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Illustration inspired by the work of John Maynard Keynes

Sharing research data: what publishers want authors to know

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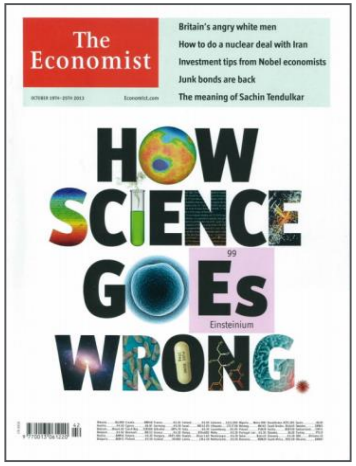
ADVANCING DISCOVERY

- Why do journals have research data policies?
- What are the key features of journal data policies?
- What are the most common methods of data sharing at journals?
- How do you choose the right repository for your data?

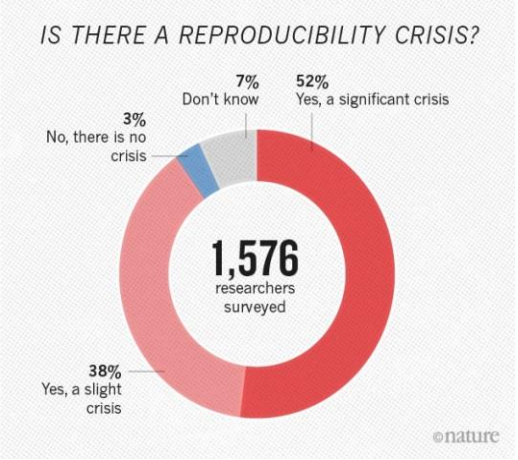
The “replication crisis”

Evidence is mounting on costs & scale of the issue



- Irreproducible biology research costs US $28 billion per year[1]
- Pharma companies report 75%+ failure rates replicating conclusions of peer-reviewed papers [2,3]

A recent *Nature* survey[4] highlights concern in the research community



>50% of researchers couldn’t reproduce their own experiments

>70% couldn’t reproduce the work of others

There is evidence that data availability increases reproducibility

A study[5] of eighteen *Nature Genetics* papers found :

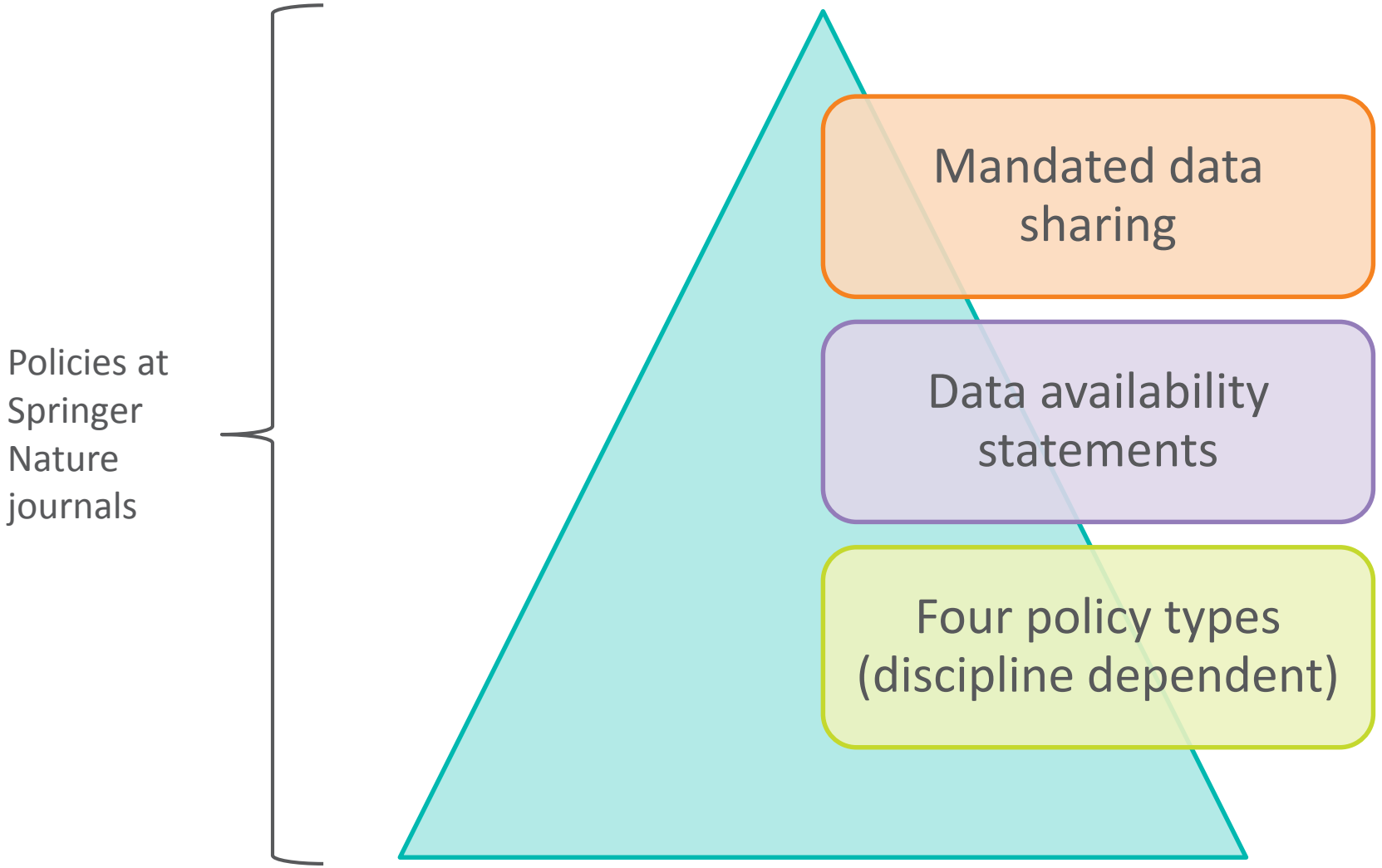
- Two could be reproduced fully
- Six were reproduced partially
- Ten could not be reproduced

