D.6.3
OSIRIS Open Science plan

Creating Trust in Open Science & Reproducibility through Accessibility and Transparency!

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PROJECT INFORMATION

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Project Coordinator	Dr. Inge Stegeman
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V02	29-06-2023	UMC Utrecht, Amsterdam UMC	Inge Stegeman, Mariska Leeflang (authors)

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TABLE OF CONTENTS

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or the European Research Executive Agency (ERA). Neither the European Union nor the ERA can be held responsible for them.

1. Objectives of OSIRIS

1. To understand the underlying drivers and effective interventions that increase reproducibility at funding, publishing, university, and researcher-level, using systematic literature review, evidence mapping, policy audits, and interviews and focus group discussions with stakeholders. Results will be distributed through an open knowledge base and Open Access (OA) publications to optimally reach global academia.

2. To develop and test effective, evidence-based solutions for the reproducibility crisis across various stakeholders in policy and research practice by utilizing well-controlled Randomized Controlled Trials (RCTs) rather than mere pilots, develop dashboards of indicators of reproducible research practices, and providing funders, publishers, researchers, and peer reviewers with guidance for judging reproducibility.

3. To embed reproducibility in the strategy and design of research projects by informing researchers and convincing funders and journals to include measures and preconditions on reproducibility in their assessment of project proposals and articles.

4. To create a collaborative community of stakeholders that will aid in educating and implementing better reproducible research practice using our results to create guidelines and training on how researchers can embed reproducibility in the design of their research and disseminate these widely, thereby increase the reproducibility of their scientific research. Additionally, we will perform quality audits at project and output level to test these novel practices.

1.1. Aim of this deliverable

This deliverable aims to give insight into the OSIRIS Open Science plan. This deliverable can be seen as the start of the larger deliverable 'Audit' in which we will present our plans for a more extensive audit of OSIRIS. The Open Science Plan of OSIRIS is closely related to the Data management plan (Deliverable 1.2) and the Communication and dissemination plan (deliverable 6.1).

The researchers of OSIRIS cover a wide range of Europe's researchers in different domains. OSIRIS output covers all stakeholders in research (figure 1) Our Plan ensures that our research, data and outcomes are available for all stakeholders.

Open Science is at the core of OSIRIS. We plan to not only study Open Science interventions to improve reproducibility but to also improve transparency in scientific projects. We will lead by example. The Open Science plan is a 'living' document and aims or tools can change during the project. We aim to provide an overview of OSIRIS Open Science plans.

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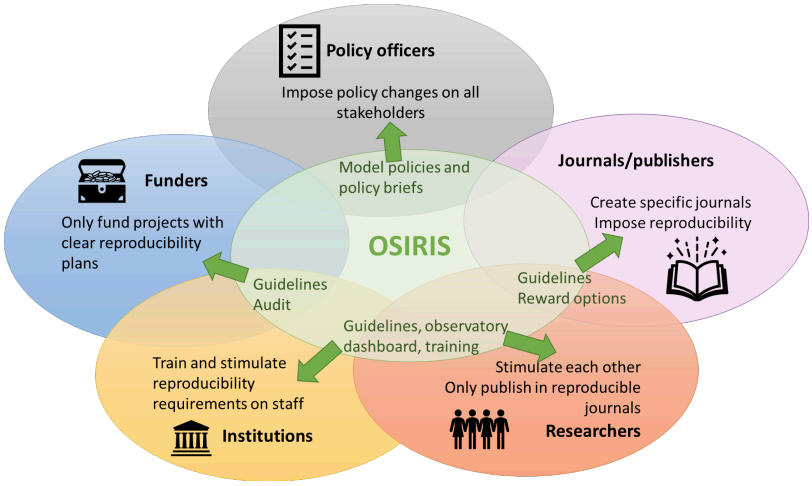

Figure 1: Stakeholders in reproducibility of science

2. Target audience

We aim to present our data, protocols, ideas and outcomes in an open and transparent manner. The Open Science Plan will help us reaching the following audiences:

- Researchers
- Institutions
- Funders
- Publishers
- Policy
- General public

2.1. Research Integrity

Research integrity refers to the use of honest and verifiable methods in proposing, performing, and evaluating research. Transparent reporting and open sharing of ideas, procedures, protocols, data, and reports is a prerequisite to enable verifiable research.

This means that we see Open Science as instrumental to research integrity, and that we regard Open Science in all its broadness by being transparent about each step in the research cycle. This includes transparent decisions about authorship and intellectual property.

2.2. Open Science Plan/Transparency

Open Science is in the core of the OSIRIS project, we will follow the Open Science recommendations of Horizon Europe. (Horizon Europe Programme Guide version 3.0) Our Open Science practices include the early and open sharing of ideas and protocols, all of our outings will be Open Access, we will develop an audit to ensure the reproducibility (deliverable 2.5) of our project and include a research data management (deliverable 1.2). A summary of the plan can be found in Table 1.

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2.2.1 Preregistration

Before the start of each research activity, we will develop detailed protocols that will be pre-registered on the Open Science Framework (OSF). These protocols will contain details about the methodology to be followed, such as the search strategy and inclusion criteria for literature reviews and inclusion criteria and interview schemes for qualitative studies. Subsequent research reports will list any deviations from the original protocol. When applicable, we will use registered reports as a format for publication. These are journal articles in which methods and proposed analyses are pre-registered and peer-reviewed before research is conducted. Journals and platforms issuing these reports are (among others) Open Research Europe, BMC Medicine, PLoS Biology, PLoS One and Nature Human Behavior.

Where possible and appropriate, we will involve stakeholders and the public in the design of our studies and the development of the protocols. These co-creation activities will also open our research activities to the public.

2.2.2 Distribution of data, analysis codes and software

Data management plans are the cornerstone of responsible data management. An extensive outline of the distribution of our data can be found in our Data Management Plan (deliverable 1.2). In short, research data will be published on OSF and/or deposited in trusted data repositories at publication of results or by the end of the project. Repositories will assign DOIs as persistent IDs. We will use repositories appropriate to each output and will place links on our website to make deposits in these repositories findable. Repositories may include DataverseNL, KU Leuven RDR, Research Data Oxford, Zenodo and the OSF. Metadata will be added to all relevant documents to aid in the interpretation, critical evaluation, reuse and reproduction of results and methods by third parties. Metadata will be added at the host repositories and made available for exchange / harvesting to aggregator sites like OpenAIRE and Google Dataset search to make our datasets findable.

2.2.3 Publication of results and conclusions

All our publications will be distributed as preprints on Open Research Europe and subsequently published in OA (diamond) journals. If the latter is not possible, articles will be published in partially 'closed' journals, in which case a charge will be paid to make the publication immediately freely available to the public (gold). If neither of these options are available, a post print version of the article will be available at an arXiv website and on the OSIRIS project website (green). Our pre- and post-prints will also be shared widely, via social media accounts and the project website.

2.2.4 Development and distribution of educational material

All our slides and educational material will be shared and openly distributed. Where possible and appropriate, we will include our stakeholders and the public in the development of educational and communication materials, in a co-creation process to ensure the open spirit of the project.

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OSIRIS is committed to adhering to open, transparent, and ethical communications. OSIRIS communications will not contain any material omissions or exaggeration of facts, misleading photographs, or any other communication that would create a false impression.

2.2.5. Measures to ensure reproducibility of results

Reproducibility is in the core of OSIRIS. In deliverable 2.5 we will develop an audit, that can be used by research projects, to ensure the reproducibility of their results. We will test this audit on our own project. Large measures to ensure reproducibly are described in the DMP. In addition, we will publicize protocols and results independent of their results. We will preregister our ideas and protocols and specify our research designs and methodologies in full detail.

2.3. Platforms for distribution and sharing

Our website (https://osiris4r.eu/) is the port for information about OSIRIS. Apart from our website we will use the Open Science Framework (OSF) as a platform for the distribution of our protocols and methods documents, as well as outputs (https://osf.io/8nyke/).

Table 1: Open science Practices

Activity	Output	Level of openness	Platform
OSIRIS Executive Board Meetings	Minutes	Distributed among all OSIRIS participants	Teams
OSIRIS Monthly Meetings	Minutes	Distributed among all OSIRIS participants	Teams
OSIRIS oversight	Data Management Plan	Open to everyone	Teams, OSF
Individual Tasks	Meeting minutes	Only distributed among team members for that task	E-mail
Individual Tasks	Protocol	Open to everyone	OSF
Individual Tasks	Data, meta-data and code	Open to everyone	OSF
Individual Tasks	Final report,	Open to everyone	Open Access journal and

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	publication		preprint repository
Teaching materials	Presentations	Open to everyone	OSF and OSIRIS website
Teaching materials	Course materials: syllabus, presentations, instructions	Open to everyone	OSF and OSIRIS website
Presentations on conferences/symposia	Presentations	Open to everyone	Teams, OSF, OSIRIS website

2.4. Implementation and maintaining internal reporting procedures.

As deliverable 2.5 we will develop an audit for the internal review of Open Science practices in scientific projects. OSIRIS will serve as test-case for that audit.

Box 1. Summary of OSIRIS' Open Publication plan

Pre-registration: For each of the research activities we will develop detailed protocols (with ethical approval sought according to national legislations) that will be pre-registered so that groups interested can replicate our work on the OSF.

Registered reports: When applicable, we will use registered reports, as a format for publication on Open Research Europe, BMC Medicine, PLoS Biology, PLoS One or Nature Human Behavior.

Open access: OSIRIS publications will all be published in OA (diamond) journals. If this is not possible, articles will be published in partially 'closed' journals, in which case a charge will be paid to make the publication
immediately freely available to the public (gold). If neither of these options are available, a post print version of the article will be available at an arXiv website and on the OSIRIS project website (green).

Preprints: We understand the value of sharing research early, for instance as a preprint on arXiv. This invites commentary at an earlier stage than generally possible within the traditional publishing model. We will publish preprints of publications resulting from the project on Open Research Europe. Of course, these preprints will also be shared widely, via social media accounts and the project website.

Open data and code: To allow the scientific community to benefit from the wealth of data that we will collect, we will freely share the data obtained during our research in trusted repositories such as DataverseNL, KUL RDR, Research Data Oxford, Zenodo and OSF as indicated in the FAIR data management section below. KUL and UOXF have

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extensive experience in openly sharing research data and code, including qualitative data.

Co-design and co-creation: some of the focus group discussions in WP2 will be used to co-develop interventions for observatories for WP3 and 4 and in WP5, training materials to improve/increase reproducibility will be cocreated with groups of researchers and other stakeholders, the end-users for such training

OS audits: Once per year, we will audit our project in terms of reproducibility practices (WP2). Each audit will be followed by a plenary discussion with the entire OSIRIS team, ensuring that every member understands and follows the agreed-upon practices.

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