Write a Data Management Plan

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UK Data Service

UK Data Archive 2016

UK Data Service

Overview

- Data policies and funder requirements
- Tools and templates
- Topics
- Exercise

Why data management planning

A data management and sharing plan helps researchers consider: when research is being designed and planned, how data will be managed during the research process and shared afterwards with the wider research community

Research benefits

- think what to do with research data, how collect, how look after
- keep track of research data (e.g. staff leaving)
- identify support, resources, services needed
- plan storage, short & long-term
- plan security, ethical aspects
- be prepared for data requests (FoI, funder)

Why data management planning

- Many research funders require planning for data management and data sharing in research applications
- Expect to cost sustainable data management and sharing into research

- Overview of requirements:
  - Digital Curation Centre, Funders' data plan requirements
  - Knight, G. (2012) Funder Requirements for Data Management and Sharing. London School of Hygiene and Tropical Medicine, London.

Research funder data policies (RCUK)

- *Publicly funded research data are a public good, produced in the public interest, that should be made openly available with as few restrictions as possible in a timely and responsible manner that does not harm intellectual property.*
- in accordance with relevant standards and community best practice
- metadata to make research data discoverable
- legal, ethical, commercial constraints on release of research data
- recognition for collecting & analysing data; limited privileged use
- acknowledge sources of data, intellectual contributions, terms & conditions
- use public funds to support the management and sharing of publicly-funded research data

Research Councils UK Common Principles on Data Policy (2011)

Guidance on best practice in the management of research data (2015)

Concordat on Open Research Data (draft, 2015)

Research funder data policies (RCUK)

Research Councils:

- Data sharing policy mandating or encouraging data sharing
- Data management / sharing planning required
- Award holders responsible for managing & sharing data, except EPSRC
- Fund data sharing support services and infrastructure

  e.g. UK Data Service (ESRC)

  NERC data centres (NERC)

  MRC Data Support Service (MRC)

  Atlas Petabyte Storage (STFC)

  Archaeology Data Service (AHRC)

Overview of UK research funders with data sharing policies and their requirements for data management and sharing plans›

Funder	Plan required?	Required at application	Data topics in DMP
Arts and Humanities Research Council (AHRC)	Yes	Technical plan	Standards, preservation, continued access and use
Biotechnology and Biological Sciences Research Council (BBSRC)	Yes	Data management and sharing plan	Type, format, standards, sharing methods, restrictions, sharing timeframe
Cancer Research UK (CRUK)	Yes	Data sharing plan	Volume, format, standards, metadata, documentation, sharing method, timescale, preservation, restrictions
Department for International Development (DFID)	Yes	Access and data management plan	Repositories, limits, timescale, responsibilities, resources, access strategy
Engineering and Physical Sciences Research Council (EPSRC)	No	Policy framework at institutional level (from 2015)	
Economic and Social Research Council (ESRC)	Yes	Data management plan	Volume, type, quality, archiving plans, difficulties sharing, consent sharing, IPR, responsibilities
Medical Research Council (MRC)	Yes	Data management plan	Collection methods, documentation, standards, preservation, curation, security, confidentiality, sharing and access, timescale, responsibilities
Natural Environment Research Council (NERC)	Yes	Outline data management plan	Data management procedures, created data
Science and Technology Facilities Council (STFC)	Yes	Data management plan	Type, preservation, metadata, value, sharing, timescale, resources needed
Wellcome Trust	Yes	Data management and sharing plan	What data, when share, where share, how access, limits, how preserve, what resources

Research funder data policies (EU)

European open access policies: Horizon 2020, European Research Council (ERC)

- communication & recommendation on access to / preservation of scientific information (July 2012) (publications & research data)
- pilot on open access to research data, primarily data underlying (open access) scientific publications for H2020
- FAQ open access to publications & data in Horizon 2020
- data management guidelines for Horizon 2020 (~ policies)
- DMP is WP deliverable after 6 months of project start

