| FAIR Data Stewardship | Open Science | |
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| | VERSION | 1.0 |

FAIR Data Stewardship comprises the planning of data management before the start of your project, the management of data during your research project, and data preservation when your project is finished, all in line with the FAIR principles. The FAIR principles state that you should make your data Findable, Accessible, Interoperable, and Reusable (FAIR), both for humans (other researchers) and machines (e.g. analysis scripts or algorithms, machine readable metadata, and the XML file of your self-built study database).

**What are the FAIR principles?**
The FAIR principles were published in 2016 and give guidance on how to handle your data and metadata (data describing your data), and how a research data infrastructure should be set up. They describe what you should do with your (meta)data, but do not describe how you should do it. The fifteen principles are divided into four parts, Findable, Accessible, Interoperable, and Reusable:

| | Your (meta)data should be... |
|---|---|
| **Findable** | … easy to find for both humans and computers |
| **Accessible** | … stored for a long term with a license and access conditions |
| **Interoperable** | … ready to be combined with other datasets by humans or computers |
| **Reusable** | … ready to be used for future research and to be further processed using computational methods |

**Why should you make your data FAIR?**

**For the scientific community**
It is estimated that 80% of the data collected in scientific research used to be "re-useless" (i.e., could not be reused for another purpose than the purpose it was collected for). This was due to the fact that metadata describing datasets in research were mostly missing, making the data unclear, and thus not reusable, for other researchers. Moreover, most data was not 'machine-readable' (i.e., could not automatically be processed by a computer), making it difficult to find, analyze and combine large datasets. Luckily, due to efforts by governments, funders and research institutions, making data FAIR is becoming the new standard. Making your data FAIR ensures that your data can be reused in a more efficient manner and will improve the reproducibility of your research, since you are describing your dataset in detail using metadata.

**For you as an individual researcher**
Making your data FAIR can help you enhance the impact of your research. Others can more easily find information about your research project, which can lead to new collaboration opportunities. In addition, describing your dataset with metadata on the variable level (e.g., column 'sys_bp' represents Systolic Blood Pressure, measured in mmHg at the outpatient clinic, and is coded with LOINC code 8480-6) allows you to understand your dataset better. It will help you to understand your data, even after not touching your data for a few years.
Also see the Why of Data Sharing

**How do you make your data FAIR?**

The Data stewardship handbook (HANDS) provides information on how to make your health research data more FAIR. Every research institute may provide their own additional practical guidelines to ensure the FAIR principles can be applied in a way that is suitable for your type of research and level of sensitivity of the data. The RDM Servicedesks of UvA, VU, and both locations of Amsterdam UMC can advise you on the most current institutional policies and guidelines and practical implications thereof for your research project.

**Start with a Data Management Plan**
A Data Management Plan (DMP) is a document in which you specify what data you will collect and use in your project, how you process and manage the data during your project, and how you will store and archive the data after your project is finished. A DMP is a living document, which means that you can always adapt your DMP or add new information to it. Besides keeping you accountable to the funder, a DMP also helps you to plan for the FAIRification of your data. Most DMPs, are structured around the Findability, Accessibility, Interoperability, and Reusability of the data collected in your project, or ensure relevant FAIR considerations are adequately described. Most funders require you to create and maintain a DMP (often your own institutional template can be used, e.g. for ZonMW) and submit a first version at the beginning, an updated version during your periodic reports and a final version of your DMP when the project is finished. For Amsterdam UMC researchers, a DMP is an obligatory document, and the Amsterdam UMC DMP template includes relevant additional requirements for medical research.
At every institution, frequent and/or online courses are available on Writing a Data Management Plan (tailored workshops per faculty) and Research Data Management (including FAIR principles) in general.

**Describe and document your data**
By describing and documenting your data, you make your data more Findable and Interoperable. Make sure that you create a data dictionary (i.e., a description of your dataset: what the variables in your dataset mean, what the units of the variables are, what the origin of the data is) when you are setting up your data collection. A part of setting up a data dictionary is defining (standardized) variable names. You may also collect multiple types of raw and processed data formats and you can describe such information in specific metadataformats, which also include information on copyrights and data access requirements. These standards often use specific computer language, which makes this information searchable for both humans and computers. You can find more information about metadata in the chapter Data Sharing.

Add your data to a data repository
By publishing your data in a data repository, you make your data more Findable and Accessible. You can find more information about data repositories in the chapter Data Sharing.

**A little bit of FAIR might be FAIR enough**
Making your data only a little FAIR, by for example publishing a description of your research project and its data with your contact information online in a registry and publishing your results in an Open Access Journal (Findable), or by making (a part and/or description of) your data available via a data repository (Findable, and Accessible), can be quite FAIR even when some of your collected data is too sensitive to be shared. Consult the Research Data Management colleagues for guidance that is tailored to your research project.

Research Data Management Helpdesk – AMC:
https://intranet.amc.nl/web/organisatie/domeinen/research/research-life-cycle/rdm-helpdeks.htm
Research Data Management Contact – VUmc: https://intranet.vumc.nl/afdelingen-themas-1/datamanagement/contact.htm
Research Data Management VU: https://www.vu.nl/en/about-vu-amsterdam/mission-and-profile/research-data-management/index.aspx

## LINKS

| | Link |
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| The FAIR Guiding Principles for scientific data management and stewardship | https://www.nature.com/articles/sdata201618 |
| Cloudy, increasingly FAIR; revisiting the FAIR Data guiding principles for the European Open Science Cloud | https://content.iospress.com/articles/information-services-and-use/isu824 |
| VU UB | https://www.ub.vu.nl/en/university-library-for-researchers/research-data-support/fair-data/index.aspx |
| Data stewardship handbook (HANDS) | https://www.health-ri.nl/data-stewardship-handbook-hands |

## DOCUMENT HISTORY

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## 1 DOCUMENT APPROVAL

| Role | Name | Date |
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| Project Leader | Dr. Seta Jahfari | 27MAY2021 |