



Vetenskapsrådet

PROPOSAL FOR NATIONAL GUIDELINES FOR OPEN ACCESS TO SCIENTIFIC INFORMATION

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PROPOSAL FOR NATIONAL GUIDELINES FOR OPEN ACCESS TO SCIENTIFIC INFORMATION

FOREWORD

In accordance with the EU Commission's recommendations for member states, the Swedish Government has mandated the Swedish Research Council (Vetenskapsrådet) to formulate national guidelines concerning open access to scientific information.

In this report, the Swedish Research Council proposes a strategic objective for Sweden with a ten-year time frame. Guidelines and proposals that shall apply for the next few years are shown also. Moreover, the report presents the identified problems that the Council believes must be investigated further, in order to enable the fulfilment of the strategic objective.

As part of its mandate, the Council has consulted and collaborated with the National Library of Sweden (Kungliga biblioteket) and other relevant stakeholders. Through consultation and collaboration, a number of viewpoints have been received through meetings, workshops and a Web forum. The Swedish Research Council wishes to express its sincere gratitude to everyone who submitted constructive proposals and contributions.

Sven Stafström
Director-General, the Swedish Research Council

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SAMMANFATTNING

Vetenskapsrådet har fått i uppdrag av regeringen att ta fram nationella riktlinjer för öppen tillgång till vetenskaplig information. Förslaget till riktlinjer har tagits fram i samarbete och samråd med Kungliga biblioteket. Vetenskapsrådet har även hållit dialog- och informationsmöten med representanter för olika intressentgrupper. De synpunkter som framkommit vid dessa möten har beaktats i arbetet med att ta fram förslaget till nationella riktlinjer. Under hösten bjöd Vetenskapsrådet även in till ett öppet webbforum på vr.se, där den som ville fick möjlighet att ge synpunkter på förslaget. Många av de synpunkter som framfördes i webbforumet togs tillvara vid den slutliga revideringen av utkastet.

Grundprincipen i de föreslagna nationella riktlinjerna är att

- vetenskapliga publikationer och konstnärliga verk samt
- forskningsdata som ligger till grund för vetenskapliga publikationer,

som är resultatet av offentligt finansierad forskning, ska vara öppet tillgängliga. I båda fallen anges förslag till tidsramar för genomförandet.

Vetenskapsrådet föreslår att Sverige ska ha en målbild för 2025 och att riktlinjerna gäller fram till 2020. Inom ramen för uppdraget lämnas rekommendationer för vad som behöver utredas vidare. Vetenskapsrådet föreslår till regeringen att uppdraget att utreda och föreslå lösningar fördelas på lämpliga myndigheter. Utredningsarbetet föreslås vara avslutat senast den sista december 2018. Vetenskapsrådet menar att det är rimligt att utforma detaljerade riktlinjer för 2025 omkring år 2020. Genom detta förslag till inriktningsbeslut blir den svenska färdriktningen tydlig för omvärlden och för svenska företrädare. Tydligheten är också viktig för de svenska forskarna.

Vetenskapsrådet föreslår att en nationell samordningsfunktion upprättas vid en för uppgiften lämplig myndighet, vilken får i uppdrag att koordinera arbetet.

Notera att i dokumentet används den svenska benämningen öppen tillgång synonymt med den internationella benämningen open access.

SUMMARY

The Swedish Research Council has been tasked by the Government to produce national guidelines for open access to scientific information. The proposal for guidelines was produced in collaboration and consultation with the National Library of Sweden. The Council also held information and dialogue meetings with representatives of various groups of interested parties. The views that emerged during these meetings were taken into account in the work on producing the proposal for national guidelines. During the autumn, the Council also invited people in to an open Web forum at vr.se where those who wished were given the opportunity to express their views on the proposal. Many of the views expressed in the Web forum were utilized in the final revision of the draft.

The basic principles in the proposed national guidelines are that

- scientific publications and artistic works, as well as
- research data forming the basis for scientific publications,

resulting from publicly funded research must be openly available. In both cases, proposals for time frames for the implementation are indicated.

The Swedish Research Council proposes that Sweden have a strategic objective for 2025, and that the guidelines apply up through 2020. Recommendations for subjects of further investigation are being submitted as part of the task. The Council proposes to the Government that the task of investigating and proposing solutions be distributed among suitable government agencies, and that the investigative work be concluded by the end of December 2018 at the latest. The Council is of the opinion that designing detailed guidelines for 2025 by around 2020 is feasible. Through this policy decision proposal, the direction in which Sweden is heading will be clear for the world around us and for representatives of Sweden. Clarity is also important for Swedish researchers.

The Swedish Research Council proposes that a national coordinating function be set up at a suitable agency, which will be tasked with coordinating the work.

INTRODUCTION

Description of the mandate in the Swedish Government directive

In the Government directive (letter of regulation) for fiscal year 2013, the Swedish Research Council was given the task of drawing up national guidelines for open access to research results and research data. The Council shall consult and collaborate with the National Library of Sweden as well as with other relevant interested parties concerning this matter. The mandated task is thus not to enquire into *whether* open access shall be introduced but to propose forms for *how* it can take place.

The assignment in the Research Council's Government directive is a consequence of the EU Commission's recommendation, which the member states received in 2012¹, concerning access to and preservation of scientific information.

The recommendation in this case is very concrete and the overall tasks that are given to the member states are as follows:

- 1) to formulate guidelines for open access,
- 2) to draw up a plan for implementing the guidelines, including the allocation of responsibilities,
- 3) to define measurable goals to enable the monitoring of the implementation,
- 4) to prepare a funding model that supports the implementation.

The recommendation also encourages the member states to designate a *National Point of Reference* (NPR), who will become the Commission's national contact person for all questions concerning open access, as well as the person who shall co-ordinate the nation's work of implementing the recommendation. Sweden's NPR is² Mats Ulfendahl, Secretary General for Medicine and Health, Swedish Research Council.

