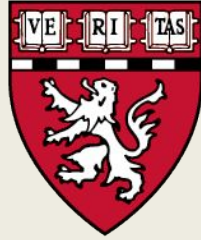
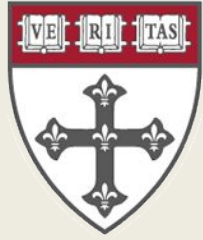




RESEARCH DATA MANAGEMENT

In the Data Lifecycle





COUNTWAY LIBRARY

Julie Goldman

Research Data Services Librarian

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HARVARD
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Data Management
Working Group



The Countway Library of Medicine
An Alliance of The Boston Medical Library and Harvard Medical School



Center for the History of Medicine

**Harvard Chan Bioinformatics
Core**



hms | hsdm

office for postdoctoral fellows



HARVARD
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OFFICE FOR
Academic and
Research Integrity



Department of
Systems Biology



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Research Information Technology Solutions - RITS

HMS Information Technology

ICCB-Longwood Screening Facility

DRSC/TRiP Functional Genomics

The Neurobiology Imaging Facility

in the Neurobiology Department of Harvard Medical School

Hi+|S

Harvard Program in Therapeutic Science

Harvard Biomedical Data Management

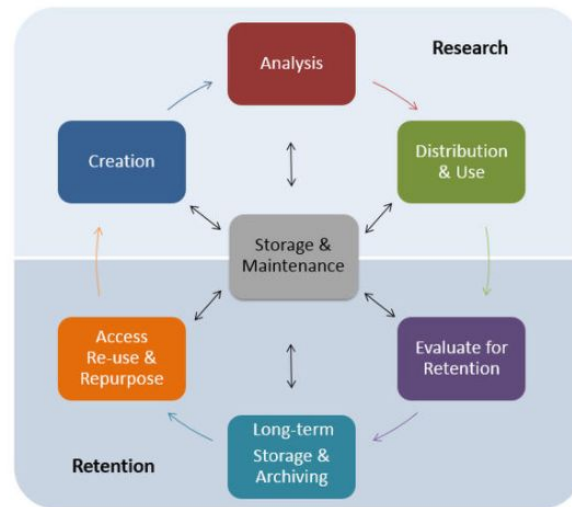
Best practices & support services for research data lifecycles

[About](#) ▾ [Best Practices](#) ▾ [Planning](#) ▾ [Data Repositories](#) ▾ [Storage](#) ▾ [Policies](#) ▾ [Harvard Open Access](#)

Data Management

Data Management is the process of providing the appropriate labeling, storage, and access for data at all stages of a research project. We recognize that best practices for each of these aspects of data management can and often do change over time, and are different for different stages in the data lifecycle.

Early and attentive management at each step of the data lifecycle will ensure the discoverability and longevity of your research.



← August 2017 →

S	M	T	W	T	F	S
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Submit your questions and feedback!

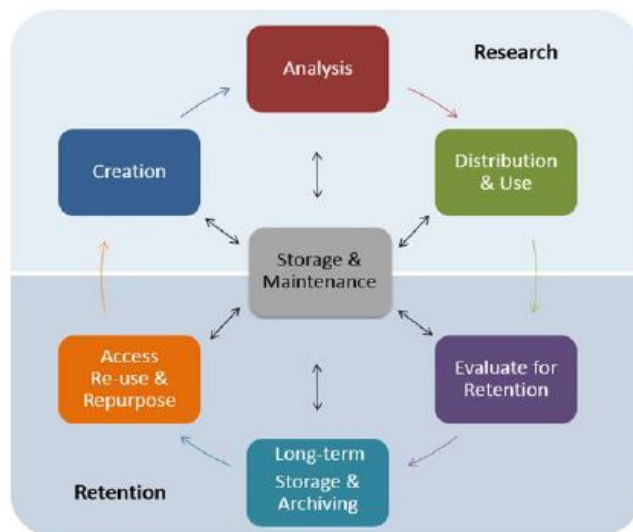
Find upcoming trainings & latest news!



Receive Data Management Updates

Powered by OpenScholar® | [Admin Login](#) ►

Research Data Management Checklist



This document serves as a reference checklist to keep track of the elements that make up good research data management in the RDM lifecycle.

The RDM lifecycle is not linear and you may find yourself jumping around this lifecycle throughout your project.


Begin building or locate a detailed README.txt overview of your project immediately. Examples of data documentation include lab notebooks and experimental protocols, questionnaires, codebooks, data dictionaries, software syntax and output files, information about your equipment settings and calibration, database schema, methodology reports, and provenance information.

<http://datamanagement.hms.harvard.edu/metadata-overview>

Your DMP document should describe final dataset formats, documentation, analytic tools necessary to use the data, data sharing agreements, and how and when the data will be made accessible to others.

We are open to identifying new kinds of data management practices that could benefit the biomedical sciences. If you would like to contribute to the RDM website for your field, please contact the HMS Data Management Working Group through the website link to "Submit your questions and feedback!"

<http://datamanagement.hms.harvard.edu/>



DATA CREATION: RDM PLANNING

What does your research project look like from start to (anticipated) finish?

<input type="checkbox"/> ID	<input checked="" type="checkbox"/> Determined by the funder and/or institution
<input type="checkbox"/> Funder(s)	<input checked="" type="checkbox"/> Data security policy <input checked="" type="checkbox"/> Data sharing policy <input checked="" type="checkbox"/> Data retention policy
<input type="checkbox"/> Grant #	<input checked="" type="checkbox"/> Post award DMPs only
<input type="checkbox"/> Project name	<input checked="" type="checkbox"/> As it appears exactly as on the grant. Append to grant proposal.
<input type="checkbox"/> Project description (background/rationale)	<input checked="" type="checkbox"/> What research question(s) are you addressing? <input checked="" type="checkbox"/> Summarize the study methods and design including data collection method(s) and purpose of collection. <input checked="" type="checkbox"/> If creating or collecting data in the field, how will you ensure its safe transfer into your main secured systems?
<input type="checkbox"/> Data description	<input checked="" type="checkbox"/> Content description (brief) - include any value definitions, questionnaires or instruments, or analysis procedures. <input checked="" type="checkbox"/> Type (imagine data, genomic, Qx, etc.) <input checked="" type="checkbox"/> Format <ul style="list-style-type: none"> Databases: XML, CSV Geospatial: SHP, DBF, GeoTIFF, NetCDF Moving Images: MOV, MPEG, AVI, MXF Audio: WAVE, AIFF, MP3, MXF Numbers/statistics: ASCII, DTA, POR, SAS, SAV Images: TIFF, JPEG 2000, PDF, PNG, GIF, BMP Text: PDF/A, HTML, ASCII, XML, UTF-8 Graphs: JSON, YAML, XML
	<p>If you need to convert or migrate your data files from one format to another, be aware of the potential risk of the loss or corruption of your data and take appropriate steps to avoid/minimize.</p>
	<input checked="" type="checkbox"/> Briefly justify the use of format – is your chosen format open, non-proprietary and in widespread use? <input checked="" type="checkbox"/> Estimated volume? <input checked="" type="checkbox"/> Describe any existing data being used (citations, link and DOI).
<input type="checkbox"/> PI	<input checked="" type="checkbox"/> Name of Principal Investigator(s) or main researcher(s) on the project.
<input type="checkbox"/> PI ORCID ID	<input checked="" type="checkbox"/> ORCID http://orcid.org/
<input type="checkbox"/> Administrative data	<input checked="" type="checkbox"/> Contacts/addresses/email details <input checked="" type="checkbox"/> Date of first DMP <input checked="" type="checkbox"/> Date and details for subsequent revision(s) of DMP
<input type="checkbox"/> Additional Institution(s)	