“The main reason for failure to reproduce was data unavailability, and discrepancies were mostly due to incomplete data annotation or specification of data processing and analysis.”

— *Nature Genetics* **41,** 149–155 (2009)

1. Freedman, L. P., Cockburn, I. M. & Simcoe, T. S. *PLoS Biol.* **13**, e1002165 (2015) http://journals.plos.org/plosbiology/article?id=10.1371/journal.pbio.1002165
2. Begley, C. G. & Ellis, L. M. *Nature* **483**, 531–533 (2012), 3. Prinz, F., Schlange, T. & Asadullah, K. *Nature Rev. Drug Discov.* **10**, 712 (2011)
4. Baker (2015) http://www.nature.com/news/1-500-scientists-lift-the-lid-on-reproducibility-1.19970
5. Ioannidis et al (2009) https://www.nature.com/ng/journal/v41/n2/full/ng.295.html

Research data policies at Springer Nature



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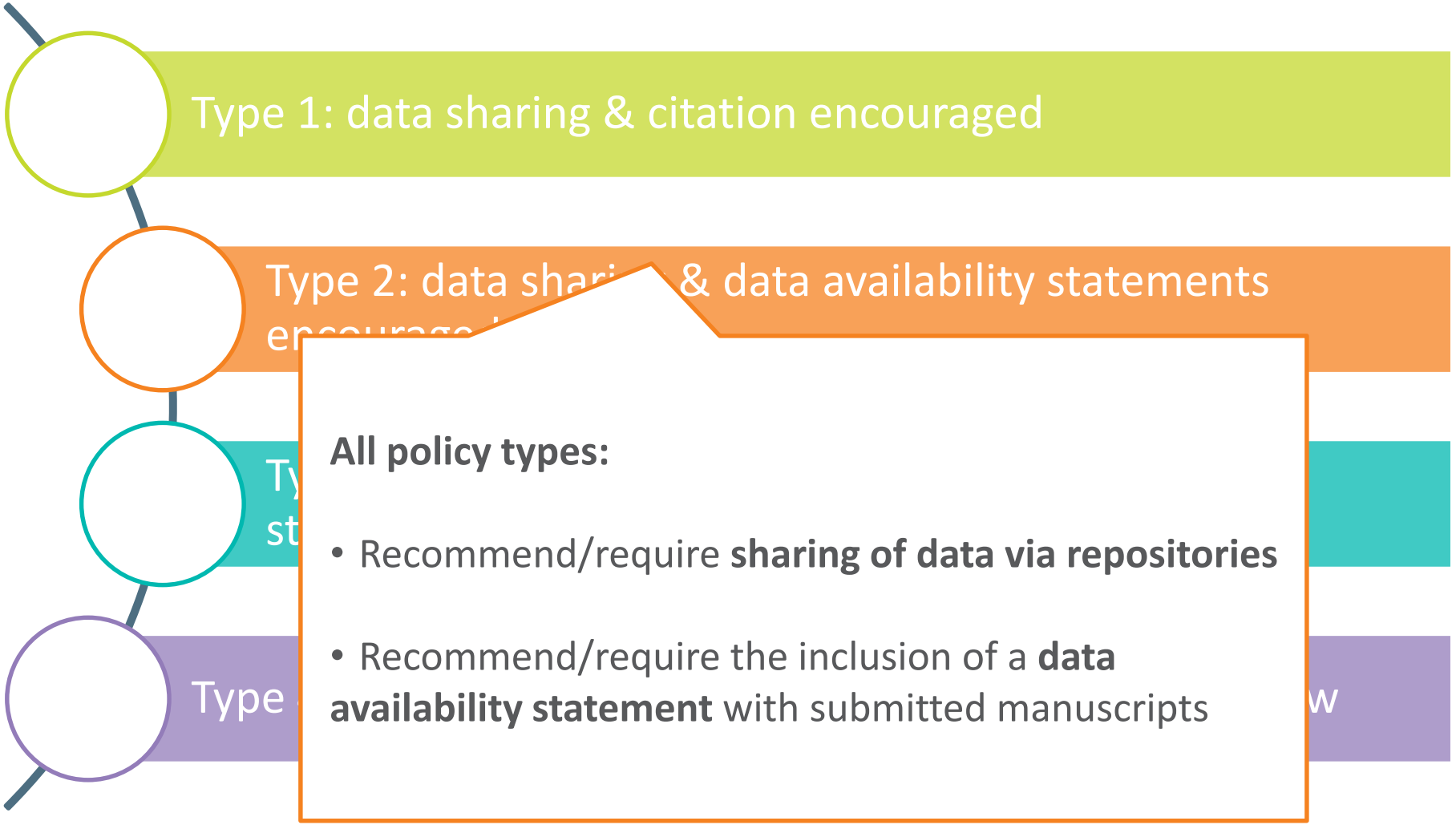
Data sharing policies