Description of the work on drawing up national guidelines

The work of formulating the proposal for national guidelines has been carried out in project form at the Swedish Research Council. The project addressed the first point above; point two is handled in the form of recommendations on what needs to be investigated. Points three and four can be handled at a later stage. The proposal for guidelines has been formulated in collaboration and consultation with the National Library of Sweden, which has been running the programme OpenAccess.se for many years. This programme is intended to promote free access via the Internet to the works produced by Swedish researchers, teachers and students.

In the work on preparing guidelines, representatives of different interested parties, e.g. research councils and other research funding providers, higher education institutions (primarily administration, library, IT and archives), as well as certain infrastructures, have had the opportunity to submit views via informational and collaborative meetings. In addition to these, representatives of the Research Council's scientific councils, the Council for Research Infrastructures (RFI) and the Committee for Educational Sciences have had the opportunity to submit views. During the autumn of 2014, those who wished to, could give their views on the proposal via an open web forum on vr.se.

¹ Commission Recommendation on access to and preservation of scientific information, C(2012) 4890.

² The Government has appointed Jonas Björck, Director Research Policy, as Swedish NPR from 1/1/2015.

NATIONAL GUIDELINES FOR OPEN ACCESS

The fundamental principle underlying the mandate is that the results of research carried out with public funds shall be openly available for both other researchers and the interested public and companies. In the EU Commission's recommendation on access to and archiving of scientific information, which the member states received in 2012³, a series of arguments were given for why open access to scientific information creates better conditions for scientific research and is good for society at large. In addition to the research value, there is also a clear focus on the social benefit; a basic assumption is that the research results produced with public funds shall benefit society as a whole.

Definitions

What does *open access* to scientific publications and artistic works mean?

What is referred to internationally as open access means, in brief, that the research results can be found via a search on the Internet and can be read by everyone, free of charge and that the material is free to reuse. There are different methods for providing accessibility where scientific articles are concerned, often referred to as gold, green and hybrid publishing. The term 'gold' is used in different ways,⁴ though it is used here as set out below:

- 1) the researcher publishes an article in an open access journal (*gold*)
- 2) the researcher publishes in a traditional subscription-based publication and thereafter a copy of the manuscript is published open access via a digital archive as soon as the publication permits this (*green/self-archiving*)
- 3) the researcher publishes the article in a traditional subscription-based publication and, for a fee, the article is made open access with immediate effect (*hybrid*).

Researchers who publish their results in book form or in the form of an artistic work can also make available the material on an open access basis.

What does *open access* to research data mean?

Open access to research data means that research data, as well as associated metadata, is freely and easily accessible via the Internet. Research data is thus made available in a digitally, standardised format which is machine-readable, and can then be reused free of charge or with/under other restrictions. Open access to research data should of course respect the legal framework, which particularly affects research data that includes personal details.

What is research data and metadata?

Research data can be defined in many ways but, within the framework of this mandate, it refers to digital information which has been collected for analysis for scientific purposes⁵. Examples of such research data are results from experiments and measurements, observations from field work, statistics, survey replies, interviews

³ EU Commission Recommendation on access to and preservation of scientific information, C(2012) 4890.

⁴ The EU Commission defines gold as "immediate open access that is provided by a publisher" a formulation that does not exclude hybrid publishing. <http://ec.europa.eu/digital-agenda/en/open-access-scientific-information> 27/11/2014.

⁵ Data collected for other purposes or, for instance, by other authorities, county councils, municipalities or companies, may also be relevant for researchers but these are not covered by the national guidelines.

and images⁶. Physical objects, for example collections relating to the natural sciences and archaeology, physical art works or biobanks (repositories for biological samples), are not in themselves to be considered research data; although digital information about such objects, is to be regarded as research data. All types of research data are normally accompanied by associated metadata i.e. information which describes the content as well as how, when and by whom the research data has been collected, how it is structured and, where applicable, the special software needed to read or analyse the data.

Arrangement

Proposal for guidelines for open access

The proposal for guidelines is set out as follows: after the introduction there comes a section on the principle of open access and definitions, subsequently a section on national guidelines for publications and artistic works, followed by a section on national guidelines for research data.

Appendices

Appendices in the first part contain information related to publications and artistic works; Appendix 1 comprises a list of terms and abbreviations used; in Appendix 2 there follows information concerning those stakeholders who participated in the dialogue that the Research Council undertook during 2014.

The second part concerns research data. Appendix 3 comprises a list of terms and abbreviations used. Appendix 4 records the meetings carried out with different stakeholders.

⁶ Research data does not include lab books, preliminary analyses, draft publications, project plans for future projects etc.

NATIONAL GUIDELINES FOR OPEN ACCESS TO SCIENTIFIC PUBLICATIONS AND ARTISTIC WORKS

The Swedish Research Council's mandate (as mentioned above) is a consequence of the EU Commission's recommendations to the member states. The research funding providers, and organisations with research on their agenda, have also long kept up pressure on the issue: the National Institutes of Health (NIH), Max-Planck-Gesellschaft and the Wellcome Trust are amongst those who have been active in the international arena. Many researchers have already embraced the principle of open access; physicists, for example, have been publishing their papers for years with open access on ArXiv.⁷ In Sweden, since 2006, the National Library of Sweden has handled and pushed for open access via the programme OpenAccess.se. From 2010 and subsequently, the Swedish Research Council, together with several other research funding providers, has required open access publishing from those researchers that receive research grants.

During the coming period it is probable that many member states, like Sweden, will respond to the EU Commission's recommendation to produce national guidelines for open access.⁸ This is promising since the research today has a high level of international interaction and it is difficult for one member state to make changes alone and set specific national requirements. The Research Council proposes that Sweden work to ensure that the EU member states jointly design harmonised requirements concerning open access to scientific information. In parallel, guidelines concerning open access can be introduced gradually in Sweden with the goal that all scientific publishing resulting from research supported by public funding be published with open access by 2025. In order to coordinate the work the Research Council proposes that a coordination function be instituted at a Government agency appropriate for the task.

