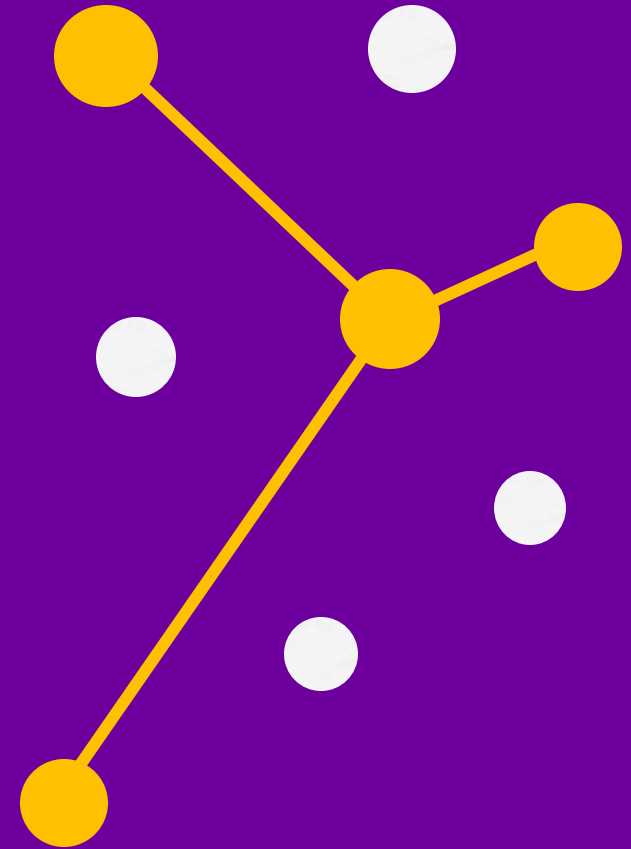


My Research Essentials

Introduction to Research Data Management

Clare Liggins – Open Research Librarian



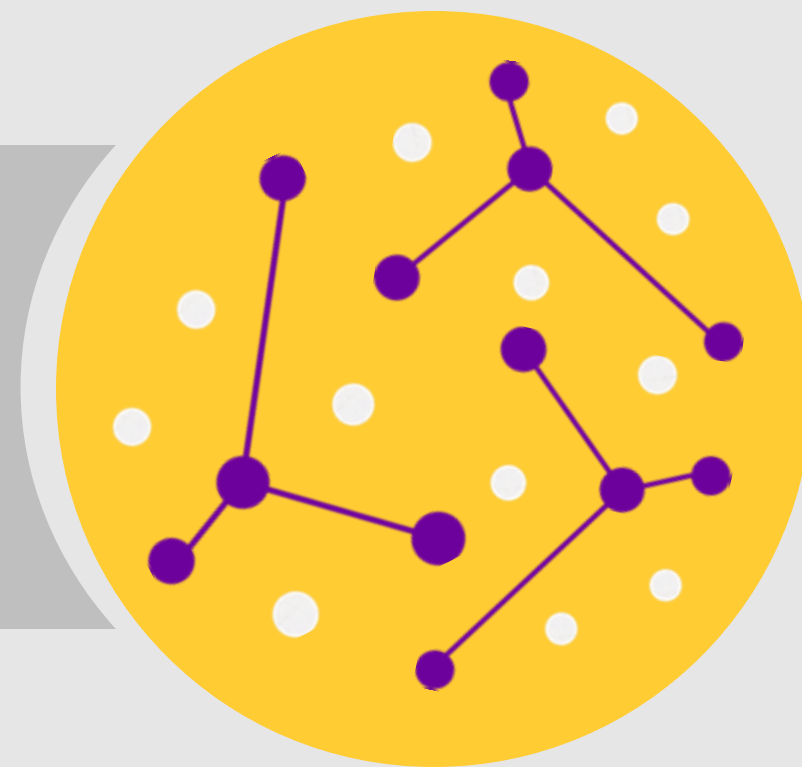
Discussing today:

1. Data Management Plans
2. Organising research data
3. Personal and sensitive data
4. Data storage
5. Data sharing
6. University of Manchester research data management support

Ask questions at any time!



What do we mean by data?



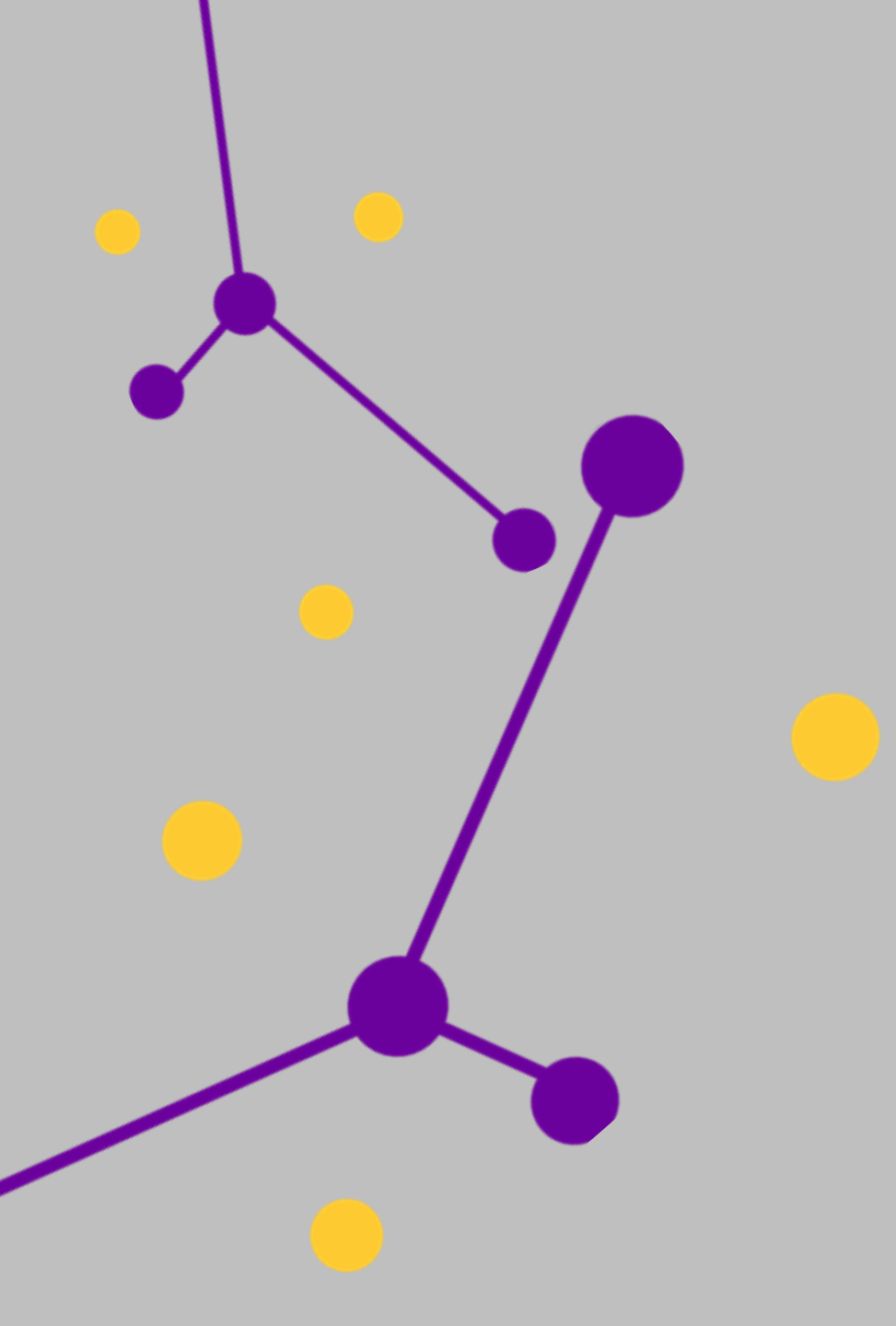
What do we mean by data?

