American Evaluation Association: Evaluation 2014

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NIH's Analysis and Reporting Infrastructure

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Mission

- **Enable quality decision-making by internal staff via timely, accurate, reliable, and high-value data**
  - Develop and support the data infrastructure needed for reporting and analysis
  - Provide easy-to-use tools for staff across NIH
  - Summarize large amounts of data into meaningful reports, charts, and other visualizations
- **Uphold NIH's commitment to the highest level of public accountability in carrying out its scientific missions**
  - Provide one-stop shop for NIH data and reports
  - Make data easily accessible to the public
  - Highlight the links between NIH funding and research results and products

Major Products from OER DATA Systems

Internal to NIH

- NIH Query View Report (QVR)
- NIH SPIRES
- MyMap — NIH RePORT Project Mapping Tool
- NIH Internal Portfolio Online Reporting Tools (InPORT)

And more in development…

Public-Facing

- NIH RePORTER
- Federal RePORTER
- STAR METRICS℠
- WORLD RePORT BETA
- NIH Data Book
- Funding Facts

and many more…

Internal NIH Support

Portfolio monitoring

- Applications received
- Review outcomes
- Funded research

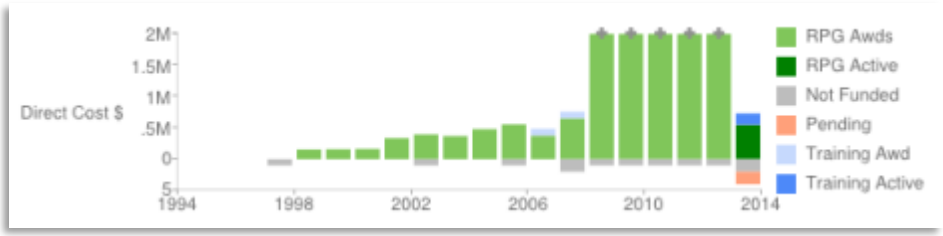
Portfolio Analysis

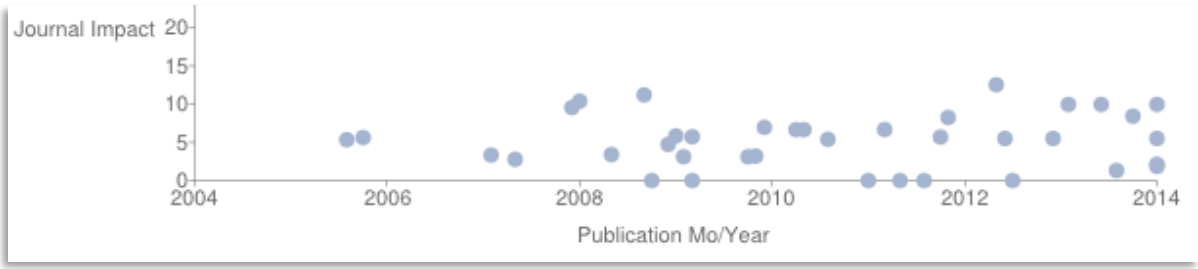
- Funding histories
- Scientific overlap
- Research results

