

Open Science, Public Accountability:

NLM helps Nurse Scholars shape

Public Discourse

The Jennifer K. Hayden Keynote Address NCSBN Scientific Symposium

March 22, 2021

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



National Library of Medicine

Objectives

- Recognize the role of the National Library of Medicine in supporting the scientific response to health challenges.
- Critically appraise the contribution of the NLM's offerings of bibliographic and full text literature databases, biomedical databanks and repositories such as clinicaltrials.gov in support nursing science
- Devise pathways for public discourse that enhance the impact of one's science

NLM helps Nurse Scholars shape PUBLIC DISCOURSE



What does the NLM Do?

- Facilitate Open access to the literature and data
 - PubMed Central full text literature repository
 - CORD-19 over 121,000 COVID-related articles available for machine processing
 - 0 PubMed bibliographic citation database, over 31M citations
- Conduct and support research
 - Computational biology and computational health sciences
- Establish and implement training
 - Pre- & post-doctoral programs, clinicians, librarian and the general public
- Inform Policy
 - 0 Open data, research integrity, information access, research accountability & reporting



Facilitate open access to literature and data









PubMed is search engine that accesses the MEDLINE database of references, citations related to articles in PubMed Central, and some related materials

PubMed Central is a free digital repository that archives publicly accessible full-text scholarly articles – serves as the archive for the NIH Public Access Policy





PubMed Central



ENHANCED DISSEMINATION Public Health Emergency COVID-19 Initiative

https://www.ncbi.nlm.nih.gov/pmc/about/covid-19/

- Launched March 2020 in response to call from the National Science and Technology Advisors from a dozen countries
- Facilitates discovery of, access to, and reuse of COVID-19 and coronavirus-related publications via PubMed Central
- Through September 2020:







50 Publishers

95K articles

 $70x10^6$ views

- Collection leveraged by the Allen Institute for AI to build the COVID-19 Open Research Dataset or CORD-19
- PMC working to speed processing of deposits and facilitate text mining / Al use

ACCELERATE DISCOVERY

NIH Preprint Pilot



Home > About the NLM > News & Events

NIH launches preprint pilot to expand discovery of NIH-funded research

June 9, 2020

First phase on COVID-19 related preprints

The National Institutes of Health is launching the first phase of a pilot project designed to test the viability of making preprints resulting from NIH-funded research searchable in PubMed Central (PMC), a widely-used digital archive of full-text articles and, by extension, discoverable in PubMed, a database containing more than 30 million citations and abstracts of biomedical literature. The NIH Preprint Pilot, a project of NIH's National Library of Medicine (NLM), is intended to increase early discoverability of NIH-supported research results, maximizing the possible impact of the research. Phase one of the pilot will focus on preprints relating to the COVID-19 pandemic.

Launched June 9, 2020

Preprints reporting NIHfunded research made discoverable in PMC & PubMed

Phase 1 focused on COVID-19

More than 1000 in-scope preprints through September



Improving Access to the Research Literature

Welcome to the new PubMed	d. For legacy PubMed go to <u>pubmed.gov</u> .				
	NIH U.S. National Libra National Center for Biote	ary of Medicine chnology Information		Log in	
	Pub Med.gov				
	Search PubMed			Search	
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	Learn	Find	Download	^{Exp} ■ 25 m	nillion users dai
	About PubMed FAQs & User Guide	Advanced Search Clinical Queries	E-utilities API FTP	MeSH D Jour	
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As of 1/31/2020

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### Best Match Algorithm Produces *Better* PubMed Results

Public gov US National Library of Medicine National Institutes of Health	oMed Image: Search   Create RSS Create alert   Advanced	Help
Article types Clinical Trial	Format: Summary - Sort by: Most Recent - Per page: 20 - Send to -	Filters: <u>Manage Filters</u>
Customize	Best matches for otitis media:	Sort by:
Text availability	Acute Otitis Media in Children. Venekamp RP et al. Am Fam Physician. (2017)	Best match Most recent
Abstract Free full text	Otitis media: diagnosis and treatment	
Full text	Harmes KM et al. Am Fam Physician. (2013)	Results by year
Publication dates 5 years	Acute otitis media. Dickson G et al. Prim Care. (2014)	
10 years Custom range	Switch to our new best match sort order	<b>▲</b> ►
Species		Download CSV
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	Lee J, Leichtle A, Zuckerman E, Pak K, Spriggs M, Wasserman SI, Kurabi A. Innate Immun. 2019 Aug 31:1753425919872266. doi: 10.1177/1753425919872266. [Epub ahead of print] No abstract	
	available.	
	Similar articles	
	<u>Reconstructing the Neanderthal Eustachian Tube: New Insights on Disease Susceptibility, Fitness</u> Cost and Extinction	Appropriet
	Pagano AS, Márquez S, Laitman JT.	See more (2964)
	Anat Rec (Hoboken). 2019 Aug 31. doi: 10.1002/ar.24248. [Epub ahead of print]	

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#### ACCELERATE DISCOVERY

### PubMed Clinical Queries: COVID-19

Customized to facilitate discovery of PubMed citations about SARS-CoV-2 and COVID-19

Filtered by research topic categories

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National Library of Medicine National Center for Biotechnology Information NIH Log in Pub Med.gov **PubMed Clinical Queries** General Results of searches on this page are limited to specific clinical resear Mechanism Search PubMed Transmission Diagnosis ✓ Treatment COVID-19 Articles Prevention Treatment ۰ Case Report This column displays citations about the 2019 novel Coronavirus filtered by Forecasting research topic categories ひちゃむちゃなたけ たちかけ からう ひっかい