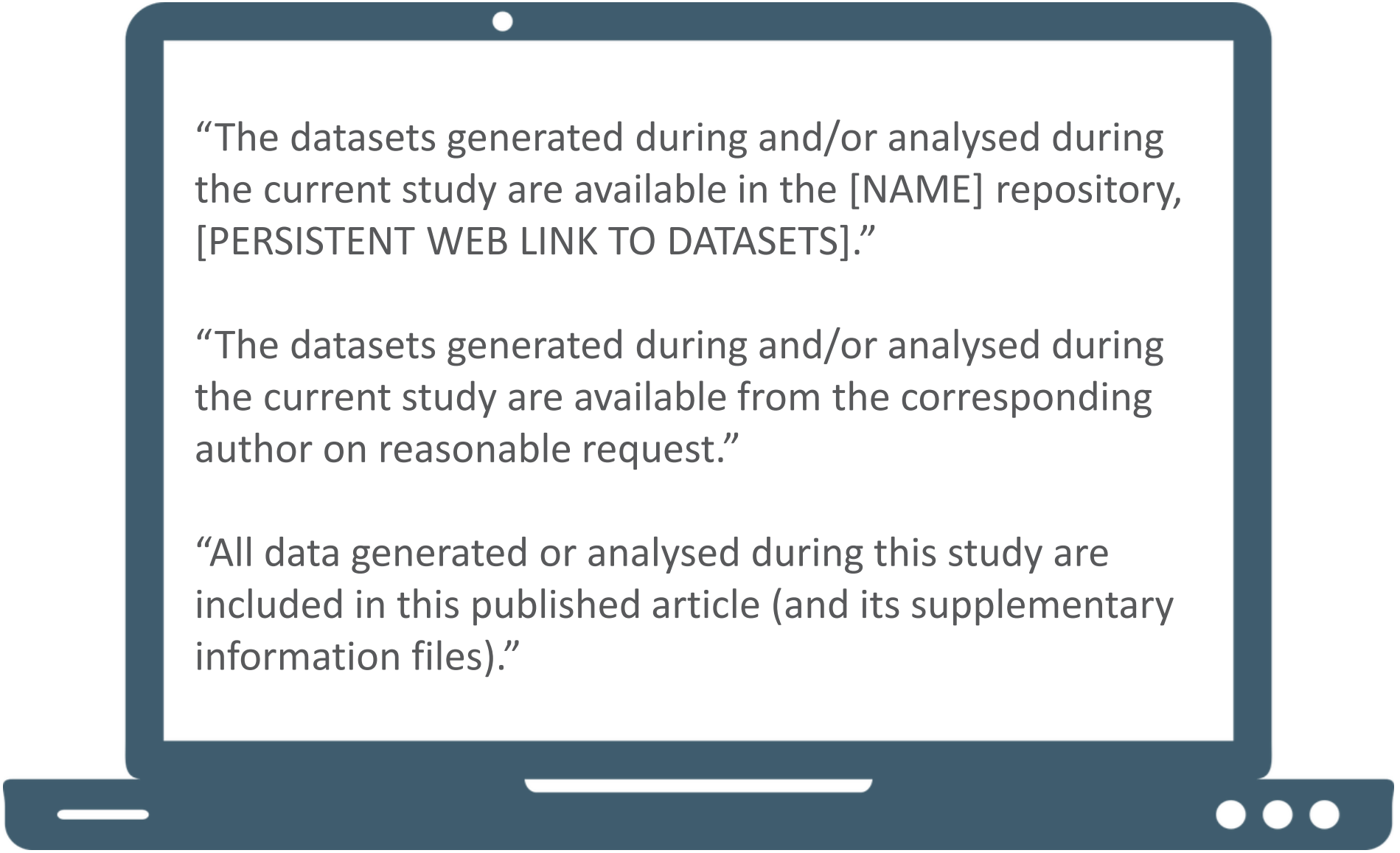
Publisher data policies

- **All major publishers** now have research data policies for their authors and are working together to explore consistent approaches.
- Policies relate to the **data underpinning the articles** submitted to journals.