- Raw instrument readings
- Processed data
- Analysed data
- Images e.g. photographs, MRI scans, western blot
- Spreadsheets
- Computer code
- Genome sequences

- Video and audio recordings
- Surveys and interviews
- Field notes
- Lab books
- Physical samples
- Protocols

Among many other things



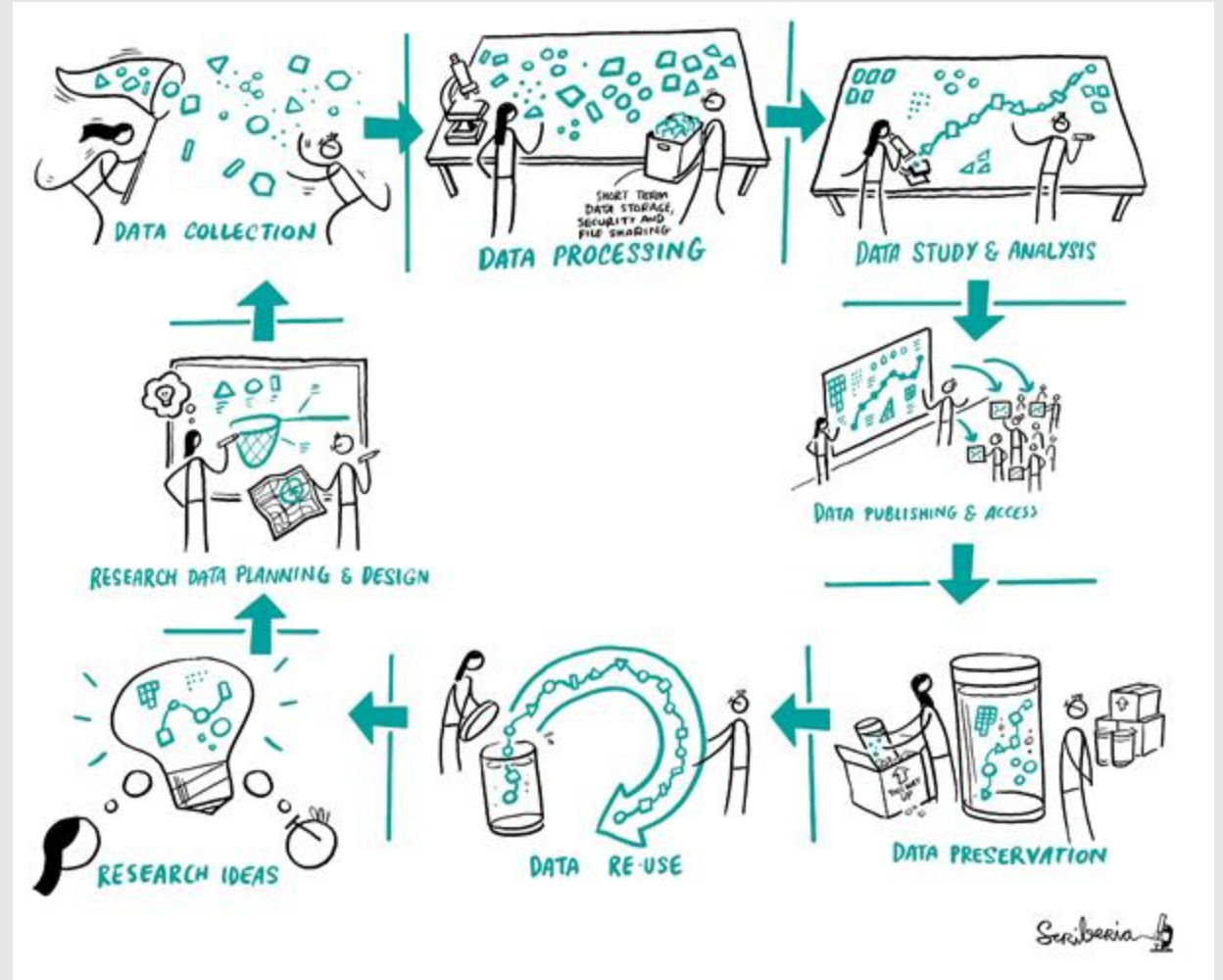


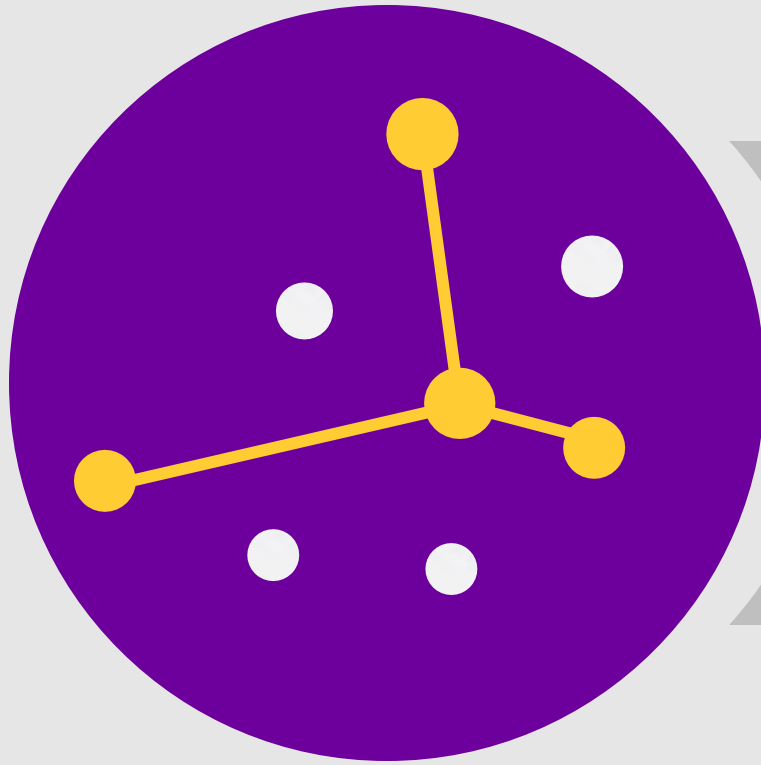
Definition: research data management

Research data management covers all actions that contribute to the effective storage, preservation and reuse of data, and documentation throughout the research lifecycle.