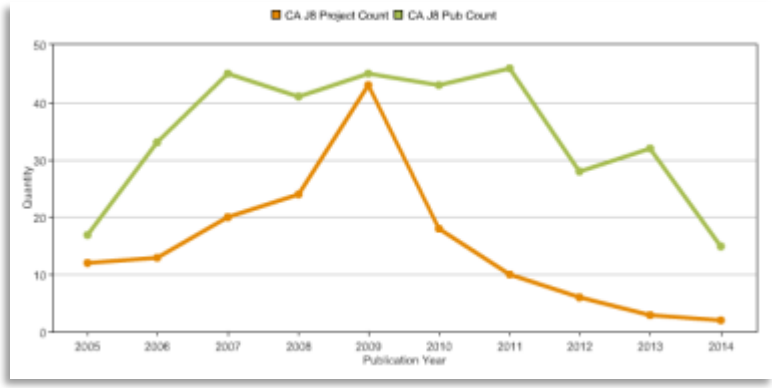
Expertise Locator

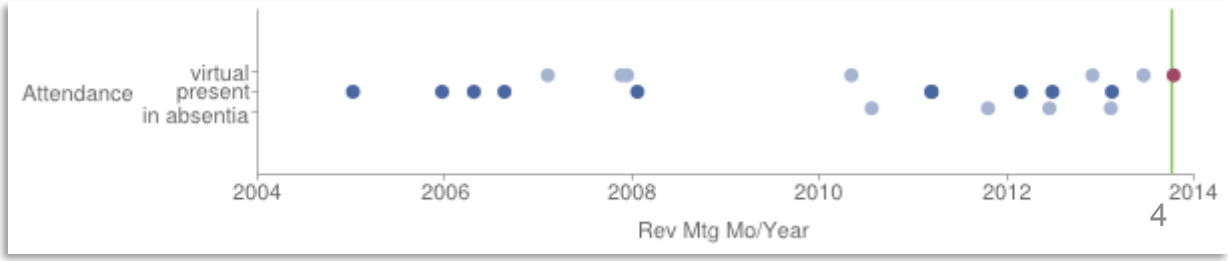
Data Integration

Data Extraction









Providing Public Access to Funded Research

NIH RePORTER

- Funded research from NIH, as well as from other Health and Human Services agencies and the Veterans Administration
- Linked to Results
  - Publications, Patents, News, and NIH reports

Federal RePORTER

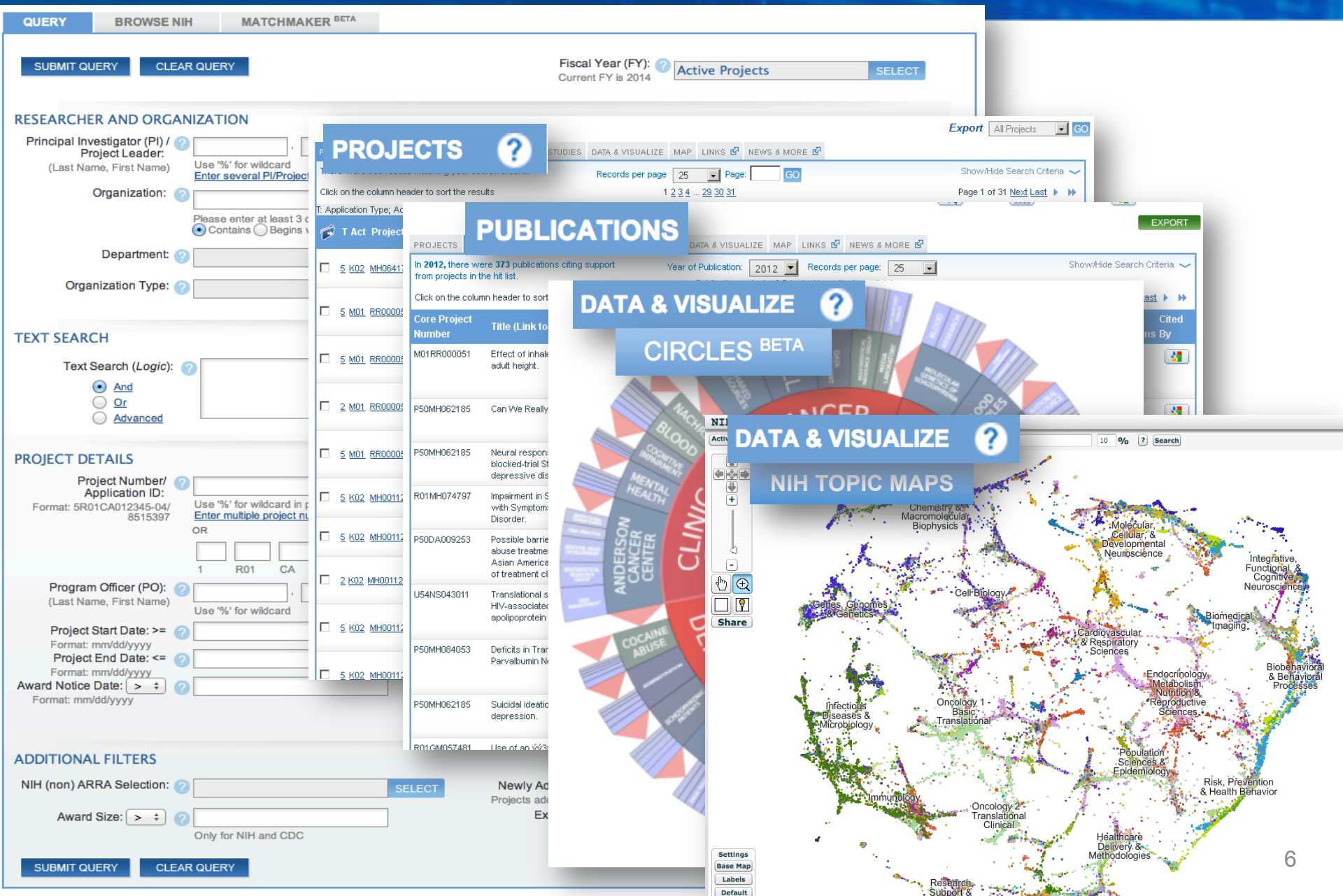
- Funded research from HHS, DOD, USDA, EPA, NSF and more

