

# Best practice guidelines for researchers: Managing research data and primary materials

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## Background

The *Australian Code for the Responsible Conduct of Research* (2007) assigns researchers and their institutions a shared responsibility to manage research data and primary materials well, by addressing aspects of ownership, storage and retention, and accessibility. Griffith University has responded to this at a policy level in Section 6 of the *Griffith University Code for the Responsible Conduct of Research*, endorsed by the Academic Committee in July 2012.

Researchers are required to manage their data – using methods appropriate to the discipline and to the nature of the data – to the highest standards. These standards include legislation, policies, funding agency requirements, technical protocols, audit and accreditation processes, discipline norms and the expectations of the broader community.

The University is required to provide infrastructure (institutional, regional, national and international), opportunities to develop professional skills, and access to advice and expertise that enable researchers to meet these standards.

In 2011, the National Health and Medical Research Council (NHMRC), as one of seventeen health research funders and four partner organisations, signalled their intent “to increase the availability to the scientific community of the research data we fund that is collected from populations for the purpose of health research”.<sup>1</sup> In 2012, the NHMRC mandated the deposit of publication outputs from NHMRC funded research into institutional repositories, and indicated that “The next steps will be improving public and other researchers’ access to publicly funded data.”<sup>2</sup>

The Australian Research Council (ARC) released its Open Access Policy in January 2013. While this policy currently only applies to publication outputs, the ARC’s Discovery Projects Funding Rules for funding commencing in 2014<sup>3</sup> strengthen the requirement for final reports to “outline how data arising from the Project has been made publicly accessible where appropriate.” Unsatisfactory final reports will be noted against future proposals from the associated investigators.

These developments in national research policy align Australia more closely with other countries such as the United Kingdom<sup>4</sup> and the United States,<sup>5</sup> where funding agencies’ requirements for data management and data sharing plans are well-established. To improve research performance as measured by grants from international and national funders, Griffith University must strengthen its commitment to comply with those agencies’ strategic agendas and formal requirements around data management, and particularly data sharing and publication.

In addition to meeting compliance requirements, Griffith recognises that better management of research data could enhance the profile of the University and its researchers. Evidence is

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<sup>1</sup> Wellcome Trust (2011). Sharing research data to improve public health: full joint statement by funders of health research. Available at: <http://www.wellcome.ac.uk/About-us/Policy/Spotlight-issues/Data-sharing/Public-health-and-epidemiology/WTDV030690.htm>

<sup>2</sup> Anderson, Warwick (2012). All research funded by NHMRC to be accessible free of charge. Available at: <http://theconversation.edu.au/all-research-funded-by-nhmrc-to-be-accessible-free-of-charge-5486>

<sup>3</sup> Australian Research Council. Discovery Projects Funding Rules for funding commencing in 2014. Available at

<sup>4</sup> Digital Curation Centre. Overview of funders’ data policies. Available at:

<http://www.dcc.ac.uk/resources/policy-and-legal/overview-funders-data-policies>

<sup>5</sup> Dietrich, Diane, et al (2012). De-Mystifying the Data Management Requirements of Research Funders. *Issues in Science and Technology Librarianship*. DOI:10.5062/F44M92G2

emerging in some disciplines that suggests sharing supporting research data has a positive impact on publication citation rates. One study of cancer microarray clinical trial publications found that publicly available data was associated with a 69% increase in citations, independent of journal impact factor, date of publication, and author country of origin.<sup>6</sup> Another study of more than 7000 astronomical science articles showed that articles with associated data received 20% more citations compared to articles without these links.<sup>7</sup>

Infrastructure is emerging that will enable the research impact of data collections to be more formally measured in their own right.<sup>8</sup> The dissemination of Griffith data assets could also increase informal impact amongst other stakeholder communities. Industry, government agencies, schools and not-for-profit organisations could potentially re-use Griffith data to support a range of activities with positive economic, social and cultural outcomes.

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<sup>6</sup> Piwowar, H. A., Day, R. S. and Fridsma, D. B. (2007). Sharing Detailed Research Data Is Associated with Increased Citation Rate. PLoS ONE 2(3): e308. DOI:10.1371/journal.pone.0000308

<sup>7</sup> Henneken, E. A., & Accomazzi, A. (2011). Linking to Data - Effect on Citation Rates in Astronomy. [arXiv:1111.3618](https://arxiv.org/abs/1111.3618)

<sup>8</sup> For example, in late 2012 Thomson Reuter launched its Data Citation Index, a resource to facilitate the discovery, use and attribution of research data.

# Best practice guidelines for researchers: Managing research data and primary materials

These best practice guidelines are aimed at Griffith University researchers (including Higher Degree by Research students). The guidelines:

- expand on the *Griffith University Code for the Responsible Conduct of Research* in relation to specific aspects of research data management
- outline practical steps that researchers can take, and
- highlight enabling technology, advisory services and professional development opportunities.

These guidelines are recommendations rather than mandatory standards. They target areas in which more detailed advice could lead to sustainable changes in research practices and the provision of further research support services should be considered.

## Rationale

A coordinated approach to improved data management benefits not only the university but the broader community.