Why is managing research data important?

1. Keeps research secure
2. Supports efficient research
3. Enables data to be re-used which increases impact
4. Assures research integrity and meets our University and funder requirements





Data Management Plans

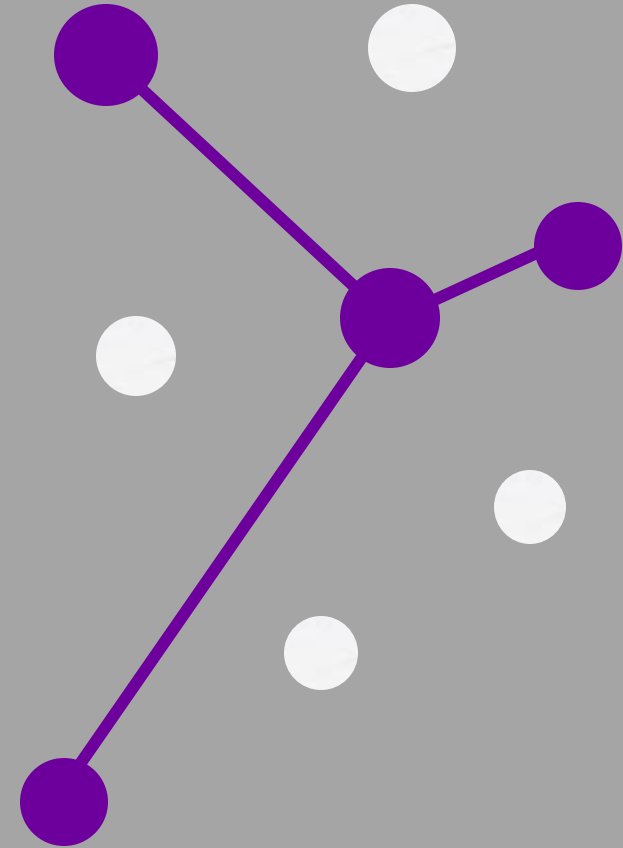
What is a Data Management Plan?

A plan to define:

- What types of data will be collected
- How the data will be collected
- How the data will be documented
- Where the data will be stored
- How the data will be backed up
- Who will be able to access the data
- How ethical and legal issues will be managed
- Whether, and how the data will be shared and preserved

At the University of Manchester, our RDM Policy requires a DMP for every research study

A DMP is a working document and should be updated whenever significant changes occur



Manchester Data Management Outline:

- Internal questions (tick-box or short answer)
- Informs service provision
- Manage risks
- Themes:
 - Governance
 - Collaboration or single-institution project
 - Whether data will be created or re-used
 - Storage
 - Retention
 - Levels of data sensitivity
 - Handling of sensitive data
 - Data custodian



DMPOnline:



My DashboardCreate plansReferenceHelp

LanguageChristopher Gibson

University of Manchester

Research Data Management at the University of Manchester

Research Data Management service team

Admin

My Dashboard

The table below lists the plans that you have created, and that have been shared with you by others. You can edit, share, download, make a copy, or remove these plans at any time.

Project Title	Template	Edited	Role	Test	Visibility	Shared	
Test CG AHRC 20210602	AHRC Data Management Plan	10-06-2021	Owner	☒	N/A	No	Actions
Test DMPo CG: Funders: All: Create: BBSRC	BBSRC Template	09-06-2021	Owner	☒	N/A	No	Actions
Test DMPo CG: Funder: WT copying	Wellcome Trust Template	09-06-2021	Owner	☒	N/A	No	Actions
Test DMPo CG: Funder menu: AHRC 1-click	AHRC Data Management Plan	09-06-2021	Owner	☒	N/A	No	Actions
Test DMPo CG: Funder: AHRC copying	AHRC Data Management Plan	09-06-2021	Owner	☒	N/A	No	Actions

DMPonline: <https://dmponline.manchester.ac.uk>
Writing a data management plan (DMP) - Library Help

DMPOnline:



The University of Manchester

[My Dashboard](#) [Create plans](#) [Reference](#) [Help](#)

[Language](#) [Clare Liggins](#)

[Research Data Management at the University of Manchester](#)

[Admin](#)

University of Manchester

[Research Data Management service team](#)

Clare's plan

[Project details](#)

[Contributors](#)

[Plan overview](#)

[Write Plan](#)

[Research outputs](#)

[Share](#)

[Request feedback](#)

[Download](#)

[expand all](#) | [collapse all](#)

Manchester Data Management Outline (0 / 16)



Project details (0 / 2)



Responsibilities and Resources (0 / 2)



Data Collection (0 / 2)



DMPOnline:

How will the data be collected or created?

B *I*    

Save

GuidanceComments

ManchesterDCC

Outline how the data will be collected / generated and which community data standards (if any) will be used. Consider how the data will be organised during the project, mentioning for example naming conventions, version control and folder structures.

Explain how the consistency and quality of data collection will be controlled and documented. This may include processes such as calibration, repeat samples or measurements, standardised data capture or recording, data entry validation, peer review of data or representation with controlled vocabularies. You may wish to summarise details from a Quality Manual where such exists.