Strategic objective

The Swedish Research Council proposes that Sweden adopt a strategic objective that from 2025, all scientific publications and artistic works resulting from research financed with public funds shall be published immediately with open access. Articles shall be published in an open access journal. All scientific publications shall have a Creative Commons (CC) license. "Scientific publications" means articles subject to peer review and conference reports, as well as books that are the result of publicly-funded research. Not only does the Council propose that the results of the publicly funded research be openly accessible but that, with this strategic objective, we recommend a shift with respect to scientific publishing, from a subscription-based system to one of open access.

Obstacles must be removed and problems solved in order to enable the fulfilment of the strategic objective. The Research Council wishes to emphasize that developments in the international arena, new technology and new forms of diffusion can justify the strategic objective and the guidelines being subject to renewed

⁷ <http://arxiv.org>

⁸ Denmark's National Strategy for Open Access was published on 23 June 2014. The goal is for one hundred per cent of all Danish articles (papers) reviewed by independent experts (peer review) published by Danish research institutes to have open access as of 2021. (2017: eighty per cent). Parallel publishing is presented as an effective alternative but 'gold' is also accepted, provided that it does not entail increased costs. The latter may be interpreted as Denmark wishing to avoid hybrid publishing becoming the applicable model, <http://ufm.dk/forskning-og-innovation/samspil-mellem-viden-og-innovation/open-science/danmarks-nationale-strategi-for-open-access.pdf>. In Great Britain, the government appointed an enquiry (the Finch Report) and in 2012, when the enquiry was published, it expressed its support for open access. The enquiry recommended 'gold', publishing in open access journals; it does not mention hybrid publishing. The British government instructed funding providers and research councils to implement and develop a regulatory framework. RCUK (Research Councils UK) state in a policy document from April 2013 that the goal is gold 2018. <http://www.rcuk.ac.uk/research/openaccess/>. The HEFCE (Higher Education Funding Council for England) published an open access policy in March 2014 that will apply in evaluations of the British higher education institutions. The policy intends to steer the researchers to publish open access from 2016 at the latest. <http://www.rcuk.ac.uk/research/openaccess/>

examination. The Council believes that around the year 2020 it may be reasonable to formulate detailed guidelines for 2025, but through this policy decision proposal Sweden's direction of travel becomes clear to the rest of the world and to Swedish representatives. Establishing clarity in this respect is also essential for Swedish researchers.

Proposal for guidelines for 2015 and 2020

2015

All peer-reviewed articles and conference reports that are the result of publicly-funded research shall be freely accessible for reading and downloading, at the latest 6 months after original publication; at the latest 12 months after original publication where the humanities and social sciences are concerned.

A copy of the publication shall be placed in an institutional repository together with metadata immediately upon publication and be made freely accessible – immediately if they are published in an open access journal (gold) or after a maximum of 6/12 months for parallel published approved manuscripts, according to the same requirements as specified within Horizon 2020, the EU framework programme for research and innovation.

2020

All peer-reviewed articles and conference reports resulting from publicly-funded research shall be freely accessible for reading and downloading, 6 months at the latest after the date of original publication.

A copy of the publication shall be placed in an institutional repository together with metadata in standard format immediately upon publication and be made freely accessible – immediately if it is published in an open access journal (gold) or after a maximum of 6 months for accepted manuscripts that undergo parallel publishing. The material which is published in open access journals shall have a CC license.

Books that are published by Swedish publishers and is a result of publicly-funded research shall be freely accessible on the Internet. The requirement applies to the digital versions of the publications, a text-based PDF type or in other machine readable format which may be used for text mining, with a CC license.

Proposal for continued studies

In consultation and collaboration with the National Library of Sweden, through meetings with different stakeholders and an open web forum on its homepage, the Swedish Research Council has striven to identify the opportunities and, above all, possible obstacles to development towards open access to publications and artistic works. Below there is a presentation of issues that emerged in the dialogue and recommendations for what needs to be studied further.

The qualification and funding allocation system versus demands for open-access publishing

Where the researcher is assessed on the publication's 'journal impact factor' or on the respective prestige of the publishing company or publication when he or she applies for grants or employment, the researchers are largely steered towards publishing in the established channels which often are subscription-based. Sweden can propel the development towards publishing in open-access journals through encouraging research councils and higher education institutions to assess the individual work instead of an assessment of the publication or publisher.

A solution used at present is what is known as "hybrid publishing". It works well in individual cases, but preserves the prevailing system and is costly. The latter raises the question of whether funding providers and universities need to set a cap on expenditures for hybrid publishing.

This should be investigated further.

The Research Council is aware that the present indicator for distribution of part of the basic grant may entail the change towards open access being delayed somewhat, since the journals must be indexed in the Web of Science in order for the citations to be counted. It takes about two years before a new journal is indexed. During the consultation process, the Council received the viewpoint that one way to favour the trend towards open access is to reward open access publishing in Fokus, the new model for allocating resources to universities and university colleges involving peer review of research quality and relevance, being proposed to the government. The Council has chosen not to do so at this stage.

Problems and opportunities related to different types of publication and work

Open access to articles in journals

Self-archiving works well, according to many who submitted views in the Research Council's web forum. However, one tendency that several stakeholders drew attention to is that the subscription-based journals' embargo periods are becoming longer, the more funding providers recommend this form of open access. This means that the researcher must pay a publication fee for "hybrid publishing" in order to make the article openly accessible within the time stipulated by the funding provider. This is costly (see also the section above on the qualification and funding allocation system).

It is necessary to investigate whether a cap on hybrid publishing costs shall be introduced—something that many believe is reasonable—and if so, how this should be designed. Furthermore, it is possible that the question needs to be asked as to how long Sweden should pay for hybrid publishing; that is, how long the period of adjustment is intended to last.