Introduce Yourself!

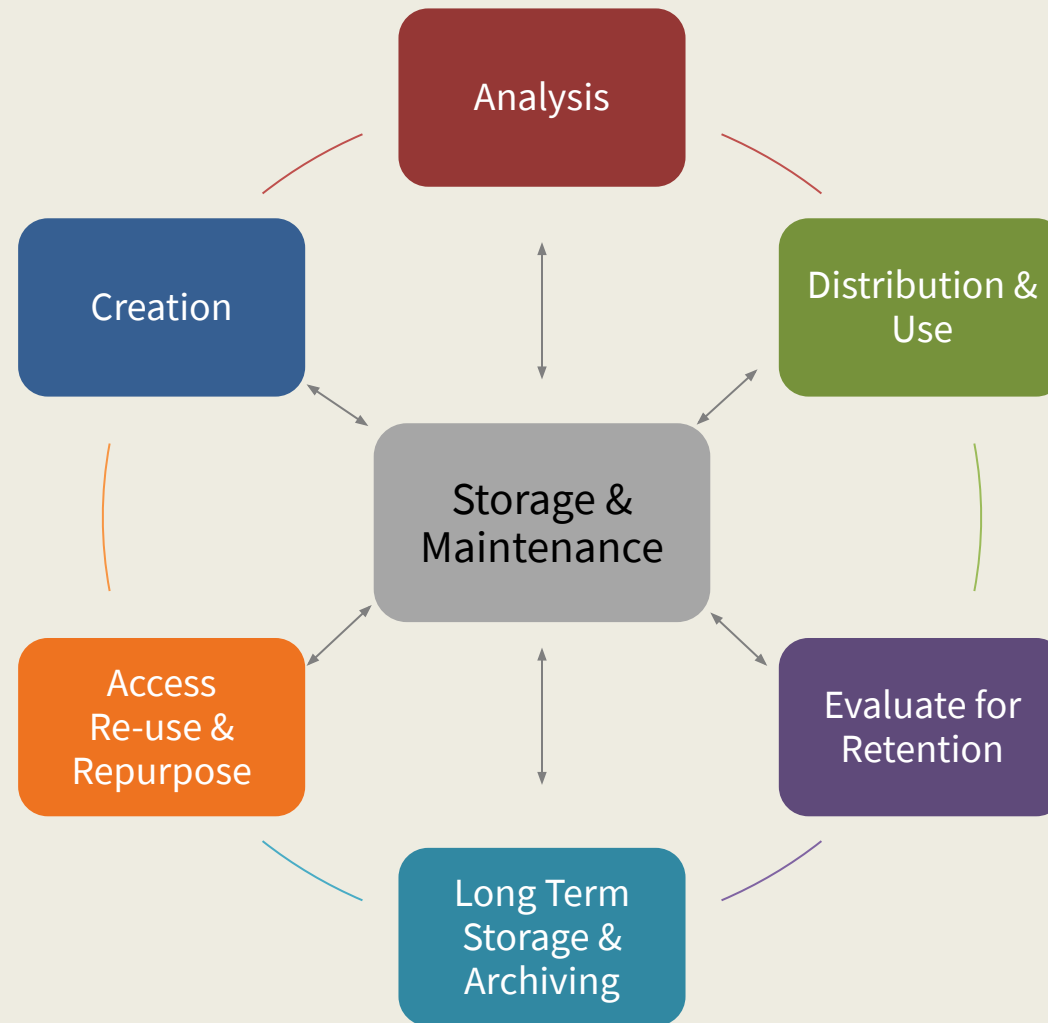
Name

School / Department

Most common data format

(Text, Excel, SPSS, Google Docs, etc.)

Data Lifecycle for Biomedical Data



What are Data?

Observation:

Sensor data, survey data, sample data, images

Experimental:

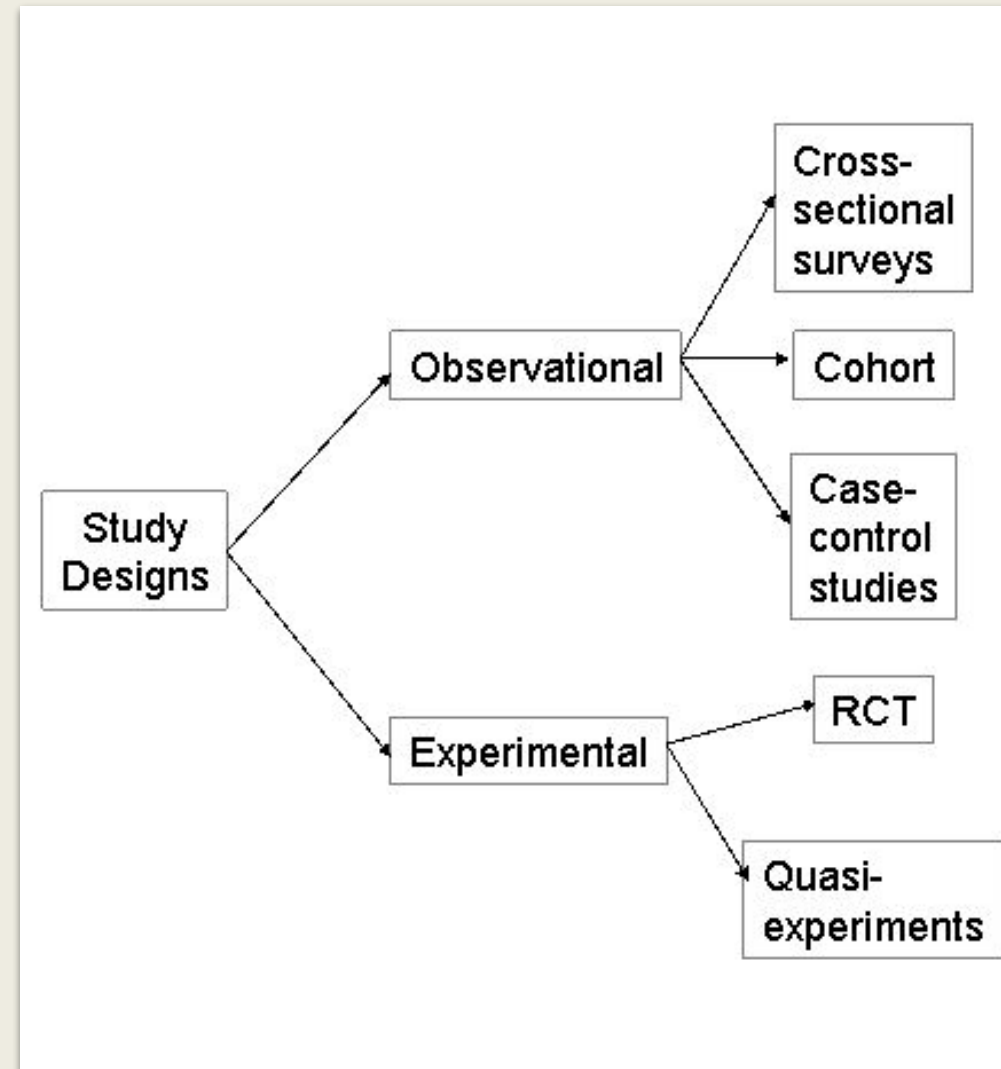
Gene sequences, chromatograms

Simulation:

Climate models, economic models

Derived or Compiled:

Text and data mining, compiled databases, 3D models, data gathered from public documents



Why Manage Data?

- Don't lose data
- Find data more easily
- Easier to analyze organized, documented data
- Avoid accusations of fraud & misconduct
- Get credit for your data
- Don't drown in irrelevant data

Data Management Plan

A data management plan (DMP) is a written document that describes the data you expect to acquire or generate during the course of a research project, how you will manage, describe, analyze, and store those data, and what mechanisms you will use at the end of your project to share and preserve your data.

DMPTool

The DMPTool is an online tool that includes data management plan templates for many of the large funding agencies that require them.

Harvard is an affiliated partner institution. You can login as a user from your institution with your HarvardKey. By being affiliated Harvard, you will be presented with institution-specific guidance to help you complete your plan.

Data Management Planning Tool

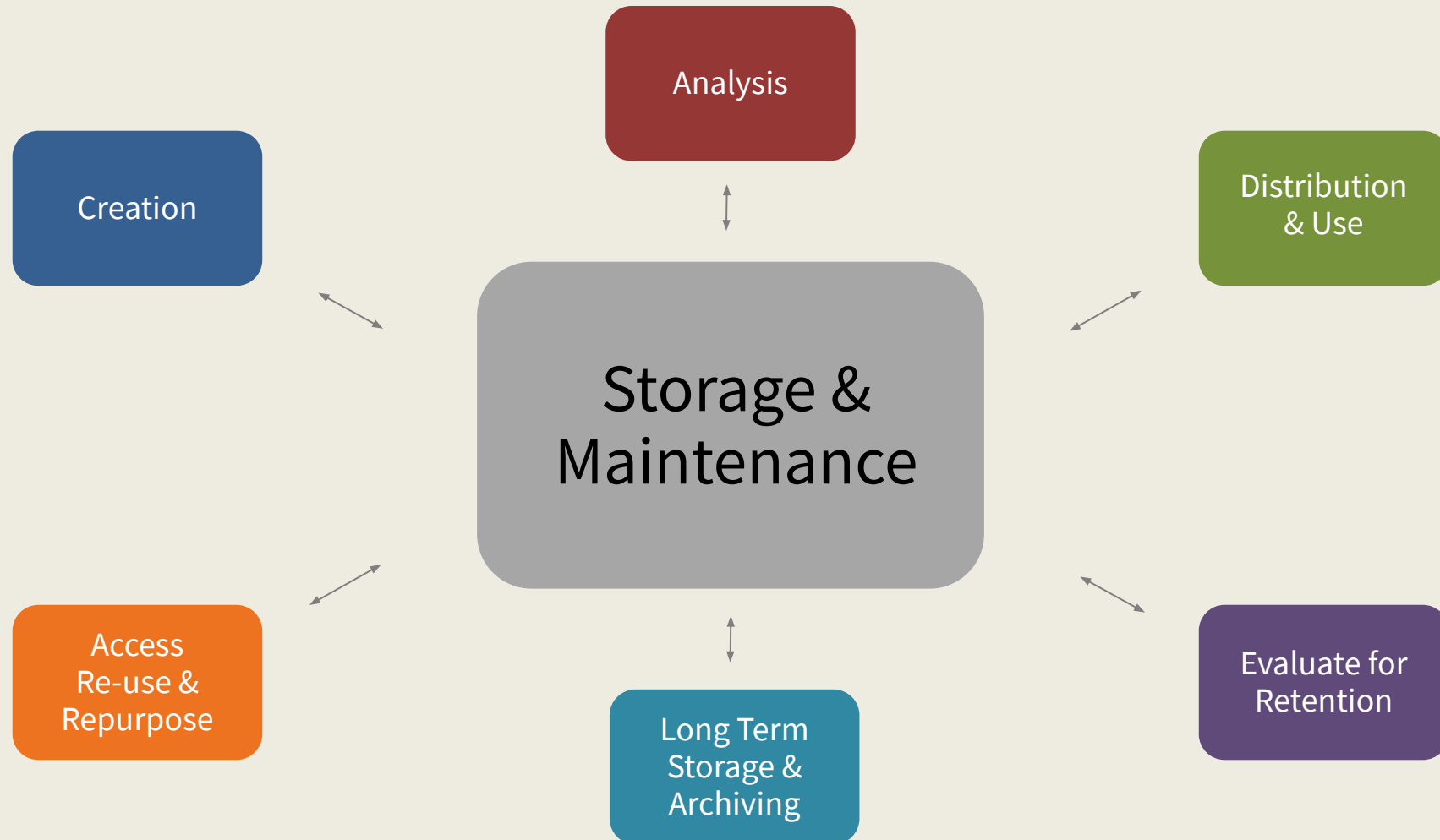
Create, review, and share data management plans that meet institutional and funder requirements.

Get Started

The screenshot shows the DMPTool interface for a user logged in as Jacqueline Cellini at Harvard University. The navigation bar includes links for Home, My Dashboard, DMP Requirements, Public DMPs, News, Help, Contact Us, About, and Log Out. The main content area displays the Harvard University logo and name, along with links to contact support. Below this, there's a section for DMP REQUIREMENTS with a search bar and filters. A table lists various funding agencies and their associated DMP templates, funder links, and sample plans.