expand all | collapse all

Data description +

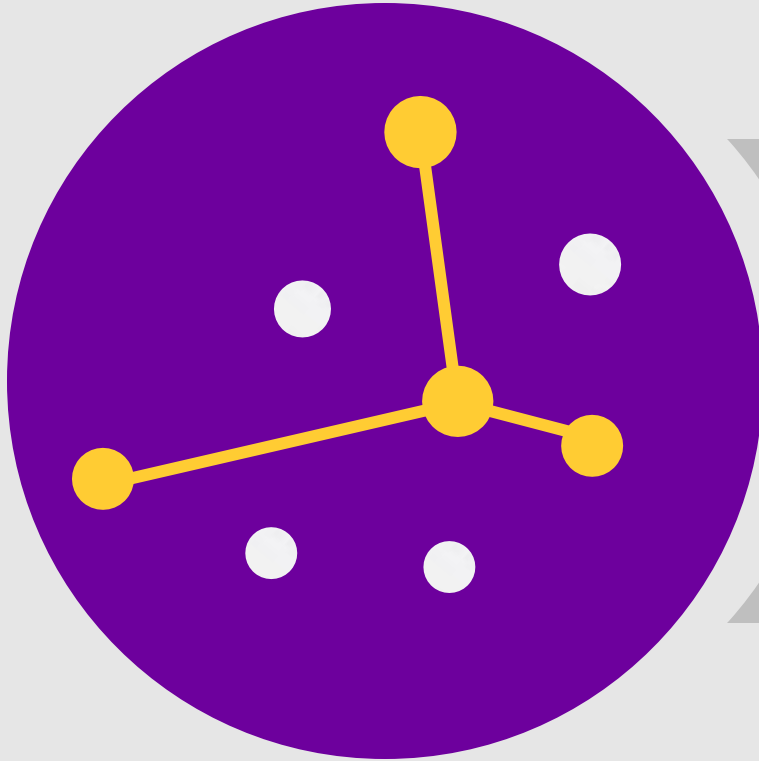
Data collection +

Benefits of a data management plan:



- Makes research more efficient
- Improves data security
- Underpins good research practice
- Helps inform costing of funding applications
- Ensures compliance with funder and University policies, and data protection legislation

Your map to help you stay on course with your research data

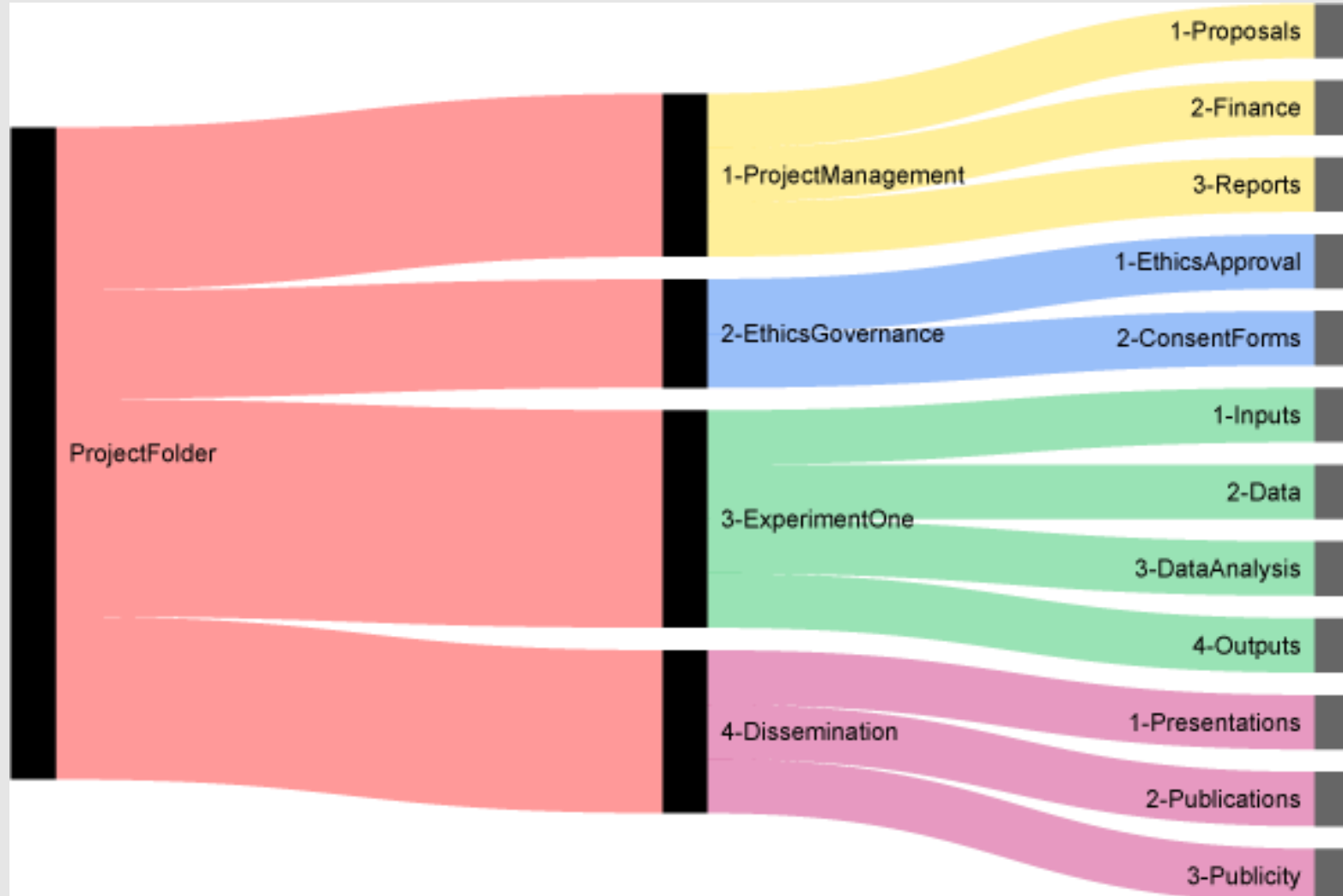


Data Organisation

Data organisation:

- Consistent
- Meaningful to you and your colleagues
- Allow you to find files easily

Folder and file structure:



File naming conventions:

TILS Document Naming Convention

Document naming for the TILS Division should follow this convention:

GDL_TILSDocNaming_V1_20090612.docx

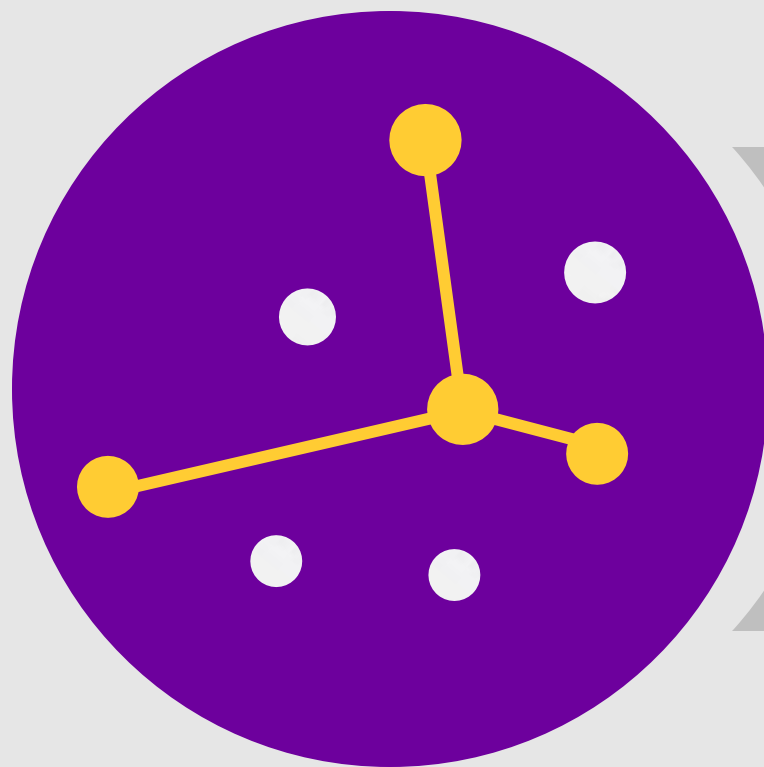
A prefix shows the document type

The document title describes the content

The version number

The date in the format yyyyymmdd

<https://www.library.qut.edu.au/about/management/documents/QUTTILSDocNamingConvention.pdf>



