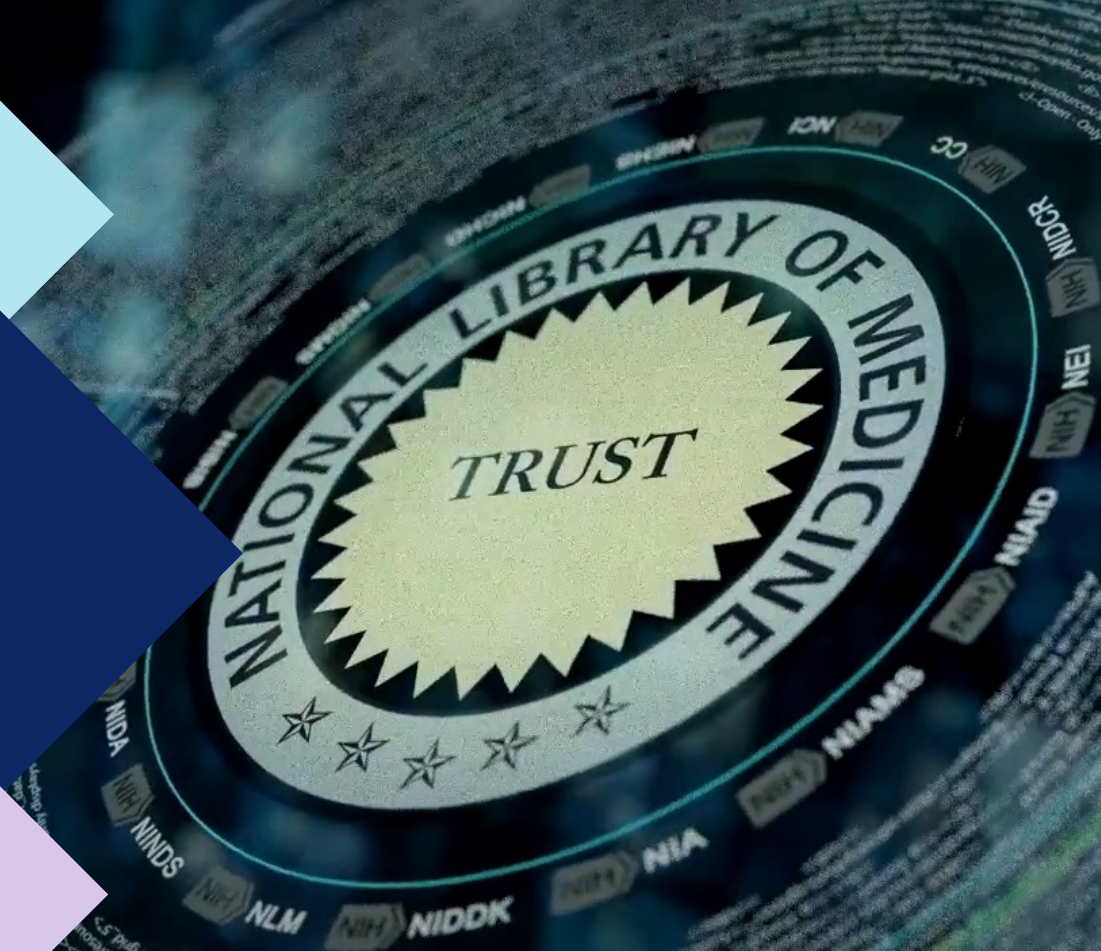
REFLECT



REIMAGINE



REENGERIZE



Live Poll 2



REENGERIZE

How do you stay informed about NLM products and services?

- ☐ Technical Bulletin
- ☐ NNLM
- ☐ NLM News & Announcements
- ☐ NLM Website
- ☐ Social Media (Twitter, Facebook, etc.)
- ☐ Listservs
- ☐ Other

Health Data Standards



Olivier Bodenreider, MD, PhD
Acting Director,
Lister Hill National Center for
Biomedical Communications