Open access to conference papers (proceedings)⁹

The requirement for open-access publishing for conference papers is established in Sweden; it is also common in the international arena. In the engineering sciences published conference papers/proceedings are a common occurrence. Within certain research fields such as computer science, it is conference proceedings rather than the scientific journals that are the principal channel of scientific publishing. The publishing processes, publishers and organisations for – and of – conference papers are frequently more heterogeneous than for journal articles. Publishing may take place electronically, on the conference website, or in digital archives. Conference contributions are also published in journal-like book series with ISSN and in journals (sometimes as an ordinary issue, sometimes as supplement). Within the humanities and social sciences, conference contributions (papers) may often result in a printed or open access published anthology.

Against the background of this variation, the introduction of a national guideline should be investigated concerning which types of conference papers should be covered by the demand for open access.

Open access to books

There is, at the present time, a series of initiatives investigating and fostering development towards open-access publication of scientific books. The EU Commission's project "Going for Gold" can be mentioned as an example from the international arena; its purpose is to establish an infrastructure for open access publishing of books, which will make it easier for university publishers who then do not need to develop their own local solutions. The books that are to be made open access undergo a peer-review process organised by the project. It is also the intention, via the project, to convince the publishers of the advantages of open access publishing. Recipients of grants from the Horizon 2020 framework programme are not obliged to publish science books on open access terms but the Commission states this as being desirable. Science Europe, of which the Swedish

⁹ This section is based on the findings in *Parallelppublicering av konferensartiklar principer, tillämpningar och tillgänglighet i svenska publiceringsdatabaser*. Jörgen Eriksson, Margareta Fathli, Klemens Karlsson, Lars Kullman, Peter Linde, Marjatta Sikström and Ylva Sköld

Research Council is a member, uses the term ‘research publications’ in its position statement which deals with open access, among other things. The term is used for the very reason that it includes books also.

The Swedish Research Council, the Riksbankens Jubileumsfond and the National Library of Sweden (KB) funded *A National Consortium for Open Academic Books in Sweden*¹⁰, a study on open access and book publishing. It includes an estimate which indicates that Swedish researchers published around 630 books in 2012: this figure includes monographs, anthologies and major reports. Around 60% were estimated to have been written in Swedish; of these, half were monographs (comprehensive, scientific presentation in book form). The authors indicated primarily two problematic aspects, as they saw it, of Swedish scientific book publishing: dissemination is poor with the current system, and quality reviews of the books are often lacking. The authors of the study proposed a free-standing consortium to be administered by the Research Council and, furthermore, described a process which included both open access publishing and quality reviews of science books.

In a report from Lund University (2011), a study was carried out into book publishing by Lund University researchers (humanities and theology) between 2007 and 2009.¹¹ A clear majority had Swedish publication. In the study it was established that the large Swedish publishers seldom publish scientific literature; instead it is the small and medium-sized publishers that are to be found in this niche. The publishers seldom market the books according to the study and do not make them accessible on the Internet; this is the reason they sometimes fail to achieve a larger readership. The study also shows that the foreign publishing houses, like their Swedish counterparts, not infrequently demand cost coverage to publish a book. There is, consequently, an established custom amongst researchers within the field to collect funds for the printing of books, according to the study.

In November 2013, the Vice-Chancellor of the University of Gothenburg decided that the University would participate in, and act as host for, a national pilot project for collaboration between higher education institutions concerning the academic review and publishing of books. In a preliminary study for the project, mention was made, among other things, of how traditional publishing of scientific monographs has been affected by a sharply diminishing market, above all due to the fact that the scientific journals take an ever larger part of the purchasing resources of the university libraries. How to improve this situation—that is the question for the project, as well as the question of how the book, as form of publication, can be strengthened and can meet the new requirements within the world of scientific publishing. The preliminary study points towards studies such as the one funded by the Swedish Research Council, titled *A National Consortium for Open Academic Books in Sweden*¹², and states that while awaiting decisions on the part of the Research Council, discussions have been undertaken concerning many possible ways forward. These discussions have resulted in a proposal for a pilot project where parts of the model are tried out on a smaller scale. The object (in accordance with the aforementioned recommendations from the study) is to tie together the quality review with the requirement to ensure open access for the books. The University of Gothenburg will work together with Lund University and Uppsala University. In line with the model sketched out in the report concerning a national consortium, the review process is steered by a management group composed of representatives of higher education institutions (one academic representative and one representative from the library of each higher education centre). The Research Council has accepted inclusion in the management group.

It may be added here that Stockholm University has launched a publishing house (Stockholm University Press) that will publish open access books. At Lund University, during a trial period, a special grant has been disbursed to those researchers who wish to make their book openly accessible. The Riksbankens Jubileumsfond encourages researchers to publish freely accessible books on the Internet and offers a publishing grant to facilitate this step. Representatives of book publishers active in Sweden have testified to the fact that a digital version with open access on the Internet increases sales of the printed book.

¹⁰ http://www.kb.se/Dokument/Om/projekt/open_access/2013/A_Consortium_Approach_to_OA_Books_final_report_2013-08-27.pdf

¹¹ <http://lup.lub.lu.se/luur/download?func=downloadFile&recordId=2278649&fileId=2278655>

¹² http://www.kb.se/Dokument/Om/projekt/open_access/2013/A_Consortium_Approach_to_OA_Books_final_report_2013-08-27.pdf

The Research Council recommends that the national co-ordination function proposed follow the results of the afore mentioned initiatives, which, according to the preliminary assessment made by the Research Council, may be assumed to increase the diffusion of research results financed by public funding.

Open access to artistic works

The Research Council has received viewpoints on this issue indicating that the requirement regarding open access for artistic research is concerned should be investigated, starting from the specific character of the field, taking into account that the output of this scientific field differs from other fields of study. At the University of Gothenburg's Faculty of Fine, Applied and Performing Arts, developmental work is under way concerning the registration of artistic works, an assignment that has been assessed to be of interest in this context.