Documentation and Metadata

Documentation, metadata and README files:

Documentation: Detailed information about the dataset/project and the methodology used.

Metadata: Structured information about the data e.g. title, creators, date, license. To identify metadata standards recognized by your discipline see:

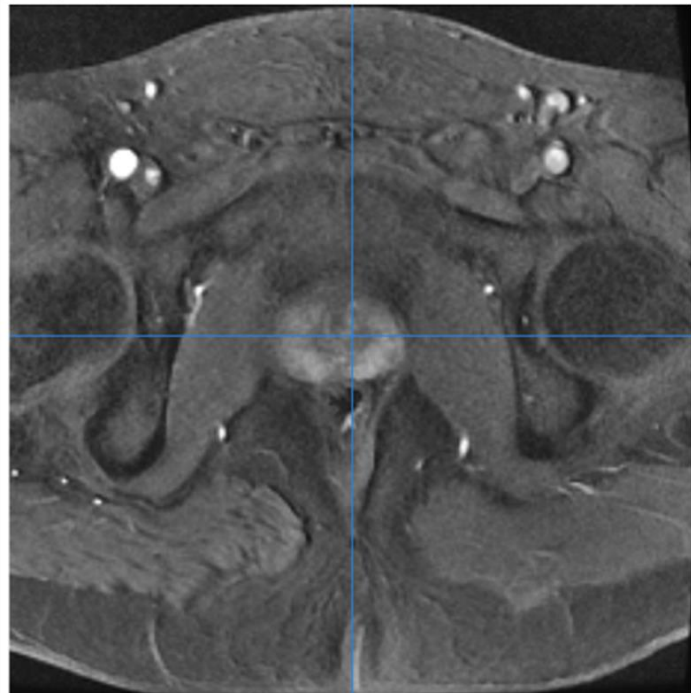
- [RDA Metadata Standards Directory](#)
- [FAIRsharing.org](#)

Write a README file!

Examples of metadata:

Title	Emergency nursing : the profession, the pathway, and the practice
Attribution	[edited by] Jeff Solheim.
Creator	Solheim, Jeff, 1967- editor. > Sigma Theta Tau International, issuing body. >
Subject	Emergency nursing > Emergency medical services >
Genre	Electronic books
Uniform title	Emergency nursing (Solheim)
Publisher	Indianapolis, IN, USA : Sigma Theta Tau International
Date	2016
Format/Physical descriptions	1 online resource (489 pages) : illustrations
Language	English
Contents	Emergency nursing defined -- The traditional role of the emergency nurse -- Unique roles of the emergency nurse -- Education of the emergency nurse -- The emergency nurse as a professional -- Self-care and the emergency nurse -- Types of emergency departments -- Common areas within the emergency department -- Key players in the emergency department -- The emergency nurse in the role of triage -- Common challenges faced by emergency nurses -- Risk management and quality issues affecting the emergency nurse -- Emergency nursing throughout the lifespan -- Challenging patient populations encountered by the emergency nurse -- The emergency nurse and the abused patient -- The emergency nurse caring for diverse cultures and ethnicities.

Library catalogue record

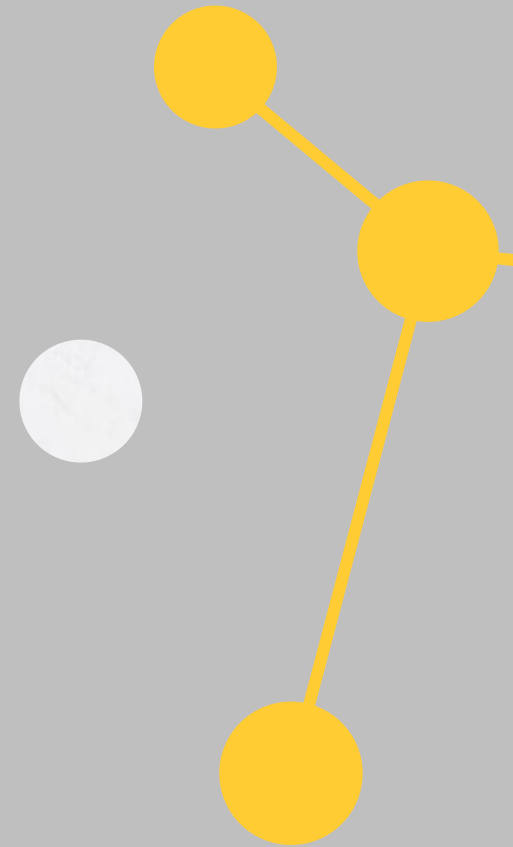
Patient Demographics	Acquisition related parameters
(0010,0010) Patient's Name [REDACTED] (0010,0020) Patient ID [REDACTED] (0010,0021) Issuer of Patient ID [] (0010,0030) Patient's Birth Date [REDACTED] (0010,0040) Patient's Sex [M] (0010,1010) Patient's Age [REDACTED] (0010,1030) Patient's Weight [98] (0010,21B0) Additional Patient History []	(0018,0023) MR Acquisition Type [3D] (0018,0025) Angio Flag [N] (0018,0050) Slice Thickness [4] (0018,0080) Repetition Time [3.952] (0018,0081) Echo Time [1.812] (0018,0082) Inversion Time [5] (0018,0083) Number of Averages [0.35] (0018,0084) Imaging Frequency [127.762284] (0018,0085) Imaged Nucleus [1H] (0018,0086) Echo Number(s) [1] (0018,0087) Magnetic Field Strength [3] (0018,0088) Spacing Between Slices [4] (0018,0091) Echo Train Length [1] (0018,0093) Percent Sampling [47.5] (0018,0094) Percent Phase Field of View [100] (0018,0095) Pixel Bandwidth [488.281] (0018,1000) Device Serial Number [000000H10392MR03] ...
	Image related parameters (0028,0100) Bits Allocated [16] (0028,0101) Bits Stored [16] (0028,0102) High Bit [15] (0028,0103) Pixel Representation [1] (0028,0106) Smallest Image Pixel Value [0] (0028,0107) Largest Image Pixel Value [893] (0028,1050) Window Center [446] (0028,1051) Window Width [893]