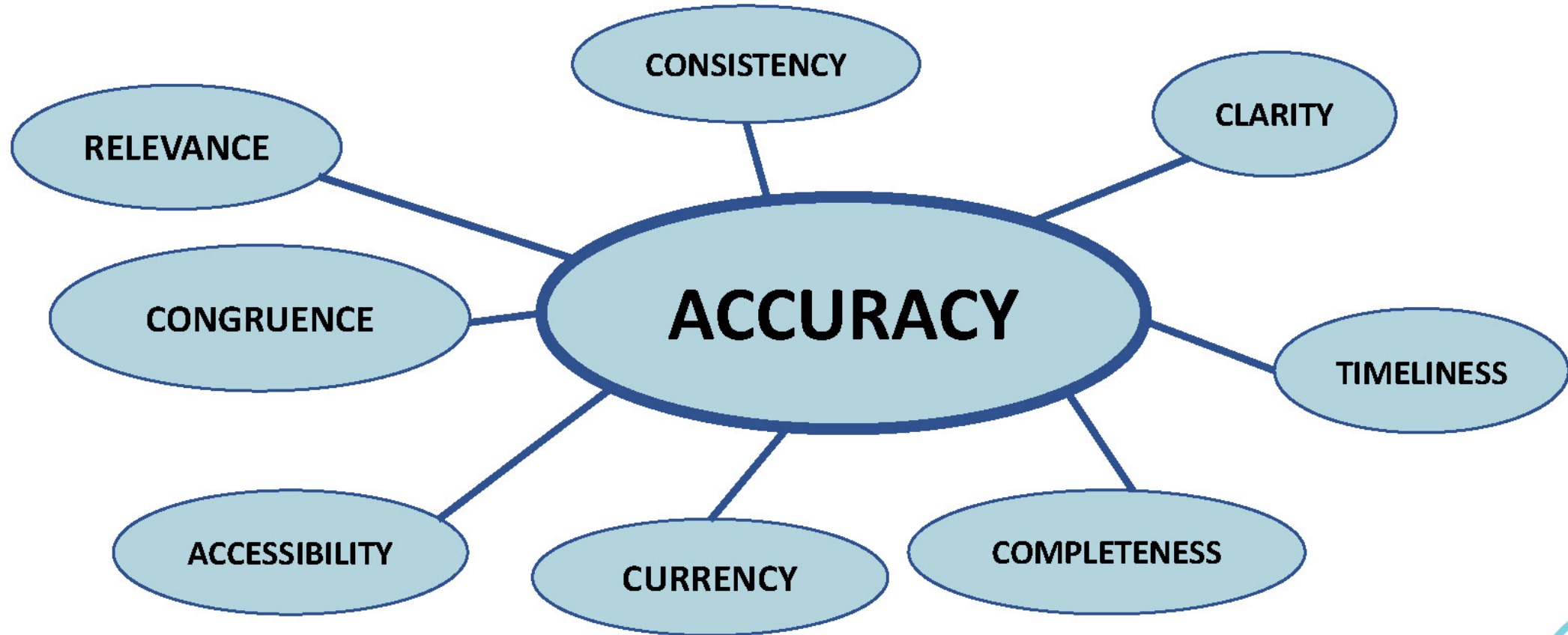


Health Data Standards at NLM

- Health Data Standards at NLM
- Unified Medical Language System (UMLS)
 - Overview
 - Reflecting: 30 years and counting
 - Reimagining UMLS
 - Reenergizing UMLS



Getting it Right: The Importance of Information Accuracy (Data Standards)



Why Standards?

To Make Data **F**indable, **A**ccessible, **I**nteroperable, **R**eusable: **FAIR**

Findable

- Indexing with MeSH helps retrieve MEDLINE articles
- Coding clinical data with Systemized Nomenclature of Medicine – Clinical Terms (SNOMED CT) helps retrieve clinical records

Interoperable

- Clinical data warehouses transformed to clinical terminology standards
 - Aggregate hospitals protocols results
- Protein products annotated with the Gene Ontology (GO) across species
 - Enable functional genomics



Health Data Standards at NLM (UMLS)



Leading healthcare terminology, worldwide



- Terminological standards
 - Developed by NLM (MeSH, RxNorm)
 - Supported by NLM (Logical Observation Identifiers Names and Codes, (LOINC), SNOMED CT)
 - Integrated by NLM Unified Medical Language System (UMLS)
- Information model standards
 - Fast Healthcare Interoperability Resources (FHIR) – promoted by NLM to support exchange of clinical and research data
 - Observational Medical Outcomes Partnership (OMOP) – supported by NLM through grants (interoperable clinical data warehouses)
- Other NLM standard products and services
 - Value Set Authority Center (VSAC) – Reference sets of codes for clinical quality measures
 - Common Data Elements (CDE) – Reference data elements for research studies



