



# Introduction to Research Data Management

Robin Björklund

**ADS Doctoral Day**

**19 March 2026**

# Research Data Management (RDM) Team

- Part of the **Research Affairs Office at RIVA – Research Innovation & Valorisation Antwerp**
- Offer advice on all things related research data management, including data management plans, storage, Nagoya, and Open Science (Open Data, FAIR data)
- Contact us via: [rdm-support@uantwerpen.be](mailto:rdm-support@uantwerpen.be)

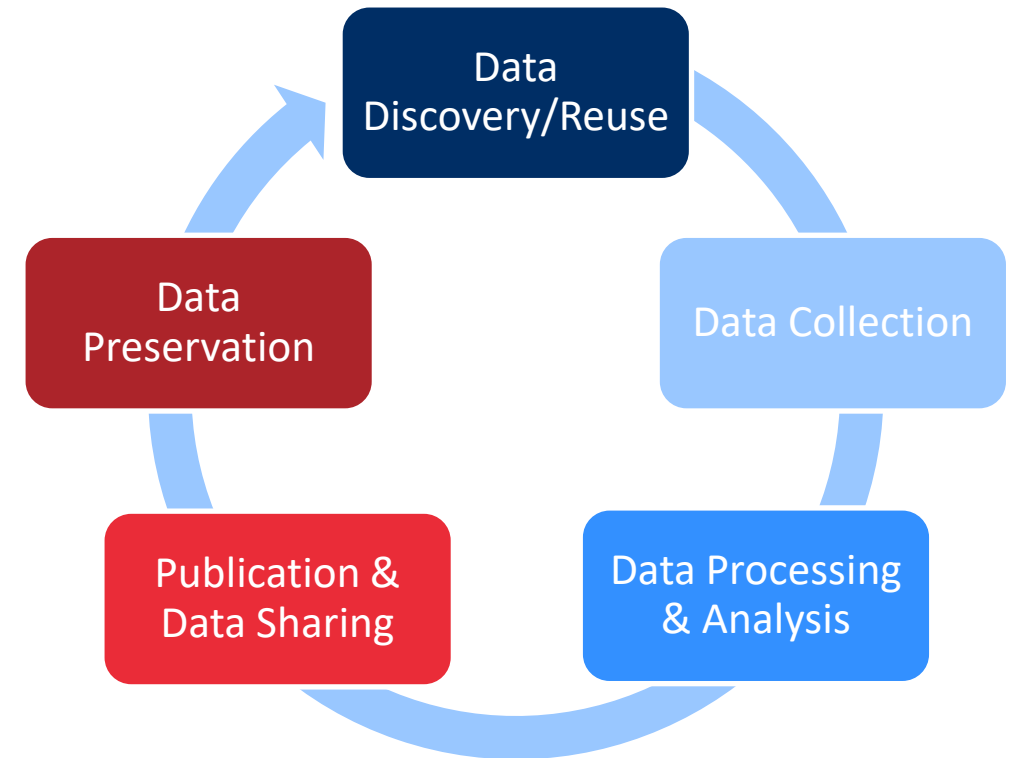


- **Siham Benramdane** (Life Sciences & Medicine)
- **Robin Björklund** (Natural Sciences & Engineering)
- **Linde Tuybens** (Social Sciences & Humanities)
- **Dunya Nasser** (RDM inbox)

# Research Data Management (RDM)

A set of actions and practices to take care of research data **during** the course of your research and **beyond**

- An integral part of doing research
- Includes all steps of the Research Data Lifecycle
- All steps are bound by conditions and regulations
  - Legal, ethical, financial & technical

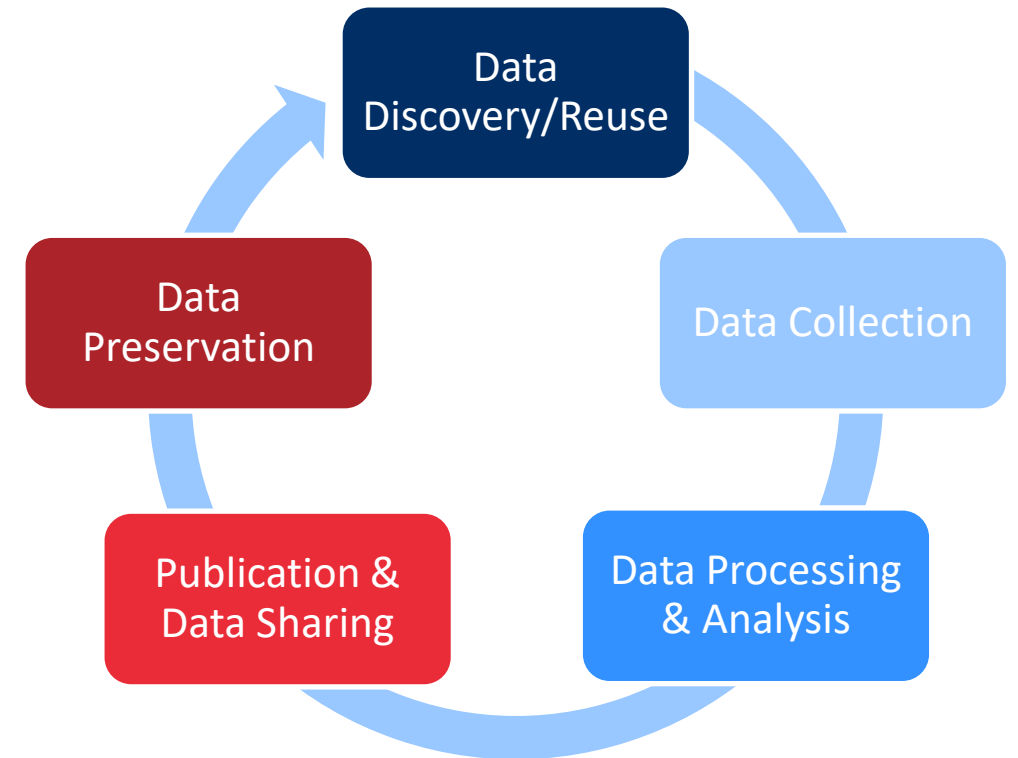


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**RDM = Risk management**



# Research Data Management – Why?

- **Avoid losing data**
- **Work more efficiently, save time and resources**
  - Find the data you need easily
  - Understand the content of your data in the future
- **Protect sensitive information**
- **Ensure data quality**
- **Share your data**
  - Ensure reproducibility
  - Facilitate collaboration
  - Give your data and research more impact
  - Support Open Science, improve your CV

## Research data



Secure



Sustainable



Findable, Understandable,  
Reusable

**Your data is valuable,  
it is also a research output!**

# Research Data

*“Research data are all **digital or physical data** - regardless of the manner in which these data are collected or stored - used or analyzed to **support research findings**, validate research results or underlie a scientific reasoning, discussion or calculation in the study.*

*Research data cover the entire spectrum of **raw data to processed and analyzed data** included or discussed in a publication. These data can be **generated data, derived or composite data**, as well as **self-generated data and data provided by third parties.**“*

RDM Policy of University Antwerp



**Your  
research  
data**

# No data?

### What are Data?

Research data are all **digital or physical objects**, regardless of how they are collected or stored, that are used or analysed to support research findings and validate research results, or are underlying a reasoning, discussion, or calculation in the research.

### What is Research Data Management?

Research Data Management (RDM) encompasses all **practices and actions** performed to ensure that research data are properly and securely collected, organised, described, preserved, and shared.

