Making UMCG research data FAIR

What is FAIR data and *why* is it paramount in research?

The FAIR Principles are *the standard* for good research data management (RDM) and a pillar for practicing Open Science.

FAIR stands for Findable, Accessible, Interoperable and Reusable.

Findable: easy discovery by both fellow researchers and computers
Accessible: availability under well-defined conditions
Interoperable: easy integration and sharing across systems and platforms
Reusable: optimize the interpretation and reuse of research data

FAIR data does not equal open data. The FAIR principles should help make the data '*as open as possible and as closed as necessary*', as there can be reasons to restrict access to your data.

Why FAIR? There is a considerable amount of effort, time and money invested in collecting and processing data. The better the quality and combinability of the data create and made available to researchers for re-use, the larger the pool of data from which (new) research questions can be answered. In turn this leads to an increase in scientific knowledge (big data) and greater possibilities for improving healthcare. Fulfilling the FAIR criteria is essential for the above process, and will help improve the quality, impact and outreach of the data.

The UMCG expects its researchers to adhere to and adopt the FAIR principles and increase the FAIRness of the research data produced as a result. This is emphasized in the UMCG Research Code.

How to make data FAIR

1. **Departmental steps towards FAIRer data:**
   - Ensure each new research project has a filled in, reviewed and updated data management plan (DMP).[1]
   - Include appropriate and updated RDM training in the introduction program (onboarding) of new research staff, and make sure new research staff follows the RDM Awareness e-learning.
   - Ensure that informed consent letters include information about the opportunity of data re-use and the request to re-use data from potential participants (unless exceptions apply).
   - Fill in the UMCG FAIR checklist (department tab): The checklist has been specifically developed to help departments check their FAIR status and monitor their FAIR progress.
     - Contact the UMCG Digital Competence Center (UMCG DCC) for department-specific tailored solutions to become FAIRer.
   - Appoint a departmental (embedded) data steward. Alternatively, data stewardship tasks can be given to a dedicated staff member with data management experience.[2]
     - Contact the UMCG DCC for training the department's (embedded) data steward.

[1] Making a DMP is necessary for *all types of research within the UMCG* (research with human subjects, fundamental/preclinical). Source: UMCG Research Code.

[2] An (embedded data) steward can facilitate support within the department regarding UMCG policy and offer 'first-line help in data management'. The appointment involves an initial training and 4 hours per month afterwards.

2. **Project steps towards FAIRer data**

- Plan ahead how to make the project's research data FAIR in a DMP, and adhere to it. Make sure the DMP is reviewed, stays up-to-date and aligned with the developments of your research and regulations (i.e. when changes occur during the research).
    - The RDM Awareness e-learning can help in the drafting of DMPs.
    - Contact the UMCG DCC for support and review of DMPs.

Findable

- Deposit data in a (trusted) data repository/data archive (for the minimal retention period), and the metadata in a data catalogue.
- Place the persistent link to your (meta)data in your publications.

Accessible

- Determine if there are reasons to restrict access to your data (during and after the research).
- Clearly define the protocol to access data, a contact person, and re-use terms and conditions.

Interoperable

- Make your data easily understandable for uninvolved researchers:
    - Choose widely accepted metadata, preferably discipline-specific.[3]
    - Provide clear, consistent and unequivocal documentation.
- Choose open formats or formats commonly used within the discipline of research.
- Share the code and/or software needed to view/analyse/understand the data.

Reusable

- Keep information about the possibility of making participants' data available for re-use in the informed consent letter, and ensure this is requested the subject consent form.
- Archive all files necessary to reproduce and verify the research in a data archive/(trusted) repository; check the Data Management SOPs for more detailed procedures.

UMCG Resources and support available for researchers to make data FAIR

- FAIR checklist UMCG (projects tab): Use this FAIR project checklist to keep track of the FAIR status of a project. The FAIR-Aware tool may also be useful for checking FAIRness.
- e-learnings, webinars, workshops, policies and SOP's are available to support researchers and departments as much as possible. More information can be found on the UMCG DCC SharePoint page and the Service Portal.
    - e-learnings:
        - e-learning Research Data Management Awareness
        - e-learning Privacy in Research GDPR/AVG
    - Workshops and Webinars:
        - Workshop: Draft DMP review
        - Webinar: FAIR Data and Metadata
    - Data Management SOPs:
        - 40H1.03 SOP Processing Data UMCG
        - 40H1.06 SOP Data Transport
        - 40H1.07 SOP Preserve Data
        - 4A.65024 SOP Choosing and using a Code list
        - 4H.27546 Data Management Infrastructure and Data Storage system
        - 4H.48944 SOP Metadata for datasets and variables in Research

[3] Source: Without appropriate metadata, data-sharing mandates are pointless; 2022. www.nature.com/articles/d41586-022-02820-7

        - 4H.54127 SOP UMCG Guidelines for Processing Personal Data in Research
        - 4H.61015 SOP Data De-identification Guidelines
        - 4H.65074 SOP Choosing and using UMCG storage and archive services
        - 80H1.01 TPL Data Management Plan
- Research data management activities timeline: Use the UMCG-developed data management checklist to check the actions to be completed per project phase.
- Upload the metadata of the research project to the UMCG Research Data Catalogue (currently only available for cohorts and biobanks, soon also for other datasets).
- Contact the UMCG DCC for support: researchsupport@umcg.nl