The Research Council recommends that the question of whether artistic works can – and should – be covered by a requirement regarding open access be further clarified by the proposed national coordination function, or by another authority suited for this purpose.

Licenses

The question of the possibility of reuse and further development of the publications under Creative Commons (CC) licenses must be investigated and notified in good time prior to introduction. The research libraries have been mentioned as being appropriate for conducting this investigation.

As an alternative to the CC license requirement in the 2020 guidelines, written information concerning what it shall be possible to do with a publication can be specified, e.g. downloading and reading, collecting for text mining, use in teaching and/or translating. Here, however, one should be careful about deviating both from CC licenses and from requirements in Horizon 2020.

Questions about financial and technical support for journals

One strategy for Sweden could be to support a conversion to open access publishing for journals. One idea that has been put forward is to institute a central support centre with an open institutional repository that can house a number of different journals. This support centre could be run as a scientific consortium and have a separate responsible authority and, furthermore, a technical and organisational domicile for the service; alternatively one and the same authority is responsible for both parts. A central institutional repository could also handle the publishing of monographs as open access and collaborate with the university-run initiatives around independent expert review and open access publishing of monographs that have been initiated.

Whether such financial or technical support for journals favours open access publishing could be subject to further investigation, together with the question concerning the possible responsible authority. The National Library of Sweden and the DiVA Consortium are competent stakeholders that have been mentioned in the consultations.

Quality of the journals

On several occasions, the problem of irresponsible open access journals has been pointed out. One way of safeguarding quality may be to prepare a list of which international and national journals are of sufficiently high quality in their review processes to be accepted/approved. The Directory of Open Access Journals (DOAJ) is presently working on such a list. The difficulty is that such a list must be constantly updated. The Research Council recommends that a suitable agency be given a mandate to investigate this area more closely. In our dialogue, the research funding providers are mentioned as appropriate bearing in mind that it relates to a form of review by independent experts (peer review).

Monitoring the requirements

It must be possible to monitor requirements for open access. The National Library of Sweden, which has a mandate from the Swedish Government to develop SwePub, can be given the task of further developing the system so that it becomes possible to monitor open access publishing and the use of licenses (CC).

If only reference to open access publications is permitted in the report feedback from the project, the research funding providers should establish a joint model for how monitoring the requirements should take place so that there are not different types of reporting and thereby, in practice, different requirements that are made.

Costs and financial adjustment

The expense of publishing in a system with author fees is a concern for many. In our dialogue the following has been proposed: earmarked ‘new’ money for open access publishing, publishing funds, a law that obliges higher education institutions to cover researchers’ publishing costs and special funds for research-intensive departments. One viewpoint is that there must be a clear link between the demands for open access and the funding of author fees. It should also be possible, it was argued, for researchers at Swedish higher education institutions or the equivalent who lack external funding to seek funds for publishing on an open access basis.

The Swedish Research Council is of the opinion that the different alternatives should be looked over, most appropriately by the research funding providers jointly. The achievements and experiences of different countries in this area can be taken into account: the Research Council of Norway, for example, sets aside NOK 9 million per year for publishing fees in open access journals. Counter-financing is required from the universities and university colleges, which must institute funds in order to be able to apply for funding from the Research Council of Norway.¹³ In Great Britain, on the other hand, RCUK has introduced “block grants” which are disbursed to the grant recipients who in overall terms receive large amounts from the fund providers.¹⁴

Furthermore, the National Library of Sweden can be tasked with administering the publishing fees on behalf of the funding providers and working on signing agreements with publishers in order to limit the costs of open-access publishing.

It is reasonable that the Ministry of Education and Research contribute extra funds in connection with this adjustment, similarly to the subsidies paid out in the 1990’s in order to support the changeover from printed to electronic journals and, moreover, that it provides resources to the National Library of Sweden and research libraries to carry out the aforementioned tasks.

International collaboration

Complications may arise, it is argued, when researchers with Swedish public funding publish together with researchers from other countries, if the publishing requirements differ between countries.

The Research Council recommends that an appropriate authority examine if this might be the case and that it propose solutions.

Research with public funding, a definition

Shall requirements be imposed only on individual(s) who receive Swedish public funding, or shall this also apply to research that uses publicly-funded infrastructure and laboratories (e.g. Max IV)?

The Research Council should investigate the possibility of imposing requirements for open access in these cases.

¹³ An article that describes this in more detail can be read here: [A boost for open access to research in Norway see also
http://scienzenordic.com/boost-open-access-research](http://scienzenordic.com/boost-open-access-research)

¹⁴ <http://www.rcuk.ac.uk/documents/documents/RCUKOpenAccessPolicy.pdf>

NATIONAL GUIDELINES FOR OPEN ACCESS TO RESEARCH DATA

Technical development over the last few decades has meant new possibilities and means for collecting and sharing information. As a consequence, new ways of conducting research have been established, with – for example – geographically distributed collaboration, and analyses where different data sources are integrated and thereby enable researchers to address new questions. There exists a widespread opinion that it is advantageous to make data in general and research results in particular as accessible as possible. Arguments that are frequently used to promote open access to research data include the following:

- **Democracy and transparency.** Research results paid for by public funds should, as a matter of principle, be accessible to citizens. Access to the data used to underpin a result, presented in a scientific paper for example, is necessary to check that the conclusions drawn are in accordance with the data.
- **Research.** Open access to research data may enable researchers to address new questions, especially within an interdisciplinary context. With open access to research data, experiments may not always need to be repeated, but rather previous results can be reused. Data can also be used within new research fields and, by combining different data sets, researchers can address new problems. Furthermore, the development of new analytical methods is facilitated if researchers have access to experimental data. For data-intensive research (popularly called *big data*) where different data sources are integrated in order to identify novel trends and correlations, access to large data sets is a prerequisite.
- **Innovation and utilisation outside research.** Easily accessible data also has the potential to be used outside the research community, for example by companies, private persons and public authorities.
- **Citation.** Researchers who reuse research data must make reference to the researcher(s) who originally produced the research data. This can be done through reference to a publication which describes data or directly to the data set. Open access to research data can thereby lead to an increased number of citations, which will be a merit for the researcher that produced it.