Template	Funder	Funder Links	Sample Plans (if available)
BCO-DMO NSF OCE: Biological and Chemical Oceanography	National Science Foundation	NSF OCE Sample and Data Policy, May 2011 (PDF) NSF GEO Data Policies	
National Aeronautics and Space Administration	National Aeronautics and Space Administration (NASA)	NASA Plan for Increasing Access to the Results of Scientific Research	FAQ & Example DMPs
National Institute of Justice (DOJ)	National Institute of Justice (DOJ)	NIJ Data Archiving Plans NIJ Submitting Data Under the Data Resources Program	
NEH-ODH: Office of Digital Humanities	National Endowment for the Humanities	Guidelines	NEH-ODH Sample
NIH-GDS: Genomic Data Sharing	National Institutes of Health	Guidance	NIH-GDS: Sample Plans
NIH-GEN: Generic	National Institutes of Health	Guidance	NIH: Sample Plans

Storage affects the whole cycle



Data & Metadata

Raw data

What is being measured or observed? This is the data that is being generated during the research project.

Processed data

How can the raw data be made useful- able to be manipulated?

Analyzed data

What does the data tell us? Is it significant? How so?

Finalized/published data

How does the data support your research question?

Creation

- ✓ Raw data
- ✓ Working files

Analysis

- ✓ Analytical methods
- ✓ Analysis results

Understanding metadata

WHAT IS METADATA?

Metadata is **data about data**.

Metadata can describe a single piece of data, a dataset or collection.

Metadata can be used to describe *anything* - both physical or digital.



WAYS TO DESCRIBE YOUR DATA

Basic: Title, dates, geographic locations, subjects, dimensions.



Connections: Investigators, collaborators, related publications, websites, projects and datasets.

Access and rights: copyright licences, access and usage restrictions, embargo dates.



Technical: File format and size, software, programming language.

Preservation: storage location and format, retention periods.

TYPES OF METADATA

Object-level



This describes a single object or piece of data such as a document, an image, or a sequence.

Collection-level

This describes a group of data, i.e. a dataset or collection.



Methodological

Details of the methods that were used to collect, generate, process and/or analyse your data.

WHERE TO DESCRIBE YOUR DATA

Locally

Within your work - files, databases and other structures. Use metadata to keep track of the data you are collecting or generating.

Beyond

Collection level metadata can be created and shared within metadata stores and data repositories. This helps other researchers to find out about your work, may lead to new collaborations and minimises duplication of effort.

Metadata helps you to **better organise** and keep track of your research data, **saving you time** by making it easier to find your data when you need it.

Metadata helps you to **understand** a dataset - what it is, **how it was collected** and **how it is structured**.

“Good metadata is standardized, consistent and interoperable, and facilitates discovery, preservation and archiving of data.”



eRESEARCHSA



<https://www.ersa.edu.au/understanding-metadata>

<https://datamanagement.hms.harvard.edu/metadata-overview>

On-Your-Own Exercise Documentation

**For your most common data type,
make a list of the most important
information to record for each dataset.**



File Conventions

Example files with no naming conventions:

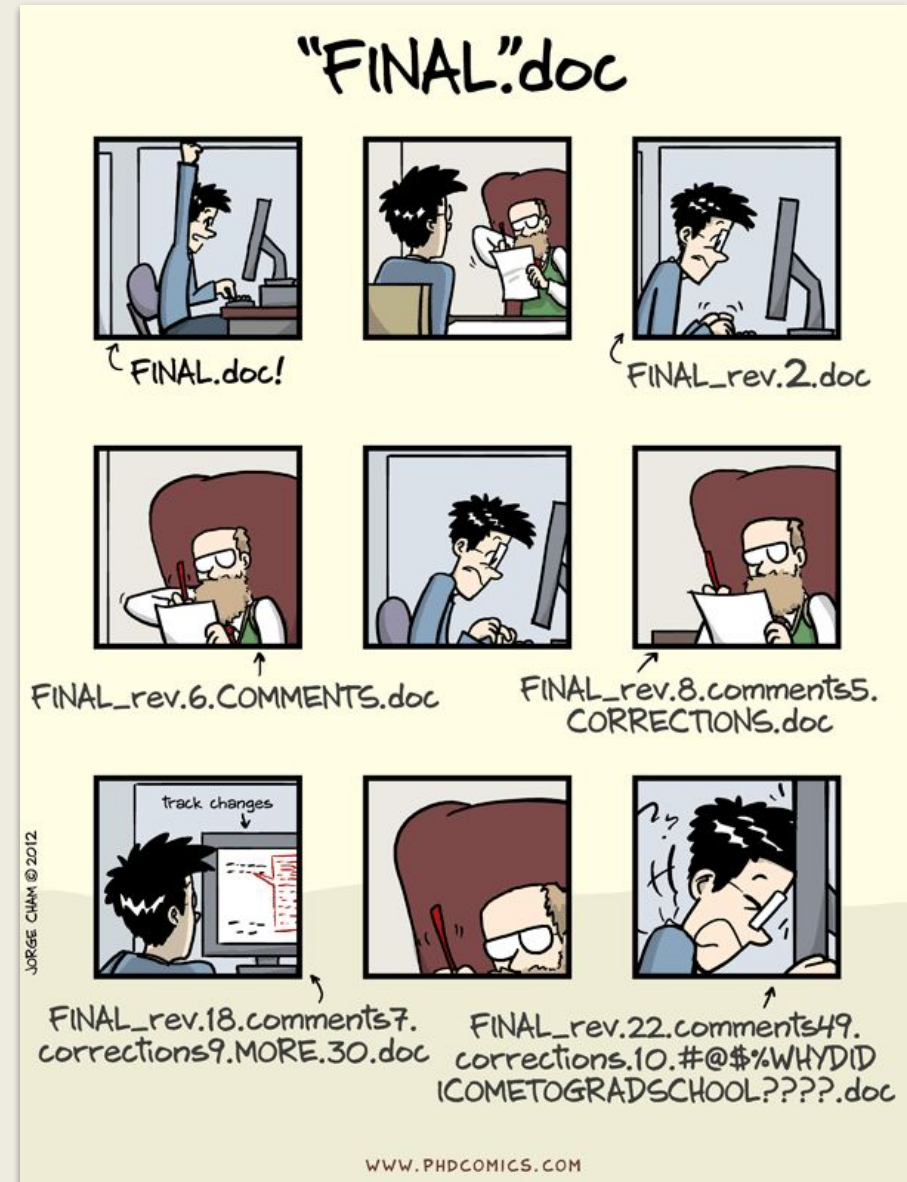
Test data 2016.xlsx

Final FINAL! last version.docx

Example files with naming conventions:

20160104_ProjectA_Ex1Test1_SmithE_v1.xlsx

20160104_ProjectA_MeetingNotes_SmithE_v.1.docx



File Conventions

File Versioning

- For analyzed data use version numbers
- Save files often to a new version
- Label the final version FINAL
- For code, consider GIT or SVN

File Organization

- Any system is better than none
- One project, one folder
- Separate folders for data or project stages
- Date-based folders (pairs well with lab notebook)

Conventions Best Practices

Dates:

YYYY-MM-DD (e.g., 2016-09-07)

Times:

Use 24-hour military time to avoid confusion over a.m./p.m. (e.g., 1623 for 4:23 pm)

Sequential numbering:

Use leading zeros (e.g., 001, 002, ... 010, 011, ... 100, 101)

Names:

Surname then given (e.g., Smith_Bob)

Versioning:

Use numbers to indicate updated versions (v1, v2)

The perfect date



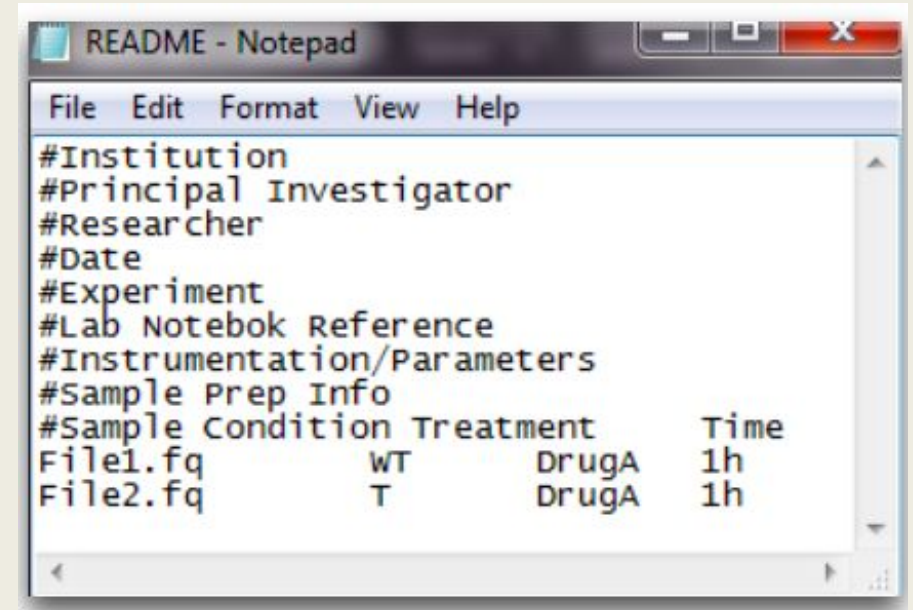
Document Your Conventions

No point to have a system without documentation

- *README.txt (use .txt over .doc because it's more durable)*
- *Front cover of research notebook*
- *A printout by the computer*

README File

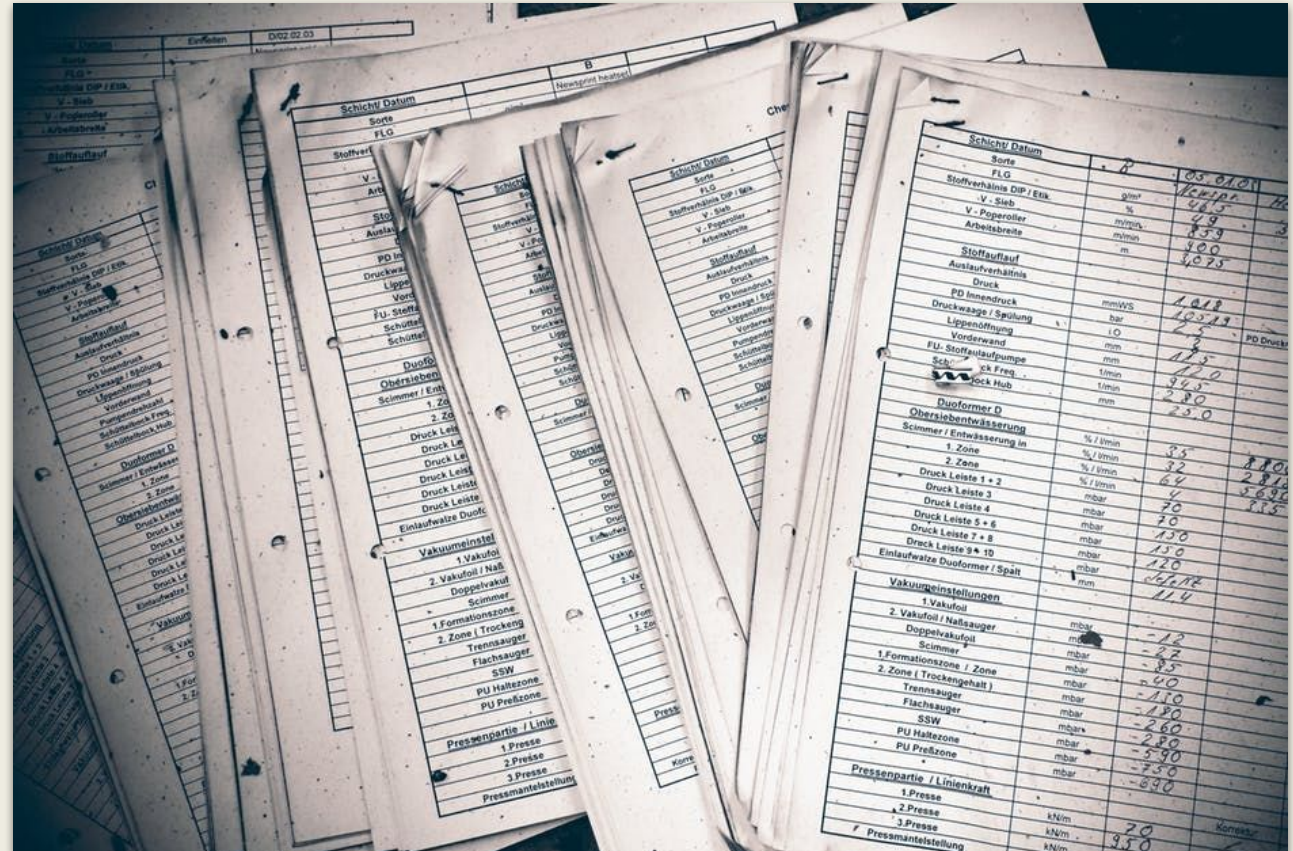
- Basic project information
- Title, Contributions, Grant Info
- Contact information
- All locations of where data live, including backups
- Useful information about the files and how they are organized
- Explain file naming conventions and abbreviations for future reference



```
README - Notepad
File Edit Format View Help
#Institution
#Principal Investigator
#Researcher
#Date
#Experiment
#Lab Notebook Reference
#Instrumentation/Parameters
#Sample Prep Info
#Sample Condition Treatment Time
File1.fq WT DrugA 1h
File2.fq T DrugA 1h
```