- **Policies can differ** depending on the discipline and journal.
- **Before manuscript submission**, check your chosen journal's policy and what you may be asked to do.

Standard data policies at Springer Nature

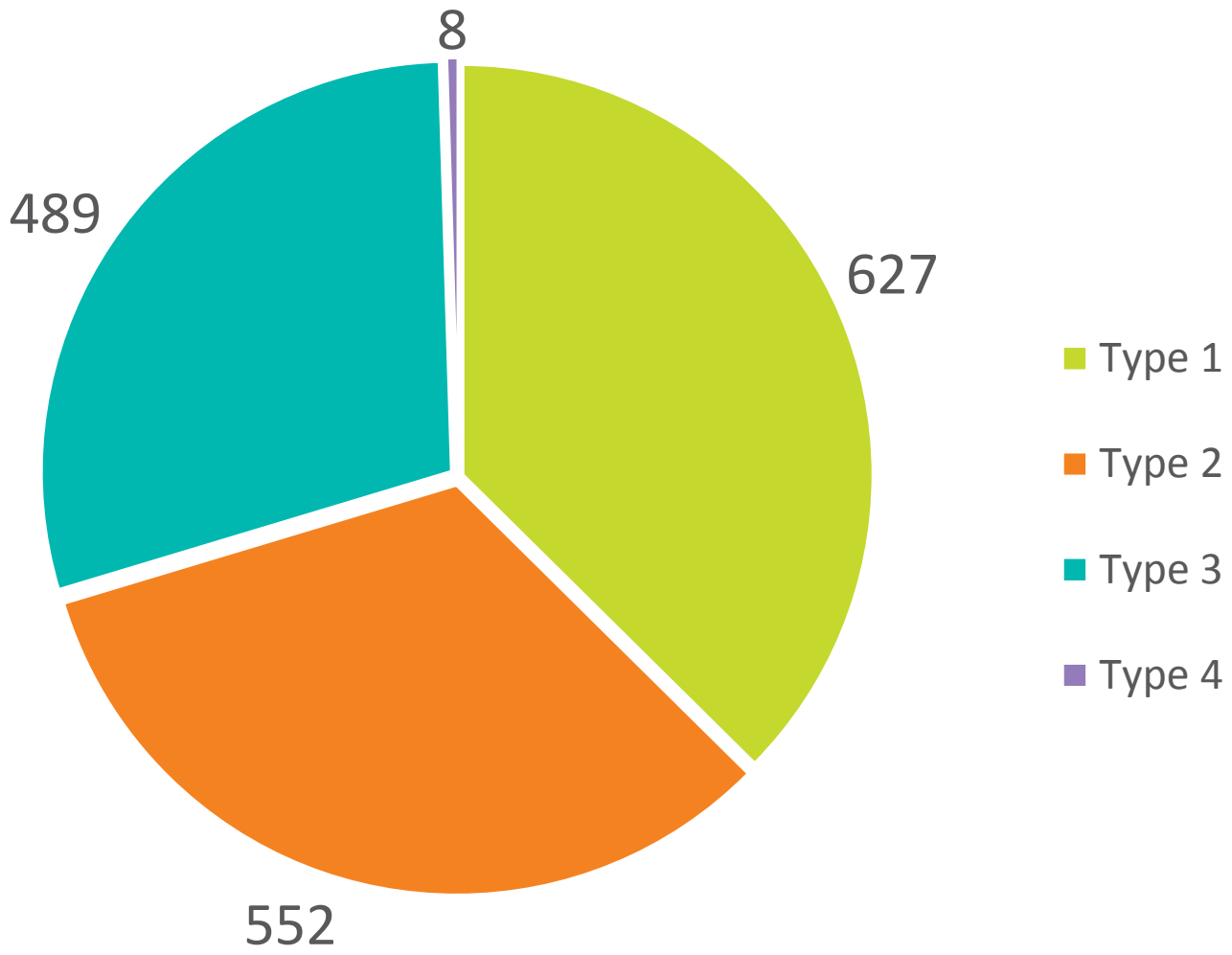


What is a data availability statement (DAS)?