Service

Overview of USA funder requirements for data management and sharing plans

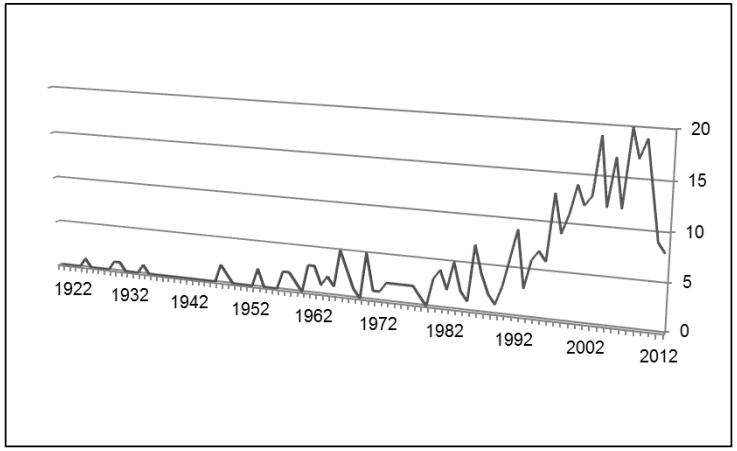
Funder	Data topics in DMP
National Science Foundation (NSF), includes Social, Behavioral and Economic Sciences Directorate; other directorates have different requirements	Expected data, retention, how share data, how manage data, legal/ethical restrictions on access, metadata, data storage & preservation, data format & dissemination, roles & responsibilities
National Institutes of Health (NIH); data sharing plan required if funding is over $500,000	Data sharing
Gordon and Betty Moore Foundation (GBMF)	Data description, data management, data sharing
Institute of Museum and Library Services (IMLS)	Data description, data restrictions, documentation, IPR, metadata, storage, access, archiving and sharing
National Endowment for the Humanities (NEH)	Expected data, roles & responsibilities, data retention, data formats & dissemination, storage & preservation
National Oceanic and Atmospheric Administration (NOAA)	Data description, stewardship, documentation, data sharing, contact, storage, protection, archiving & preservation
Bill and Melinda Gates Foundation; data access plan if funding over $500,000	Expected data, data access, timeframe for sharing, storage and dissemination
National Institute of Justice (data archiving plan)	Data management and archiving process, confidentiality protections, tasks associated with data preparation and archiving, costing
Institute of Education Sciences (data sharing plan)	Expected data, data management, confidentiality of private information, roles and responsibilities, schedule for data sharing, format, documentation, how to share, limitations to sharing

Source: California Digital Library 2013

Journal / publisher data policies

- data underpinning publication accessible
  - upon request from author
  - as supplement with publication
  - in public repository
  - in mandated repository (e.g. PANGAEA – Elsevier)
- citation via unique DOIs
- e.g. BioMed Central open data statement
- global registries of data repositories:
  - databib.org/
  - re3data

Growth in number of data repositories over time



Source: Databib 2012

ESRC research data policy

*Publicly-funded research data are a public good, produced in the public interest, which shall be made openly available and accessible with as few restrictions as possible in a timely and responsible manner that meets a high ethical standard and does not violate privacy or harm intellectual property (*ESRC Research Data Policy, 2015)

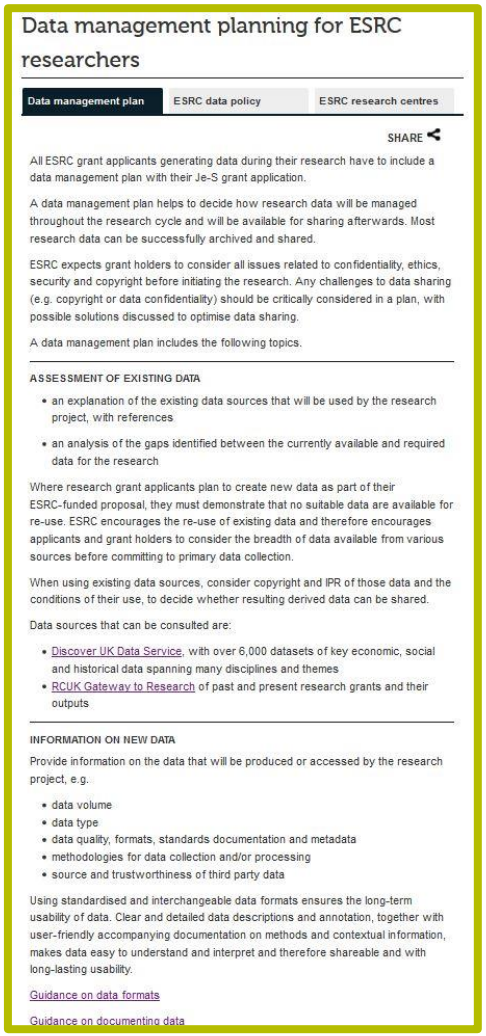
- ESRC grant include a data management plan with their application, as an attachment to the Je-S form
- ESRC award holders deposit their research data in the ReShare repository (managed by UK Data Service) within three months of the end of their grant, to preserve them and to make them available for new research.