Researchers benefit by:

- Saving time if data is better organised and easier to find
- Reducing the risk that data could be stolen, lost or mis-used
- Gaining easier access to raw and processed data needed for their research , and
- Increasing their research profiles and potentially finding new audiences and collaborators through dissemination, citation and re-use of data

The University benefits from:

- Identifying, capturing and re-using more research outputs
- Increasing compliance with government and funding agency requirements
- Improving readiness for audits and changes in funding agency strategy towards open access, and
- Demonstrating its commitment to being a university of influence.

The broader community benefits from:

- Increased access to Griffith's research outputs, potentially increasing the informal impact amongst other stakeholder communities. Industry, government agencies, schools and not-for-profit organisations could potentially re-use Griffith data to support a range of activities with positive economic, social and cultural outcomes.

## Acknowledgements

These guidelines are informed by information provided under open licences by other organisations, including:

Australian National Data Service. *ANDS guides and other resources*. Available at: <http://ands.org.au/guides/>

Digital Curation Centre. *How-to guides*. Available at: <http://www.dcc.ac.uk/resources/how-guides>

Monash University Library. *Guidelines*. Available at: <http://monash.edu/library/researchdata/guidelines/>

Van den Eynden, Veerle, et al (2011). *Managing and sharing data: Best practice for researchers*. Colchester: UK Data Archive. Available at: <http://data-archive.ac.uk/media/2894/managingsharing.pdf>

## Quick guide

### Best practice requires a planned approach to data management

All the involved parties holistically consider all aspects of data management at the start of the research and review data management over the lifecycle of the project.

<p>1.1</p> <p>Fulfilling obligations to funders, publishers, University, researchers &amp; the community</p>	<p>1.2</p> <p>Contributing to research impact</p>	<p>1.3</p> <p>Costing</p>	<p>1.4</p> <p>Data planning documentation</p>	<p>When applying for grants and planning your project, think about your legal and professional obligations. Consider also how data can contribute to the research impact of your project. Document your decisionmaking, including costings, for your grant application.</p>		
<p>2.1</p> <p>Intellectual property</p> <table border="1"> <tbody> <tr> <td data-bbox="262 847 486 943"> <p>Ownership of rights in new data you create or collect</p> </td> <td data-bbox="517 847 741 943"> <p>Re-using existing data from other sources legally and responsibly</p> </td> </tr> </tbody> </table>		<p>Ownership of rights in new data you create or collect</p>	<p>Re-using existing data from other sources legally and responsibly</p>	<p>2.2</p> <p>Retention</p>	<p>2.3</p> <p>Ethics and consent</p>	<p>Before your project starts, work out who owns the data and how long it needs to be kept for. Ethical commitments and the consent you seek from your participants will affect what you can do with data later, so consider potential data sharing and re-use scenarios well before data is collected or acquired.</p>
<p>Ownership of rights in new data you create or collect</p>	<p>Re-using existing data from other sources legally and responsibly</p>					
<p>3.1</p> <p>Choosing durable file formats</p>	<p>3.2</p> <p>Secure storage</p>	<p>3.3</p> <p>Secure transfer</p>	<p>3.4</p> <p>Organising and documenting data</p>	<p>During the project, collect data in formats that are long-lasting. Data that is organised and well-documented is easier to find and use. Regularly assess your options for storing your data and moving it around. If your data is lost, stolen or mis-used you will lose valuable work and damage your reputation as a researcher.</p>		
<p>4.1</p> <p>Sharing data through a repository or archive</p>	<p>4.2</p> <p>Licensing data for re-use</p>	<p>4.3</p> <p>Destroying data securely</p>	<p>4.4</p> <p>Exit planning – what to do when you leave Griffith</p>	<p>When you have your results, deposit data in repositories to validate and promote your research and increase its impact. Be explicit about re-use by applying appropriate licences. If confidential or obsolete data needs to be destroyed, seek advice on secure methods. When you leave Griffith, make plans for the data you are taking and the data left behind.</p>		

## Guidelines for researchers

As a researcher, you are responsible for efficiently and responsibly carrying out your research and for communicating the results of research effectively. Good data management can save you time and give you peace of mind that your data is not at risk. If you are not subject to commercial or ethical restrictions, you can also increase your research profile by including data outputs as part of your dissemination strategy.