What our journal policies require

497 journals **require** a data availability statement (29%)



n = 1676

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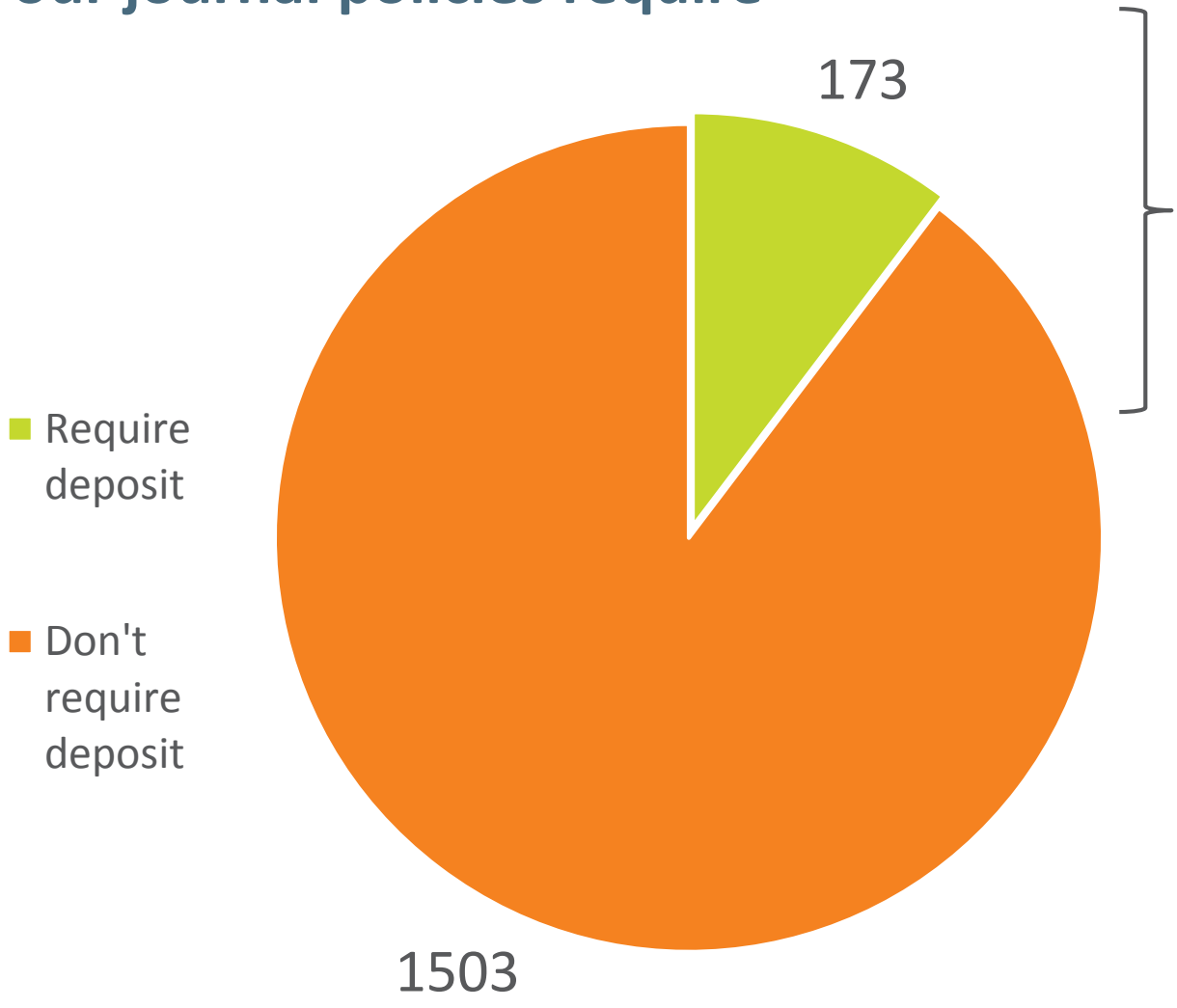
What our journal policies require



173 journals **require** data to be deposited in a repository (10%)

*This includes life sciences journals with community mandates for deposit

n = 1676

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Options for research data sharing

How can you comply with journal data policies?