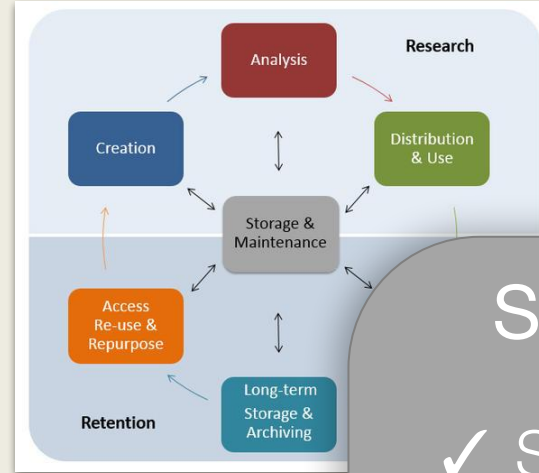

On-Your-Own Exercise Conventions

Develop a file naming convention for your most common data type.



Storage

**Storage,
backup, and
security are
interrelated**



Storage & Maintenance

- ✓ Store on appropriate tier, with proper security
- ✓ Store locally on servers or in the cloud
- ✓ Plan to maintain system

Security

Access

Limiting the availability of your data

Systems

Protecting your hardware and software

Data Integrity

Ensure that your data is not manipulated in an unauthorized way

LEVEL 1	Public information	Level 1 Data Types
LEVEL 2	Level 2 is information the University has chosen to keep confidential but the disclosure of which would not cause material harm.	Level 2 Data Types
LEVEL 3	Level 3 information could cause risk of material harm to individuals or the University if disclosed.	Level 3 Data Types
LEVEL 4	Level 4 information would likely cause serious harm to individuals or the University if disclosed.	Level 4 Data Types
LEVEL 5	Level 5 information would cause severe harm to individuals or the University if disclosed.	Level 5 Data Types

Note on Security

Does your data fall under the following:

- *HIPAA: health information*
- *FERPA: student information*
- *FISMA: government subcontractor*
- *Human subject research, etc.*

→ Ask for help!



<http://www.boonya.net/is-your-email-hipaa-compliant/>

Electronic Lab Notebooks

ELECTRONIC LAB NOTEBOOKS

Benchling

BIOVIA

Confluence

Docollab

ecLabNote

ELOG

Evernote

Exemplar

Findings

Hivebench

IDBS e-Workbook

LabArchives

LabCollector

LabWare

LabVantage

LabWare

HOME / BEST PRACTICES /

Electronic Lab Notebooks

Electronic Lab Notebooks at HMS

Lab notebooks are good for writing down procedures, observations, conclusions and for drawing flow charts and diagrams by hand. However, in order to accommodate the increase of digital data collected, researchers have taped instrumentation and computer printouts onto the pages of their notebooks. Electronic lab notebooks (ELNs) are software tools that allow researchers to capture data sets by recording file names and locations in the notebook.

An ELN (electronic lab notebook) is a software tool that in its most basic form is a digital page in a paper lab notebook. In this electronic notebook you can capture data using your computer or mobile device. This offers several advantages over a paper notebook.

The number of available ELN tools is increasing and the function set of each tool may be confusing to evaluate all of the advantages and limitations of each tool for your project.

The Electronic Lab Notebook Matrix has been created to aid Harvard Medical School researchers in choosing usable Electronic Lab Notebook solutions to meet their specific needs. The matrix allows researchers to compare and contrast the numerous solutions available in-depth.

Questions about Electronic Lab Notebooks at HMS? Contact us at elb@hms.harvard.edu

Features	Benchling	Biovia	Confluence	Docollab	ECL	ELOG	Evernote	Exemplar	Findings	Hivebench	IDBS	LabArchives	LabCollector	LabWare	LabVantage	LabWare
Interactivity																
Intuitive Interface Design	✓	No response received	★	★	No response received	★	No response received	No response received	★	★	★	✓	No response received	★	★	★
Auto Metadata Harvest	★	No response received	✗	✓	No response received	✗	No response received	No response received	✗	✓	—	✓	No response received	✗	✓	✓
Search functions can search across file formats and beyond typos	★	★	—	★	No response received	★	★	★	★	★	★	★	No response received	★	★	★
Ability to manipulate files and images	★	No response received	✓	✓	No response received	—	No response received	—	★	★	—	★	No response received	★	★	★
Support for multiple open windows	✓	★	✓	✓	No response received	✓	✓	★	★	✓	✓	✓	No response received	✓	★	★
Ability to link out	✗	No response received	★	✓	✓	✓	✓	✓	✓	✓	✓	✓	No response received	✓	✓	✓
Support for Researcher Documentation																
Hyperlink support	✓	No response received	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	No response received	✓	✓	✓
Metadata Creation Prompts	✓	No response received	✗	—	No response received	✓	✗	No response received	✗	✓	—	✓	No response received	✗	✓	✓
Rights Management (licensing)	★	No response received	—	✓	No response received	★	No response received	No response received	✓	✓	★	✓	✓	✓	✓	✓
Protocol Integration	✓	★	✓	✓	No response received	✓	★	★	✓	✓	✓	✓	★	✓	★	✓
Adaptability to Lab workflows																
Accounts/Permissions Levels	✓	No response received	★	✓	✓	✓	✓	★	★	✓	✓	✓	✓	✓	★	✗
Internal Data Sharing	✓	★	★	✓	No response received	✓	—	No response received	✓	★	★	★	—	✓	★	★
Adaptable to a Variety of Workflows	★	No response received	★	—	No response received	★	No response received	—	★	★	★	★	★	★	★	★
Compatibility with authoring tools	✓	No response received	✓	✓	No response received	✗	No response received	No response received	✗	★	★	✓	No response received	✗	★	✗
Windows Compatible	✓	No response received	✓	✓	✓	✓	✓	✓	✗	✓	✓	✓	✓	✓	✓	✓
Macintosh Compatible	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Linux Compatible	✓	✗	✓	✓	No response received	✓	No response received	✓	✗	✓	✓	✓	No response received	✓	✗	✗
Android Compatible	✓	✓	✓	✓	✓	✓	✓	✓	✗	✗	✓	✓	✓	✓	✓	✗
iOS Compatible	✓	✓	✓	✓	No response received	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✗
Storage																
Cloud Storage	✓	No response received	✗	✓	No response received	✓	No response received	No response received	✓	✓	✓	✓	✓	✓	✓	✗
Local Storage	✗	No response received	✓	✗	No response received	✓	No response received	No response received	✓	✗	✓	✓	No response received	✓	✓	✓
Hybrid (cloud/local) Storage	✗	No response received	✗	✗	No response received	✗	No response received	No response received	✓	✓	✗	✓	No response received	✗	✗	✗
Versioning	—	—	—	—	No response received	—	—	—	★	★	—	★	—	★	★	★
File Redundancy	★	No response received	★	★	No response received	★	No response received	No response received	★	★	★	★	No response received	★	★	★
Creates stable URLs or persistent identifiers for entries	✓	No response received	✓	✓	No response received	✓	No response received	No response received	★	✓	✓	✓	No response received	✓	✓	✓
Can unregistered users access the data found at persistent links?	✓	No response received	✓	✗	No response received	✗	No response received	No response received	★	★	✗	✗	No response received	✗	✗	✗
Storage Capacity - Users	★	No response received	★	★	No response received	★	★	No response received	★	★	★	★	No response received	★	✓	✓
Storage Capacity - Max File Size	—	No response received	—	—	No response received	—	No response received	No response received	—	—	—	—	No response received	—	✓	✓