### Why should you care? What is in it for you?

By applying good RDM practices, you can:

- Avoid **data loss**
- Avoid **accusation** of fraud in research
- Increase the **reusability** of your data
- Increase the **reproducibility** of your research
- Improve **integrity and quality** of your data and research
- Comply with legislative/funder/publisher **requirements**

### Research Methods

### Examples: (Re)Used Data

### Examples: Generated Data

(Systematic)  
**Literature Review**

Published work of other scholars (articles, book chapters, conference papers, reports, grey literature, etc.), existing databases

Critical appraisal, syntheses of findings, bibliographic data, summary tables, thematic maps, narrative syntheses

**Web-based Review**

Websites, web articles, blog posts, social media, news (online), other digital content

Media content analyses, thematic analyses, coded datasets, social media analytics, data extraction sheets, quality assessment

**Literary Analysis**

Novels, theatre plays, poetry, translations, (auto)biographies, letters, diaries

Annotated texts/images, transcriptions, thematic/textual analyses, character analyses

**Audiovisual Media Review**

Films, audio/video clips, TV shows, advertisements, podcasts, (radio) broadcasts, production notes, promotional material

Annotations, notes, syntheses of findings, thematic/narrative/comparative analyses, visual/auditory analyses

**Visual Analysis & Art Review**

Music (scores), sculptures, paintings, stage performances, ceramics, comics, graffiti, memes, exhibition catalogues

Thematic/curated collections, annotated images, symbols/motifs extracted, databases, 3D models, critical analyses

**Interviews & Focus Groups**

Guidelines, interview protocols, participant profiles, visual aids

Moderator's notes, audio/video recordings, flipchart notes, (annotated) transcripts, thematic analyses, coding frameworks

**Archival Research**

Manuscripts, photographs, maps, audiovisual material, governmental/organisational records, personal papers

Catalogue entries, inventories, metadata, contextual/comparative analyses

(Participant/Natural)  
**Observation**

Live performances, sports events, rituals, religious ceremonies, storytelling, oral history

Critical reviews, performance analyses, noted impressions, reflective notes, photographs, coding frameworks

**Ethnography / (Ethno)Archeology**

Archival records, maps, geographic data, cultural/physical artifacts, material culture

Field notes, diaries, thematic analyses, coded transcripts, images, ethnographic reports

**Meta-analysis**

Primary research studies, study characteristics, reported results, quality assessment scores

Data extraction sheets, publication bias assessments, sensitivity analyses, critical appraisal

**Theoretical / Computational / Simulation Research**

Parameters, mathematical methods/techniques, existing theories/models, empirical data for validation/training/calibration

Mathematical equations, conceptual frameworks, analytical results, performance metrics, visualisations, sensitivity/error analyses, formulas, code, software

Note that the abovementioned examples of data are non-exhaustive.

### Top 4 Critical RDM Strategies to Consider

1. **Safekeeping** of digital / physical data
2. **File Naming & Folder Structure**
3. **Correct data storage** (check with your institution)
4. **Documentation and Metadata**

### Simple Tools to Support Your RDM

- **Data Management Plan (DMP)** for your overall strategy as to research data lifecycle
- **Word processors and spreadsheets** for data and process documentation
- **Electronic Lab Notebooks** to keep track of and document your research
- **Bibliographic/Reference Management Tools** to keep up with literature, documents, and other references

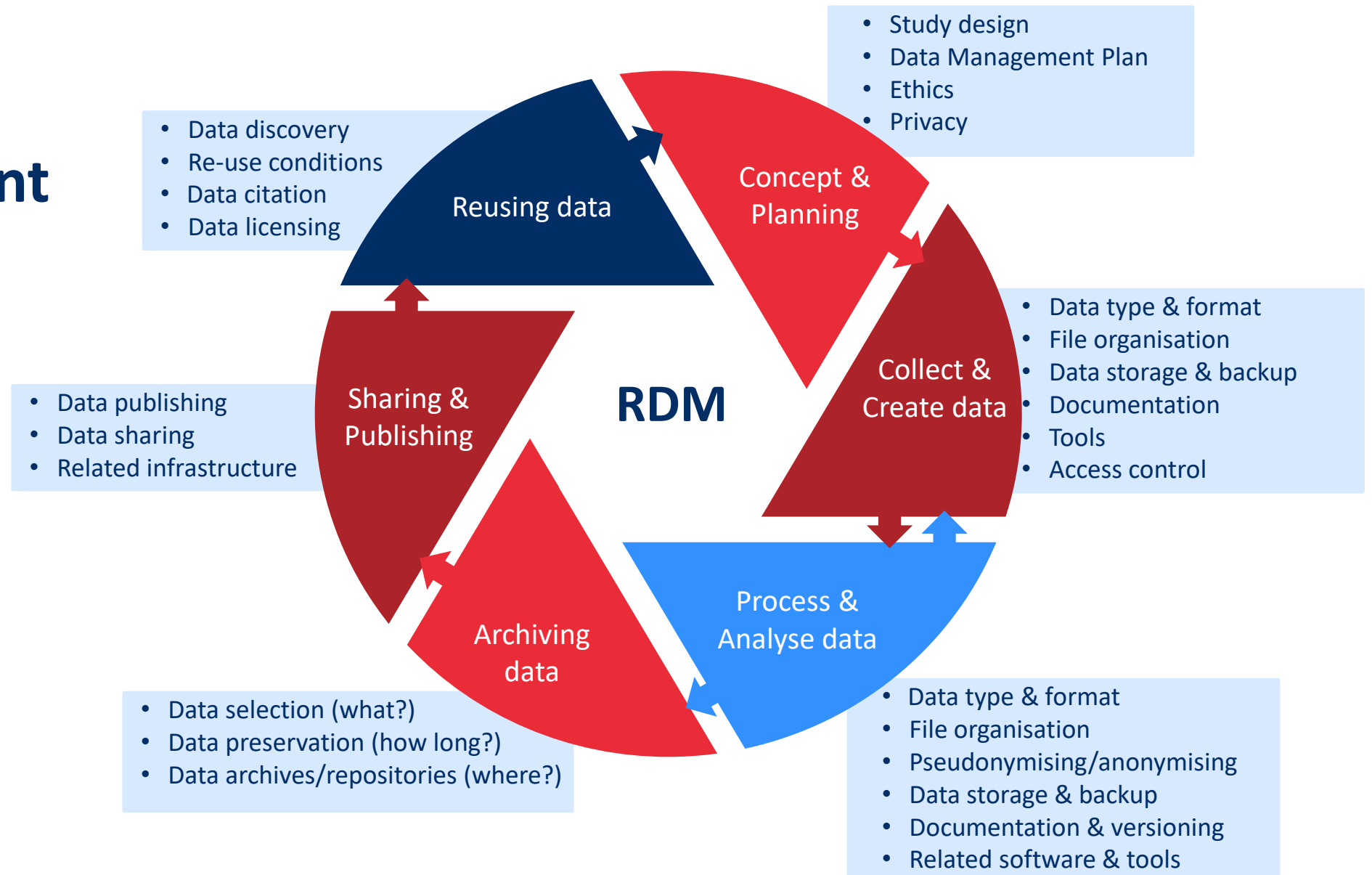
### Do you want to know more about RDM?