*Researchers who collect the data initially should be aware that ESRC expects that others will also use it, so consent should be obtained on this basis and the original researcher must take into account the long-term use and preservation of data. (*ESRC Framework for Research Ethics, 2012)

ESRC data management plan

- Assessment of existing data
- Information on new data
- Quality assurance of data
- Backup and security of data
- Difficulties in data sharing and measures to overcome these
- Consent, anonymisation, re-use strategies
- Copyright / Intellectual Property Ownership
- Responsibilities
- Management and curation

[ESRC DMP guidance]



Data management planning for ESRC researchers

Data management plan | ESRC data policy | ESRC research centres

SHARE

All ESRC grant applicants generating data during their research have to include a data management plan with their Je-S grant application.

A data management plan helps to decide how research data will be managed throughout the research cycle and will be available for sharing afterwards. Most research data can be successfully archived and shared.

ESRC expects grant holders to consider all issues related to confidentiality, ethics, security and copyright before initiating the research. Any challenges to data sharing (e.g. copyright or data confidentiality) should be critically considered in a plan, with possible solutions discussed to optimise data sharing.

A data management plan includes the following topics.

ASSESSMENT OF EXISTING DATA

- an explanation of the existing data sources that will be used by the research project, with references
- an analysis of the gaps identified between the currently available and required data for the research

Where research grant applicants plan to create new data as part of their ESRC-funded proposal, they must demonstrate that no suitable data are available for re-use. ESRC encourages the re-use of existing data and therefore encourages applicants and grant holders to consider the breadth of data available from various sources before committing to primary data collection.

When using existing data sources, consider copyright and IPR of those data and the conditions of their use, to decide whether resulting derived data can be shared.

Data sources that can be consulted are:

- Discover UK Data Service, with over 6,000 datasets of key economic, social and historical data spanning many disciplines and themes
- RCUK Gateway to Research of past and present research grants and their outputs

INFORMATION ON NEW DATA

Provide information on the data that will be produced or accessed by the research project, e.g.

- data volume
- data type
- data quality, formats, standards documentation and metadata
- methodologies for data collection and/or processing
- source and trustworthiness of third party data

Using standardised and interchangeable data formats ensures the long-term usability of data. Clear and detailed data descriptions and annotation, together with user-friendly accompanying documentation on methods and contextual information, makes data easy to understand and interpret and therefore shareable and with long-lasting usability.

Guidance on data formats

Guidance on documenting data

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NERC outline data management plan

- Project information
- Organisation
- Roles and responsibilities
- Data generation activities
- Data management approach
- Metadata and documentation
- Data quality
- Exceptions or additional services

NERC DMP guidance

Horizon 2020 data management plan

- Data set reference and name
- Data set description
- Standards and metadata
- Backup and security of data
- Data sharing
- Archiving and preservations (incl storage and backup)

Horizon 2020 DM guidelines

Tools and templates

- Funder template for DMP
  - ESRC DMP requirements in data policy and DMP guidance
  - MRC DMP guidance and template
  - AHRC technical plan requirements
  - NERC DMP guidance and template

