



# Open Science for Health Sciences

EIFL Training Programme Outline  
for Librarians and Open Science Trainers

August 2024



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## Introduction

The adoption of open science practices in health sciences is associated with many challenges, such as the lack of awareness, skills, resources, and infrastructure for research data management, as well as the complexity of legal and ethical considerations related to research data sharing.

To support university and research libraries, as well as all trainers working with researchers and students in health sciences, EIFL has compiled a training programme outline that can be used to develop training about the implementation of open science practices in health sciences.

## How can librarians use this resource?

This resource is divided into six sections: Introduction to Open Science, FAIR and open data, Open research tools and resources, Communicating research, Citizen Science, Responsible research and ethics.

Each section gives an overview of the topic, what the trainer should cover, and what the learner should gain by the end of the training. Each topic includes “Resources for facilitators and learners”, with useful material that trainers and learners can use to improve their own knowledge or, if the licence allows, use in their own training.

The outline focuses on the meeting points between open science and health sciences and does not cover general and disciplinary specific topics, tools and methods in full detail.

In order to be able to follow the programme learners should have some general and disciplinary specific knowledge about research methodology.

We encourage you to become familiar with this training programme and to adapt and use relevant topics to train researchers, students and librarians.

If you would like to suggest new content and resources for consideration, please contact us at: [oa@eifl.net](mailto:oa@eifl.net).

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# Introduction to Open Science

This training provides a brief introduction into Open Science (OS), highlighting the benefits of OS practices in health sciences.

By the end of this training, learners should be able to:

- Explain the principles and practices of open science (OS)
- Explain the benefits of OS
- Explain the benefits of OS practices in health sciences

## Training outline

- Definitions of OS
- Components/pillars of OS
- Transparency and reproducibility
- Benefits of OS for health sciences (citing examples, e.g. COVID-19 research)

## Resources for facilitators and learners

### Online courses

- Almarzouq, B., Azevedo, F., Batalha, N., Bayer, J., Bell, T., Bhogal, S., Black, M., Brown, S., Campitelli, E., Chegini, T., Dunleavy, D., Ee, Y. K., El-Gebali, S., Erdmann, C., Ferdush, J., Fouilloux, A., Hall, S. M., Kherroubi Garcia, I., Klusza, S., ... Yehudi, Y. 2023. Opensciency - A core open science curriculum by and for the research community. Zenodo. <https://doi.org/10.5281/zenodo.7662732>
- *MOOC for Open Science in the Life Sciences 2.0*. ORION\_MOOC\_2.0 ORION. <https://www.open.edu/openlearncreate/course/view.php?id=4633>
- NBIS - National Bioinformatics Infrastructure Sweden. 2023. *Open Science and FAIR*. <https://nbisweden.github.io/module-open-science-dm-practices/>
- *FORRT's Educational Nexus*. FORRT - Framework for Open and Reproducible Research Training. <https://forrt.org/nexus/>.

### Videos, webinars, online tutorials

- Sorbonne Université. 2021. *What is Open Science? | Open for You! An Introduction Series to Open Science*. <https://www.youtube.com/watch?v=mVCDkhxxUgg>
- Hotchkiss Brain Institute (HBI). 2020. *Open Science with OHDSI: From Question to Evidence in 4 Days*. [https://www.youtube.com/watch?v=A1S\\_wDBE-i4](https://www.youtube.com/watch?v=A1S_wDBE-i4)
- Hotchkiss Brain Institute (HBI). 2021. *What Is Open Science?*. [https://www.youtube.com/watch?v=Bq1Epvz\\_RH8](https://www.youtube.com/watch?v=Bq1Epvz_RH8)
- National Library of Medicine. 2024. *What Is Open Science?*. <https://www.youtube.com/watch?v=3PEY1341LHU>
- National Library of medicine. 2021. *What Is Open Science? An Introduction for the Public; 2021*. <https://www.youtube.com/watch?v=WQmJOrAupSU>

### Collections of resources

“Open Research Resources.” UK Reproducibility Network.  
<https://www.ukrn.org/open-research-resources/>.

# FAIR and open data in Health Sciences

This section focuses on the key principles and practices related to research data management and sharing in health sciences. Learners will gain an understanding of the importance of data sharing, learn how to manage data across the research data lifecycle, and deal with legal and ethical requirements for handling sensitive and personal data.

We have identified the following topics that researchers and must know well:

[Introduction to FAIR and open data](#)

[Research data management](#)

[Managing sensitive and personal data](#)

## Introduction to FAIR and open data

This training covers the fundamental concepts related to research data reuse and sharing in health sciences.

By the end of this training, learners should be able to:

- Explain the importance of data reuse and sharing for health research
- Know where to find (open) data for their research
- Explain the concepts of Findability, Accessibility, Interoperability, and Reusability of research data in the context of health sciences
- Understand CARE principles (Collective Benefit, Authority to Control, Responsibility, Ethics) for Indigenous Data Governance

## Training outline

- Why is it important to share data?
- Sources of open data for health research (specific to various research topics)
- FAIR principles: Findability, Accessibility, Interoperability, and Reusability of research data
- CARE principles (Collective Benefit, Authority to Control, Responsibility, Ethics) for Indigenous Data Governance

## Resources for facilitators and learners

### Learning paths

- EMBL-EBI. *Finding and using publicly available data - A curated set of online courses*. <https://doi.org/10.6019/TOL.PublicDataCollection-t.2022.00001.1>
- EMBL-EBI. *Federated data analysis - From finding data to data analysis following FAIR principles* [learning path]. <https://doi.org/10.6019/TOL.FederatedData-t.2023.00001.1>

## Publications

- Tamuhla, T.; Lulamba, E. T.; Mutemaringa, T.; Tiffin, N. 2024. Multiple Modes of Data Sharing Can Facilitate Secondary Use of Sensitive Health Data for Research. *BMJ Global Health* 8 (10), e013092. <https://doi.org/10.1136/bmjgh-2023-013092>
- Lubiana, T.; Amaral, O. B.; Neves, K. 2021. Sharing Intermediate Datasets from Systematic Reviews. OSF. <https://doi.org/10.31222/osf.io/vbwa9>

## Videos, webinars, online tutorials

- Journalology OHRI. 2022. *RDM Workshop Series - Benefits of Open Data for Public Health*. <https://www.youtube.com/watch?v=c2mwFLU2yD0>
- Center for Open Science. 2024. *Open Science Data for Space Biology and Health Research*; <https://www.youtube.com/watch?v=dFt0G-XLCYI>
- European Bioinformatics Institute - EMBL-EBI. *Finding the Data behind Research Articles with Europe PMC*. <https://embl-ebi.cloud.panopto.eu/Panopto/Pages/Viewer.aspx?id=13c9057b-f24f-44bf-9f3b-abc000f4852e>
- European Bioinformatics Institute - EMBL-EBI. 2020. *Europe PMC Programmatic Access Webinar*, 2020. [https://www.youtube.com/watch?v=u4\\_5wdpiJCc](https://www.youtube.com/watch?v=u4_5wdpiJCc)
- CINECA Project. 2021. *Practically FAIR*. <https://www.youtube.com/watch?v=3NODvP4aDWI>
- Ontologies in Agriculture. 2021. *The CARE Principles of Indigenous Data Governance*. <https://www.youtube.com/watch?v=309QIZt9H74>

## Library guides

- Data Resources for Health & Medical Research. Welch Medical Library. <https://browse.welch.jhmi.edu/data-resources/open-data>

## Collections of resources

- *Managing and sharing research data*. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians. <https://eifl.net/programme/digital-research-literacy/managing-and-sharing-research-data>

## Repositories and datasets

- *SRDR+*: *Systematic Review Data Repository*. Agency for Healthcare Research and Quality. [https://srdplus.ahrq.gov/?no\\_redirect=true](https://srdplus.ahrq.gov/?no_redirect=true)
- SYNERGY Dataset, 2024. <https://github.com/asreview/synergy-dataset> (open machine learning dataset on study selection in systematic reviews).

# Research data management

This training covers the basics of research data management.

By the end of this training, learners should be able to:

- Understand the research data lifecycle
- Explain why it is important to manage research data
- Be able to identify and implement data management procedures relevant for each stage of the research data lifecycle
- Understand the challenges of data management in health sciences
- Be able to prepare a data management plan
- Know where and how to publish/share research data

## Training outline

- Research data lifecycle
- Research data in institutional and funder policies [note to trainers: add local examples]
- Research data organization, documentation and metadata.
- Research data storage, back-up and long-term preservation
- Legal and ethical requirements
- Research data sharing and re-use
- Research data management responsibilities
- Data management plan (DMP)
- DMP tools
- Publishing/sharing research data

## Resources for facilitators and learners

### Online courses

- *Bringing data to life: data management for the biomolecular sciences*. 2021. EMBL-EBI Training. [https://doi.org/10.6019/TOL.Data\\_Management-w.2018.00001.1](https://doi.org/10.6019/TOL.Data_Management-w.2018.00001.1)

### Publications

- Lubiana, T.; Amaral, O. B.; Neves, K. 2021. Sharing Intermediate Datasets from Systematic Reviews. OSF. <https://doi.org/10.31222/osf.io/vbwa9>

### Videos, webinars, online tutorials

- Journalology OHRI. 2023 *Data Champions Symposium - Expanding the Data Champions Program*. 2023. <https://www.youtube.com/watch?v=pPK5DFhRItE>
- Journalology OHRI. 2023 *Data Champions Symposium - A Biomedical Data Management and Sharing Exemplar*. <https://www.youtube.com/watch?v=uoj5hMyLjdQ>
- Research Data Management @ Austria. 2022. *Licenses for Research Data*. <https://www.youtube.com/watch?v=eCdsgUhFBy0>
- NBIS - National Bioinformatics Infrastructure Sweden. 2023. *Data publication*. <https://nbisweden.github.io/module-data-publication-dm-practices/>

- Office of Scholarly Communication, Cambridge. 2021. *Sharing Your Data in a Repository* <https://www.youtube.com/watch?v=eAFLPwOT-M>
- NIH - DPCPSI. 2021. *Data Repositories 101*. <https://www.youtube.com/watch?v=UJsdBpCGx58>
- UK Data Service. 2019. *Research Data Lifecycle*. <https://www.youtube.com/watch?app=desktop&v=-wjFMMQD3UA>
- UGent Open Science. 2020. *Knowledge Clip: The Research Data Lifecycle*. [https://www.youtube.com/watch?v=OL\\_Vd9dd-AQ](https://www.youtube.com/watch?v=OL_Vd9dd-AQ)
- Journalology OHRI. 2022. *The Importance of Data Management*. <https://www.youtube.com/watch?v=BsfGwULkEHk>
- OpenAIRE. 2023. *ARGOS Tool Tutorial: How to Have Access to ARGOS*; 2023. <https://www.youtube.com/watch?v=Yxhh0VmCt4E>
- UGent Open Science. 2023. *Knowledge Clip: Data Repositories*; 2023. [https://www.youtube.com/watch?v=pm\\_C0U8ByYE](https://www.youtube.com/watch?v=pm_C0U8ByYE)

## Guides

*Guides - Research Data Management Support*. Utrecht University. <https://www.uu.nl/en/research/research-data-management/guides>

## Collections of resources

- *Managing and sharing research data*. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians. <https://eifl.net/programme/digital-research-literacy/managing-and-sharing-research-data>.
- *Writing a data management plan (DMP)*. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians. <https://eifl.net/programme/digital-research-literacy/writing-data-management-plan-dmp>.

## Managing sensitive and personal data

This training explains the distinctions between personal and sensitive data and discusses legal requirements for personal and sensitive data protection, as well as data protection procedures and tools.

By the end of this training, learners should be able to:

- Understand how different privacy laws, including the GDPR (General Data Protection Regulation in Europe) define and treat personal and sensitive data
- Be able to identify personal and sensitive data
- Be familiar with different procedures and tools for sensitive data protection

## Training outline

- Legal requirements relating to personal and sensitive data protection
- Distinction between personal and sensitive data
- Data protection procedures and tools



## Resources for facilitators and learners

### Online courses

- EMBL-EBI. *Working with sensitive data*.  
<https://doi.org/10.6019/TOL.BiocurationSensitive-w.2022.00001.1>
- Utrecht University. *Policies, codes of conduct and laws - Research Data Management Support*.  
<https://www.uu.nl/en/research/research-data-management/guides/policies-codes-of-conduct-and-laws>
- Utrecht University. *Handling personal data - Research Data Management Support*.  
<https://www.uu.nl/en/research/research-data-management/guides/handling-personal-data>

### Publications

- Tamuhla, T.; Lulamba, E. T.; Mutemaringa, T.; Tiffin, N. 2023. "Multiple Modes of Data Sharing Can Facilitate Secondary Use of Sensitive Health Data for Research." *BMJ Global Health* 8 (10), e013092. <https://doi.org/10.1136/bmjgh-2023-013092>
- Ficek, J.; Wang, W.; Chen, H.; Dagne, G.; Daley, E. 2021. "Differential Privacy in Health Research: A Scoping Review." *J Am Med Inform Assoc* 28 (10), 2269–2276. <https://doi.org/10.1093/jamia/ocab135>

### Videos, webinars, online tutorials

- Journalology OHRI. 2022. *RDM Workshop Series - Clinical Trials Data Sharing*.  
<https://www.youtube.com/watch?v=1eyzu3CemJc>
- Journalology OHRI. 2022. *RDM Workshop Series - Electronic Health Information Sharing and Privacy/Security*. <https://www.youtube.com/watch?v=k9vMGRJr43g>
- Journalology OHRI. 2022. *RDM Workshop Series - Patient Preferences for Data Sharing and Privacy Considerations*.  
[https://www.youtube.com/watch?v=w\\_MdL9HmlhU](https://www.youtube.com/watch?v=w_MdL9HmlhU)
- Journalology OHRI. 2022. *RDM Workshop Series - Indigenous Health Data and Research at ICES*. <https://www.youtube.com/watch?v=s8ix2T7qhSA>
- Journalology OHRI. 2022. *RDM Workshop Series - Sharing Biological Data: Why, When, and How*. <https://www.youtube.com/watch?v=hVLyWOxdMXg>
- IBE Munich 2021. *Pseudonymization in Medicine*.  
<https://www.youtube.com/watch?v=ZDyt9ynSho4>
- NFDI. 2022. *NFDI ToolTalk: ARX Data Anonymization Tool*.  
<https://www.youtube.com/watch?v=kX5qJob7NIg>
- Simply Explained; 2018. *Differential Privacy*.  
<https://www.youtube.com/watch?v=gl0wk1CXIsQ>
- NIHR University College London Hospitals Biomedical Research Centre. *Anonymising Patient Data for Research*.  
<https://www.youtube.com/watch?v=Q9-jh7TsXF0>
- OpenAIRE. 2022. *Amnesia Anonymization Tool Tutorial: Load Dataset*.  
<https://www.youtube.com/watch?v=vZbU0n6n01c>
- OpenAIRE. 2022. *Amnesia Anonymization Tool Tutorial: Data Anonymization*.  
<https://www.youtube.com/watch?v=D3TQOogv-HA>

# Open research tools and resources

This training highlights the importance of free and open source software (FOSS) and open hardware for health sciences.

By the end of this training, learners should be able to:

- Understand the importance of free and open source software (FOSS) for health sciences
- Be aware of the widely used FOSS tools for data analysis and visualization
- Understand the importance of open hardware for health research

## Training outline

- The potential of FOSS tools
- Finding commonly used FOSS tools
- Using collaborative tools and platforms (e.g. GitHub, interactive notebooks)
- Virtual REsearch Environments (VRE) for health research
- Open hardware

## Resources for facilitators and learners

### Online courses

- The Carpentries. *Welcome – Introduction to Open Data Science with R*. <https://carpentries-incubator.github.io/open-science-with-r/>
- *Foundations of data analysis with R – The GRAPH Courses*. <https://thegraphcourses.org/courses/r-foundations-beta/>
- Chang, Winston. *Cookbook for R*. <http://www.cookbook-r.com/>
- Oxford Population Health. *FoSSA: Fundamentals of Statistical Software & Analysis – The GRAPH Courses*. <https://thegraphcourses.org/courses/fossa/>

### Publications and blogs

- Niezen, G.; Eslambolchilar, P.; Thimbleby, H. 2016. Open-Source Hardware for Medical Devices. *BMJ Innovations* 2 (2). <https://doi.org/10.1136/bmjinnov-2015-000080>
- Heath, V. 2020. *Open-Source Medical Hardware: What You Should Know and What You Can Do*. Creative Commons. <https://creativecommons.org/2020/04/15/open-source-medical-hardware-what-you-should-know-and-what-you-can-do/>

### Videos, webinars, online tutorials

- Bülau, Konstatin, Dege, Lion. 2022. *APIs - Interfacing Tools and Services*. <https://www.youtube.com/watch?v=1p75D9GNGPg>
- Bonaretti, S. 2020. *Why We Should Use Jupyter Notebook in Medical Image Analysis*. TORW2020. <https://www.youtube.com/watch?v=QSSgLflyisI>
- CINECA Project. 2022. *Text Mining Tools for Cleaning Cohort Data*. <https://www.youtube.com/watch?v=0jvumF37EKk>

- Parrot, Scott. 2023. *How To Extract Data from Systematic Review and Meta-Analysis*. <https://www.youtube.com/watch?v=8HVwAelAa8k>
- Jap, Jens. 2018. *Abstrackr: Collaborative Open-Source Analysis Tool for Systematic Reviews*; <https://www.youtube.com/playlist?list=PLimnjL5t2EFTQrXeGTt1qqZX6pSKKnBj6>
- Washington State University Libraries. *Using Zotero for Systematic Reviews*. Google Docs. [https://drive.google.com/file/d/1TEzwcwxO1tl8gtVt9WhZ5Fzc9TPsV07B/view?usp=embed\\_facebook](https://drive.google.com/file/d/1TEzwcwxO1tl8gtVt9WhZ5Fzc9TPsV07B/view?usp=embed_facebook)
- Berlin Institute of Health at Charité. *BIH/Charité Virtual Research Environment*. <https://www.bihealth.org/en/translation/network/digital-medicine/bihcharite-virtual-research-environment>
- The Open Source Hardware Association. 2022. *Open Hardware and Health Technology: A Panel Discussion*. <https://www.youtube.com/watch?v=pbD4TbsmTeY>
- National Library of Medicine. 2021. *NCBI Minute: Using NCBI Datasets Command-Line Tools to Access Data and Metadata for Genomes*. <https://www.youtube.com/watch?v=I989pigiJzI>
- BrainModes. 2020. *What Is The Virtual Research Environment? (English)*. [https://www.youtube.com/watch?v=dsjE\\_iYZkcU](https://www.youtube.com/watch?v=dsjE_iYZkcU)

### Library guides

- Stansfield, C., Gough, D., Bangpan, M., Bhimani, N. 2021. *Systematic Reviews*. London: UCL Library Services, <https://library-guides.ucl.ac.uk/systematicreviews>

### Curated lists of tools

- Awesome Health. <https://github.com/kakoni/awesome-healthcare>
- Wellcome / EPSRC Centre for Interventional and Surgical Sciences. *WEISS Open Source Tools*. <https://www.ucl.ac.uk/interventional-surgical-sciences/weiss-open-research/weiss-open-source-tools>
- National Library of Medicine. *Data & Software - Site Guide*. <https://www.ncbi.nlm.nih.gov/guide/data-software/>
- *Category:Medical devices*. Appropedia, the sustainability wiki. [https://www.appropedia.org/Category:Medical\\_devices](https://www.appropedia.org/Category:Medical_devices)

# Communicating research

This section focuses on the key aspects of communicating research results. It helps learners understand reporting guidelines and apply the appropriate standards for different types of studies. The concept of preregistration is explained, as well as the importance of early sharing of research results through preprint platforms. Different open access publishing options are presented. The training outline also provides information about methods to enhance the transparency of the peer review process and familiarizes learners with platforms supporting open peer review.

We have identified the following topics that researchers and must know well:

[Reporting guidelines](#)

[Preregistration](#)

[Preprints](#)

[Open access to publications](#)

[Open peer review](#)

## Reporting guidelines

This training covers reporting standards and requirements for various types of research studies.

By the end of this training, learners should be able to:

- Understand the reporting standard and requirements for various type of research studies
- Select appropriate guideline for their study
- Find additional resources by browsing and searching on the Equator Network website

## Training outline

- Different types of reposting guidelines
- Using reporting guidelines to structure a study
- EQUATOR network resources

## Resources for facilitators and learners

### Library guides

- Sheffield Hallam University. *LibGuides: Open Research: Open Methods*. <https://libguides.shu.ac.uk/c.php?g=684448&p=4887352>
- University of Westminster. *Open Research Methods*. <https://www.westminster.ac.uk/research/researcher-support/open-research/open-research-methods>

## Presentations

- EQUATOR Network. *Lectures and presentations*.  
<https://www.equator-network.org/category/events/lectures-and-presentations/>

## Videos, webinars, online tutorials

- JBI. 2024. *Reporting Guidelines for Health Research*.  
<https://www.youtube.com/watch?v=pBa77UfMS1M>

# Preregistration

This training explains the concept of preregistration and its benefits in promoting research transparency. Preregistration workflows and common preregistration platforms and repositories are also covered.

By the end of this training, learners should be able to:

- Explain preregistration and its benefits in promoting the transparency of research
- Understand the preregistration workflow
- Identify common preregistration platforms and repositories (e.g. such as ClinicalTrials.gov, Open Science Framework, Prospero, AsPredicted)

## Training outline

- What is a preregistered study?
- Why should you preregister your research?
- Preregistration workflows (practical steps)
- Preregistration platforms

## Resources for facilitators and learners

### Videos, webinars, online tutorials

- Center for Open Science. 2024. *Preregistration: A Plan, Not a Prison*.  
<https://www.youtube.com/watch?v=NzZTtB2qkmg>
- Journalology OHRI. 2022. *RDM Workshop Series - Preclinical trials.Eu and Data Sharing*; 2022. <https://www.youtube.com/watch?v=8ajO5kqPLaw>

### Guides

- U.S. Department of Health & Human Services. *Pre-Registering Studies – What Is It, How Do You Do It, and Why?*  
<https://www.acf.hhs.gov/opre/blog/2022/08/pre-registering-studies-what-it-how-do-you-do-it-and-why>
- Center for Open Science, *Preregistration*. <https://www.cos.io/initiatives/prereg>
- *Preregistration*. PhD on track.  
<https://www.phdontrack.net/open-science/preregistration/index.html>

## Preprints

This training highlights the importance of early sharing of research results and explains the concept of preprints.

By the end of this training, learners should be able to:

- Explain the importance of the early sharing of research results
- Know what preprints are
- Find a suitable preprints platform to share their early findings
- Understand how sharing preprints can benefit their career progression.

## Training outline

- What are preprints?
- What do your peers think about preprints?
- Weighing the pros and cons of preprints.
- Want to give it a try? Discipline-specific and general preprint repositories that you can use.
- Preprints in the time of COVID-19.

## Resources for facilitators and learners

### Online courses

- EMBL-EBI. *Open access: publications and preprints*.  
<https://doi.org/10.6019/TOL.OpenAccessPublications-w.2021.00001.1>

### Videos, webinars, online tutorials

- Scientific Writing School. 2021. *What Are Preprints? Should You Publish Your Scientific Research Paper as a Preprint?*.  
<https://www.youtube.com/watch?v=JE35vwnitRs>
- van Vliet, Arnoud. 2021. *An Introduction to Preprints and bioRxiv*. University of Surrey. <https://www.youtube.com/watch?v=CAHBrcgsEsA>
- Rodrigues Araujo, D.; Parkin, M.; Rosonovski, S. *Europe PubMed Central: Quick tour*. <https://doi.org/10.6019/TOL.EPMC-qt.2017.00001.2>
- EMBL-EBI. *How to make your research open with Europe PMC*.  
[https://doi.org/10.6019/TOL.OpenResearch\\_ePMC-w.2023.00001.1](https://doi.org/10.6019/TOL.OpenResearch_ePMC-w.2023.00001.1) (video:  
<https://www.youtube.com/watch?v=tsMibKz0cfU>)
- sivabioinfo. 2022. *How to Use Preprint Servers to Improve Citations | Biorxiv, Arxiv, Chemrxiv, Authorea, EuropePMC*. <https://www.youtube.com/watch?v=Z5a0dRxeDIO>
- eLife. 2021. *eLife and the Future of Preprints: Monash University Preprint Event*.  
[https://www.youtube.com/watch?v=-v2M\\_yafaUQ](https://www.youtube.com/watch?v=-v2M_yafaUQ)
- Rodrigues Araujo, D.; Parkin, M.; Rosonovski, S. *Europe PubMed Central: Quick tour*.  
<https://doi.org/10.6019/TOL.EPMC-qt.2017.00001.2>.[https://www.youtube.com/watch?v=-v2M\\_yafaUQ](https://www.youtube.com/watch?v=-v2M_yafaUQ)
- Shannon, Paul. 2024. *A New Science Publishing Model for a More Open Future*. Center for Open Science. [https://www.youtube.com/watch?v=OxF\\_gyxig74](https://www.youtube.com/watch?v=OxF_gyxig74)

## Collections of resources

- *Preprints*. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians. <https://www.eifl.net/programme/digital-research-literacy/preprints>

## Open access to publications

This training highlights the benefits of open access to publications. It explains the different models of open access (OA), typical policy requirements relating to OA and strategies to comply with OA policies.

By the end of this training, learners should:

- Understand how to publish their work openly and be aware of the advantages of OA.
- Understand different OA models.
- Understand rights retention.
- Be able to find an OA publishing option for their research.
- Know how to find a suitable repository to provide OA and archive their work.
- Know how to publish OA monographs.
- Understand funders' expectations and policies on OA.
- Be aware of the options to secure funding for Article Processing Charges (APCs) where applicable, and available discounts or waivers.

## Training outline

- OA drivers: increased discoverability, visibility and impact; funders' requirements to deposit in an OA repository; publishers' responses; rights retention.
- Get started with OA publishing by finding a suitable journal or a suitable repository for your publications.
- No-fee (Diamond) OA publishing.
- APC waivers and discounts.

## Resources for facilitators and learners

### Online courses

- EMBL-EBI. *How to make your research open with Europe PMC*. [https://doi.org/10.6019/TOL.OpenResearch\\_ePMC-w.2023.00001.1](https://doi.org/10.6019/TOL.OpenResearch_ePMC-w.2023.00001.1) (video: <https://www.youtube.com/watch?v=tsMibKz0cfU>)

### Videos, webinars, online tutorials

- CharlestonConference. 2022. *What's in a Waiver?* <https://www.youtube.com/watch?v=Dm7zYGYpox0>
- Goms Tech Talks. 2022. *Letter to Editor |writing a Letter to the Editor #1 | Requesting to Reduce the APC Charges| Trending*. [https://www.youtube.com/watch?v=59of\\_TSrC0w](https://www.youtube.com/watch?v=59of_TSrC0w)

## Collections of resources

- *Using Open Access (OA) routes to increase research impact*. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians.. <https://www.eifl.net/programme/digital-research-literacy/using-open-access-oa-routes-increase-research-impact>

## Open peer review

This training explains different ways to make peer review more transparent and highlights notable platforms using open peer review.

By the end of this training, learners should:

- Understand different ways to make peer review more transparent
- Be able to explain advantages and challenges
- Be familiar with platforms supporting open peer review (Health Open Research, Wellcome Open Research, Open Research Europe, Review Commons)

## Training outline

- The benefits of greater transparency in the peer review process
- Different ways to make peer review more transparent (open identities, open reports)
- Rewarding reviewers
- Challenges to open peer review
- Platforms supporting open peer review

## Resources for facilitators and learners

### Publications

- Ross-Hellauer, T. What Is Open Peer Review? A Systematic Review. *F1000Research* August 31, 2017. <https://doi.org/10.12688/f1000research.11369.2>

### Videos, webinars, online tutorials

- Ross-Hellauer, Tony. 2023. *Peer Review in the Age of Open Science*. <https://www.youtube.com/watch?v=qaSmsUswWhc>
- Ross-Hellauer, Tony. 2021. *Dr. Tony Ross-Hellauer on Open Science & Open Peer Review*. <https://www.youtube.com/watch?v=OeNTJ8clMtE>
- Shannon, Paul. 2024. *A New Science Publishing Model for a More Open Future*. Center for Open Science. [https://www.youtube.com/watch?v=OxF\\_gyxig74](https://www.youtube.com/watch?v=OxF_gyxig74)
- León, Alejandro. 2023. *Lightning Talk: Open Peer Review*. Center for Open Science. <https://www.youtube.com/watch?v=6TkWPqRI4Go>

### Guides

*FAQ on publishing peer review*. ASAPbio. <https://asapbio.org/pr-faq>



# Citizen/Community Science

This training provides the definition of citizen/community science and explains different levels of engagement in citizen/community science. The relevance of citizen/community science for health research is also discussed.

By the end of this training, learners should:

- Be able to define citizen/community science,
- Understand the significance of citizen/community science,
- Understand the different levels of public participation in citizen/community science;
- Know where to find learning resources and guidelines if they want to start citizen/community science projects
- Be familiar with citizen science platforms

## Training outline

- Different ways of engaging citizens and communities in scholarly research
- Types of citizen/community science activities
- Determining whether citizen/community science is an appropriate approach for a particular type of research
- Advantages and risks associated with citizen/community science projects
- Ethical considerations in citizen/community science
- Citizen science platforms

## Resources for facilitators and learners

### Online courses

- *EU-Citizen.Science : Resources.* [https://eu-citizen.science/training\\_resources](https://eu-citizen.science/training_resources)

### Videos, webinars, online tutorials

- Rasmussen, Lisa. 2021. *Ethical Considerations In Citizen Science with Dr. Rasmussen.* Network of the National Library of Medicine [NNLM]. <https://www.youtube.com/watch?v=7ZKBtrGUaEU>
- Santa Fe Institute. 2023. *Crowdsourced Wearable Data and Citizen Science for Public Health Research.* [https://www.youtube.com/watch?v=TXVJ\\_dp6pol](https://www.youtube.com/watch?v=TXVJ_dp6pol)
- The Australian Prevention Partnership Centre. 2021.
- *Explainer Video: What Is Citizen Science?* <https://www.youtube.com/watch?v=G2oen07wKKE>
- Medscape. 2017. *Citizen Science and Mapping the Microbiome.* Interview with Jessica Richman. <https://www.youtube.com/watch?v=aKIK3RiFYLY>
- Michelucci, Pietro. 2015. *Overview of Citizen Science Methodologies.* National Human Genome Research Institute. <https://www.youtube.com/watch?v=ZAvtCeBTDeU>
- SciStarter. 2023. *LIVE #26: Platforms and Resources for Citizen Science Project Leaders.* <https://www.youtube.com/watch?v=q6SUtz4mrPg>

# Responsible research and ethics

This training covers the basics of ethics in health sciences. Ethical challenges and common types of research misconduct are also discussed.

By the end of this training, learners should be able to:

- Know the basics of ethics in health sciences
- Identify ethical challenges throughout the research lifecycle
- Explain the most common types of research misconduct

## Training outline

- Ethics in data collection and informed consent
- What is ethical review and when is it needed?
- Data fabrication, falsification and manipulation, including image manipulation
- Plagiarism
- Questionable journals
- Paper mills
- Using generative AI tools

## Resources for facilitators and learners

### Online courses

- *TRREE: Training and resources in research ethic evaluation.* <https://elearning.trree.org/> [on-line training programme on the ethics and regulation of health research involving human participants]
- *Ethics in clinical trials.* EURORDIS Open Academy. <https://openacademy.eurordis.org/courses/ethics-in-clinical-trials/>

### Videos, webinars, online tutorials

- Writing Lab Tec de Monterrey. 2020. *Introduction to Ethics in Research.* [https://www.youtube.com/watch?v=jrzBc3jiS\\_0](https://www.youtube.com/watch?v=jrzBc3jiS_0)
- PAHO (Pan American Health Organization) TV. 2021. *When Does Health Research Need Ethics Review?.* [https://www.youtube.com/watch?v=3nT\\_2Gnnerg](https://www.youtube.com/watch?v=3nT_2Gnnerg)
- Writing Lab Tec de Monterrey. 2021. *Ethical Principles in Research Involving Humans as Subjects.* <https://www.youtube.com/watch?v=mRHif4WIB7c>
- PAHO (Pan American Health Organization) TV. 2021. *What Do Research Ethics Committees Review?.* <https://www.youtube.com/watch?v=Xd2cntkhllQ>
- Center for Taiwan Academic Research Ethics Education (AREE). 2022. *Authenticity Is the Way to Go: Data Fabrication and Falsification.* <https://www.youtube.com/watch?v=pWShZFXCSm4>
- Center for Taiwan Academic Research Ethics Education (AREE). 2023. *Conflicts of Interest in Research—What Should I Do When Facing Conflicts of Research?* (Taiwan Academic Ethics Education Resource Center). [https://www.youtube.com/watch?v=0wGI9fb\\_-mQ](https://www.youtube.com/watch?v=0wGI9fb_-mQ)

- Center for Taiwan Academic Research Ethics Education (AREE). 2023. *Copyright Issues in Academic Research*. <https://www.youtube.com/watch?v=ToTzngY8SIk>
- Lone Star College North Harris Library. 2020. *Research Misconduct: Fabrication & Falsification*. <https://www.youtube.com/watch?v=oLE9HzjgJf4>
- Bik, Elisabeth. 2022. *Dr. Elisabeth Bik on Misconduct in Biomedical Research | Odrta Znanost 2022 | Open Science 2022*; The Young Academy of Slovenia. <https://www.youtube.com/watch?v=fWmqDon0k8s>
- Ritchie, Stuart. 2020. *Scientific Fraud and Misconduct*. King's Open Research Conference. <https://www.youtube.com/watch?v=vp4Suz5cJeY>
- Sorbonne Université. 2022. *Predatory publishers and identity fraud - How to identify dubious providers | Open for You!*. <https://www.youtube.com/watch?v=z--A-qstE7s>.
- European Network for Academic Integrity. 2023. *The Rising Threat of Paper Mills (Anna Abalkina)*. <https://www.youtube.com/watch?v=osMaceoDh70>.
- Foltýnek, Tomáš; Sivasubramaniam, Shiva. 2023. *ENAI Recommendations on the Ethical Use of AI & ECEIA 2023*. <https://www.youtube.com/watch?v=DNkhgaPQMn4>

## Guides

- Utrecht University. *How to write an informed consent form - Research Data Management Support*. <https://www.uu.nl/en/research/research-data-management/guides/legal-considerations/how-to-write-an-informed-consent-form>
- JISC. 2023. 'Generative AI : A Primer'. <https://beta.jisc.ac.uk/reports/generative-ai-a-primer>.
- [Living guidelines on the responsible use of generative AI in research \(ERA Forum Stakeholders' document\)](#), 2024
- WAME. 2023. [Chatbots, ChatGPT, and Scholarly Manuscripts](#), [WAME Recommendations on ChatGPT and Chatbots in Relation to Scholarly Publications](#)
- UNESCO. 2023. 'UNESCO's Recommendation on the Ethics of Artificial Intelligence: Key Facts'. <https://unesdoc.unesco.org/ark:/48223/pf0000385082>
- World Health Organization. 2023. 'WHO Calls for Safe and Ethical AI for Health'. <https://www.who.int/news/item/16-05-2023-who-calls-for-safe-and-ethical-ai-for-health>

## Collections of resources

- 'Academic Integrity'. 2024. EIFL Digital Research Literacy Training Programme Outline for Librarians. <https://www.eifl.net/programme/digital-research-literacy/academic-integrity>
- 'Artificial Intelligence and Open Science'. 2024. EIFL. 2024. <https://www.eifl.net/programme/ai-and-os/artificial-intelligence-and-open-science>