### 1. Before the project starts

Topic	Guidelines	Resources and contacts
<b>1.1 Regulatory requirements and professional obligations</b>	<p>Review the data management and data sharing requirements of funding agencies, taking particular note of how compliance will be assessed and the consequences of non-compliance.</p> <p>Review the data management requirements of partner organisations, particularly commercial organisations.</p> <p>Consider the expectations of researchers in your discipline and from other disciplines and how these might affect how you manage your data (including sharing, if possible).</p>	<p>e.g. ARC <a href="#">Discovery Projects Funding Rules</a> (sections 13.3.2 and 14.6.2 apply) and <a href="#">Linkage Projects Funding Rules for funding commencing in 2013</a> (5.2.1.e, 12.3.2 apply)</p> <p>e.g., <a href="#">NHMRC Funding Rules incorporating the Project Grants scheme for funding commencing in 2014</a> (15.1 applies)</p> <p><a href="#">Overview of funders' data policies</a> (UK )</p> <p><a href="#">De-Mystifying the Data Management Requirements of Research Funders</a> (US)</p> <p><i>Seek advice from the Office for Research if required.</i></p>
<b>1.2 Contribution to research impact</b>	<p>Data can be an important research output in its own right as well as providing supporting evidence for published findings. In some disciplines the availability of data has led to a quantifiable increase in the number of citations for a related publication. Internationally infrastructure and services are emerging that will support the citation of datasets.</p> <p>When planning a project, consider:</p> <ul style="list-style-type: none"> <li>the audiences for your research and how they could make use of the data you will be collecting – is your work of interest to policy makers, not-for-profit agencies, the commercial sector or the general public, as well as to other researchers?</li> <li>the data management and data sharing requirements of journals you might publish in</li> </ul>	<p><a href="#">A list of data journals</a> (PREPARDE project, University of Leicester)</p> <p><a href="#">Data Citation : Awareness Level!</a> (Australian National Data Service)</p> <p><i>Seek advice from eResearch Services if required.</i></p>

Topic	Guidelines	Resources and contacts
	<ul style="list-style-type: none"> <li>• the availability of data journals for your discipline for publishing data outputs</li> <li>• how you could use data to communicate your results more effectively - data in raw and visualised forms adds interest to your publications and conference presentations</li> <li>• whether an institutional repository or subject repository can disseminate your data – these services assign your data a Digital Object Identifier (DOI) that will help with citation and impact tracking, and provide information about your data to search engines like Google Scholar and registries like Research Data Australia. (See 4.1 for more details about depositing in repositories and archives.)</li> </ul> <p>Incorporate your data dissemination plans into the sections of grant application forms dealing with publication and research impacts.</p>	
1.3	<p><b>Costing</b></p> <p>If possible, establish data management related costs and include these in the proposed budget of your grant application if the funding rules allow.</p>	<p><a href="#">Costing Tool: Data Management Planning</a> (UK Data Archive)</p> <p><i>Seek advice from eResearch Services if required.</i></p>
1.4	<p><b>Planning documentation</b></p> <p>If the funder does not require a formal data management plan, you can record data planning information in an internal document, which should cover the following types of information:</p> <ul style="list-style-type: none"> <li>• what types of data will be created</li> <li>• who will own and have access to the data</li> <li>• what facilities and equipment and methods will be used to capture and process the data</li> <li>• where data will be stored during the project and after the project is completed</li> <li>• if appropriate, how data will be shared or published and what conditions of re-use will apply</li> <li>• who will be responsible for each of these activities.</li> </ul> <p>All partners should be involved in the development and signoff of a data plan.</p> <p>You can also document your data planning in a variety of other places, including grant proposals, funding and collaboration agreements, ethics applications, and annual reports to funding agencies. Treat that these important documents as corporate records and retain and dispose of them appropriately.</p>	<p><a href="#">Data Management Planning</a> (Australian National Data Service)</p> <p><i>Seek advice from eResearch Services if required.</i></p>

## 2. At the start of the project

Topic	Guidelines	Resources and contacts
<b>2.1 Intellectual property</b>	<p>For data that you create or collect, you need to:</p> <ul style="list-style-type: none"> <li>Determine what rights, including copyright, will subsist in the data produced by the project</li> <li>Establish who will be the rights holder/s for the data</li> </ul> <p>As a Griffith staff member most data you produce will be owned by the University. As a Higher Degree by Research student you would usually own the data you generate; however, there are certain cases in which you must assign your IP to the university that you should be aware of.</p> <ul style="list-style-type: none"> <li>Consider what terms and conditions should be applied to the data for re-use.</li> </ul> <p>As a Griffith staff member you have a licence from Griffith to re-use most of your scholarly works (including data) for research and teaching purposes and to make decisions about re-use using your professional judgement. As a Higher Degree by Research Student, unless you have assigned IP to the university, decisions about re-use and licensing of your data are yours to make. (See 4.2 below for more information on licensing.)</p> <hr/> <p>For data that you are sourcing from elsewhere, you need to:</p> <ul style="list-style-type: none"> <li>Establish the rights holder.</li> <li>Establish the terms and conditions of re-use granted by the rights holder/s and assess whether your re-use fits within these. To establish the terms and conditions of re-use, you will need to:             <ul style="list-style-type: none"> <li>Find and keep a copy of any 'express permission' that the rights holder has given. This will usually be a licence or a set of standard terms and conditions that apply to the process by which you have obtained the data, such as downloading from websites and online data archives.</li> <li>OR, if no express permission is given that enables you to establish terms and conditions of re-use, you must seek permission from the rights holder directly.</li> </ul> </li> </ul>	<p><a href="#">Griffith University Intellectual Property Policy</a>  <a href="#">Griffith University Copyright Guide</a>  <a href="#">Copyright and Research Data</a> (Australian National Data Service)</p> <p>Examples of express permissions for data re-use:</p> <ul style="list-style-type: none"> <li><a href="#">Australian Bureau of Statistics</a></li> <li><a href="#">Protein Data Bank</a></li> <li><a href="#">World Bank Data Catalog</a></li> </ul> <p><i>Seek advice from eResearch Services if required.</i></p>