Check out VUB's RDM resources on Zenodo:

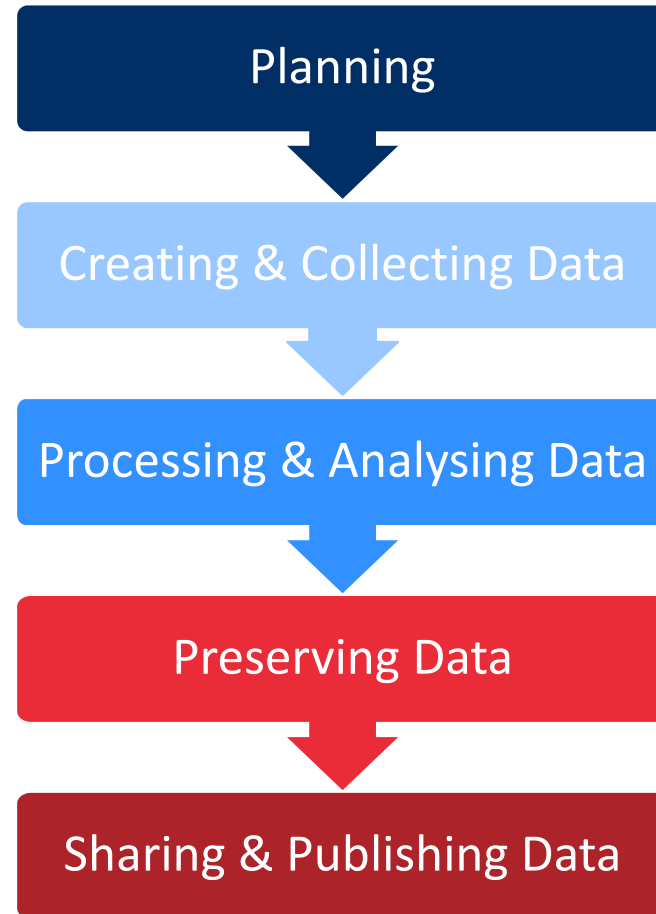


# Key concepts of RDM

# Research Data Management



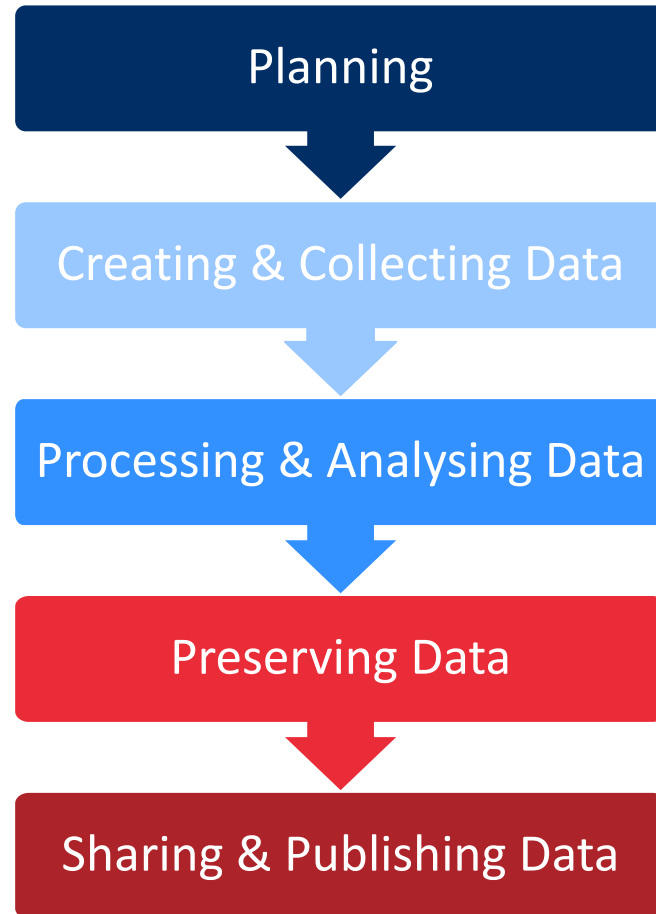
## RDM stage



## RDM practices

1. Preparing a DMP
2. Organising & Documenting Data
3. Storing Data & Data Security
4. Preserving & Sharing Data

## RDM stage



## RDM practices

**1. Preparing a DMP**

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# Data Management Plan

*Formal document describing how research data will be managed during the research lifecycle*



# Data Management Plan content

DATA SUMMARY



DOCUMENTATION  
& METADATA



DATA STORAGE &  
BACKUP



DATA  
PRESERVATION



DATA SHARING  
& REUSE



RESPONSIBILITIES  
& RESOURCES

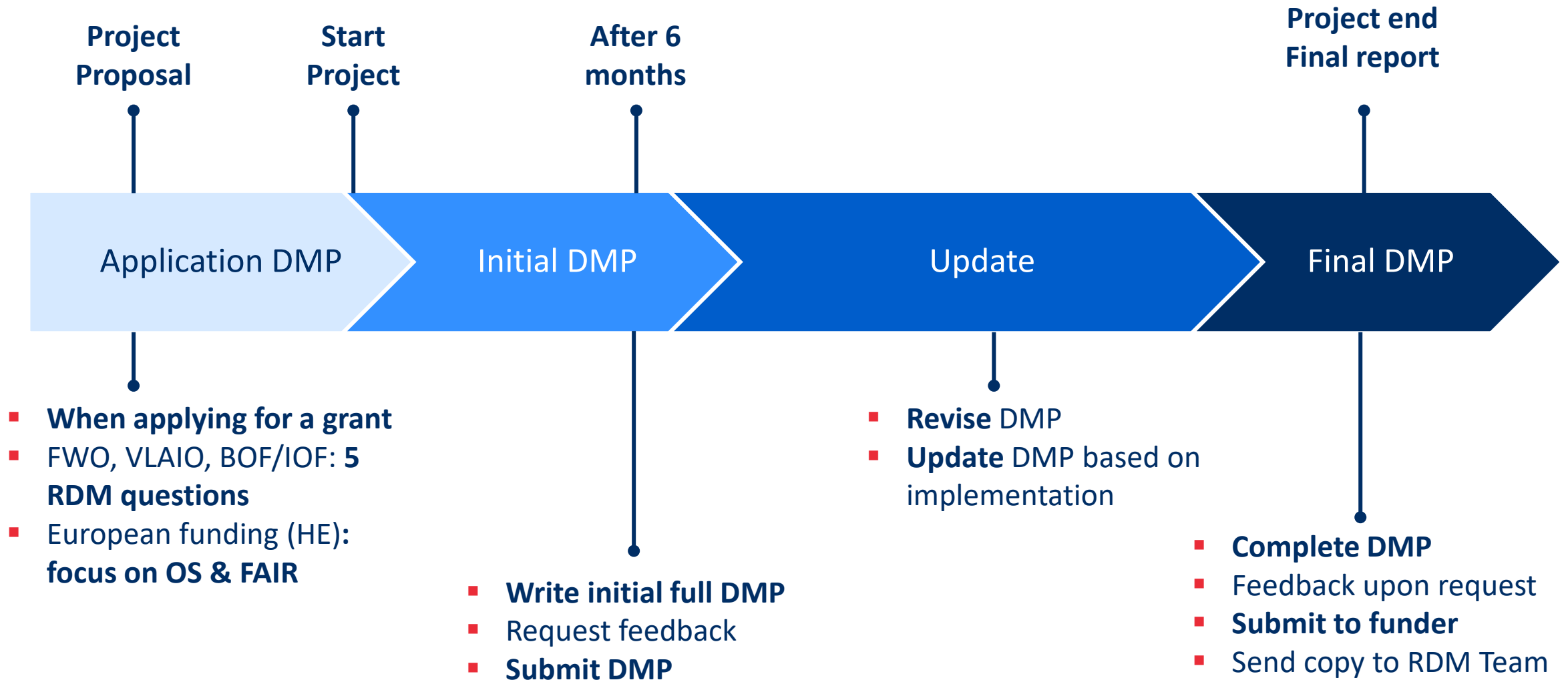


# Purpose of a Data Management Plan?

## The DMP is a text document that:

- Describes **which research data** you will use and/or generate during your research and how you **plan** to manage them.
- Helps you **track** your research data management practices throughout your project.
- Acts as **checklist** to ensure you have considered all important questions about data.
- Helps you plan how your research data will be **preserved and shared** once the project is finished.
- Provides an **opportunity to reflect** on your research data, possible obstacles in sharing said data, and ways to overcome them.



