- DCC's DMPonline tool

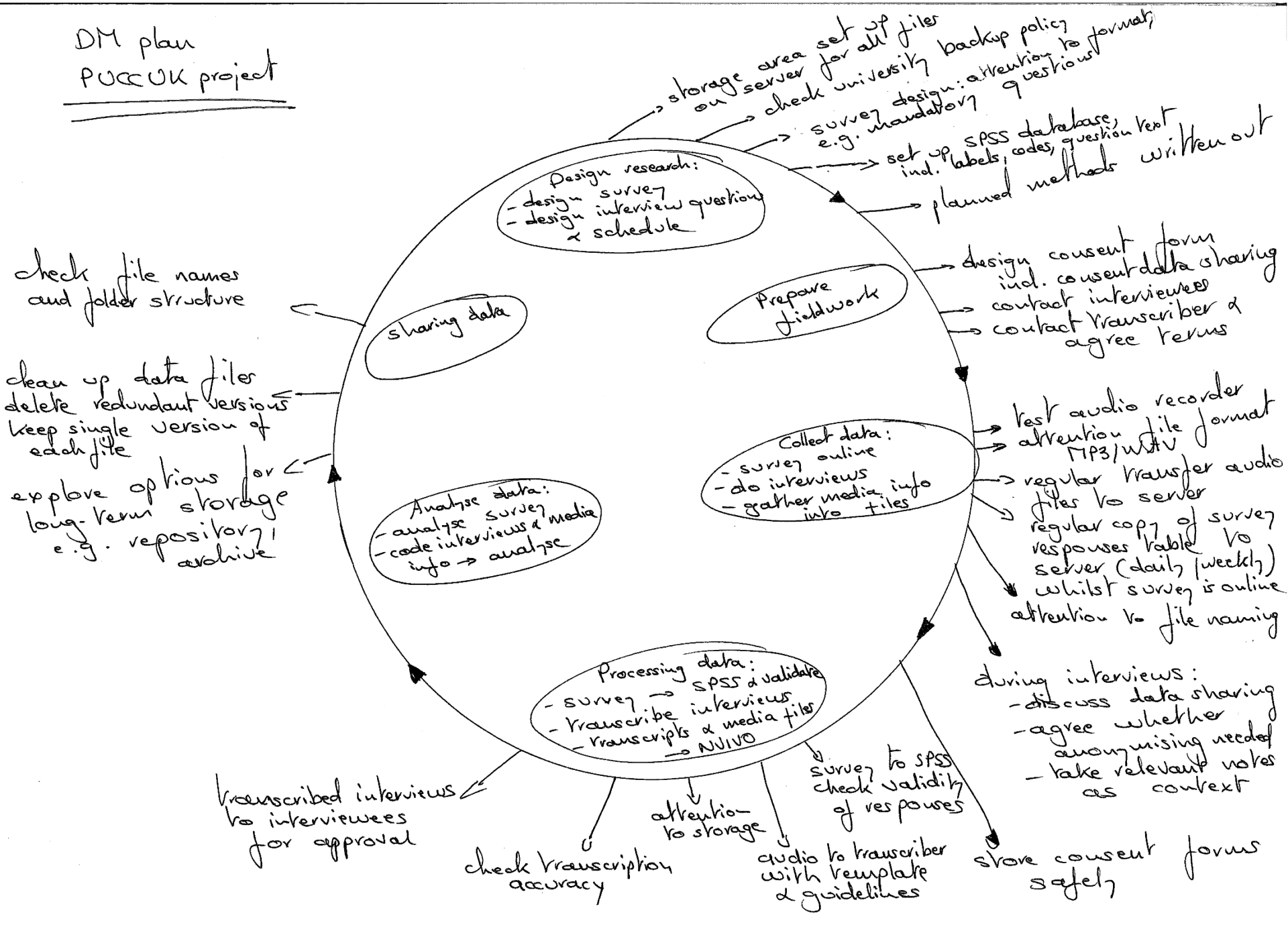
"We back up our data on sticky notes because sticky notes never crash."

DM checklist

- Are you using standardised and consistent procedures to collect, process, check, validate and verify data?
- Are your structured data self-explanatory in terms of variable names, codes and abbreviations used?
- Which descriptions and contextual documentation can explain what your data mean, how they were collected and the methods used to create them?
- How will you label and organise data, records and files?
- Will you apply consistency in how data are catalogued, transcribed and organised, e.g. standard templates or input forms?
- Which data formats will you use? Do formats and software enable sharing and long-term validity of data, such as non-proprietary software and software based on open standards?
- When converting data across formats, do you check that no data or internal metadata have been lost or changed?
- Are your digital and non-digital data, and any copies, held in a safe and secure location?
- Do you need to securely store personal or sensitive data?
- If data are collected with mobile devices, how will you transfer and store the data?
- If data are held in various places, how will you keep track of versions?
- Are your files backed up sufficiently and regularly and are back-ups stored safely?
- Do you know what the master version of your data files is?
- Do your data contain confidential or sensitive information? If so, have you discussed data sharing with the respondents from whom you collected the data?
- Are you gaining (written) consent from respondents to share data beyond your research?
- Do you need to anonymise data, e.g. to remove identifying information or personal data, during research or in preparation for sharing?
- Have you established who owns the copyright of your data? Might there be joint copyright?
- Who has access to which data during and after research? Are various access regulations needed?
- Who is responsible for which part of data management?
- Do you need extra resources to manage data, such as people, time or hardware?