 Value Set Authority Center
U.S. National Library of Medicine



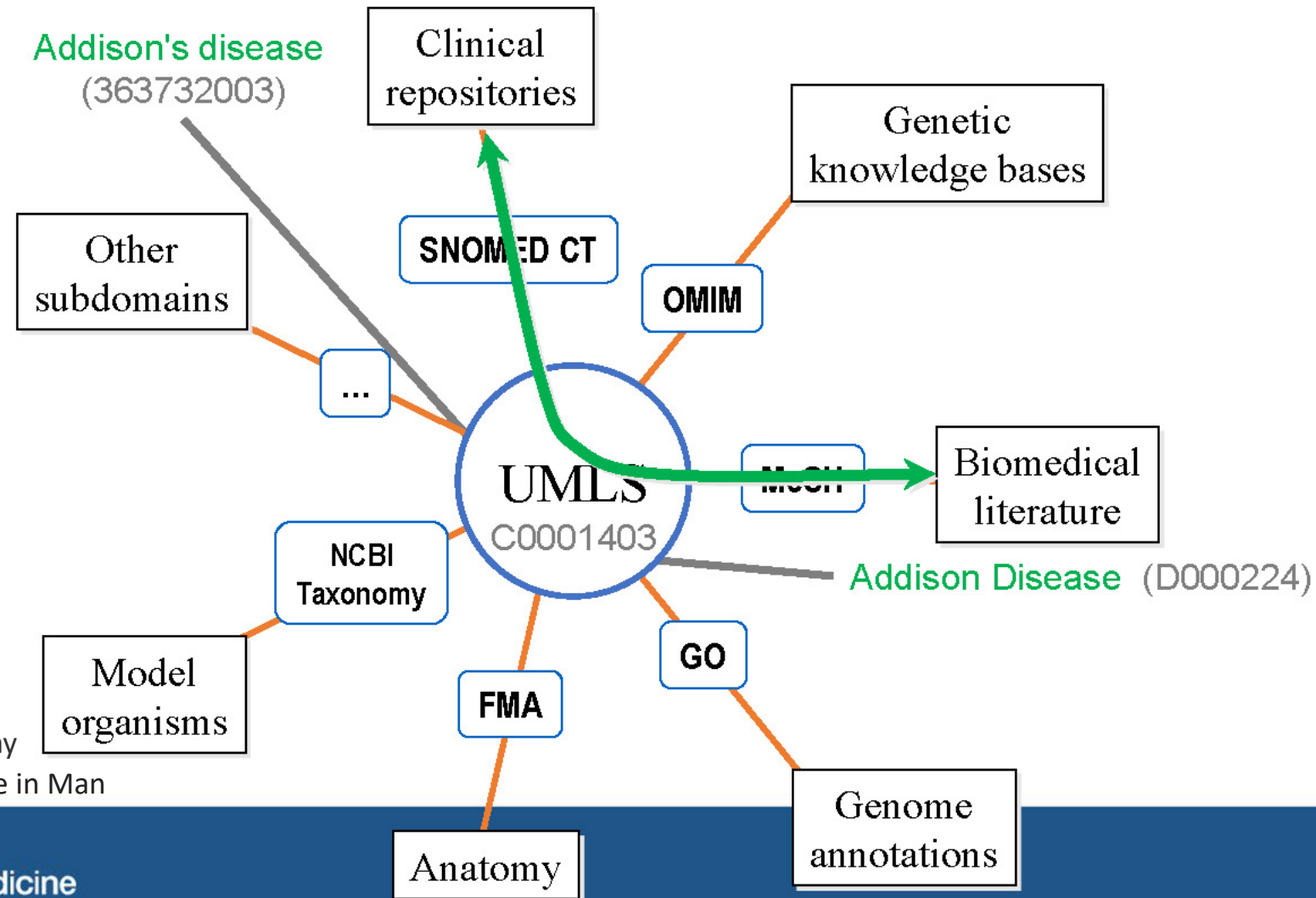
Why a Unified Medical Language System?

“[...] the UMLS project is an effort to overcome two significant barriers to effective retrieval of machine-readable information.”

- The first is the **variety of ways the same concepts are expressed** in different machine-readable sources and by different people.
- The second is the **distribution of useful information** among many disparate databases and systems.”