WORLD RePORT BETA

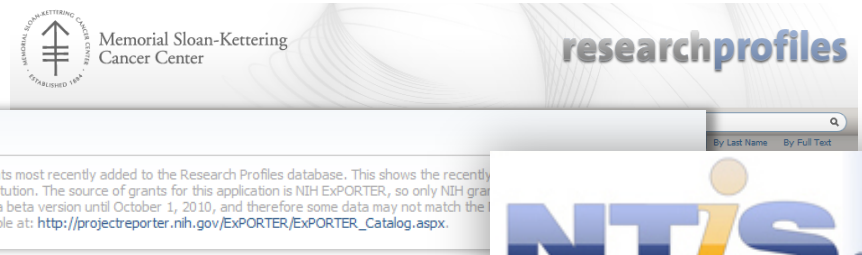
- Global funded research, from 9 funders
- Focused on sub-Saharan Africa, South Asia and East Asia/ Pacific regions

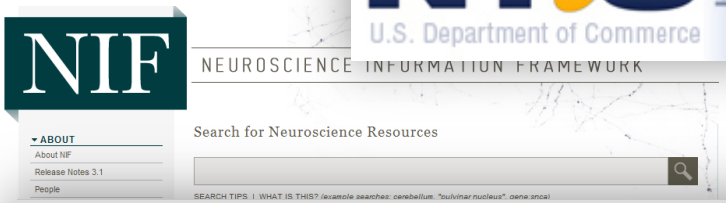
National Institutes of Health
OER DATA Systems

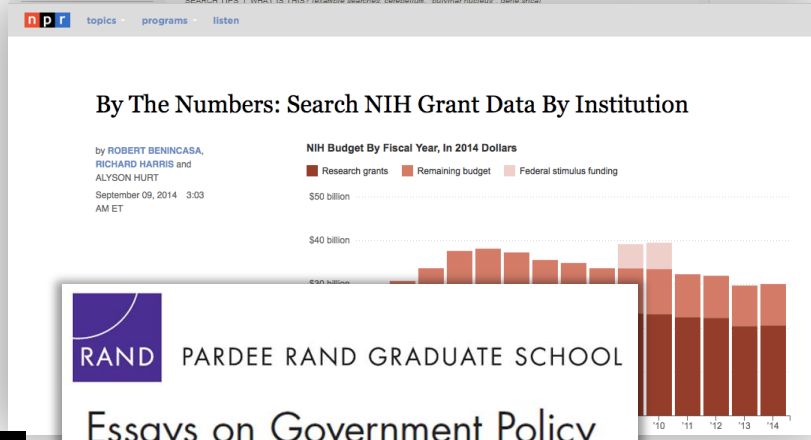
RePORTER
http://projectreporter.nih.gov



Making RePORTER data available for bulk download and re-use







Federal RePORTER (Alpha)