# DMP Flow



## Funder Templates

Templates are provided by a funder.

Templates for data management plans are based on the specific requirements listed in funder policy documents. DMPonline.be maintains these templates, however, researchers should always consult the funder guidelines directly for authoritative information.

Template Name	Download	Organisation Name	Last Updated	Funder Links	Sample Plans (if available)
BELSPO DMP +	 	Belgian Federal Science Policy Office (BELSPO)	27-09-2021		
ERC DMP +	 	European Research Council (ERC)	27-09-2021		
DCC Template	 	Digital Curation Centre	27-09-2021		
Horizon 2020 FAIR DMP +	 	European Commission (Horizon)	27-09-2021		
BRAIN 2.0	 	Belgian Federal Science Policy Office (BELSPO)	13-05-2022	<a href="http://www.belspo.be">www.belspo.be</a>	
FNRS DMP	 	Fonds National de la Recherche Scientifique (FNRS)	19-05-2022		
VLAIO cSBO DMP (Flemish Standard DMP)	 	Vlaams Agentschap Innoveren & Ondernemen (VLAIO)	02-09-2022		
Horizon Europe DMP +	 	European Commission (Horizon)	12-10-2022		
FWO DMP (Flemish Standard DMP)	 	Fonds voor Wetenschappelijk Onderzoek - Research Foundation Flanders (FWO)	21-01-2025		

## Organisational Templates

Templates are provided by your organisation (UAntwerpen)

# DMPonline.be

- Web-based tool for data management planning
  - Originally developed by the DCC – modified by DMPbelgium consortium
  - Owned by Belnet
- DMP templates + guidance
- Does not check or validate your answers
- Tutorial: DMPonline [knowledge clip](#) by Ugent

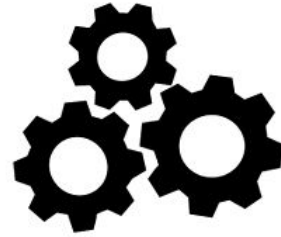
F  
Findable



A  
Accessible



I  
Interoperable



R  
Reusable



# FAIR Data



Findable



**How easily can humans (and machines) find my data?**



Accessible



**Once found, how easy is it to access my data?**



Interoperable



**How well does my data integrate with other data?**

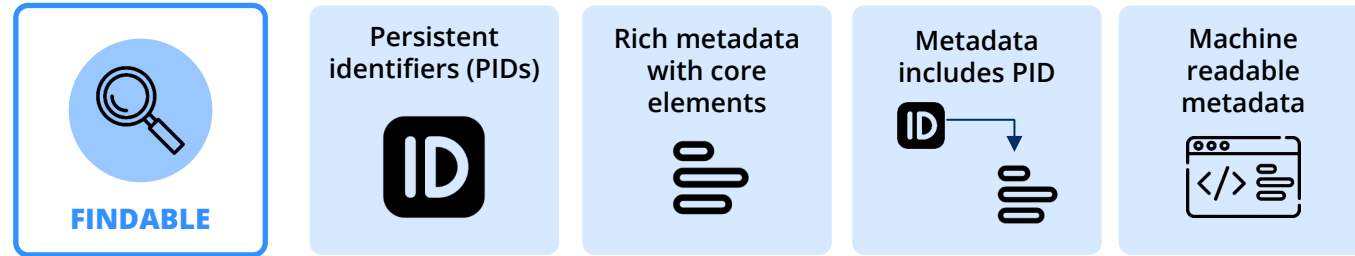


Reusable



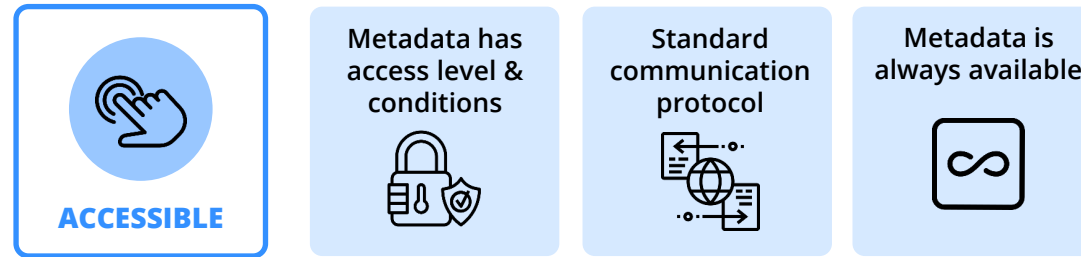
**How difficult is it to reuse my data?**

# F is for making data findable



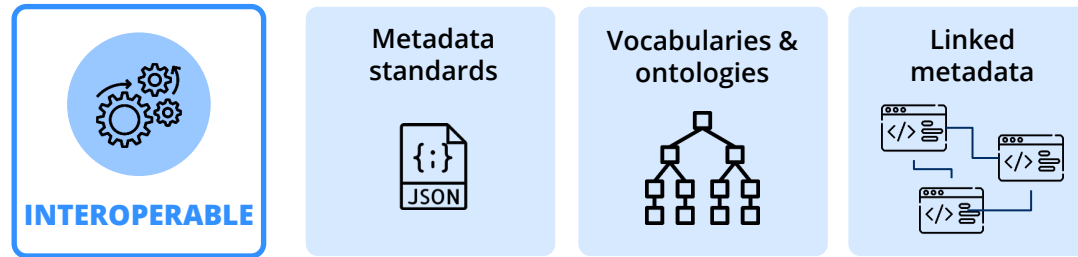
- **Look for existing data in repositories**
- **Upload to and share your data via a research data repository**
- **Describe your data with as much detail as possible (= metadata)**
  - For search and filtering
- **Apply persistent identifiers**
  - DOI, ORCID, ROR

# A is for making data accessible



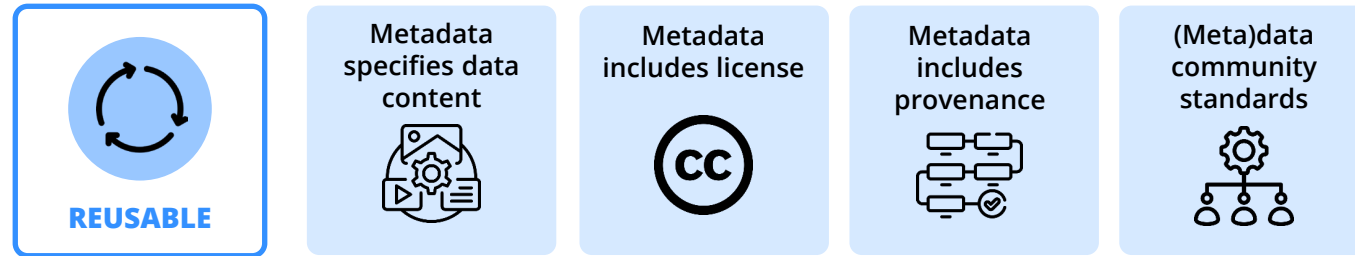
- **Consider what can and will be shared under which conditions**
  - Determine access control
  - Access conditions clear and understandable
- **Obtain participant consent and perform risk management**
- **Share your metadata**