On-Your-Own Exercise Storage

1. Conduct a quick inventory of your data:

- *What datasets do you have?*
- *How big are they?*

2. Inventory where your files are currently stored, including backups:

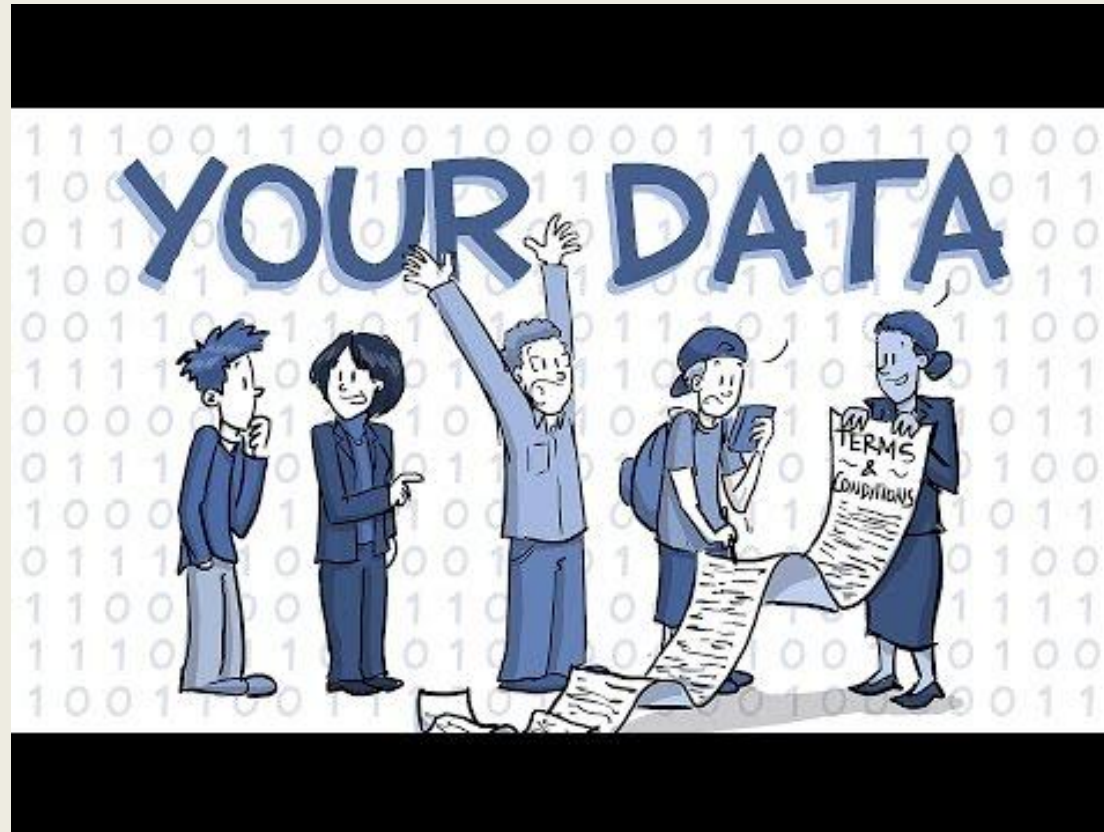
- *How safe are your data?*

3. Do you have any PHI or HRCI data?

What do you need to ensure their security?

Ownership

Do you know who owns your data or the dataset you are using?



Data Sharing

When establishing data sharing and access policies and provisions, consider *whom* you will share your data with, *how* it will be shared, and *when* in the research process you will share it.

Distribution & Use

- ✓ Share data with collaborators
- ✓ Annotate datasets & upload to public repositories
- ✓ Include in relevant publications & reports

Citation & Attribution

An orange circle containing the text "give credit", "get credit", and "cite data" stacked vertically.

give credit
get credit
cite data

Acknowledgement of the use of someone else's information or work is a long-accepted practice in scholarly communication.

The following elements are generally considered the core elements of a data citation:

- *Author/Creator(s): creators of the data; can be one or more people or organizations*
- *Title: title of the data set*
- *Version: exact version or edition of the data set used*
- *Publication Date: date when the data set was published or released*
- *Publisher/Archive: data center or repository that is archiving and distributing the data*
- *Identifier/Locator: URL or other linkable locator for the data; a persistent, permanent URL such as a DOI (Digital Object Identifier) or a handle is preferred*

Unique Identifiers



- Digital Object Identifier
- Permanently assigned to an object to provide a resolvable persistent network link to current information about that object, including where the object, or information about it, can be found on the Internet
- <https://www.doi.org>



- Open Researcher and Contributor ID
- Provides a persistent digital identifier that distinguishes you from every other researcher and supports automated linkages between you and your professional activities ensuring that your work is recognized
- <https://orcid.org>

On-Your-Own Exercise

ORCID

Don't have an ORCID? Create one now!

It's free, easy and will last throughout your professional career!

<https://orcid.org>



Data Repositories

HOME / DATA REPOSITORIES /

Submit your questions and feedback!

Choosing a repository

Key questions to consider when choosing a repository:

- What are your data sharing and/or publication goals?
- What features do you require for data deposition and/or data publication?