Type 1 & 2 policy journals

- Add DAS if desired
- Any data sharing option allowed

Type 3 journals

- DAS is required
- Any data sharing option allowed*

Type 4 journals

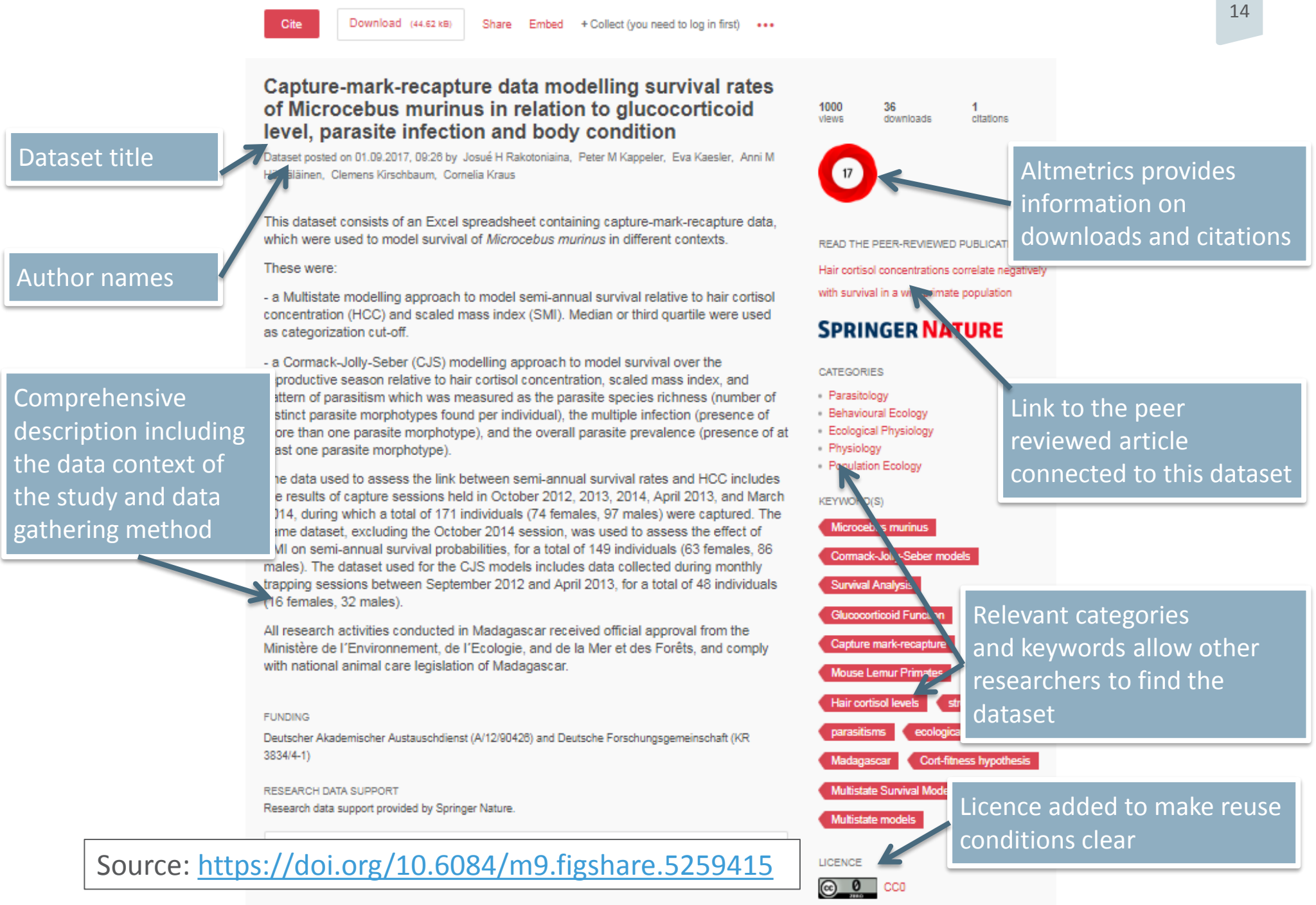
- DAS is required
- Data must be in a repository

Some data are subject to community mandates for sharing

Mandatory deposition	Suitable repositories
Protein sequences	Uniprot
DNA and RNA sequences	Genbank
	DNA DataBank of Japan (DDBJ)
	EMBL Nucleotide Sequence Database (ENA)
DNA and RNA sequencing data	NCBI Trace Archive
	NCBI Sequence Read Archive (SRA)
Genetic polymorphisms	dbSNP
	dbVar
	European Variation Archive (EVA)
Linked genotype and phenotype data	dbGAP
	The European Genome-phenome Archive (EGA)
Macromolecular structure	Worldwide Protein Data Bank (wwPDB)
	Biological Magnetic Resonance Data Bank (BMRB)
	Electron Microscopy Data Bank (EMDB)
Gene expression data (must be MIAME compliant)	Gene Expression Omnibus (GEO)
	ArrayExpress
Crystallographic data for small molecules	Cambridge Structural Database
Proteomics data	PRIDE
*Earth, space & environmental sciences	Recommended Repositories

Thinking outside of data policy requirements..