# I is for making data interoperable



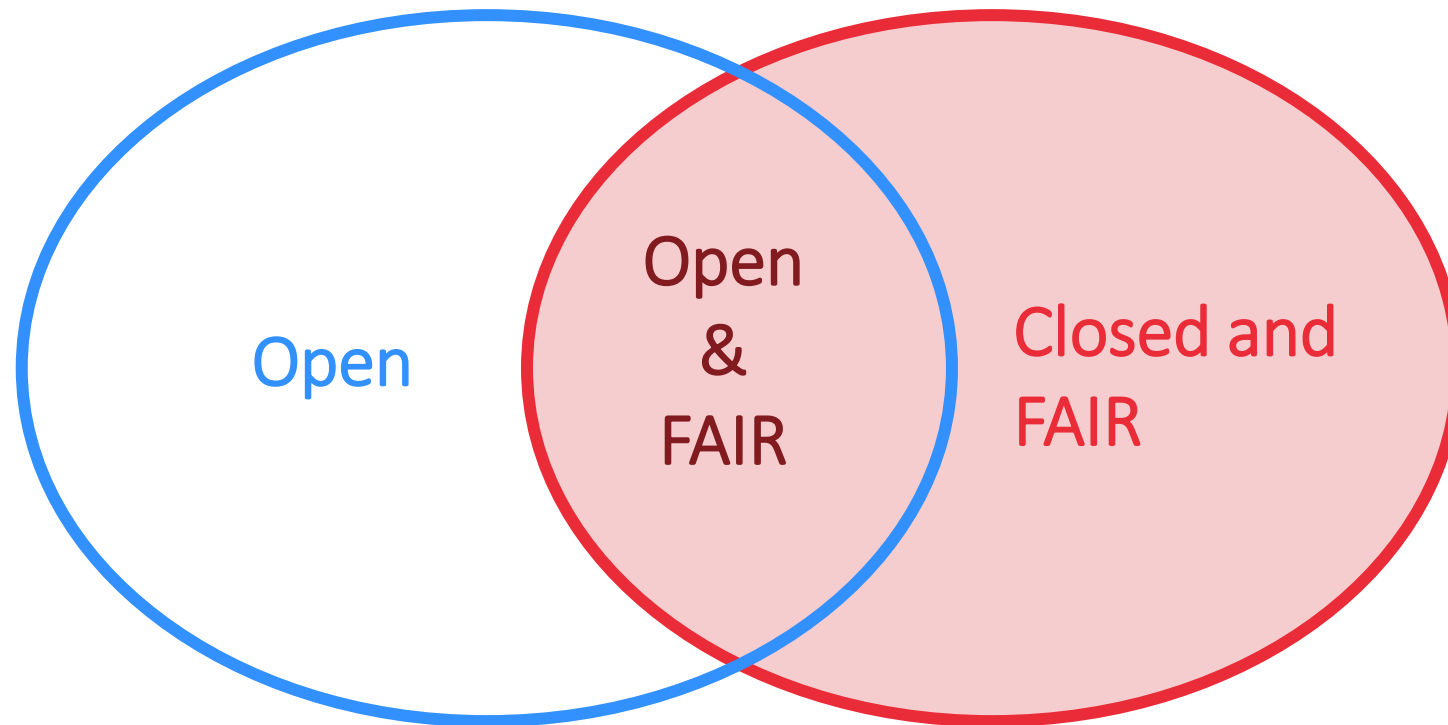
- **Use open, standardized and common formats**
- **Consistent vocabulary**
  - Preferably controlled vocabularies
- **Apply common metadata standards**
- **Linked (meta)data**

# R is for making data reusable



- Consider permitted use
- Apply appropriate license to specify how others can re-use your data/code
- Add sufficient documentation and provenance information
- When using data of others, give credit by data citation

# FAIR ≠ Open



**“As open as possible, as closed as necessary”**

# “As open as possible, as closed as necessary”

- FAIR data ≠ OPEN data
- There might be access controls or restrictions
- Available to whom and under what conditions?
  
- Reasons not to share data openly:



Personal data



Confidential data



Sensitive data



Third-party data



Copyright



Valorization

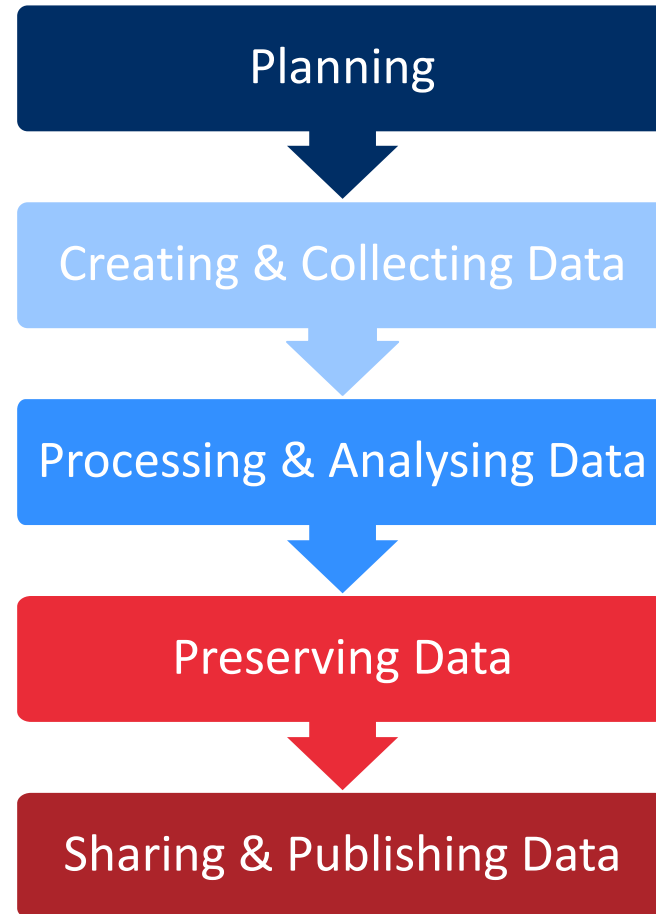


# University of Antwerp RDM Policy

- **Write a Data Management Plan (DMP)**
  - Mandatory for all (partially) publicly funded research, recommended for others
  - Promotor is responsible for making sure a DMP is present
  - Proper data management as shared responsibility of all parties involved
- **“As open as possible, as closed as necessary”**
- **FAIR principles**
- **Preserve all relevant research data for min. 10 years**
- **Register published research datasets in IRUA**
- **Maximum use of PIDs (ORCID, ROR,...)**