About the recommendations for open access to research data

The proposed guidelines are based on the existing Swedish legal framework and the following laws, among others, are relevant: The Freedom of the Press Act¹⁵, Public Access to Information and Secrecy Act¹⁶ (OSL), the Personal Data Act¹⁷ (PUL), Law on Ethical Review of Research¹⁸ and the Archives Act¹⁹. References to these are found throughout the document but they are not described in detail here. It should be noted, however, that as a rule research data is to be regarded as *a public document* since it is stored or was produced at a public authority, which has consequences for the guidelines. First, public documents belong to the public authority and research data is consequently not the property of the individual researcher but of the higher education institution (which normally is a public authority) where the researchers is employed. Second, everyone who wishes to has the opportunity to request public documents from an authority, which means that we already have a passive form of open access. Research data that includes personal information is protected, however, by legislation regarding secrecy and integrity and any disclosure of such research data may only take place after special review. Third, the higher education institutions are responsible for archiving and long-term preservation of research data produced by researchers employed by them.

¹⁵ SFS 1949: 105

¹⁶ SFS 2009:400

¹⁷ SFS 1998:204

¹⁸ SFS 2003:460

¹⁹ SFS 1990:782

Furthermore, the guidelines also has to account for the EU Commission's view of open access to research data, which is expressed in both the Commission's recommendation relating to access to and the preservation of scientific information²⁰ and in the guidelines for Horizon 2020. A pilot is being carried out as part of Horizon 2020 in which calls for proposals, covering about 30% of the total budget, require that research data underpinning a scientific publication is made openly accessible.

Taking the above into account, the Research Council recommends that open access to research data that is produced, either wholly or partly, with public funding should be considered the norm. In certain cases, however, there are legal, ethical or commercial considerations that need to be further considered.

Scope and limitations with respect to funding source

The proposed guidelines focus solely on data that is produced for purposes of research and with public funding (the two inner rings in figure 1). The Swedish Research Council acknowledges that there are many other data sources within trade, industry and the public sector (the two outer rings in figure 1), which are important for researchers. An example of the former is industry-related research funded by a company, a collaboration that can favour both the company and the researchers. An example of the latter is patient data produced within the ongoing activities of the County Councils. Such data is not collected for research purposes but may still be of great value for researchers to study. Another example of data from the public sector that is of interest for researchers is different data concerning the population collected by Statistics Sweden and the National Board of Health and Welfare. To what extent data not covered by the proposed guidelines can, and should, be made openly accessible is, nevertheless, a separate issue that should be dealt with at a later stage.

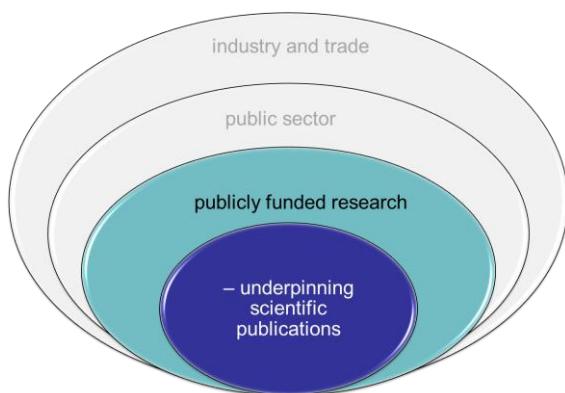


Figure 1. Researchers can use data from many different sources. The proposed guidelines address the two innermost rings, i.e. data produced from publicly-funded research. For the next five years the guidelines are further narrowed to only cover research data that is produced with public funds and which underpins a scientific publication.

Strategic objective

The Swedish Research Council proposes that the Swedish strategic objective is that all research data produced either wholly or partly with public funding (the two inner rings in figure 1) is to be made openly accessible as soon as possible. Consequently, the strategic objective encompasses research data that emerges as a result of publicly-funded research. The introduction of such a recommendation is, however, a laborious and time-

²⁰ Commission Recommendation on access to and preservation of scientific information, C(2012) 4890.

consuming process requiring further study of certain issues, such as how Sweden should handle research into sensitive personal data, as well as research taking place in collaboration with industry and where there is a potential for commercialisation of results. The objective is also strongly dependent on international development and the construction of appropriate technical infrastructure. With this in mind, it is proposed that in the short term there be a less far-reaching objective, which is described below in the form of proposed guidelines for 2015–2020.

Proposed guidelines for 2015–2020

During the period from 2015 up through 2020, there should be pilot calls²¹ in which open access to research data that is publicly funded, either in whole or in part, and underpins a scientific publication²² (the innermost ring in figure 1) is required.

In connection with the introduction of open access to research data, both in the long term and upon implementation of pilot calls, there are certain essential aspects that need to be taken into account.

Limitations to the basic principle of open access to research data

For certain types of research data, there are legal, ethical or commercial reasons that prevent open access to the full data set; in such cases the metadata (i.e. information that describes the data) should instead be made readily accessible. Examples of such cases are listed below:

- For research data based on personal data there are special restrictions on access²³. Such data should be made as accessible as possible with regard to laws and protection of personal integrity.
- Research data that threatens the nation's security or that conflicts in other ways with Swedish legislation.
- Research data that has a commercialisation value may, in certain cases, need to be exempted from the requirement for open access. In such cases this should be specified in calls for proposals involving public funding and the objective should be that this data too becomes openly accessible as soon as possible.

Metadata and the reuse of research data

Along with research data, metadata – as well as a license²⁴ defining the conditions of its use – must also be made accessible to facilitate understanding and reuse of the research data in the best possible way. Metadata shall be sufficiently detailed so that other researchers can understand which research data forms the basis for the publication. Both metadata and research data need to follow established standard formats. If special software is needed to read, or analyse data, this too should be indicated in the metadata. If the software is *open source* it should be made accessible together with the research data and metadata.