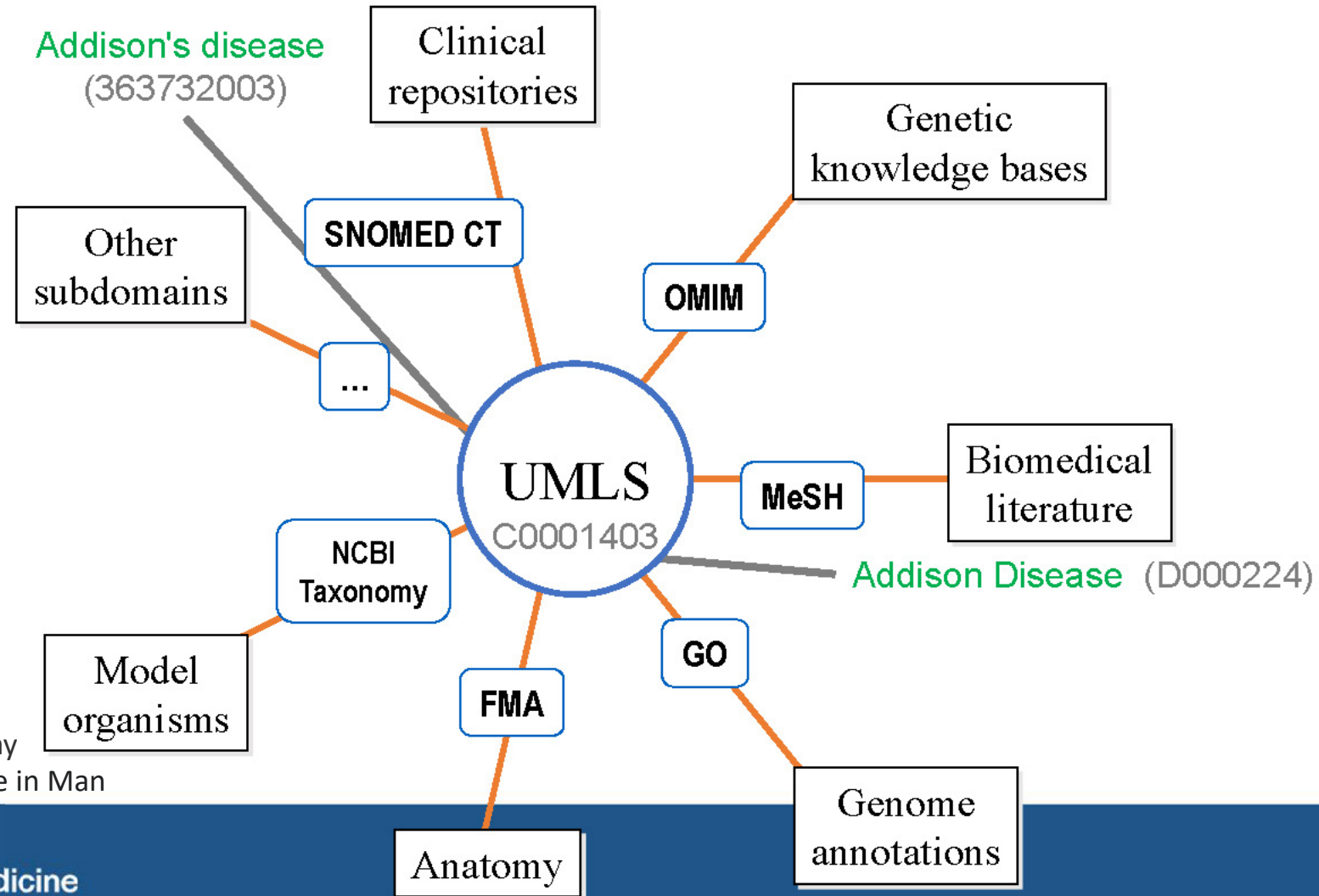
Biomedical Terminology Integration



FMA: Foundational Model of Anatomy

OMIM: Online Mendelian Inheritance in Man

Biomedical Terminology Integration (continued)



FMA: Foundational Model of Anatomy
OMIM: Online Mendelian Inheritance in Man

UMLS Content Today

- 157 families of source vocabularies
 - Not counting 61 translations
- 25 languages
- Broad coverage of biomedicine
 - 12.5M names (normalized)
 - 4.4M concepts
 - >10M relations
- Common presentation