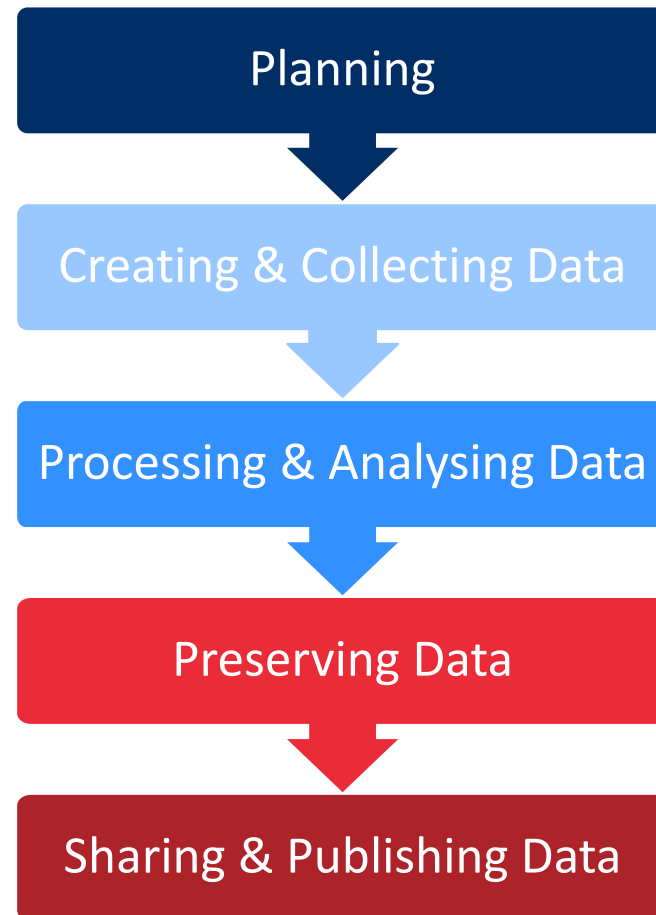
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# Data documentation

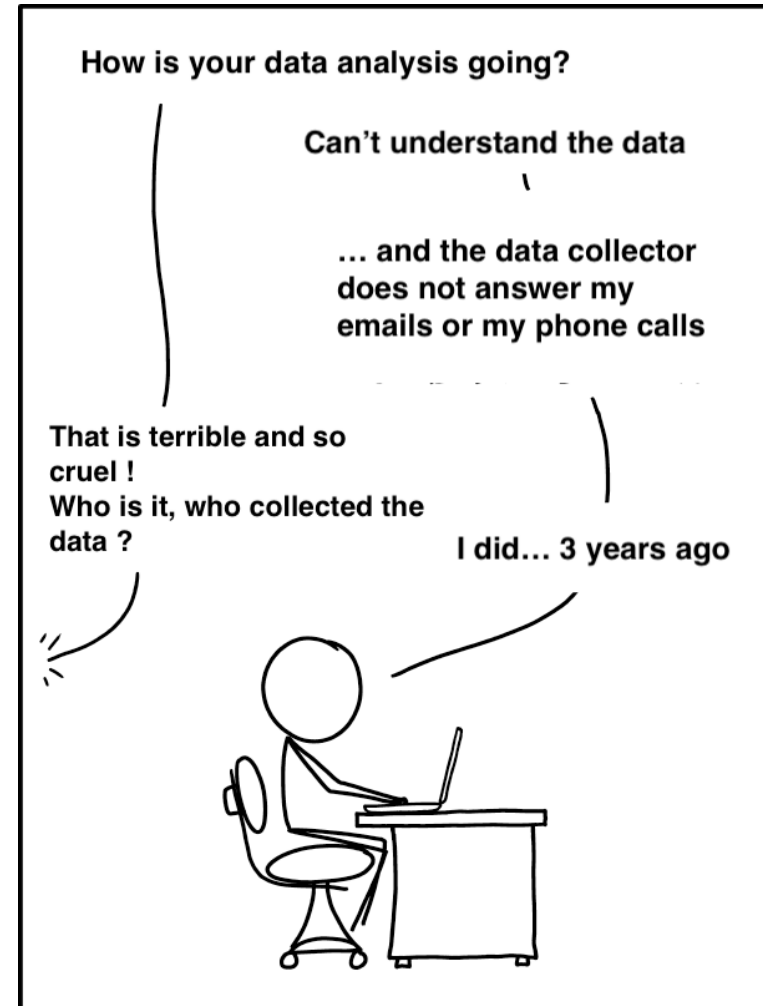
## Data documentation

**WHY?** Needed for correct interpretation by any user (including yourself)

**WHAT?** Data collection methodology, analytical and procedural information, data manipulations, measurement units, data characteristics, code definitions, terminology, data quality control measures, known problems,...



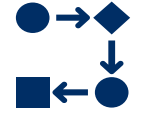
Structure/organisation of data files, file naming conventions, any comments, ...

**HOW?** Use README.txt file, codebook, ELN or any other form of documentation. Keep these documents alongside your datasets.



**Your first collaborators  
are your future selves,  
be nice to them !**

# Levels of data documentation

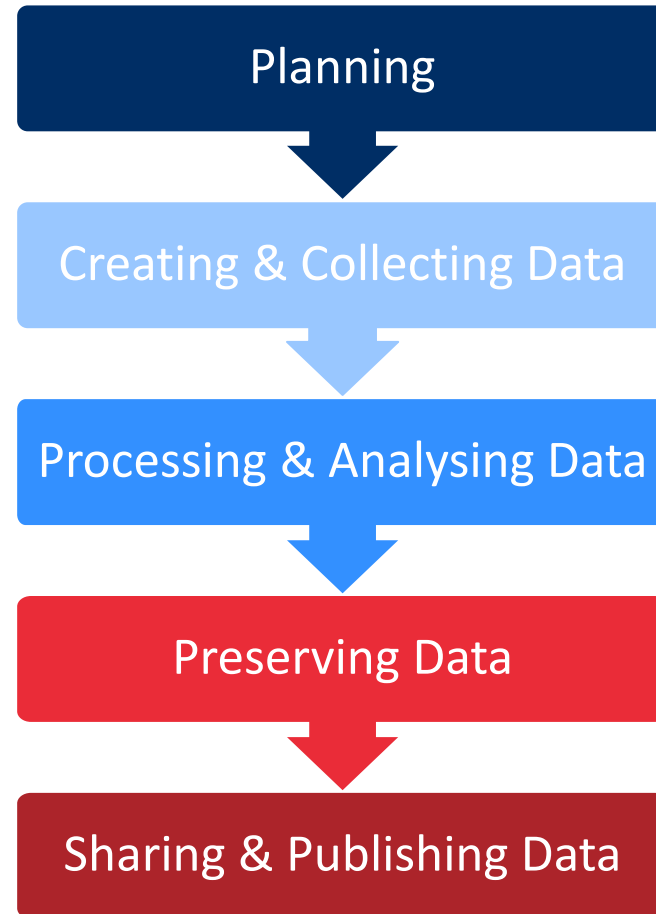
DOCUMENTATION LEVEL	WHAT TO DOCUMENT	WHERE TO DOCUMENT
 <b>Item Variable</b>	Methods, units, possible values, synonyms, abbreviations	Codebook, data dictionary
 <b>Sample Study object</b>	Study object, method, instrument settings, time, place	(Register) table, protocol, notebook
 <b>File or database</b>	File inventory and relations, database structure	Readme, database schema, data listings (qualitative data)
 <b>Project or study</b>	Subject, grant, contributors, methods, process, workflow	Notebook (e-, code), document, protocol, readme, data inventory table

# README

- A README file is highly recommended as an **entry point** to a published dataset
- Contains all documentation or references to other kinds of documentation
- Should be the first file created when collecting or creating data
- README = **naming convention**
- Often **.txt** file
  
- Template:  
<https://data.research.cornell.edu/content/readme>

The screenshot shows the Zenodo interface for a dataset. At the top, the Zenodo logo is on the left, and a search bar and navigation links for 'Communities' and 'My dashboard' are on the right. Below the header, the University of Antwerp logo and 'University of Antwerp Data Repository' are displayed. The dataset title is 'Capital markets in 16th-century 's-Hertogenbosch (Bois-le-duc)', published on August 3, 2022, version v1. The author is Hanus, Jord. The description states: 'This csv-file contains a simple transcription of the so-called Bosch' Protocol, the aldermen's registers of the city of 's-Hertogenbosch, for the period October 1508 to August 1512. I transcribed this source during my master's research. This source documents real estate and annuity transactions in the wide region of 's-Hertogenbosch (the Meierij).' The 'Files' section lists two files: 'readme.txt' (2.6 kB) and 'Transcription\_BoschProtocol\_15081512.csv' (642.6 kB). The 'readme.txt' file is highlighted with a red box. The 'readme.txt' file entry shows the filename, its size (2.6 kB), and options for 'Preview' and 'Download'. The 'Transcription\_BoschProtocol\_15081512.csv' file entry shows the filename, its size (642.6 kB), and options for 'Preview' and 'Download'.