https://www.ukdataservice.ac.uk/manage-data/plan/checklist

DM plan
PUCCUK project



Key planning issues

- Know your legal, ethical and other obligations towards research participants, colleagues, research funders and institutions
- Know your institution’s policies and services: storage and backup strategy, research integrity framework, IPR policy, institutional data repository
- Assign roles and responsibilities to relevant parties
- Incorporate data management into research cycle
- Implement and review management of data during project meetings and review

Roles & responsibilities

- Project director: design, oversee research
- Research staff: design research, collect, process and analyze data, where keep data, who has access
- Laboratory or technical staff: generate metadata and documentation
- Database designer
- External contractors: data collection, data entry, transcribe, process, analysis; agree standard protocols
- Support staff: manage and administer research and funding, ethical review and assess IPR
- Institutional IT services: data storage, security and backup services
- External data centres: facilitate data sharing.

Cost research data management

- Cost RDM into research applications / research budgets / DMPs
- List and identify resources needed to make research data shareable beyond primary research team - above planned standard research procedures and practices
- Resources = people, skills, equipment, infrastructure, tools

  to manage, document, organise, store and provide access to data
- Early planning can reduce costs
- No ’easy rules’
  - extra costs depend on standard research management practices
  - extra costs depend on long-term storage / preservation / publishing plans - repository may carry those costs

    e.g. UK Data Archive, funded by ESRC, this covers all data processing / curation / preservation / dissemination costs
- Budget for duration of research project
- Overhead costs – institutional infrastructure

How cost RDM ?

STEP 1	• check data management activities in table and tick what applies to your proposed research; we propose 18 essential RDM activities
STEP 2	• for each selected activity, estimate / calculate additional time and/or resources needed and cost this
STEP 3	• add data management costs to your research application; coordinate resourcing and costing with your institution, research office and institutional IT services

Our data management costing tool

- Developed in discussion with researchers, research funders, research managers and administrators
- www.data-archive.ac.uk/media/247429/costingtool.pdf

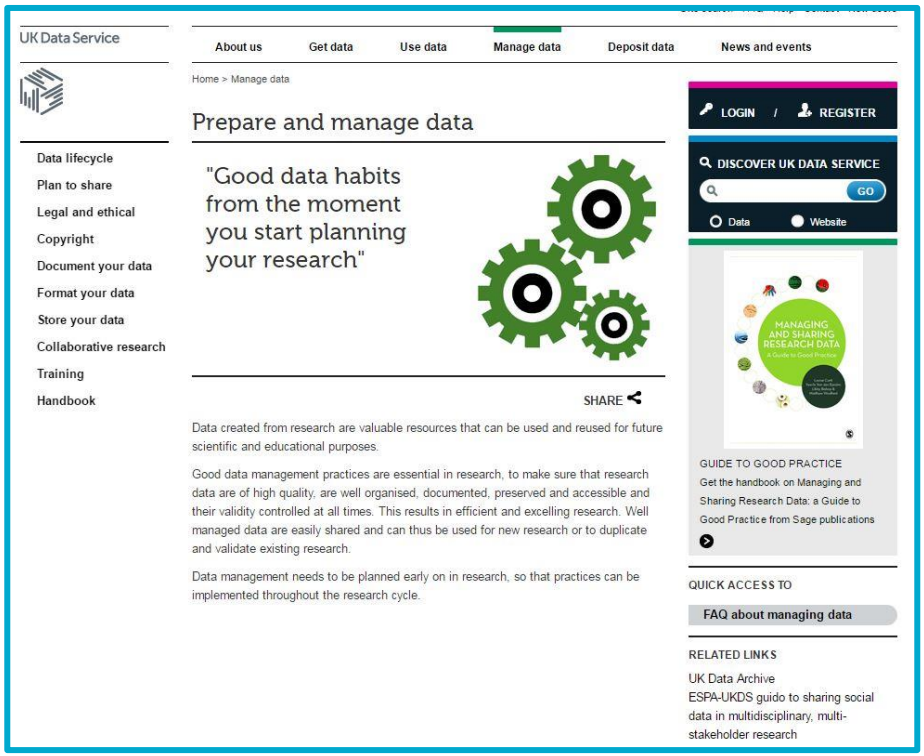
ACTIVITY	COMMENTS AND SUGGESTIONS	√	COST
Data description • Are data in a spreadsheet or database clearly marked with variable and value labels, code descriptions, missing value descriptions, etc.? • Are labels consistent? • Do textual data like interview transcripts need description of context, e.g. included as a heading page?	• if data description is carried out as part of data creation, data input or data transcription – low or no additional cost • if needed to be added afterwards – higher cost • codebooks for datasets can often be easily exported from software packages		
Data cleaning • Do quantitative data need to be cleaned, checked or verified before sharing, e.g. check validity of codes used, check for anomalous values? • Will data match documentation, e.g. same number of variables, cases, records, files? • Does textual information in data need to be spell-checked?	• if carried out as part of data entry and preparation before data analysis – low or no additional cost • if needed afterwards – higher cost		
Documentation • Do you have documentation for the data that describes the context and methodology of how data were gathered, created, processed and quality controlled?	• often essential contextual and methods documentation will be written up in publications and reports • if all data creation steps are well documented and documentation is kept well organised during research – low or no additional cost • if documentation to be written or compiled specifically afterwards – higher cost		
Metadata • Do structured metadata need to be created when data are shared via a data centre or archive, e.g. completing a deposit form for the UK Data Archive?	• completing a UK Data Archive deposit form may take one to two hours • other data centres will have their own metadata forms		
Formatting and organising • Are your data files, spreadsheets, interview transcripts, records etc. all in a uniform format or style? • Are files, records and items in the collection clearly named with unique file names and well organised?	• if planned beforehand by developing templates and data entry forms for individual data files (transcripts, spreadsheets, databases) and by constructing clear file structures – low or no additional cost • if needed afterwards – higher cost • free software exists for batch file renaming to harmonise file names		
Transcription • Will you transcribe qualitative data (e.g.	• if part of research practice – very low or no additional cost		