Topic	Guidelines	Resources and contacts
<b>2.2 Retention</b>	<p>Before the project starts, work out the <i>minimum</i> retention period for the data, using the table on pp. 6-8 of the Griffith Schedule of Retention Periods for Research Data and Primary Materials.</p> <p>To work out the <i>maximum</i> retention period, you need to consider the longer-term value of the data in light of the potential research impact and other factors, such as:</p> <ul style="list-style-type: none"> <li>• the research would be difficult or impossible to repeat</li> <li>• repeating the research would be burdensome for human participants or animals</li> <li>• the results are of high public interest or contention</li> <li>• methods or results constitute of a paradigm shift for the field of inquiry, or</li> <li>• the research will result in notifiable intellectual property (e.g. a patent application).</li> </ul> <p>In addition to the data, you also need to retain any corporate records related to the research data that you are generating.</p>	<p><a href="#">Schedule of Retention Periods for Research Data and Primary Materials</a></p> <p><i>Seek advice from the Corporate Archives and Records Management Services if required.</i></p>
<b>2.3 Ethics and consent</b>	<p>When completing your ethics application consider data management, and in particular data sharing and re-use, in the context of privacy, confidentiality and consent, cultural sensitivity, and community-based research.</p> <p>Be explicit in your ethics application about any plans you have to make data available to other researchers or more broadly. Describe your strategies for protecting privacy and confidentiality, e.g. by ensuring</p> <ul style="list-style-type: none"> <li>• that participants will not be identifiable, or</li> <li>• that informed consent will be sought from participants for the proposed data re-use, or</li> <li>• that access controls or re-use agreements will be in place.</li> </ul> <p>Be explicit in your consent forms about any plans to make data available, who will be able to access the data, and how the data would be accessed and potentially re-used.</p> <p>You may enhance your ability to share data later if you identify broad types of access rather than specific services that may be unsuitable or unavailable in future. For example, saying that you will publish data 'through web-based institutional or subject archives or repositories' will give you more flexibility than if you specify a single repository or archive that may not be available in future.</p>	<p><a href="#">Griffith University Human Ethics Manual, Booklet 23 Regulatory and ethical privacy issues in human research</a> (intranet)</p> <p><a href="#">Griffith University Human Ethics Manual Booklet 42 Retesting and the reuse of data</a> (intranet)</p> <p><a href="#">Ethics, consent and data sharing</a> (Australian National Data Service)</p> <p><a href="#">Consent and Ethics</a> (UK Data Archive) especially subsections on <a href="#">Consent</a>, <a href="#">Anonymisation</a>, and <a href="#">Access control</a></p> <p><a href="#">Guidelines for Ethical Research in Australian Indigenous Studies</a> (Australian Institute of Aboriginal and Torres Strait Islander Studies, section 13 applies)</p> <p><i>Seek advice from the Office for Research - Research Ethics and Integrity if required.</i></p>

Topic	Guidelines	Resources and contacts
	<p>Do not specify in your ethics application that you will destroy data at a certain time, until you have considered the significance of the data and the possibility that it may be used in follow-up studies or as a basis for new work by you or other researchers.</p> <p>Data does not have to be openly accessible to be shared for the benefit of future researchers and other interested groups. In many cases, mediated or restricted access could be appropriate. Even if your data is confidential, you may be able to share it under certain circumstances, for example:</p> <ul style="list-style-type: none"> <li>• if the re-users have to register</li> <li>• if the re-users make an application to an ethics committee or project board, or</li> <li>• if a formal re-use agreement protecting participant confidentiality is in place.</li> </ul>	

### 3. During the project

Topic	Guidelines	Resources and contacts
<b>3.1 Durable formats</b>	<p>Assess the durability of the file formats you will use by considering if the format is:</p> <ul style="list-style-type: none"> <li>• endorsed and published by standards agencies such as Standards Australia or ISO</li> <li>• publicly documented, i.e. complete authoritative specifications are available</li> <li>• the product of collaborative development and consultative processes</li> <li>• widely used and accepted as best practice within your discipline or other user communities.</li> </ul> <p>You should also assess the long-term accessibility of any hardware and software used to create and manipulate research data.</p> <p>If you develop software as part of your research, follow available best practice guidelines for developing, releasing and licensing your software.</p>	<p><a href="#">File formats (awareness level)</a> and <a href="#">File formats (working level)</a> (Australian National Data Service)</p> <p><a href="#">Tips and tricks for sustainable software and development</a> (Software Sustainability Institute, UK)</p> <p><i>Seek advice from eResearch Services if required.</i></p>