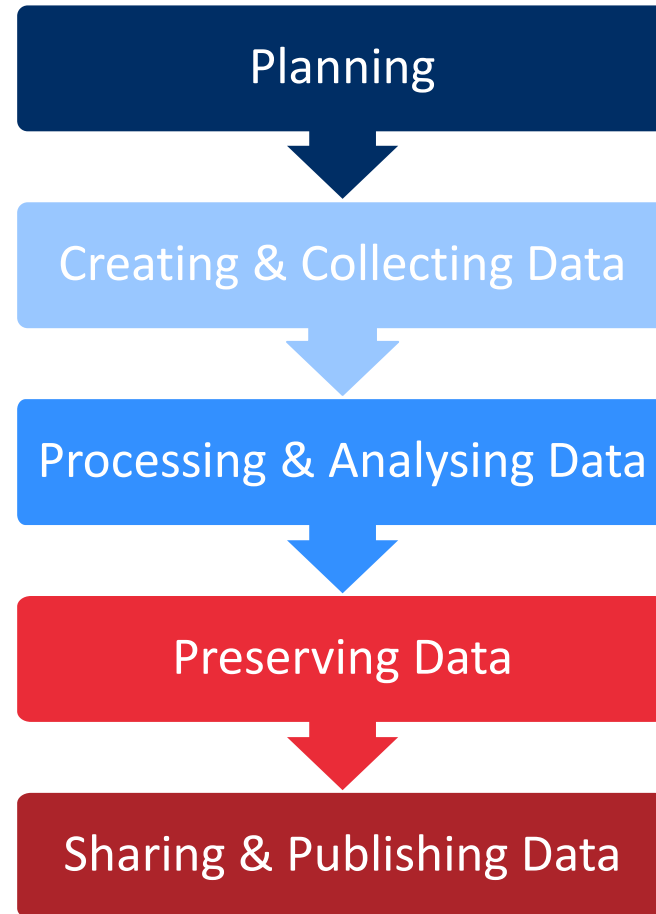
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# Data storage

- **Ensure safe storage of your research data**
  - Use central storage facilities with automated backup managed by UA ICT
    - Shared network drive (N drive)
    - Personal network drive (H drive)
    - Additional fileserver storage: €120 per TB/year
  - Use a cloud solution offered by UA (Microsoft 365)
    - SharePoint online-site (for sharing & collaboration)
    - Teams-site (for communication & collaboration)
    - OneDrive for Business (Personal cloud storage)
  - Coming soon: UAntwerpen Connect
  - Personal data and other sensitive data should be stored with special care and extra security

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- **Storing research data on personal laptops, computer hard drives or external storage devices alone can be risky!**
  - No support from UA ICT; make sure to make your own regular backups
  - Not fit for master copy of data

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# Security of data files

- **Access control**
  - Encryption (BitLocker, VeraCrypt, FileVault)
  - Password protection
  - Access restriction by assigning user rights  
'no access', 'read only', 'read and write' or 'administrator'
- **Procedural arrangements**
  - Non-disclosure agreements
- **Secure transfer of files**
  - Use [Belnet FileSender](#) for large files (up to 5 TB)
  - Avoid using Dropbox or WeTransfer
- **Authorisation and authentication**
  - Very selective access rights to sensitive information
  - Multifactor authentication
- **Destroying data in a consistent and reliable manner when (no longer) needed**

Utrecht University

Handling personal data - Research Data Management Support -

« **Protect your data with organisational measures**  
E.g., access control, agreements with external parties, data protection policies, researcher training

» **Protect your data with technical measures**  
E.g., anonymise, pseudonymise, encrypt your data, use safe storage

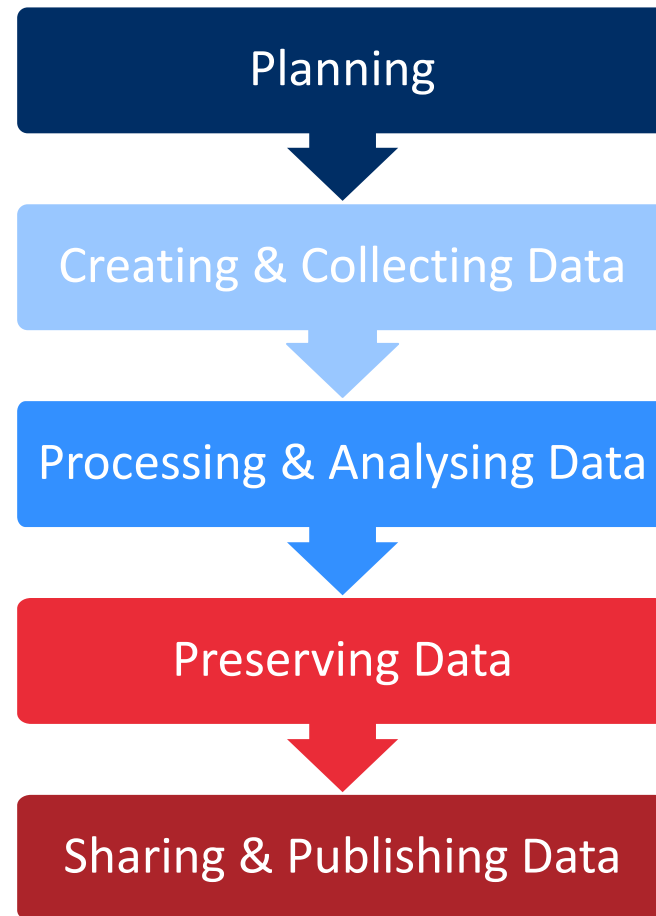
«



# Software & tools

- **Free & open-source alternatives?**
- **Adhering to community standards**
  
- **Know your tools!**
- **Consider privacy & security aspects of tools**
  - Not all will be appropriate to use
  - Evaluate use for individual study, remain sceptical
  - Run tool locally & control where data is stored and kept