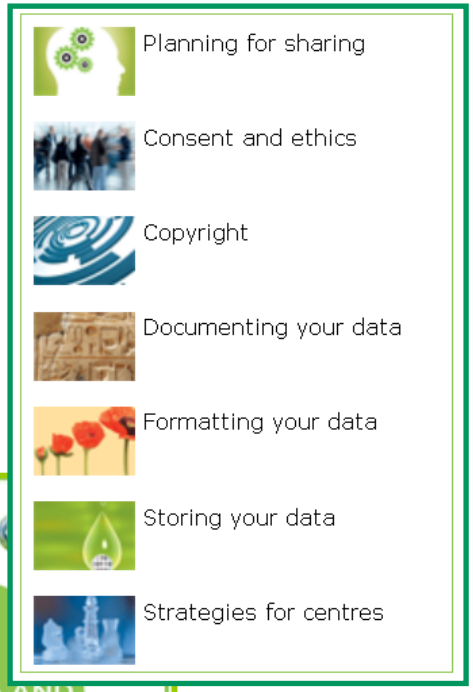
DM topics

- File formats
- Data documentation
- Quality control
- Storage, backup and security
- Ethical and legal
  - Consent
  - Anonymisation
  - Access control
- Copyright and IP
- Responsibilities

Our managing and sharing data resources

- UKDS Prepare and manage data web guidance
- Sharing social data in multidisciplinary, multi-stakeholder research Best practice guide for researchers
- Training programme





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Example DMPs

- http://www.dcc.ac.uk/resources/data-management-plans/guidance-examples

Exercise: ESRC DMP questions

- existing data sources that will be used by the research project, with references
- analysis of the gaps identified between the currently available and required data for the research
- information on the data that will be produced or accessed by the research project:
  - data volume, data type
  - data quality, formats, standards documentation and metadata
  - methodologies for data collection and/or processing
  - source and trustworthiness of third party data
- planned quality assurance and back-up procedures [security/storage]
- plans for management and curation of primary or third party data
- expected difficulties in data sharing, along with measures to overcome these difficulties, explicitly stating which data may be difficult to share and why
- explicit mention of consent, confidentiality, anonymisation and other ethical considerations and, in particular, strategies taken to not preclude further reuse of data
- copyright and intellectual property ownership of the data
- responsibilities for data management and curation within research teams at all participating institutions