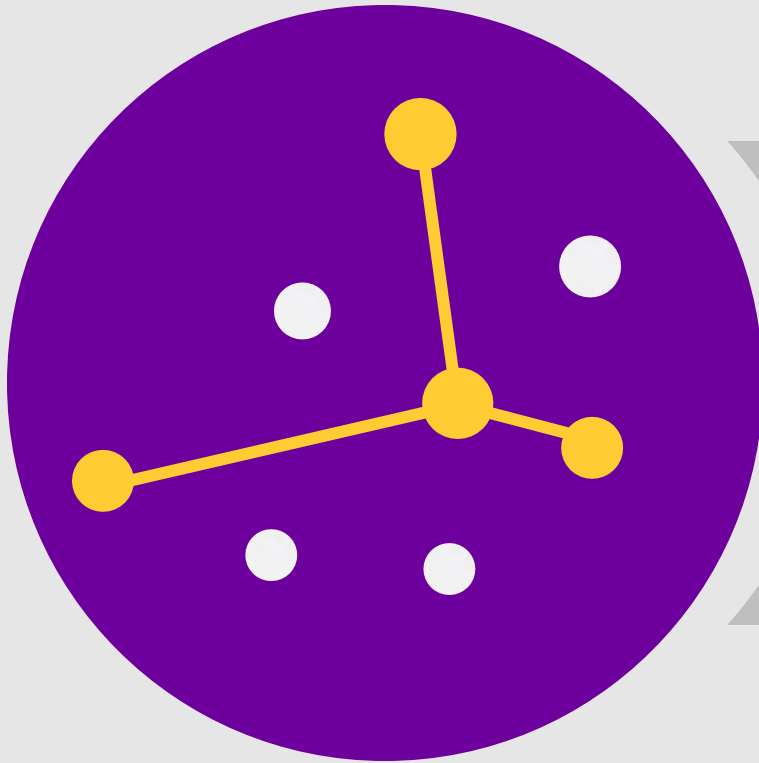
Source: <https://doi.org/10.1186/s41747-022-00281-1>

DICOM magnetic resonance image and DICOM metadata describing patient demographics, acquisition, and image-related parameters

Basic metadata standard example fields from Dublin Core:

Dublin core element	Use
Title	Resource name
Subject	Topic of resource
Description	Account of the resource
Creator	Entity responsible for making the resource
Publisher	Entity responsible for making the resource available
Contributor	Entity responsible for contributing to the resource
Date	Point or period of time associated with an event in resource lifecycle
Type	Nature or genre of the resource
Format	File format, physical medium, or resource dimensions
Identifier	Unambiguous reference to the resource within context
Source	Related resource from which the described resource is derived
Language	Language of the resource
Relation	Related resource
Coverage	Spatial or temporal topic, applicability or jurisdiction of the resource.
Rights	Information about rights held in and over the resource





Managing personal data

What is personal data?

Any information relating to an identified or identifiable natural person

An identifiable natural person is one who can be identified directly or indirectly using:

- a name
- an identification number
- location data
- an online identifier
- one or more factors specific to the physical, physiological, genetic, mental, economic, cultural or social identity of that natural person

What is special category personal data?

Personal data that includes any of the following types of information:

- racial or ethnic origin
- political opinions
- religious or philosophical beliefs
- trade union membership
- genetic data
- biometric data
- health data
- sex life or sexual orientation

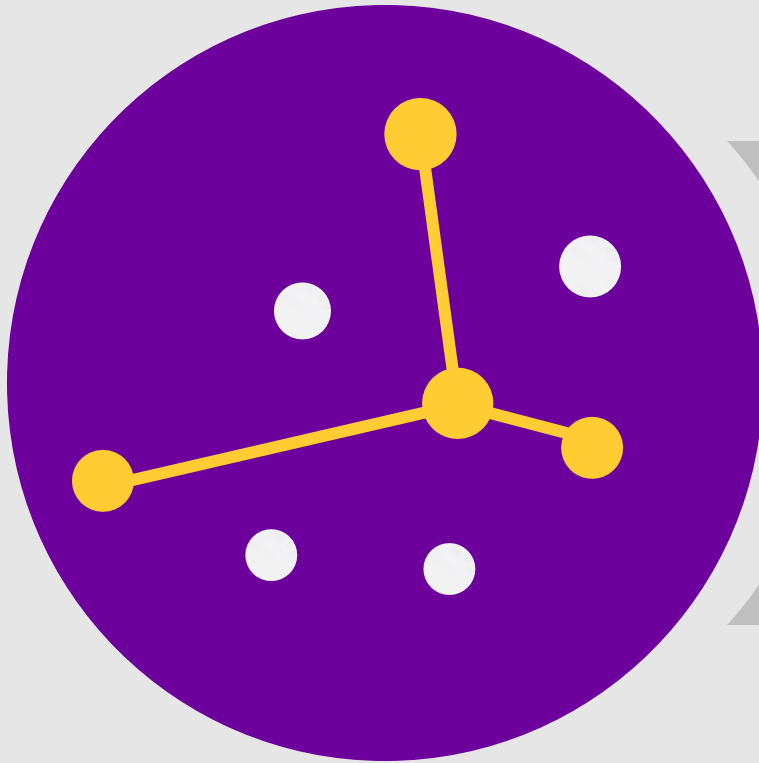
How to handle personal data:

- Collect the minimum needed to achieve research objectives
- Gain informed consent (preferably written and open)
- Anonymise data, including:
 - Removing direct identifiers
 - Reducing precision by aggregation / categorisation
 - Generalising meaning of a detailed text variable
 - Restricting upper / lower ranges to remove outliers
- Control access: use managed access repositories and data access committees