http://FederalRePORTER.nih.gov

World RePORT (Beta)

http://WorldRePORT.nih.gov

Portfolio Analysis Challenges

- **Proliferation of tools and databases available**
- **Duplication of effort and inefficient use of limited resources**
- **Users' idiosyncratic portfolio management needs and practices**
- **Data quality and data availability**
  - In program administrative systems (e.g., unstructured data)
  - From outside systems (ability to link to program data)
- **Gathering information on long-term outcomes is labor-intensive**
- **Lack of acceptance of quantitative measures**

Exploring Future Directions

Addressing Challenges

Software

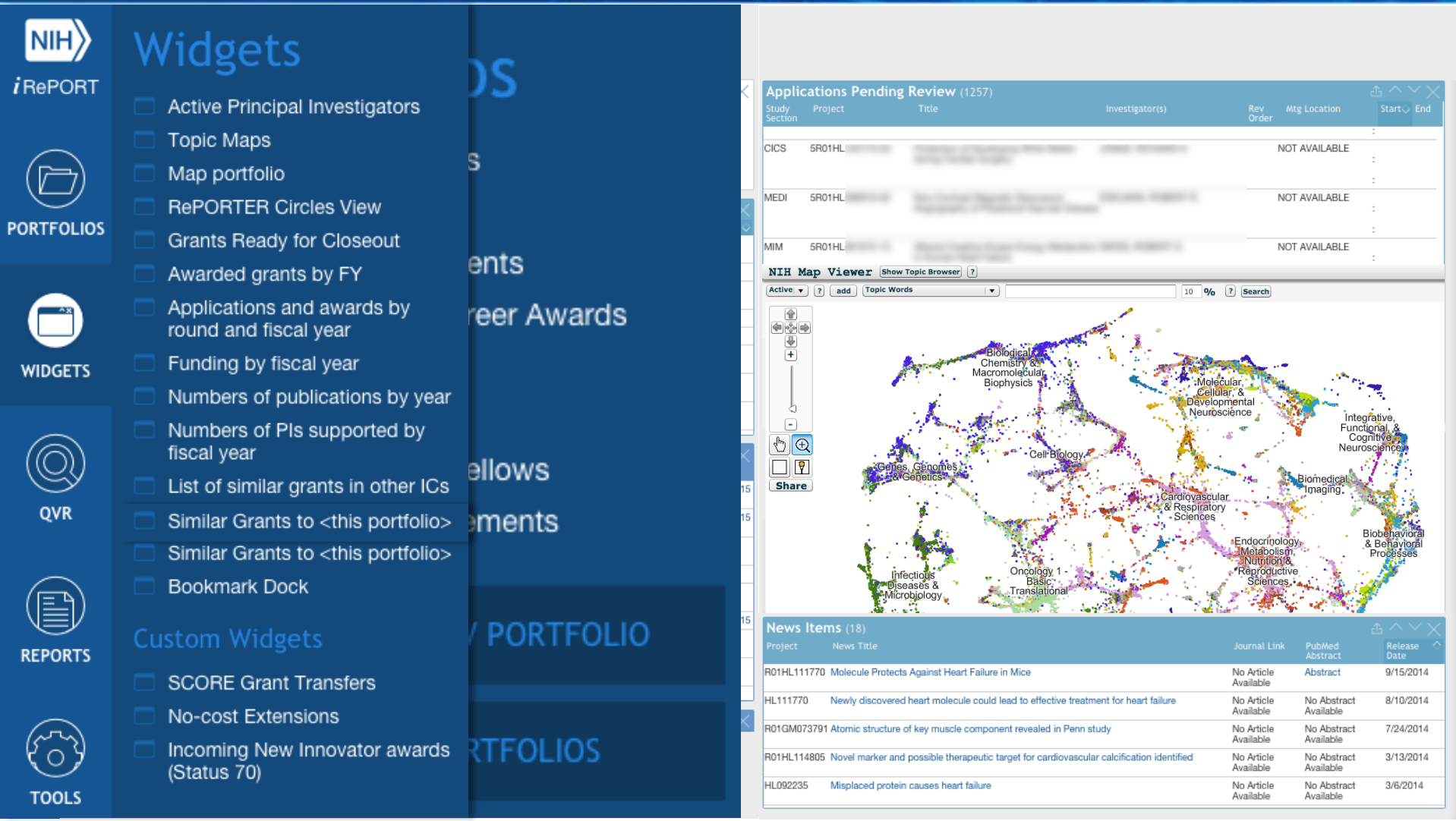
- Develop common platform to integrate multiple analytic tools
- Provide access to basic portfolio management tools and standard reports
  - But building in features for customization
- Continue to incorporate new intuitive tools for visualization, exploration, and analysis