Data needs a unique identifier²⁵ so it can be referred to, both in the original scientific publication and in new studies.

In connection with the reuse of research data it is important to recognise all the work required for collection and documentation of the data. Researchers who reuse research data must, therefore, correctly refer to the

²¹ Pilot calls in this case implies that open access requirements are implemented in a number of ordinary calls for proposals.

²² Or published in some other way.

²³ Research data that concerns individuals is regulated by legislation such as the Public Access to Information and Secrecy Act (OSL), Personal Data Act (PUL) and the Law on Ethical Review of Research. Personal data cannot always be made openly accessible in the same way as other research data, but it shall be made as accessible as possible for other researchers. At a minimum, the metadata shall be openly accessible so that other researchers know what data has been collected. Other researchers can then request data (public document (OSL)) and the higher education institute examines whether the data can be disclosed and whether possible confidentiality applies. The researcher who obtains the data shall handle it in accordance with the applicable legislation.

²⁴ There are different systems of licenses and it is the principle that is important here; which license to be used should be investigated further.

²⁵ There are different systems for this and it is only the principle that is important here; which license to be used should be defined upon implementation of pilot calls for proposals.

person(s) who originally collected and published the research data. However, this is not a new requirement since even today good research practice involves including references to all the material included in a study. References to research data that is reused may be done either through a reference to the publication that describes the data or directly to the data set. The new user obviously need to observe the same legal and ethical framework as the researcher who originally produced the research data, which implies for example that research involving personal data is evaluated against the Personal Data Act and the Law on Ethical Review of Research.

Open access to research data means that the researcher that originally produced the data may not place any additional demands – apart from any legal limitations – in the form of e.g. co-authorship or fees on the person(s) who reuse the research data.

Implementation and follow-up of pilot calls for proposals with requirement for open access to research data

The purpose of carrying out pilot calls for proposals is to speed up the development towards open access for research data. A first essential step is thus to advance the planning and construction of the required technical infrastructure. As illustrated in Figure 2, at least two levels of technical infrastructure are needed. The basic level concerns technical solutions for archiving and long-term preservation of research data. This is the responsibility of the higher education institutions; it does not, however, necessarily mean that each of them must develop its own system. On the contrary, it may be appropriate for the higher education institutions to collaborate on this. When this foundation is in place, technical systems that actively facilitate access to the stored data (the upper level in figure 2) are needed. These ought to be sufficient challenges and it is therefore proposed that pilot calls for proposals are chosen so that they do not generate additional complications concerning the law or opportunities for patenting research data. The Research Council notes that there is a contradiction: on one hand technical infrastructure is a necessary prerequisite for making research data from the proposed pilot calls openly accessible, and on the other hand there is a lack of such supporting infrastructure because there is little incentive to build it. The Research Council believes that the pilot calls may provide this necessary incentive.

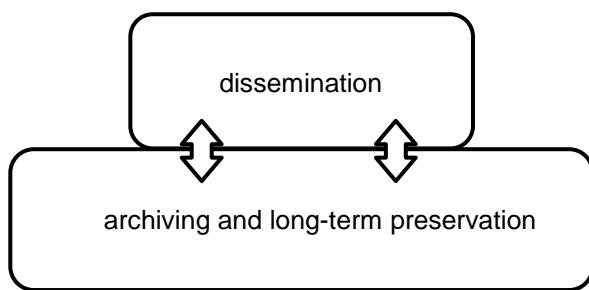


Figure 2. Archiving and long-term preservation of research data is a necessary prerequisite for open access to research data. Only when data is safely archived and preserved can it be disseminated to others.

In addition to the technical aspects, several practical issues will be of interest upon implementation of the proposed pilot calls. One such issue, for example, is how information regarding data management and dissemination shall be included in the application for research funds. Research funding bodies with a requirement for open access often use a data publishing plan, in which the applicant describes which data will be collected, how it will be documented, stored and disseminated to others. In the application it is usually also possible to include extra costs for management and dissemination of data from the research project. A related issue is how the research funding bodies ensure that the guidelines are followed.

From the researcher's perspective a number of different questions become important such as: the best way to analyse, document, quality-assure and disseminate the research data produced within one's own project. Similar

questions apply to data which is reused from other sources. There is probably a corresponding need for education, training and support for researchers on these issues.

The questions raised above have no clear answers at present but must be addressed and solved within the framework of the first pilot calls for proposals. Therefore it is important that the pilot calls are closely and continuously monitored to allow all stakeholders to learn from the gained experiences, and if necessary change direction. The experiences from the pilot calls should be continuously communicated to different stakeholders, including the Swedish Government.

2020–2025

After the first five-year period, the public authority responsible for national coordination of the work on open access to research data should conduct a major evaluation and, on the basis of this, propose to the government how the work should continue beyond 2020.

On different stakeholders and their internal roles

In order to achieve the goals above regarding open access to research data, sustainable and long-term work is required together with structured collaboration between the different stakeholders. To achieve the goals it is imperative that there is a clear political ambition stating that this is important and prioritised. Two key issues are how political coordination of the work with open access to research data and other authority data²⁶ can take place, and how the work in the different ministries and administrative authorities that work with these issues can be coordinated.

Swedish legislation provides generous opportunities to everyone who wishes to obtain access to research data; even today, Sweden has a form of passive open access to research data through the ‘the principle of public access to official documents’ (*offentlighetsprincipen*). It is nevertheless a complex form of accessibility and the purpose of the proposed guidelines is to facilitate and speed up the shift from passive access to active dissemination of research data. The foundation for making research data openly accessible is that they are archived and preserved in a safe and structured way. The Swedish legislation is clear about this (see Archives Act), it is the responsibility of the higher education institutions to ensure archiving and long-term preservation of research data (the lowest level in figure 2) produced by their researchers. It may be noted here, however, that this basic prerequisite has not been fulfilled. The absence of technical infrastructure and competence for archiving and the long-term preservation of research data is a serious shortcoming at many universities and university colleges. On the other hand, this opens an opportunity for them to develop joint technical solutions and processes. There are obvious advantages to this; for example, systems and processes become uniform, which facilitates sharing research data between the various higher education institutions. Another aspect is that joint solutions are likely to be cheaper than if each university or university college builds its own system.