Topic	Guidelines	Resources and contacts
3.2 <b>Secure storage – digital data</b>	<p>You should only store master copies of digital research data on:</p> <ul style="list-style-type: none"> <li>• Griffith University systems</li> <li>• Griffith-approved cloud storage services for the Australian research sector, and</li> <li>• other cloud storage services that are approved by the University.</li> </ul> <p>Consult eResearch Services for advice about secure storage options. eResearch Services can refer you to Griffith storage experts and authorised off-site providers. Gathering the following information will help you explain your needs to eResearch staff:</p> <ul style="list-style-type: none"> <li>• current data volume - total size in Mb/Gb/Tb – and likely rate of growth</li> <li>• number of files and folders, and how they are organised</li> <li>• location of your workspace/s e.g. office, lab, home, in the field</li> <li>• platform - Mac / Windows / Linux</li> <li>• applications used to access and work with your data</li> <li>• frequency of update, e.g. working data that changes daily, or data from a completed project that needs to be retained but would not be used often</li> <li>• data type/s: spreadsheets, database, documents, images, datasets, etc.</li> <li>• any special security needs e.g. clinical data, personal data, commercial potential</li> <li>• access control: Who needs access? Are they from Griffith? If not, are they based in Australia or overseas? At universities or at other kinds of organisations?</li> </ul> <p><b>Network storage</b></p> <p>Storing your data on Griffith systems has the following benefits:</p> <ul style="list-style-type: none"> <li>• data is readily available to you and other authorised users</li> <li>• data is available via remote access on request</li> <li>• standard security and access controls can prevent loss, theft or unauthorised use</li> <li>• all your research data can be stored in a single place</li> <li>• automated systems can be put in place for back up, replication and integrity checks.</li> </ul>	<p>A number of storage solutions are currently being developed at Griffith to provide larger quantities of working storage, and longer term storage for completed datasets and data collections, and for regular snapshots of ongoing data collections. These services should be available later in 2013. Consult eResearch Services for advice about these secure storage options.</p>

Topic	Guidelines	Resources and contacts
	<p><b>Desktop and laptop computers</b></p> <p>You should not store master copies of digital data on individual desktop or laptop computers. You should treat these as convenient working areas but not as primary stores. Local drives fail and are often not backed-up. Local machines are regularly replaced, upgraded, and allocated to other people - data on those machines is at risk of being lost or inappropriately accessed.</p> <p>If you store <i>additional</i> working copies on local computers, schedule automatic synchronisation and/or backups and password-protect and physically secure the machines.</p>	
	<p><b>Removable media</b></p> <p>You should not store master copies of digital data on removable media like CDs and DVDs, flash memory devices (i.e. USB sticks), and portable hard drives. These are:</p> <ul style="list-style-type: none"> <li>• not always long-lasting, especially if they are not stored correctly (CDs/DVDs)</li> <li>• easy to damage physically (e.g. through magnetism or shocks)</li> <li>• prone to errors in writing to the media ('burning')</li> <li>• a risk in terms of data security – they are easy to misplace or lose, and often the data on them does not have access controls. In the case of USB drives, they are also an easy target for viruses and malware.</li> </ul> <p>If you store <i>additional</i> working copies on removable media, schedule automatic synchronisation and/or regular backups. You should password-protect and encrypt the media and ensure they are as physically secure as possible.</p> <p>Choose high quality products, and follow the instructions provided by the manufacturer for care and handling, including environmental conditions and labelling.</p> <p>Regularly check the media to make sure that they are not failing, and periodically 'refresh' the data (i.e. copy to a new disk, USB stick, or portable drive).</p>	<p><a href="#">Caring for CDs and DVDs</a> (UK National Preservation Office)</p> <p><a href="#">Using Optical Media for Digital Preservation</a> (UK JISC Digital Media)</p> <p><a href="#">Recommended encrypted USB memory sticks and external hard drives</a> (University of Exeter)</p> <p><i>Seek advice from eResearch Services if required.</i></p>
	<p><b>Cloud services</b></p> <p>Other cloud providers should only be used to store <i>additional</i> copies that are not critical, and that contain no private, confidential, or sensitive information.</p> <p>Read the terms and conditions of use of any external service carefully, and assess the risk associated with storing or transferring your data using that service. In particular you should ask yourself:</p>	<p><a href="#">Cloud computing and the privacy principles</a> (Office of the Information Commissioner Queensland)</p> <p><i>Seek advice from eResearch Services if required.</i></p>

Topic	Guidelines	Resources and contacts
	<ul style="list-style-type: none"> <li>• <i>Who actually has my data? What are their policies on intellectual property?</i> Some cloud services assert their ownership of the intellectual property in anything that is uploaded by users.</li> <li>• <i>Where is the service located? If the organisation delivering the service is in a different jurisdiction, are there any legal implications?</i> In many cases, storage of data that contains personal information outside Australia will be a breach of the <i>Privacy Act</i>.</li> <li>• <i>Who has access to my data and what controls are in place to ensure that they will not misuse my data? What happens if my data is lost or becomes corrupted? What happens to my data if I stop using the service?</i> The Terms and Conditions of some cloud services state that they will take no responsibility for data loss and that they can withdraw the service at any time.</li> </ul> <p>If you store <i>additional</i> working copies of non-critical and non-sensitive data on a cloud service, make sure that you have scheduled backups in place, that your account is secure, and that your use of the service is not in breach of any legal or contractual requirements.</p>	
<p><b>Secure storage – print and physical data</b></p>	<p>You should store your research data in:</p> <ul style="list-style-type: none"> <li>• on-site secure local facilities managed by your school or centre</li> <li>• on-site secure central facilities managed by INS (Corporate Archives and Records Management Service)</li> <li>• off-site in other storage services, only if they are approved by INS CARMS and/or the Ethics Committee.</li> </ul> <p>Consider the conditions in which you will store the data, and whether these may affect data durability. Storage areas should be climate-stable, structurally sound, and free of risks such as pests, flood and fire.</p> <p>Storage rooms and cabinets should be locked when not in use and records should be kept of who is able to access the data (holders of keys, swipe cards). Check-in/check-out procedures may be needed if data is regularly removed from the secure area.</p> <p>Data should be well-organised, clearly and appropriately labelled, and physically accessible to authorised researchers.</p>	<p><a href="#">Offsite storage of research data</a> (intranet)</p> <p><i>Seek advice from the Office for Research - Research Ethics and Integrity and from Corporate Archives and Records Management Services if required.</i></p>