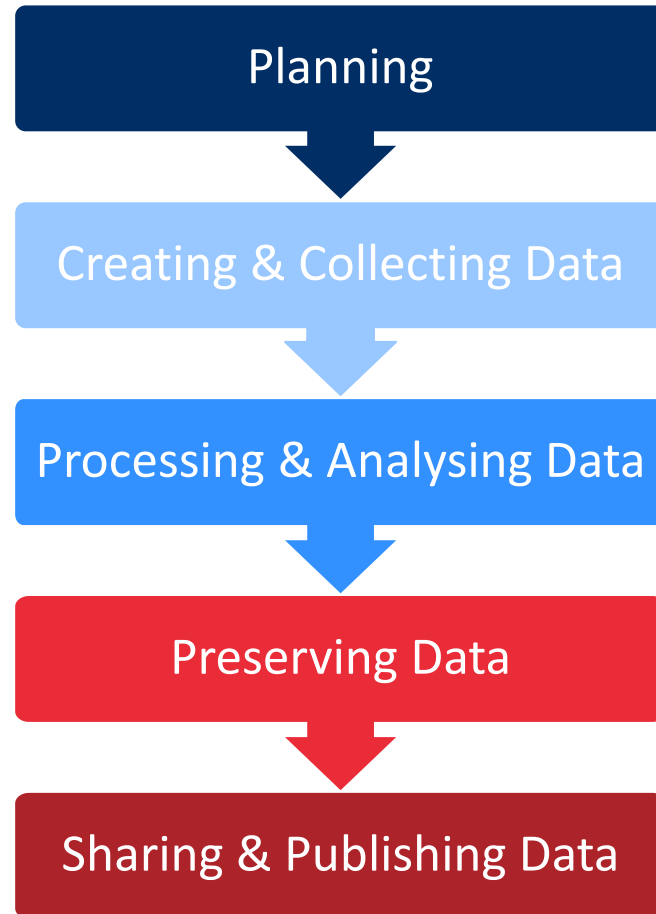
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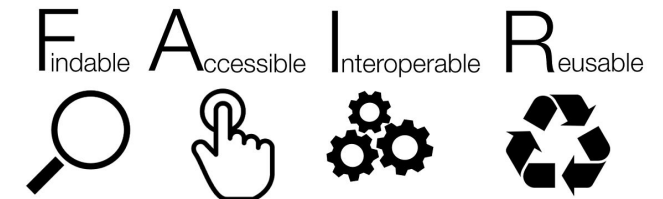
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# Data repositories

## Advantages

- No handling of data reuse queries and managing data access.
- Guarantees in terms of sustainable access to data.
- Make your data discoverable and citable.
- Make your data FAIR



## Wide variety of data repositories

- Most have the option to publish your dataset using a persistent identifier
- Some provide the service of long-term preservation
- Some host data from various disciplines and others are domain- or discipline specific

ACCESSIBLE

≠

OPEN

April 30, 2020 (v1)

Dataset

🔓 Open

### High-resolution future climate data for species distribution models in Europe

De Troch, Rozemien ; Termonia, Piet ; Van Schaeysbroeck, Bert 

Description This dataset contains a set of 13 climatological variables (Variable, VariableName) at a spatial resolution of 1x1km for Europe (nx = 13147, ny = 6071) for historical (ClimatePeriod) and future climate conditions. These variables are a subset of the so-called bioclimatic variables that are often part of global gridded datasets (e.g...

Uploaded on April 30, 2020

👁 683 📄 623

March 13, 2023 (v1)

Dataset

🔒 Embargoed

### Flemish Political Ambition Survey

Bram Wauters ; Robin Devroe ; Audrey Vandeleene 

Dataset based on a survey about political ambition among a random sample of the youth population ( aged 18-35) in Flanders (Belgium), N = 1,000

Uploaded on March 13, 2023

👁 32 📄 0

November 12, 2018 (v3)

Dataset

🔒 Restricted

### Data for development, evaluation and application of NicheNet

Browaeys, Robin ; Saelens, Wouter ; Saeys, Yvan 

Here you can find the datasets used for development, validation and application of NicheNet, a method that links ligands to target genes to model intercellular communication. The software to use NicheNet (i.e. R package nichenet) is available at: <https://github.com/browaeysrobin/nichenet>  
Short description of individual files: \* data for d...

Uploaded on November 12, 2018

2 more versions exist for this record

👁 425 📄 6

# Access levels

## Open Access (with open license!)

- Available for everyone and for every use
- Released under open, standard licenses (CC0, CC-BY)

## Restricted access

- Available to others, but not openly available
- Limits on who can access and for what purpose
  - Non-disclosure agreements
  - Personal data, but available for research purposes
  - ...
- Explain access conditions and the requirements that must be met clearly

## Closed access

- No access possible, not shared under any circumstances
  - Under embargo
  - Unable to share



# Preferred method for depositing data

- Publish in a domain specific or a generic **repository or database**
- Make sure the dataset has its own **permanent identifier** (doi, handle, ...)
- Use repositories that link with **ORCID**
- Create at least a metadata record with study level metadata and add domain specific metadata if applicable
- Use standard formats and vocabularies
- Include **documentation** (README.txt)
- Include a **license** (CC-0 or CC-BY, Open Source)
- Include a **data availability statement** in your publications
- Register the dataset in **IRUA**

# IRUA: Registration of metadata

- **Uantwerpen Institutional Repository (IRUA)**
- Mandatory registration of published datasets
- **Only metadata** of your published research outputs
- NOT the datasets themselves
  
- <https://repository.uantwerpen.be/desktop/irua>
  
- Guidance: [PINTRA Library](#)



Institutional Repository My bibliography Authors A-Z Faculties A-Z Research Groups A-Z Projects

Search Advanced Search Search History Save List

The UAntwerpen Institutional Repository (IRUA) is a search and Open Access publishing platform supporting the Academic Bibliography of the University of Antwerp. The Academic Bibliography provides an overview of scientific publications by researchers at the University of Antwerp.

[Read more](#)

Introduction to the Institutional Repository

Introduction to Open Science

**Important?** An introduction to the institution...  
• Used in promotions, evaluations and project applications  
• Only output in IR is listed in e-curriculum  
• Updated weekly  
• Data is supplied to external databases/organizations  
• FRS  
• VABB  
• Support Open Access policy  
• 2014: Open Access obligation  
• 2019: ORCID obligation

An introduction to Open Science  
"...the practice of science that others can contribute, where lab notes and other processes are freely available under terms that enable redistribution and its use in the research and its un..."

# Wrap up

# RDM Good Practice Checklist



Know what data you have.



Keep relevant documentation and metadata.



Have proper storage, backup, security.



Observe privacy and ethics principles.



Know your policies and legal obligations.



Plan for access and sharing.



Properly archive or preserve data

# How to get started?

- **Know your data!**
- Discuss RDM practices with your promotor and **plan ahead!**
- Start documenting all your research steps
- Set up your **ORCID** if you do not have one (<https://orcid.org/>)
  - Add to it to your account on our institutional repository ([instructions](#))
- Make use of our **DMP authoring tool** (<https://dmponline.be>)
- Reach out if you have RDM related questions ([rdm-support@uantwerpen.be](mailto:rdm-support@uantwerpen.be))
  - Check out our [support pages on RDM](#)
  - Check out our [ADS course on DMP](#)

# Useful links for UAntwerpen guidance

- [Research Data Management | University of Antwerp](#)
- [RDM | Pintra](#)
- [ORCID | Library | University of Antwerp](#)
- [IRUA UAntwerpen Institutional Repository](#)
- [Personal data | DPO Pintra](#)
- [Storage | ICT Pintra](#)



# Useful resources

- <https://fairsharing.org/>
- <https://datacite.org/>
- <https://www.dcc.ac.uk/guidance/standards>
- [https://rdmkit.elixir-europe.org/metadata\\_management](https://rdmkit.elixir-europe.org/metadata_management)
- <https://rd-alliance.github.io/metadata-directory/>
- [Registry of Research Data Repositories \(Re3data\)](#)





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