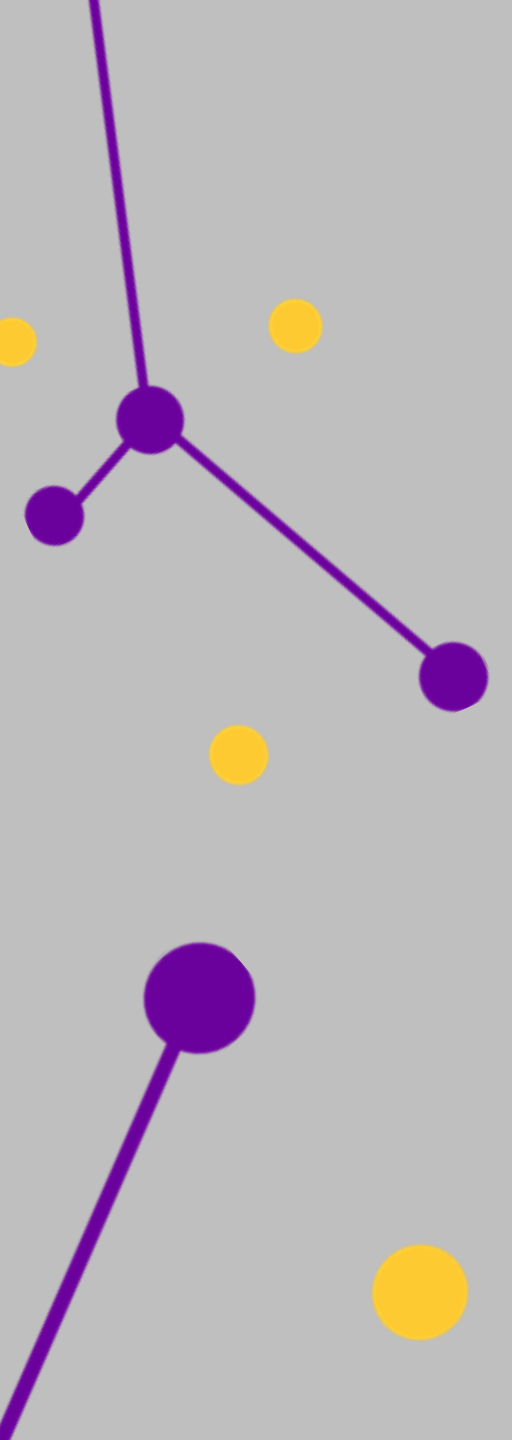
Further information is provided at The University of Manchester by: [Information Governance Office, Research Ethics](#)

Resources for working with personal and sensitive data:

- At The University of Manchester:
 - MRE online learning resources: 'Start to finish: Personal data'
 - Data protection guidance
 - Information security and data protection online training
- MRC guide: Using information about people in health research
- ESRC/UK Data Service:
 - Consent
 - Anonymisation



Data storage



Would you lose data if...

- You lost your laptop and/or external drive?
- You lost your USB?
- Your department burnt down?
- There was a ransomware attack?

Backup strategies at The University of Manchester:

- Research Data Storage from IT Services – automatic daily backups
- University of Manchester OneDrive
- External drives – **last resort! Talk to Research IT before using**

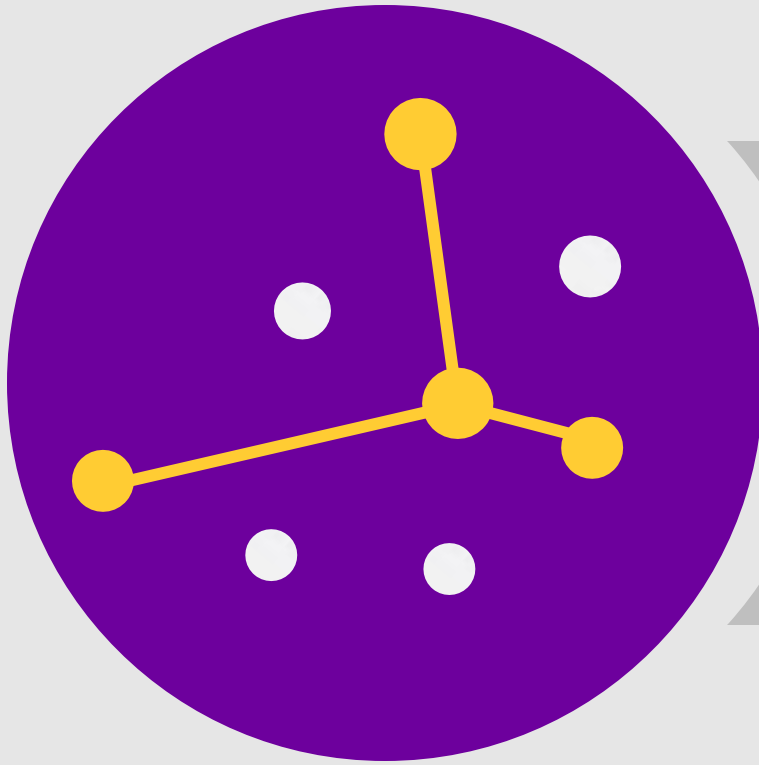
3 – 2 – 1:

3 copies, in 2 locations, on more than 1 type of hardware
Research Data Storage does this for you!

Sharing with collaborators:

- Internally: Research Data Storage or Sharepoint
- Internally / Externally: The University of Manchester's OneDrive
- Small files: ZendTo
- Encrypt files if confidential
- Not advised:
 - Do not use public cloud services to store sensitive data
 - Google Drive
 - (Commercial) OneDrive*

*OneDrive refers to the commercial equivalent rather than the University of Manchester OneDrive for Business service