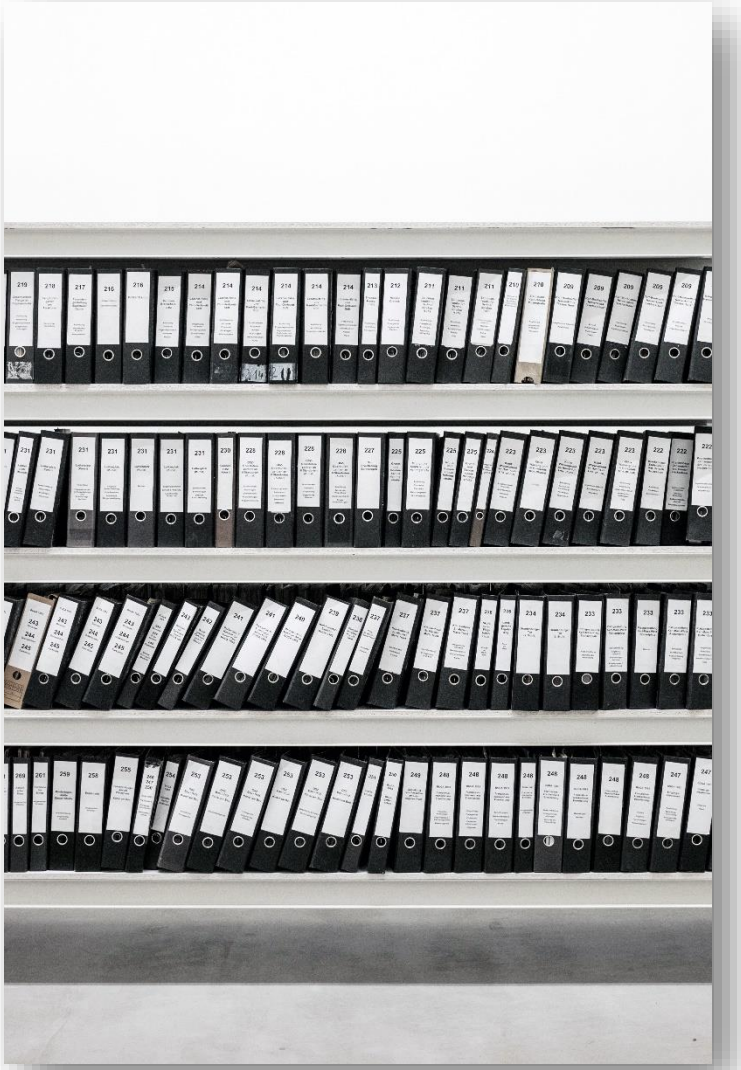
- Community expectations to share certain data in a repository even at Type 2 and 3 journals - this will be clear from the journal's instructions for authors.
- Peer reviewers or editors may require you to share other data types in repositories, at their discretion.
- You will NOT be forced to share your data if it would be inappropriate to do so, e.g. human data without consent to share, data you do not own.



Source: https://doi.org/10.6084/m9.figshare.5259415

Common features of data repositories

- Provide a place to **share your data and metadata**.
- Assign a **persistent and unique identifier and URL** for your data.
- Provide a **landing page** for your dataset.
- Most guarantee **data preservation** for a defined period of time (most).
- Some provide guidance on the landing page as to **how your data should be cited.**
- Some manage **data access requests** on your behalf.



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How do I pick a data repository?

1. Start by using an appropriate **repository list or indexing service** for your specific needs.
2. If there is a **discipline or data-specific repository** for your data type, upload your data there.
3. If no discipline or data-specific repository exists for your data type, select **a generalist repository** for your data.

- Be aware that your funder, institution or journal may mandate deposit in a particular data repository.
- Be aware that you may need to upload your data to several repositories, depending on what you aim to deposit.