Topic	Guidelines	Resources and contacts
<b>3.3 Safe and secure data transfer</b>	<p><b>Cloudstor</b></p> <p>You should use the Cloudstor service run by AARNET (Australia's Academic and Research Network) to transfer research data, particularly that containing sensitive or personal information. Cloudstor:</p> <ul style="list-style-type: none"> <li>• can be used to transfer files to/from collaborators at other Australian universities as well as "external" users</li> <li>• encrypts your data before submission</li> <li>• is accessible using your Griffith login details</li> <li>• can accommodate large files.</li> </ul> <p>Important note: Cloudstor is a transfer service only and does NOT support long-term shared storage of files. Your data is deleted after 20 days. If your collaborators require longer-term access to transferred files, you should consider collaborative storage options.</p> <p><b>Data transfer using cloud services</b></p> <p>While other services provide functionality that is very attractive, you should carefully consider their use. Dropbox, for example, has experienced at least three major security breaches since 2011, including an incident in which all users' files were publicly accessible for several hours.</p> <p>Cloudstor provides a research sector specific alternative that is safer and more secure than other web-based services.</p> <p><b>Email</b></p> <p>You should avoid using email for data transfer. Some of the limitations of email include:</p> <ul style="list-style-type: none"> <li>• size restrictions - most institutions have limits on the size of emails and attachments (Griffith's Gmail service restricts you to 25MB)</li> <li>• security risks - particularly if you are working with data that is personally or commercially sensitive and/or utilising personal accounts that may not meet legal and ethical requirements around privacy and confidentiality, and</li> <li>• version control issues.</li> </ul>	<p><a href="#">AARNET Cloudstor</a></p> <p><a href="#">Cloud computing and the privacy principles</a> (Office of the Information Commissioner Queensland)</p> <p><i>Seek advice from eResearch Services if required.</i></p>
<b>3.4 Organising and documenting data</b>	<p>You should create and maintain sufficient documentation or metadata (i.e. structured information about the data) to enable research data to be identified, discovered, associated with its owners and creators, linked to other related data or publications, contextualised in time and space, and to have the quality of the data assessed and research results validated.</p>	<p><a href="#">Metadata (awareness level)</a> and <a href="#">Metadata (working level)</a> (Australian National Data Service)</p> <p><i>Seek advice from eResearch Services if</i></p>

Topic	Guidelines	Resources and contacts
	<p>If you poorly document your data, it will be difficult (or impossible) to find it and manage it in the longer term. Even if you (or others, in future) can find the data, its value will be diminished if it is hard to interpret.</p> <p>Practices will differ depending on your discipline, but you should always ensure that protocols are agreed early in the project and adopted by all researchers consistently.</p>	<p><i>required.</i></p>
	<p><b>Choosing a metadata standard</b></p> <p>Some common descriptive standards are available that work for many different kinds of material and across disciplines. One widely-used metadata standard, Dublin Core, facilitates the finding, sharing and management of data. It includes elements such as Title, Creator, Subject, Date and Type, and can be used to describe many different types of content.</p> <p>In many disciplines, you will find an existing standard specifically designed for describing and sharing data for that community. The UK's Digital Curation Centre provides a useful list of metadata standards suitable for different disciplines that you can search and browse.</p>	<p><a href="#">Disciplinary metadata</a> (Digital Curation Centre, UK)</p> <p><i>Seek advice from eResearch Services if required.</i></p>
	<p><b>File naming for digital files</b></p> <p>Digital file names can be important for identifying and finding digital files. You should develop file naming conventions early in a research project, and agree on these with colleagues and collaborators before data is created.</p> <p>Conventions will differ depending on the nature and size of a research project. In all cases, filenames should be unique, persistent and consistently applied, if they are to be useful for finding and retrieving data.</p>	<p><a href="#">Organising data: file naming</a> (UK Data Archive)</p> <p><i>Seek advice from eResearch Services if required.</i></p>
	<p><b>Identifiers</b></p> <p>An identifier is a reference number or name for a data object and forms a key part of your documentation and metadata. To be useful over the long-term, identifiers need to be:</p> <ul style="list-style-type: none"> <li>• unique - globally unique if possible, but at the very least unique within your particular systems and processes, and</li> <li>• persistent - the identifier should not change over time.</li> </ul> <p>The emerging identifier standard for publicly available datasets is the Digital Object Identifiers (DOIs). Although DOIs have been traditionally used for electronically published journal articles, they can now be assigned to datasets. The Griffith University Data Repository will automatically assign a DOI to a collection that you make available.</p>	<p><a href="#">Persistent identifiers (awareness level)</a>, <a href="#">Persistent identifiers (working level)</a> and <a href="#">Persistent identifiers (expert level)</a> (Australian National Data Service)</p> <p><i>Seek advice from eResearch Services if required.</i></p>