Data sharing

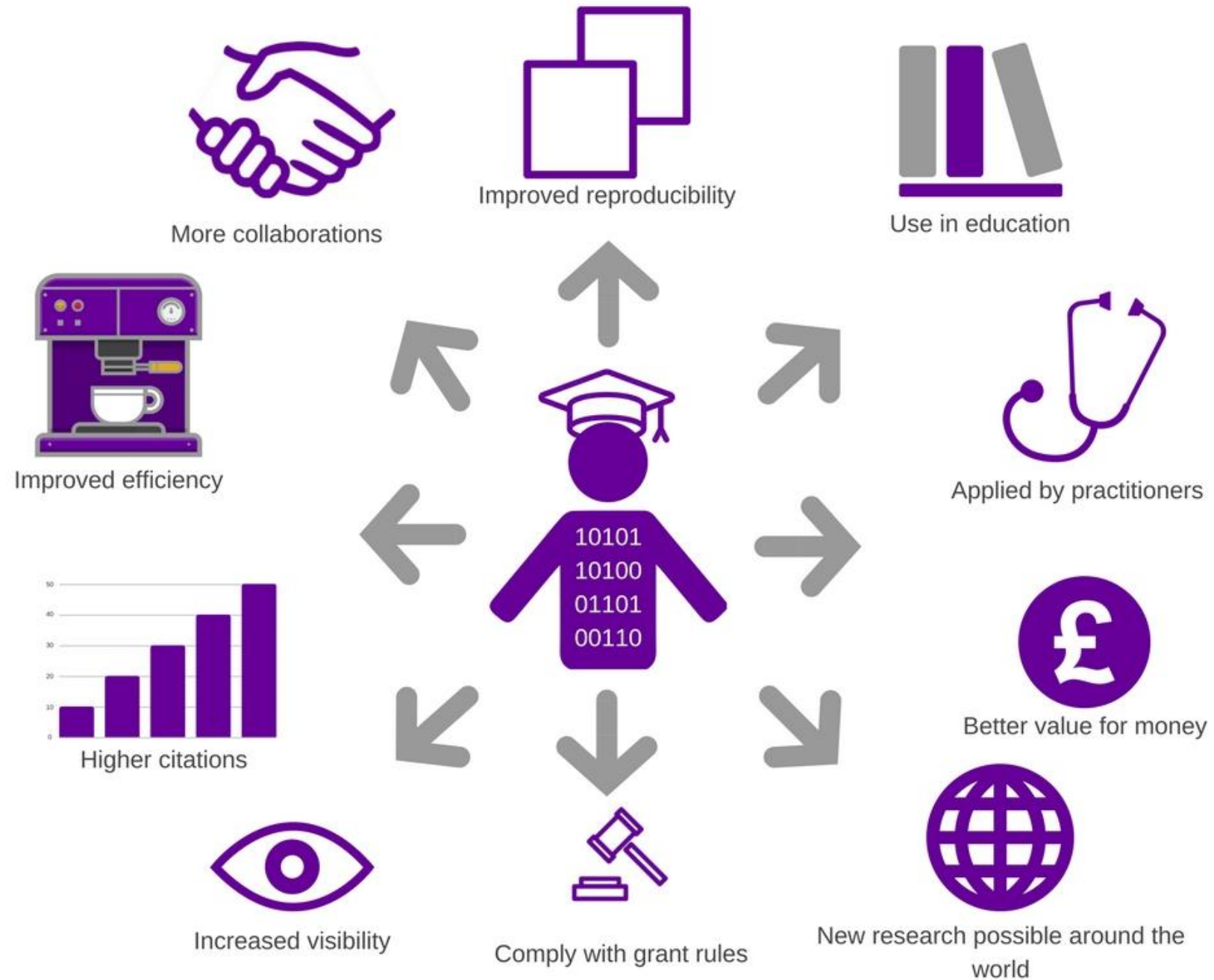
Why is it important to share research?

Open Research is fundamental to being an academic

Research relies on the principle that we share our findings

Ideas and results need to be shared to move human knowledge forward

Research without the underlying data is just a claim



Comply with grant rules: share research data

Comply with grant rules: share research data



How to share your data?

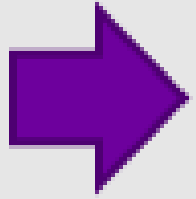
F: Make it **findable** in a data repository with a DOI or other unique identifier;

A: Make it **accessible** by including sufficient metadata and including a link to your data in your paper;

I: Make it **interoperable** by sharing in open, non-proprietary formats and (where relevant) using metadata standards and controlled vocabularies;

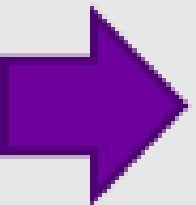
R: Make it **re-usable** by including a clear license which defines how it can be used.

FINDABLE:



Is there a discipline specific repository available?

Check re3data



Use a general-purpose data repository

For example, Figshare



ACCESSIBLE

- Data doesn't necessarily need to be open
 - Restricted access
 - Can use metadata only record
- **Example** - UK Data Service:
 - open data: contains no personal or disclosive information
 - safeguarded data: contains no personal information, but there is a risk of disclosure from linking to other data
 - controlled data: for data that may be disclosive

INTEROPERABLE

- Appropriate file types include:
- Non-proprietary: open, documented standard
- Common usage by research community
- Unencrypted
- Uncompressed
- Long term preservation (longevity) vs. short term use (functionality)

UKDS list of recommended formats

INTEROPERABLE

Choosing metadata standards and controlled vocabularies

- Community recognised
- Interoperable

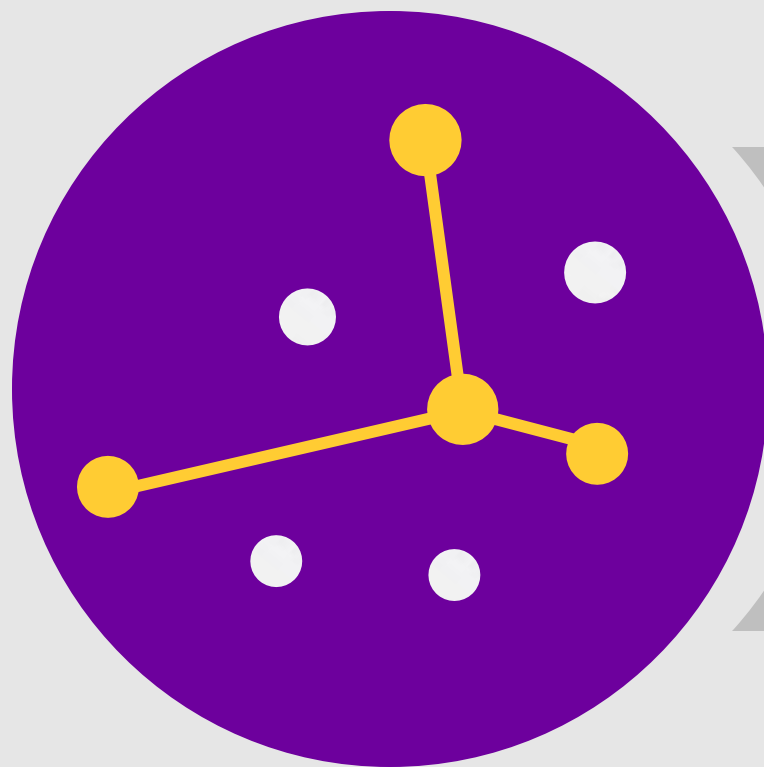
There is help available at the following links:

<http://rd-alliance.github.io/metadata-directory/>

<https://FAIRsharing.org/>

REUSABLE: Creative Commons Licenses

	COPY & PUBLISH	ATTRIBUTION REQUIRED	COMMERCIAL USE	MODIFY & ADAPT	CHANGE LICENSE
CC 0 					
CC BY 					
CC BY-NC 					
	You can redistribute (copy, publish, etc.)	You have to attribute the original work	You can use the work commercially	You can modify and adapt the original work	You can choose the license when you re-use the data



**University of Manchester
support for data management
and sharing**

How we help:

My Research Essentials

Online resources and workshops

Research Data Storage

IT Services provide online guidance on using RDS

Website and guidance

Planning support, funder policies, help with sharing

Data management plans

DMPonline and review service

Highly Restricted Data Service

Provision of secure platforms for restricted and highly restricted research data



Contact

researchdata@manchester.ac.uk

<https://www.openresearch.manchester.ac.uk/research-services/research-data-management/>

Thank you.