How It's Done

- Algorithmic pre-processing
 - Source synonymy
 - Lexical knowledge
 - Source semantics
- Manual curation
 - Metathesaurus editors

Adrenal gland diseases

Adrenal disorder

Disorder of adrenal gland

Diseases of the adrenal glands

C0001621



UMLS at 30

Main uses of the UMLS

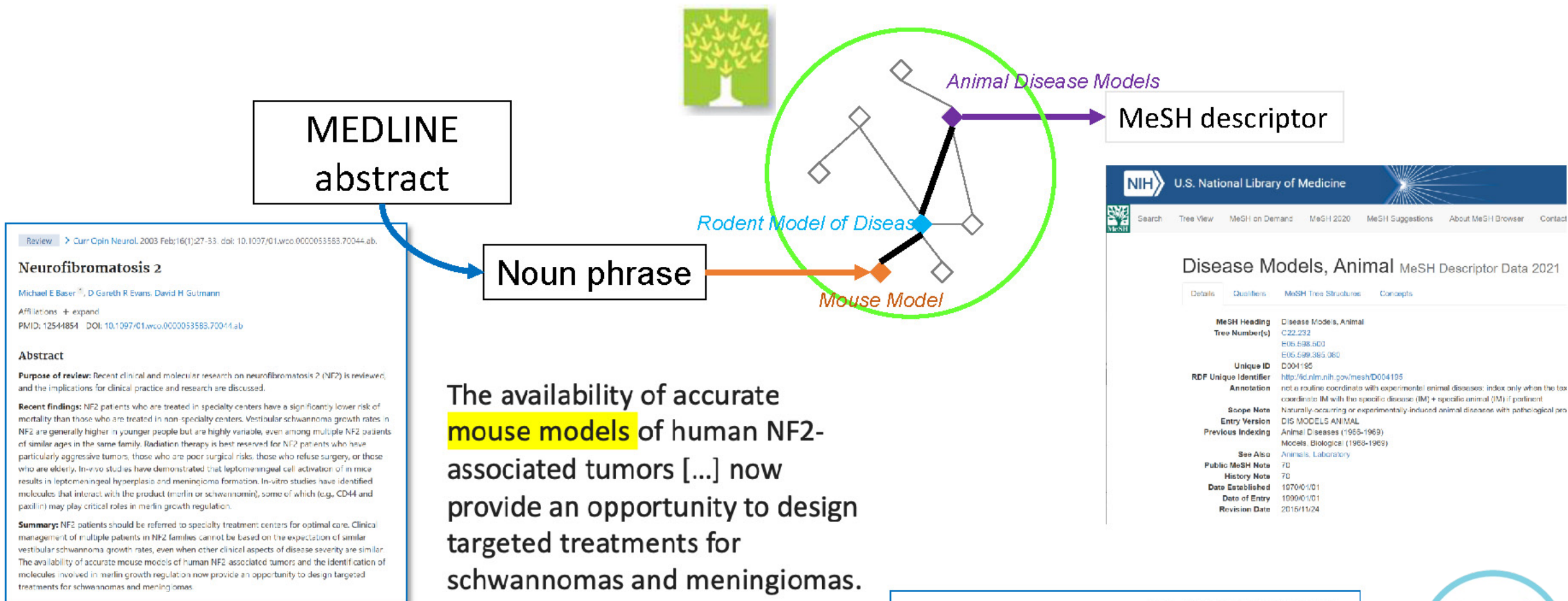
For what purpose(s) did you use the UMLS?	%
Processing of texts to extract concepts, relationships, or knowledge	51%
Facilitate mapping between terminologies	49%
Extract specific terminologies from the Metathesaurus (e.g., Medical Dictionary for Regulatory Archives (MedDRA), MeSH, National Drug File – Reference Terminology (NDF-RT))	29%
Develop an information retrieval system	19%
Creation and maintenance of local terminology	19%
Research terminologies and ontologies beyond any of the above categories	18%
Other	8%
Support of a terminology server or service	7%



Volume 27, Issue 10
October 2020



UMLS in Action: Supporting Automatic Indexing



Reimagining Metathesaurus Curation

- Traditional curation model

- Algorithms

- Preserve synonymy as indicated by sources
 - Group lexically-similar terms as potential synonyms
 - Prevent similar terms from being grouped if they have different semantics