Data Infrastructure

- Integrate NIH program records with external databases
  - Direct citations
  - Fuzzy matching
- Maximize re-use by providing common access to integrated data sources

Software: *i*RePORT

NIH *i*nternal Research Portfolio Online Reporting Tools



Data Infrastructure:
Need for Data Integration

"NIH administrative staff have had limited tools to retrieve, analyze, and report the results of the NIH collective investment in biomedical research… A better way would be a more facile, integrated analysis and reporting tool for use across the NIH by administrative leadership and program staff. This tool (or these tools) would take advantage of recent informatics capabilities."

-NIH Advisory Committee to the Director, Data and Informatics Working Group
http://acd.od.nih.gov/Data and Informatics Working Group Report.pdf

"NIH should link its own data infrastructure with that of its many partners in the science and health ecosystems who are already tracking many outcomes of interest to NIH (e.g., CDC, U.S. Patent and Trademark Office, Food and Drug Administration)."

NIH Scientific Management Review Board
Working Group on Approaches to Assess the Value of Biomedical Research Supported by NIH
http://smrb.od.nih.gov/documents/reports/VOBR-Report-122013.pdf

"Measures of research activities, outputs, and technology transfer are important, and both the measures and the underlying data need to be improved. [NIH Data] would be more valuable if its data had more complete coverage, were linked to other data sources, and were made more accessible to researchers."

NRC Committee on Assessing the Value of Research in Advancing National Goals
http://nap.edu/catalog.php?record_id=18804