### Envisioning a Future of Interconnected Data Sets



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#### Research Organism Ecosystem Extramural

#### NCBI Infrastructure

#### Tools

BLAST

Genome QC

> Genome Annotation

> > Data Portal

Genome sequence Transcriptome Genome annotation Genes Orthologs

Data

Visualization

Knowledgebases Community Ontologies Images Tools Stock centers

#### **Strategic Goals**

Promote highquality data submissions and re-use Integrate NCBI data with community content Support efficient and effective scientific discovery

#### **Benefits**

- $\checkmark$  Central portal for all sequences.
- Work in the cloud no need to download data to apply tools, resulting in cost savings.
- Shared tools NCBI tools and community tools can be applied against the data
- Scalable analysis better infrastructure for Data Science and large-scale analysis



# Conduct and support research



### **NLM Research Portfolio**



#### NLM IRP Home Page



What will we discover when we can link individuals' electronic health care records with their personal data, alongside clinical and basic



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# Discovery in Clinical Text: NLP

### THYME Project

Goal: Extract temporal relationships from clinical text

- Recognizes disorders
- Normalizes clinical narrative
- Integrates individual episodes into an aggregate patient timeline
- Annotates within a document and across documents
- Incorporates into Apache via cTAKES <u>ctakes.apache.org</u>

Guergana Savova, PhD [U54LM008748, R01LM010090]



# ClinicalTrials.gov

- Register trials
- Report results
- Enhance recruitment
- Promote discovery



sommorence: no Amnesia: no Stupor: no Seizures: no Review of Systems

#### **Electronic Health Record**

#### discharge

Ear/Nose/Throat: denies ear pain or discharge, nasal obstruction or discharge, sore throat Cardiovascular: chest pain with exercise, palpitations, paroxysmal nocturnal dyspnea, orthopnea, oxidative stress, edema, emercipe Respiratory: denies coughing, wheezing, dyspnea, hemoptysis Gastrointestinal: denies abdominal pain, dysphagia, nausea, vomiting, diarrhea, constipation Genitourinary: denies hematuria, frequency, urgency, dysuria, discharge, impotence, incontinence Musculoskeletal: denies back pain, joint swelling, joint stiffness, joint pain Skin: denies rashes, itching, lumps, sores, lesions, color change Neurologic: denies syncope, seizures, transient paralysis, weakness, paresthesias Psychiatric: denies depression, anxiety, mental disturbance, difficulty sleeping, suicidal ideation, hallucinations, paranoia Endocrine: denies polyuria, polydipsia, polyphagia, weight change, heat or cold Heme/Lymphatic: denies easy or excessive bruising, Matching of blood transfusions, and the sweats Norders, aden Digit of blood transfusions, and the sweats Digit of the study described above Serve Everyone clinic March 24, 2010 Digit of the study described above March 24, 2010 Digit of the study described above March 24, 2010 Digit of the study described above test validated instruments across five test va

WeServeEveryone Clinic 1111 First Street California Pox: 111-111-1111 Page 2

Specific Aim 1: Test if initiation of the rapid FiO2 optimization protocol following ROSC from cardiac arrest is associated with the degree of

#### **Clinical Research Eligibility Criteria**

arrest. We will record biomarkers of free radicals and antioxidants, isoprostanes (IsoPs) and isofurans (IsoFs)] in the plasma at 0 and 6 hours after ROSC using gas chromatography negative ion chemical ionization mass spectrometry. We will compare plasma IsoPs/IsoFs at each time point between subjects enrolled the study intervention, rapid Fi02 optimization).

Specific Aim 2: Test if initiation of the rapid FiO2 optimization protocol following ROSC from cardiac event is associated with a decrease in neurological disability at hospital discharge.

Approach: In the study described above, we will determine the proportions of good neurological outcome [defined as a mRS < 3] between subjects enrolled in REOX II (i.e. receive the study intervention, rapid FiO2 optimization) vs. those enrolled in REOX I (i.e. do not receive the study intervention), using binomial test.

Specific Aim 3: Optimization protocol following ROSC from cardiac arrest is associated with neuropsychological outcomes among survivors at 360 days.

diac

Approach: In the study described above, we will cognitive domains (attention, Wechsler Adult reasoning, Wechsler Adult Intelligence Scale-IV-similarities; (3) immediate and Scale-III-logical memory I and II; (4) verbal fluency, Controlled Oral Word Association Test; cutive functioning, Hayling Sentence





# Establish and Implement Training



# Expand & enhance research training for biomedical informatics & data science



### Training across society

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### Engage the Next Generation and Promote Data Literacy among librarians, clinicians and consumers







# Inform Policy



# Data Science

# **Open Science**



# Privacy

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SNP MATCH

# Nursing Scholars' special roles in using data-driven science to shape public policy

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# Nursing scholars' special roles

- 1. Respect the dignity of the source
- 2. Employ principled approaches to discovery
- 3. Use theory to guide interpretation
- 4. Attend to the phenomena of concern to nursing: the diagnosis and treatment of human response
- 5. Ask and answer questions germane to the discipline and the people we serve

# Enhancing the impact of science

# Creating pathways for public discourse



### Starting point: Enhance Rigor and Reproducibility





# Before you begin...

Build your network



### Next Step: Know what you know, and what you don't know

• It's not just about the content, but the analytics that revealed the content



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### Amplifying: Preserving Trust & Provenance in a Highly-Distributed Information Environment





### Leveraging: How emerging technologies help convey your message



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Storytelling: The plural of anecdotes isn't data, but stories



# **Transporting: Transforming Science into Action**



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### **Reaching NLM**



Innovations in Health Information from the Director of the National Library of Medicine





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# Thank you!