- Manual curation

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**Biomedical Vocabulary Alignment at Scale
in the UMLS Metathesaurus**

Vinh Nguyen
vinh.nguyen@nih.gov
National Library of Medicine
Bethesda, Maryland, USA

Hong Yung Yip
hyip@sc.edu
University of South Carolina
Columbia, South Carolina, USA

Olivier Bodenreider
olivier@nlm.nih.gov
National Library of Medicine
Bethesda, Maryland, USA

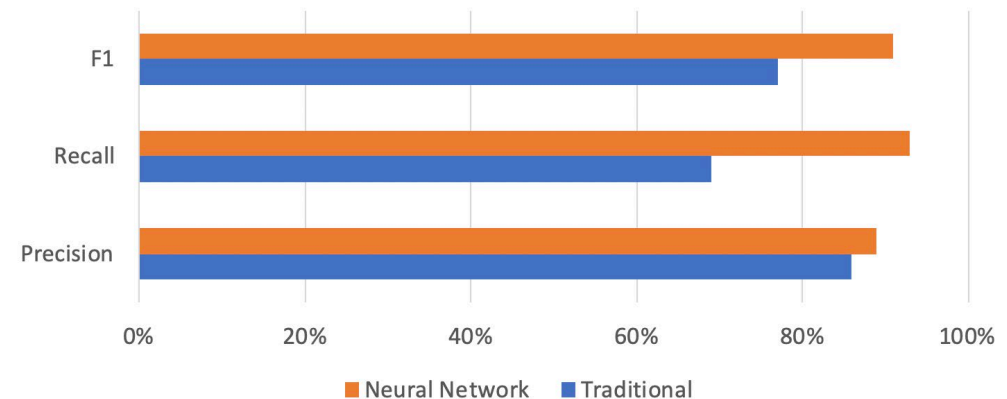
- Reimagined curation model

- Algorithms

- Use AI techniques (neural networks) to predict synonymy among terms

- Manual curation

Performance



UMLS in Action: Reimagining Biomedical Named Entity Recognition

Original MetaMap

- Created in 1994
- Developed in Prolog
- Widely used **but...**
- Slow
- Very complex

MetaMapLite

- Created in 2015
- Developed in Java
- Streamlined
- Supports real-time processing
- Increased performance

Journal of the American Medical Informatics Association, 24(4), 2017, 841–844
doi: 10.1093/jamia/ocw177
Advance Access Publication Date: 27 January 2017
Brief Communication



Brief Communication

MetaMap Lite: an evaluation of a new Java implementation of MetaMap

Dina Demner-Fushman, Willie J Rogers, and Alan R Aronson

Lister Hill National Center for Biomedical Communications, National Library of Medicine, National Institutes of Health, Bethesda, MD, USA



Reenergizing the UMLS

- What do UMLS users need?
 - UMLS Request for Information (RFI)
 - UMLS workshop (upcoming)
- Updated tooling
 - Federated login
 - UMLS browser redesign
 - Cloud migration

Request for Information (RFI) on Next Directions for the National Library of Medicine's Unified Medical Language System®

Notice Number: NOT-LM-20-001

Key Dates

Release Date: October 23, 2019

Related Announcements

None

Issued by

National Library of Medicine (NLM)

Purpose

Background


Created in 1986, the National Library of Medicine's (NLM) [Unified Medical Language System® \(UMLS\)](#) integrates and distributes key terminology, classification and coding standards, and associated resources to promote creation of effective and interoperable biomedical information systems and services, including electronic health records. It is a set of files and software that brings together many health and biomedical vocabularies and standards to enable interoperability between computer systems. For the past 30 years, researchers, health care providers, industry/vendors, and others have utilized the terminological resources of the UMLS in various applications of natural language processing, text processing, search retrieval, data extraction, and other applications. With recent advancements and improvements (e.g., artificial intelligence, AI) in computer processing, NLM is reviewing the computational infrastructure of the UMLS to consider how to improve its efficiency and utility, and to support modern use cases.

The UMLS RFI NLM seeks stakeholder input on how to improve the UMLS. Additionally, NLM will conduct at least one public webinar that presents proposed ideas for improving UMLS. The input received from these stakeholders will inform NLM in the development of future versions of the UMLS.