Quantitative vs. Qualitative Assessment

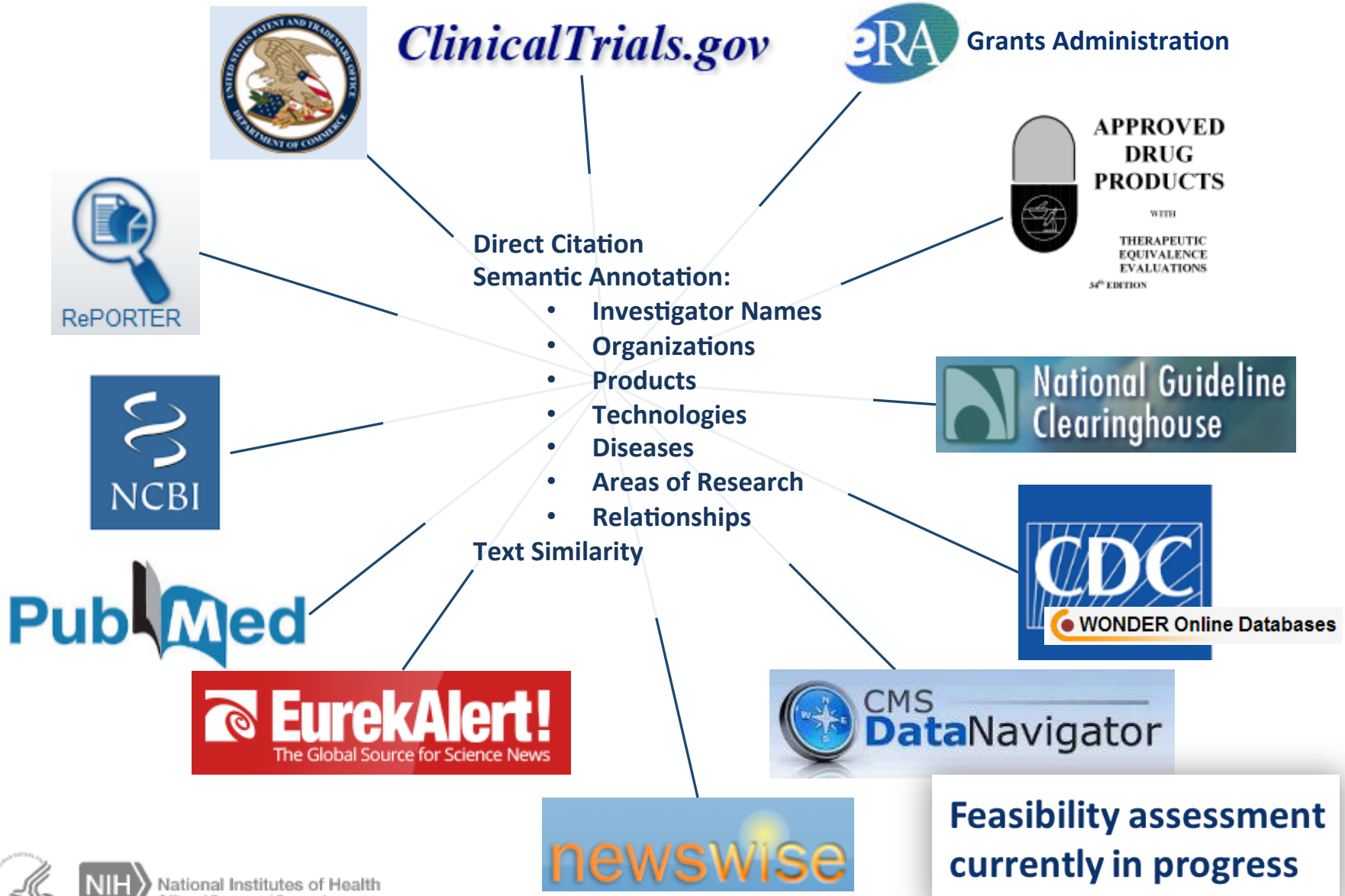
It is also challenging to place an empirical value, especially a dollar amount, on knowledge… Narratives constructed from well-designed case studies can be especially effective illustrations of the broad impacts of biomedical research. Carefully constructed retrospective case studies can demonstrate stewardship and capture value in a range of outcomes, including the impact of a basic finding on public health, or the economic return on investment for a specific research endeavor… Information and stories for case studies can come from a variety of sources, including the publications and communications documents of research institutions in all sectors and from around the globe.

NIH Scientific Management Review Board
Working Group on Approaches to Assess the Value of Biomedical Research Supported by NIH
http://smrb.od.nih.gov/documents/reports/VOBR-Report-122013.pdf

Recommendation: Assessments of NIH's value should attempt to trace NIH's contribution to the numerous translational pathways that exist and draw clear connections between the generation of knowledge and its application to health and broader societal impacts.

Data Infrastructure: PARDI

A Portfolio Analysis and Reporting Data Infrastructure



Semantic Annotation

Go back

Curatable
Not Curatable

PubTator

PMID:25115152 **Anti-tumor effects of genetic vaccines against HPV major oncogenes.**

Publication: Human vaccines _ immunotherapeutics; 2014 Aug 6 ; 11(1) [Full text links]