Topic	Guidelines	Resources and contacts
	<p><b>Controlled vocabularies</b></p> <p>A vocabulary sets out the common language a discipline has agreed to use to refer to concepts of interest in that discipline. It models of the concepts in a discipline, by applying labels to the concepts and relating the concepts to each other in a formal structure.</p> <p>Vocabularies take many forms. They include glossaries, dictionaries, gazetteers, code lists, taxonomies, subject headings, thesauri, semantic networks and ontologies.</p> <p>Wherever possible, you should use an existing controlled vocabulary. Even if you need to adapt or customise an existing standard, this is preferable to creating something from scratch.</p>	<p><a href="#">Vocabularies and research data (awareness level)</a> (Australian National Data Service)</p>

#### 4. Towards the end of the project and after the project is complete

Topic	Guidelines	Resources and contacts
<p><b>4.1 Sharing data through a repository</b></p>	<p>By depositing data in a repository (or archive), you can make sure that your data can be accessed and cited in the long term.</p> <p>Before depositing, you should consider the implications of doing so, in terms of ownership of intellectual property, and ethical requirements like privacy and confidentiality.</p> <p>Repositories differ in their discipline focus and the types of research data that they accept. It is common for repositories to specify some or all of the following:</p> <ul style="list-style-type: none"> <li>• preferred formats that facilitate long-term access and preservation</li> <li>• minimum standards for documentation and metadata that enhance the discoverability and usability of the data</li> <li>• assurances from you, as the depositor, that storing the data and making it available will not infringe upon the rights of others, and</li> <li>• your assignment of a licence that makes clear what rights re-users are granted.</li> </ul> <p>Identifying a suitable repository for your data and discussing requirements with the repository staff is a valuable part of data planning.</p>	<p><a href="#">Digital repositories</a> (Digital Curation Centre, UK)</p>

Topic	Guidelines	Resources and contacts
	<p><b>Griffith University Data Repository</b></p> <p>From late 2013, Griffith staff will have access to an institutional data repository that is not discipline-specific. The service is run by INS and is suitable for a wide range of data. You can upload research data and make it openly accessible, or you can restrict access to users that you specify.</p> <p>You can also use the data repository to record and showcase:</p> <ul style="list-style-type: none"> <li>• data that is hosted elsewhere – you provide metadata about the collection and links to the hosting site, and</li> <li>• data that is not available online but may be accessed through negotiation with the collection custodian – you provide metadata about the collection and an access statement that tells users how to negotiate access.</li> </ul> <p>Data and metadata that you choose to share publicly can be cited by others, and will be discoverable through the Griffith Research Hub, Google and other services that expose your research to new audiences and potential collaborators.</p> <p>There are a number of ways to deposit data. Self-deposit processes are designed for collections that are not too large or too complex and that do not require complex access control mechanisms.</p> <p>Not all data that is within the scope of the Griffith University Data Repository is suitable for self-deposit. Some deposits need to be mediated, for reasons such as:</p> <ul style="list-style-type: none"> <li>• technical complexities – e.g. large volumes, high dependency between files, requiring specialised hardware or software</li> <li>• risk management</li> <li>• the user community has special requirements about how data needs to be delivered.</li> </ul> <p>eResearch Services can help you deposit your data via other means if self-deposit is not suitable.</p>	<p><i>Seek advice from eResearch Services if required.</i></p>
	<p><b>Other digital data repositories</b></p> <p>In many disciplines, national or international repositories are available to support the long-term access to research data.</p> <p>Databib is a searchable directory of research data repositories. In February 2013, more than 500 data repositories were listed in Databib.</p>	<p><a href="#">Databib</a> (website)</p>

Topic	Guidelines	Resources and contacts
	<p>In deciding whether to deposit to a repository outside Griffith, consider the sustainability of the service (in terms of staffing, funding arrangements, and support from its host institution) and assess its level of support for and within your discipline.</p> <p>If you add a metadata record to the Griffith University Data Repository that links to the other archive or repository holding your data, your collection can still appear in your Griffith Research Hub profile as one of your research outputs.</p>	
4.2	<p><b>Licensing for re-use</b></p> <p>When you disseminate data that you own or manage, you need to think about how you want others to re-use it. It is your responsibility to communicate clearly the terms and conditions that you want re-users of your data to follow.</p> <p><b>All rights reserved: relying on the Copyright Act</b></p> <p>You can reserve all your rights under the <i>Copyright Act</i>. This means people can view and download a copy of your data for private research and study only. They must credit you as the creator, and potential re-users would need to seek your permission for any other type of activity, including re-publishing.</p> <p>While reserving all your rights can be useful for publications, in the case of data it can limit the research impact of your work by restricting other researchers from undertaking common activities such as deriving data or aggregating your data with other datasets.</p> <p>If your goals in disseminating your data are to facilitate the greatest re-use possible, then applying an open licence will be more effective than relying on copyright legislation.</p> <p><b>Some rights reserved: standard open licences</b></p> <p>For openly accessible data, a standard licence is the most effective way of ensuring appropriate re-use. An open licence lets you reserve some rights as the owner of the material, but grant re-users more rights than they would have just under copyright legislation.</p> <p>Adopting a standard licence is often a pre-condition to depositing in a repository or archive, but licences can also be applied to resources disseminated via the web or other means.</p>	<p><a href="#">How to Licence Research Data</a> (Digital Curation Centre, UK)</p> <p><a href="#">Creative Commons and Data</a> (Australian National Data Service)</p> <p><a href="#">Creative Commons Australia</a> (website)</p> <p><i>Seek advice from eResearch Services if required. eResearch Services may refer you to Legal Services for more complex queries about licensing.</i></p>