Considering your data sharing goals:

Scenario	Possible Solution	Example(s)
You want to release your data to the public, but you aren't ready to publish it yet.	data deposition in a repository	Dataverse , figshare , Zenodo
You want to share data with collaborators, but you aren't ready to release it publicly or publish a paper about it.	data deposition in a repository with tiered access	figshare , Dataverse , Zenodo
You want to publish a comprehensive research paper while also making the relevant data publicly available.	data deposition in a repository that is compatible with the journal's workflow	Dataverse , Dryad , figshare , Zenodo



Receive Data Management

Requirement	Dataverse	Dryad	figshare	Zenodo	GigaScience	Scientific Data
Data Size and Format						
• hosting of common file formats (e.g. csv, tsv, xls, xlsx, doc, pdf)	✓	✓	✓	✓	✓	N/A ⁶
• hosting of proprietary file formats (e.g. raw image files)	✓	✓	✓	✓	✗	N/A ⁶
• unlimited size per file	✗	✓	✗ ⁵	✗	✓	N/A ⁶
• unlimited total dataset size	✓	✓	✓	✓	✓	N/A ⁶
Data Licensing						
• CC0 waiver ¹	recommended	required	recommended	available ⁸	required	N/A ⁶

On-Your-Own Exercise Repositories

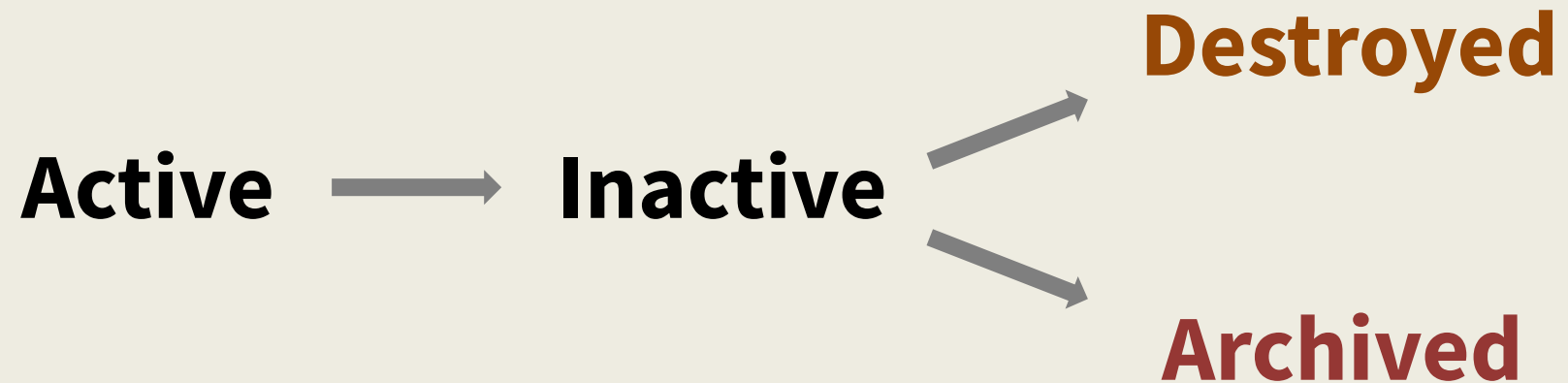
Consider your grant funding or project goals.

- *Are you required to deposit your data in a repository?*
- *What repository(ies) will work for your dataset?*



Research Records

4 Types of Records



Retention

Data retention requirements are put in place by funding agencies and sponsoring institutions for a number of reasons:

- *the need to make research findings available for corroboration*
- *to promote the reuse of data within and across disciplines*
- *to support open data initiatives*
- *the need to protect intellectual property rights*

Evaluate for Retention

- ✓ Identify and retain essential research records
- ✓ Organize and annotate appropriately

Appraisal & Archiving


Long-term Storage & Archiving

- ✓ In compliance with HMS & federal policy
- ✓ As requested by investigators

Appraisal process for evaluating research records and data:

- Inventory of the records: volume, data types, formats, metadata, other relevant information
- Interview about the project: impact of the project, significance of the research or researcher, basic information about the grant

Questions?

 HARVARD UNIVERSITY

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Harvard Biomedical Data Management

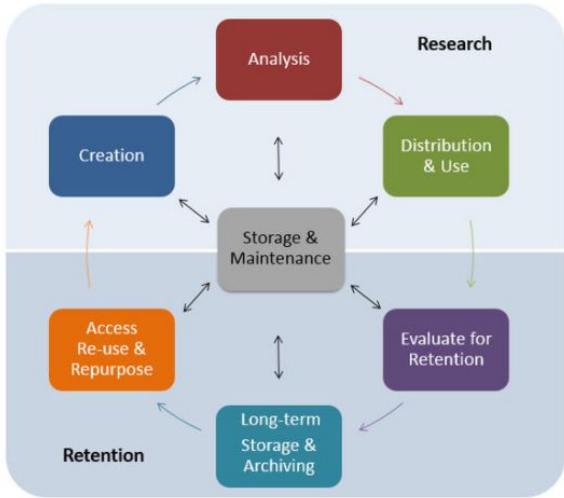
Best practices & support services for research data lifecycles

[About ▾](#) [Best Practices ▾](#) [Planning ▾](#) [Data Repositories ▾](#) [Storage ▾](#) [Policies ▾](#) [Harvard Open Access](#)

Data Management

Data Management is the process of providing the appropriate labeling, storage, and access for data at all stages of a research project. We recognize that best practices for each of these aspects of data management can and often do change over time, and are different for different stages in the data lifecycle.

Early and attentive management at each step of the data lifecycle will ensure the discoverability and longevity of your research.





← August 2017 →

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		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

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 HARVARD MEDICAL SCHOOL  The Francis & Countway Library of Medicine

[Receive Data Management Updates](#)

datamanagement.hms.harvard.edu

Open Online Course via Canvas



BEST PRACTICES FOR BIOMEDICAL RESEARCH DATA MANAGEMENT

Started Jan 8, 2018

COURSE DATE:
Starts Jan 8, 2018

DURATION:
On-going

COMMITMENT:
7+ hrs/week

REQUIREMENT:
None

COURSE TYPE:
Self-paced

CREDENTIAL:
Badge, Certificate
(free)

bit.ly/HMS-RDM-MOOC



Data Management Class Survey

Please complete this feedback for for the training:

bit.ly/rdm-survey

Key Resources

Harvard Biomedical Data Management

<http://datamanagement.hms.harvard.edu>

Center for the History of Medicine | Archives and Records Management

<https://www.countway.harvard.edu/chom/archives-and-records-management>

Research Information Technology Solutions

<http://rits.hms.harvard.edu>

Office of the Vice Provost for Research | Research Data Security & Management

<https://vpr.harvard.edu/pages/research-data-security-and-management>

Harvard Catalyst | The Harvard Clinical and Translational Science Center

<http://catalyst.harvard.edu>

Office for Scholarly Communications

<https://osc.hul.harvard.edu/policies>