Repository resources, indexes and lists

Indexing services

re3data.org
REGISTRY OF RESEARCH DATA REPOSITORIES

FAIRsharing.org
standards, databases, policies

Curated lists

SCIENTIFIC DATA

elixir

AGU100 ADVANCING EARTH AND SPACE SCIENCE

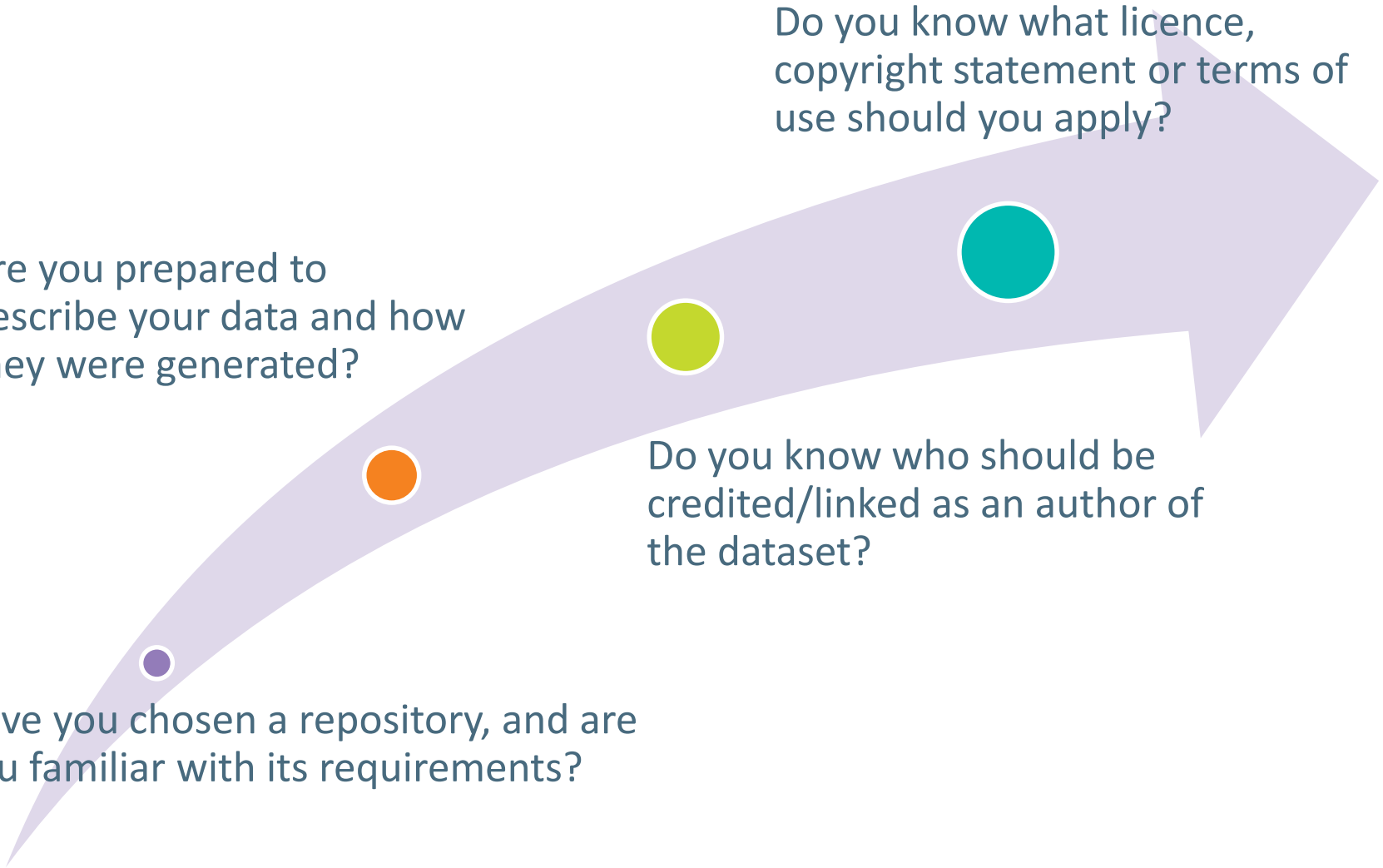
Certified repositories

CORE TRUST SEAL

Tools to help select repositories

https://repositoryfinder.datacite.org/

Steps to data deposit



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Benefits of data sharing in repositories

PLOS ONE

OPEN ACCESS PEER-REVIEWED

RESEARCH ARTICLE

The citation advantage of linking publications to research data

Giovanni Colavizza, Iain Hrynaszkiewicz, Isla Staden, Kirstie Whitaker, Barbara McGillivray

Published: April 22, 2020 • https://doi.org/10.1371/journal.pone.0230416

- Linking papers to their supporting data in a repository was associated with an average **25% increase in citations**
- Study based on **over half a million** open access articles

https://doi.org/10.1371/journal.pone.0230416

In summary: Journal policies and data sharing

- ✓ Check the policy requirements that apply to you.
- ✓ Don’t assume that all journals have the same policy.
- ✓ At most journals, you should expect to include a data availability statement with your manuscript.
- ✓ Policies give you high-level guidance but editors and peer reviewers can use their discretion and request data sharing.
- ✓ Editors will not force you to share something that you shouldn’t.
- ✓ There are many repositories available for your data, and tangible benefits to using them.

Useful resources

- Writing a data availability statement: https://tinyurl.com/DAStips
- FAQs and Author Support: https://tinyurl.com/SNdataFAQs
- Recommended repositories list: https://tinyurl.com/SNrepos
- Repositories index: www.re3data.org
- Repositories, policies and data standards: www.fairsharing.org

Research data training from Springer Nature

- Training from Nature Research Academies: https://partnerships.nature.com/product/nature-research-academies-research-data-workshops/

- Nature Masterclasses Online “Managing Research Data to Unlock its Full Potential” (free taster): https://masterclasses.nature.com/online-course-in-managing-data/18365540

Thank you for your attention.

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