Topic	Guidelines	Resources and contacts
	<p>Griffith researchers are encouraged to consider using open licences. Licences enable you to clearly indicate to others your wishes about how the data can be re-used and how you want to be attributed.</p> <p>The Creative Commons (CC) framework is the current recommendation for Griffith researchers. CC provides six standard licences that give you a great deal of flexibility in expressing your wishes.</p> <p>A good principle to apply is to use the least restrictive licence that is applicable to your data collection. If you want your data to be as widely used as possible, the Creative Commons Attribution Only licence (CC-BY), would be the most useful for that aim.</p> <hr/> <p><b>Some rights reserved: restricted licences and custom re-use agreements</b></p> <p>If you would like to make data available only under certain conditions or by negotiation, you can use a restrictive licence or other written agreement (such as a Data Transfer Agreement). You might consider this when data contains personal or other confidential information, or if you want to impose some other condition such as a time limit on use or some form of payment.</p> <p>Agreements of this kind could be constructed from a model template or developed for you especially to meet the requirements of a specific project. Examples of this approach include:</p> <ul style="list-style-type: none"> <li>• the agreements associated with the <a href="#">Australian National Corpus</a> (AUS-NC)</li> <li>• the <a href="#">Protocols</a> of the Aboriginal and Torres Strait Islander Data Archive (ATSIDA)</li> </ul> <p>A restricted licence provides you with more protection and enables you to be specific about terms and conditions, but it can also be time-consuming and, if legal advice is required, expensive.</p> <hr/> <p><b>No rights reserved: copyright waivers and public domain dedications</b></p> <p>Some licences or agreements allow you to place your work in the public domain. When you apply these to your work, you waive all your rights and the protections offered by copyright, including the right to be credited as the creator.</p> <p>You should think carefully before using a 'No rights reserved' licence. Standards and tools for data citation are emerging, and in future citation of data may be an important metric for research impact. Waiving your rights means that neither you nor Griffith University must be credited if data is re-used.</p> <p>If you are required by an archive or repository to use a copyright waiver or public domain dedication, you should find out whether any "community norms" statements can be applied: these will not be legally binding but can signal your wishes to potential re-users, where this is practical.</p>	

Topic	Guidelines	Resources and contacts
<b>4.3 Secure destruction</b>	<p>When the required retention period has come to an end, you may need to destroy data to meet ethical requirements or because you determine the data no longer has any value.</p> <p>The destruction process must be irreversible, meaning that there is no reasonable risk that any information may be recovered later. You must take extra care when dealing with records that contain sensitive information.</p> <p>Print materials should be shredded and pulped. For non-sensitive materials, office shredders can be used. For sensitive materials, order a confidential waste bin through Campus Life.</p> <p>Data in digital formats must be processed so the information is irretrievable. These processes can include deleting or overwriting information, purging magnetic media through degaussing (exposure to a strong magnetic field), or destroying the physical media (e.g. CD-ROMS, DVDs).</p>	<p><a href="#">Confidential documents</a> (intranet)</p> <p><a href="#">E-waste</a> (intranet)</p> <p><a href="#">Advice on the destruction of public records</a> (Queensland State Archives)</p> <p><i>Seek advice from the Corporate Archives and Records Management Services if required.</i></p>
<b>4.4 Exit planning</b>	<p>You must not remove master copies of any working data that belongs to the University or to a third party with which the University has an agreement. The University's IP policy allows you to take a copy for teaching and research purposes; if you intend to use the data for other purposes (e.g. commercial), this should be agreed in writing with the Head of School or Research Centre.</p> <p>Before leaving the University, you should arrange access for at least one other researcher or your Head of School or Research Centre to the data and any documentation relating to it.</p> <p>Copies of completed data that you have deposited in the Griffith University Data Repository can remain in the care of the University. They will continue to be found and cited using the Digital Object Identifier (DOI) assigned to the collection at the time of publishing.</p> <p>You must remove from University systems any working data that belongs to you. On leaving Griffith, it is your responsibility to ensure this data is stored and managed correctly, that the privacy and confidentiality of the data is kept intact, and that the data is deposited or disposed of appropriately at the end of the retention period.</p>	