Gene Chemical Disease Species Mutation Clear Reset

TITLE:
Anti-tumor effects of genetic vaccines against HPV major oncogenes.
ABSTRACT:
Expression of HPV E5, E6 and E7 oncogenes are likely to overcome the regulation of cell proliferation and to escape immunological control, allowing uncontrolled growth and providing the potential for malignant transformation. Thus, their three oncogenic products may represent ideal target antigens for immunotherapeutic strategies. In previous attempts, we demonstrated that genetic vaccines against recombinant HPV16 E7 antigen were able to affect the tumor growth in a pre-clinical mouse model. To improve this anti-HPV strategy we developed a novel approach in which we explored the effects of E5-based genetic immunization. We designed novel HPV16 E5 genetic vaccines based on two different gene versions: whole E5 gene and E5Multi. The last one is a long multi epitope gene designed as a harmless E5 version. Both E5 genes were codon optimized for mammalian expression. In addition, we demonstrated that HPV 16 E5 oncogene is expressed in C3 mouse cell line making it an elective model for the study of E5 based vaccine. In this mouse model the immunological and biological activity of the E5 vaccines were assessed in parallel with the activity of anti-E7 and anti-E6 vaccines already reported to be effective in an immunotherapeutic setting. These E7 and E6 vaccines were made with mutated oncogenes, the E7GGG mutant that does not bind pRb and the E6F47R mutant that is less effective in inhibiting p53, respectively. Results confirmed the immunological activity of genetic formulations based on attenuated HPV16 oncogenes and showed that E5-based genetic immunization provided notable anti-tumor effects.

Wei CH et. al., PubTator: a Web-based text mining tool for assisting Biocuration, Nucleic acids research, 2013, 41 (W1): W518-W522. doi: 10.1093/nar/gkt44

Wei CH et. al., Accelerating literature curation with text-mining tools: a case study of using PubTator to curate genes in PubMed abstracts, Database (Oxford), bas041, 2012

Wei CH et. al., PubTator: A PubMed-like interactive curation system for document triage and literature curation, in Proceedings of BioCreative 2012 workshop, Washington DC, USA, 145-150, 2012

Integrating Data to Trace Results

NIH's Role in Developing an HPV Vaccine: a retrospective portfolio analysis

Pritty Joshi, PhD
Division of Planning and Evaluation,
Office of Extramural Research, National Institutes of Health

Building the Chain of Evidence

2006: FDA approval for girls and women through age 26

2007: CDC's Advisory Committee on Immunization Practices recommends 3-dose series for girls age 11 and older

2007: American Academy of Pediatrics & American Academy of Family Physicians approved addition of Gardasil to recommended immunization schedules for children and adolescents in the US

ReTRACE

Research Timeline Reporting, Analysis, and Curation Environment

- **Build on integrated data infrastructure to support tracing studies**
- **Identify direct and semantic links among NIH investments, investigators, publications, intellectual property, and other long-term outcomes**
- **Provide timeline of critical events**
- **Allow experts to easily curate to identify the valid relationships**

ReTRACE
(mock data, illustrative only)

Research Timeline Reporting, Analysis, and Curation Environment (ReTRACE)

First Term Search Criteria | REVISE SEARCH

Search Results

- NIH research project
- News release
- Awarded patent
- Clinical trial
- Publication
- Clinical guideline
- NIH report

DOCUMENT TITLE	YEAR	TYPE	CITES	CITED BY	PEOPLE
Gardasil Vaccination as Therapy in Low Grade Cervical Abnormalities	2010		30	57	
Quadrivalent Human Papillomavirus Vaccine	2010		23		
Papillomavirus L2 N-terminal peptides for the induction of broadly cross-neutralizing antibodies	2009		17	74	Schiller, John T., et al.
HPV vaccine shown effective at reducing cancer-causing infections	2009		1		
Major step forwards for vaccine against cervical cancer	2008		2		
Papillomavirus vaccine	2007		7		
Cervical cancer – A single vaccine could benefit most women	2006		25	23	
Treatment of papillomavirus infections	2005		15	8	Frazer, I., et al.
ORAL IMMUNIZATION AGAINST ANOGENITAL HPV DISEASE	2003		11	5	ROSE, ROBERT C
A PHASE I/II STUDY OF A VACCINIA-HPV RECOMBINANT	1999		3		ALLEGRA, CARMEN J

Linked to NIH funding

THANK YOU

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Learn more at http://report.nih.gov
Video Tutorials at http://report.nih.gov/tutorial/

NOTES: