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REPORT FROM THE IARC WORKING GROUP ON IARC/WHO VISION FOR OPEN SCIENCE

1. The present document describes the Open Science Vision of the International Agency for Research on Cancer of the World Health Organization (“IARC/WHO”).
2. According to the [UNESCO Recommendation on Open Science](#), Open Science can be defined in the following terms:

“Open Science is defined as an inclusive construct that combines various movements and practices aiming to make multilingual scientific knowledge openly available, accessible, and reusable for everyone, to increase scientific collaborations and sharing of information for the benefits of science and society, and to open the processes of scientific knowledge creation, evaluation and communication to societal actors beyond the traditional scientific community.”

- IARC/WHO commits itself to the advancement of science and the wide dissemination of knowledge to the benefit of society and cancer prevention, by adopting openness as one of its guiding principles.
- IARC/WHO acknowledges the necessity of balancing the desire for complete openness within scientific research with the need for restrictions where required, due to existing obligations around data protection, security, intellectual property rights, contractual obligations, legal restrictions and ethical considerations.
- IARC/WHO therefore aims to follow the principle of being “as open as possible, as closed as necessary”, seeking to reconcile the ethos of Open Science with the complex realities of the research environment. Under this principle, any restrictions on openness are not the default but are exceptions based on justifiable obligations.
- IARC/WHO’s commitment to Open Science is woven into the fabric of knowledge creation and dissemination processes. IARC/WHO upholds a multifaceted Open Science framework that spans across its scientific endeavour and the value chain of cancer research, encompassing:
 - **Open Research Data:** IARC/WHO commits to the FAIR Data Principles, ensuring that research data are Findable, Accessible, Interoperable, and Reusable. IARC/WHO shall encourage the use of data repositories with persistent identifiers to facilitate validation and reuse of research findings, while balancing openness with data protection, privacy and ethical considerations under the principle “as open as possible, as closed as necessary”. In instances where restrictions limit the sharing of data, IARC/WHO commits to making Metadata available, ensuring findability and transparency.

- **Biobank open research infrastructure:** IARC/WHO's biobank aims to provide an open-for-collaboration resource, adhering to trusted quality standards and FAIR principles. It serves as a centralized repository for biological samples and associated data, facilitating findability and interoperability, and is dedicated to meeting international accreditation standards.
 - **Open-source software and Source Code:** IARC/WHO aims to promote open access to the Source Code developed during research, using Version Control Systems and by encouraging the release of software on dedicated platforms under open licenses. Comprehensive documentation and software citation are key aspects, ensuring that software and code are preserved for long-term accessibility and collaboration.
 - **Open access to Publications:** IARC/WHO advocates for immediate and unrestricted access to Publications via Gold or Green Open Access routes, with a commitment to the timely deposit of Publications and Metadata in relevant repositories. IARC/WHO aims to retain copyright for externally published materials and prioritize transparency and sustainability in the costs of scholarly publishing.
 - **Training and professional development of personnel:** IARC/WHO aims to invest in building Open Science competencies among its personnel through targeted training, awareness-raising, and professional development opportunities. This includes the acquisition of skills for all facets of Open Science as defined in this document.
 - **Open education:** IARC/WHO champions open education by promoting free and equitable access to learning resources and events, designed to be accessible and accommodating of various learning styles and needs. The promotion of Open Educational Resources and periodic updates are an integral part of IARC/WHO strategy.
 - **Citizen science:** IARC/WHO aims to actively support citizen science initiatives, recognizing the value of involving the public in research to ensure relevance and impact. IARC/WHO shall encourage the inclusion of citizens in the research process and in ethical review boards, enhancing the societal engagement in science.
 - **Research assessment and evaluation:** IARC/WHO's framework for research assessment strives to be cooperative and integrative, acknowledging Open Science practices and responsible metrics as reflected in the San Francisco Declaration on Research Assessment (DORA). It reflects a commitment towards FAIR, data protection, and ethical principles, to reward a diversity of research outputs and to recognize the broader social impact of research activities.
- IARC/WHO embraces a **multidimensional** understanding of openness, recognizing its diverse implications and applications in the realm of scientific research. This comprehensive view of openness extends beyond mere availability, encompassing various dimensions that are crucial for fostering an inclusive, equitable, and collaborative scientific community. The key aspects of this multidimensional approach to openness include:
 - **Cost:** IARC/WHO strives to minimize financial barriers to accessing its research, making it more affordable and ensuring that financial barriers do not impede the dissemination of scientific knowledge.
 - **Intellectual Property Rights:** IARC/WHO's management of intellectual property rights is structured to facilitate the use of IARC/WHO's knowledge (Publications, Research Data, Source Code, educational materials, etc.) for the greater good.
 - **Licensing:** IARC/WHO commits to implementing consistent and clear licensing policies to facilitate sharing and enabling straightforward reuse and distribution of its research outputs.
 - **Accessibility:** IARC/WHO commits to ensuring that all research outputs are created and disseminated with accessibility in mind, making certain that information is readily available and usable by individuals with disabilities.

- **Equity, Diversity and Inclusion:** IARC/WHO champions initiatives that promote social justice, ensuring that its research practices and policies advance diversity, equity and inclusion within the scientific community and the broader society.
- **Public Engagement:** IARC/WHO is dedicated to fostering a collaborative relationship with the public, placing researchers and citizens on a more equal footing to co-create and share scientific knowledge.
- IARC/WHO is committed to the development and enhancement of a robust **digital infrastructure** for the support of Open Science in all its aspects. Recognizing that the backbone of Open Science is the ability to store, preserve, and share scientific data, IARC/WHO invests thoughtfully in advanced mechanisms and services that underpin these activities.
- IARC/WHO aspires to align with international **best practices and standards**, recognizing that such harmonization is key to achieving interoperability of research outputs. This strategic alignment ensures that scientific data and findings can be integrated and utilized across various platforms and by diverse global research communities. By adhering to these standards, IARC/WHO not only enhances the collaborative potential of its work but also reinforces the reproducibility and reliability of cancer research worldwide.
- IARC/WHO is dedicated to fostering the growth and development of its personnel through comprehensive **learning and development** initiatives. IARC/WHO seeks to empower researchers with the tools and knowledge necessary for conducting high-quality research, recognizing and rewarding research efforts that contribute significantly to the field of cancer research and adhere to the principles of Open Science.

Feedback from the Scientific Council

3. The SC is invited to review the above report and share lessons learnt, if applicable, and/or to provide recommendations to IARC on the topic of “Open Science”.

Glossary

- **FAIR Data Principles** refer to a set of guidelines that facilitate the Findability, Accessibility, Interoperability, and Reusability of digital assets. These principles emphasize ease of discovery and efficient use of data by both humans and machines, ensuring that data is well-described, openly accessible, compatible with other datasets, and ready for reuse in different contexts.
- **Gold Open Access** refers to the process of achieving open access through publication in an open access journal (open access publishing).
- **Green Open Access** refers to the process of providing open access through an open access repository (also known as “self-archiving”).
- **Metadata** are the data used for the description, tracking, use and management of the deposited item, including Publications, Research Data, and biological samples. For Publications, it includes details such as title, author(s), institutional affiliation, name of journal where the Publication has been accepted). In Research Data, Metadata covers aspects such as data origin, format, and collection methods. For biological samples, metadata provides critical information like the source, collection date, preservation method, and any associated clinical or demographic details.
- **Open Educational Resources (OER)** are defined according to the OECD as “teaching, learning and research materials that make use of tools like open licenses that permit their free reuse, continuous improvement and repurposing by others for educational purposes”.

- **Publication** refers to any IARC/WHO document or work disseminated to the public, including both scholarly articles in mainstream journals as well as IARC-produced books, reports, and other materials.
- **Research Data** is the data (such as statistics, results of experiments, measurements, observations, interview recordings, images, etc.) used to validate the results presented in publications or other data used during a project.
- **Source Code** refers to the human-readable instructions that comprise a computer program, including scripts and definitions written in statistical programming languages such as R, SAS, or STATA. This definition encompasses not only the foundational algorithms and operational commands of software applications but also the specialized commands and functions employed in statistical analysis and data manipulation within these programs.
- **Version Control Systems** are software tools that help manage changes to source code over time. They track code modifications, allowing multiple collaborators to work on the same codebase simultaneously without conflicts. VCS record each change to the code, including a timestamp and the identity of the person who made the change.

References

- [UNESCO recommendation on Open Science](#)
- [UNESCO Draft Recommendation on Open Science](#)
- [EU open science policy](#)
- [OECD guidance on open science](#)
- [2nd French plan for open science](#)
- [CoalitionS / PlanS](#)
- [OpenAIRE](#)
- [Edmunds *et al.* 2022, A Decade of GigaScience: Milestones in Open Science](#)
- [FAIR Data Principles](#)
- [San Francisco Declaration on Research Assessment \(DORA\)](#)