The screenshot displays the NIH National Library of Medicine UMLS Terminology Services interface. At the top, there's a navigation bar with 'NIH National Library of Medicine' and links for 'My Profile', 'Sign Out', and 'Contact Us'. Below this, the page title is 'UMLS Terminology Services'. The main content area features the 'UMLS Metathesaurus Browser' logo and a search bar containing the text 'vestibular schwannoma'. To the right of the search bar is a 'Search' button. Below the search bar, the results are listed under 'Results (7):'. The first result is 'Acoustic Neuroma (C0027859)', followed by 'Unilateral vestibular Schwannoma (C1863653)', 'Melanocytic Vestibular Schwannoma (C0751380)', and 'Neurofibromatosis 2 (C0027832)'. Each result includes a 'Definition' and 'Semantic Types'. To the right of each result, there are 'Vocabularies' listed, such as 'MTH · MSH · SNOMEDCT_US · HPO · MDR · OMIM · NCI · NCI_CTRP' for Acoustic Neuroma.



UMLS in Action: Support for COVID-19

 National Library of Medicine


[My Profile](#) [Sign Out](#) [Contact Us](#)

UMLS Terminology Services

 **UMLS**
Metathesaurus
Browser

SARS-CoV-2 B.1.1.7 variant

UMLS CUI: C5433393**Semantic Types:** Virus**Atoms (14)**[Filter by Vocabulary](#)
[Reset Filters \[x\]](#)

 National Library of Medicine


[My Profile](#) [Sign Out](#) [Contact Us](#)

UMLS Terminology Services

 **UMLS**
Metathesaurus
Browser

post-acute COVID-19 syndrome

UMLS CUI: C5433293**Semantic Types:** Disease or Syndrome**Atoms (9)**[Filter by Vocabulary](#)
[Reset Filters \[x\]](#)**Broader Concepts (1)**
COVID19 (disease)

 National Library of Medicine

[My Profile](#) [Sign Out](#) [Contact Us](#)

UMLS Terminology Services

 **UMLS**
Metathesaurus
Browser

Moderna COVID-19 Vaccine

UMLS CUI: C5424056**Semantic Types:** : Immunologic Factor · Nucleic Acid, Nucleoside, or Nucleotide · Pharmacologic Substance**Atoms (4)**[Filter by Vocabulary](#)
[Reset Filters \[x\]](#)

Why Are Data Standards Important?

Standards

- Contribute to make data findable and interoperable
- Are a key component of the data ecosystem

Standardized Datasets

- Can be integrated
- Can be exploited more easily



Why Should Medical Librarians Care?

Medical Librarians...

- Are the pathway to connecting your researchers to research data
- Are the ears of NLM in community – you can help us
- Have an important role to play in hospitals



NC_045512.2 29903 bp ss-RNA linear VRL 30-MAR-2020

Severe acute respiratory syndrome coronavirus 2 isolate Wuhan-Hu-1, complete genome.

NC_045512.2

NC_045512.2

BioProject: PRJNA440440

ORDS: RefSeq

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV2)

Severe acute respiratory syndrome coronavirus 2

Ribes, Ribovirales, Nidovirales, Orthocoronavirinae; Betacoronaviridae

Orthocoronavirinae; Betacoronaviridae

ENCE 1 (bases 13476 to 13476)

HORS: Baranov,P.V., Hendrickson,J.F. and Howard,M.T.

atkins,J.F. and Howard,M.T.

Programmed ribosomal frameshifting in decoding the SARS-CoV genome

RNAI: Virology 332 (2), 415-421

ENCE 2 (bases 15680415 to 15680415)

ENCE 2 (bases 15680415 to 15680415)

ences for RID-M3JFFL

cott,W.G.

arch: Search Summary

The structure of the SARS-CoV genome

to records that exclude: Homo sapiens (taxid: 9606)

75: Homo sapiens chromogranin A (CHGA), transcript variant 1

ENCE 3 (bases 29609 to 29609)

ENCE 3 (bases 29609 to 29609)

ences for RID-M3JFFL

cott,W.G.

arch: Search Summary

The structure of the SARS-CoV genome

to records that exclude: Homo sapiens (taxid: 9606)

75: Homo sapiens chromogranin A (CHGA), transcript variant 1

ENCE 3 (bases 29609 to 29609)

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B., Gesteland,R.F.,

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