Archiving and preservation, however, are not sufficient to make research data openly accessible; there is also a need for supporting technical infrastructure (the uppermost level in figure 2) as well as human expertise to support researchers. At present, it is unclear who has the responsibility for this, in practical as well as economical terms. If there is a political will to make research data openly accessible, it is also necessary that funds are allocated to construct and operate the appropriate infrastructures for dissemination.

Responsibilities and roles for different stakeholders can be summarised in the following recommendations.
The government should:

- adopt a policy standpoint in favour of open access to research data.
- coordinate tasks for the different ministries and authorities that work with open access to research data and data from administrative authorities (other than the universities and university colleges).

²⁶ This is regulated in the Law on the reuse of public administration documents (2010:566) which in turn is an implementation of the EU directive on Public Sector Information (PSI).

- designate a stakeholder responsible for national coordination of Sweden's work concerning open access to research data.
- allocate funds for infrastructure (technology and expertise) for dissemination of research data.

The higher education institutions should:

- work actively on the issue of archiving and long-term preservation of research data.
- allocate funds for archiving and long-term preservation of research data²⁷.
- collaborate on planning of technical solutions, processes and guidelines for researchers.

The Swedish Research Council should:

- be a policy leader on issues relating to open access to research data, for example drawing up guidelines.
- together with other research councils, gradually introduce requirements for open access to research data in their calls for proposals; pilot calls for proposals are carried out as an initial stage of this process.
- announce²⁸ targeted calls for proposals for infrastructures that support open access to research data.

All stakeholders involved should jointly work for increased awareness of the benefits of open access for research data.

Proposal for continued studies

In the process of developing a proposal for national guidelines, the Research Council has done its best to cover all relevant aspects. We have, however, identified a number of areas where our work is insufficient and further studies are necessary. These are listed below; it is especially urgent that the first one is addressed.

- 1) It is necessary to further investigate whether, and if so how, the higher education institutions can coordinate their technical systems and processes for archiving and long-term preservation of research data produced within the higher education institution.
- 2) There should be further investigation into the extent to which research data produced in collaboration with trade and industry (the outer ring in figure 1) can be made openly accessible.
- 3) There should be further study regarding to which extent personal data from public sector (the next outermost ring in figure 1), including sensitive personal data from patients, can be made accessible for research.

Many other issues, especially of practical nature, are also still unsolved and need to be analysed and discussed further. The Research Council believes that this is done best as part of the process of implementing the pilot calls, i.e. a number of calls for project funding where the funding is tied to a requirement for open access to research data that underpins a scientific publication. With such a clear incentive, the Research Council believes that the necessary development of technical systems for both data archiving and preservation, as for actively making accessible research data, will proceed more rapidly.

²⁷ In accordance with the Archives Act that specifies that the higher education institutions are responsible for this.

²⁸ That the government mandates the Research Council in its appropriation directions or alternatively that it is pointed out as a prioritised area in the Infrastructure guide, which will form the basis for future calls for proposals of the research infrastructure.

Consequences of introducing the proposed guidelines

Introducing national guidelines for open access to research data has far-reaching consequences for all those involved. At the meetings with stakeholders throughout the project, as well as in the web forum, many opinions – and some issues of concern – were voiced and highlighted; these are discussed below. One general observation is that the different aspects that were raised are also elaborated on in reports from other countries²⁹; they are consequently not unique for Sweden.

Legislation

The proposal for national guidelines is based on Swedish legislation, since the Research Council has not been mandated to propose any changes to the law. However, we have recurrently received proposals for changes to the legal framework; these are therefore discussed below.

Research data as public documentation

The guidelines are based on the prevailing perception, represented by Alf Bohlin³⁰ amongst others, that research data is regarded as a public document. Two consequences of this are: research data do not belong to the individual researcher but to the public authority (i.e. the higher education institution or equivalent authority), and everyone who so wishes has the right to request research data (public documents) from the higher education institutions. We have noted that this is not well known amongst researchers in general, and several researchers have argued that they wish to see a change in the legal framework. For example, within the social sciences and medicine there is a practice of promising respondents in questionnaires total anonymity and that the questionnaire responses will never be disclosed to anyone else. Within the framework of Swedish legislation it is not possible to make this form of promises.

Archiving responsibility of the higher education institutions

Another aspect of the legislation which has been highlighted is the unconditional responsibility of the higher education institutions for archiving and the long-term preservation of research data produced by researchers at the higher education institution. It has been repeatedly questioned whether the higher education institutions do this at present in a systematic way, and indeed if it is even desirable that they have the main responsibility for this. Some believe that it would be better to have a joint operator or actor responsible for all technical infrastructures for archiving and long term preservation of research data. However, even with the current legislation it should be possible for the higher education institutions to use common technical infrastructures as long as long as they remain as the data owners. Another aspect put forward is that it will probably be very costly for the higher education institutions if they begin to work seriously with these issues. Consequently, both costs and shared technical solutions should be analysed further.

Within some fields there are already established (or planned) data archives where all researchers within the field deposit their data for long-term preservation. As long as the data sets are fairly small and the costs are low this generally works well, but with the data explosion that is now taking place within many scientific fields the costs increase dramatically and it is unclear who is going to finance this. There is a potential conflict of interest here since the higher education institutions have the responsibility for long-term preservation of the research data from their researchers but the researchers frequently feel that it is better to deposit data somewhere else. The Research Council believes that this is a discussion that should be conducted within, and among higher education institutions.

²⁹ *Science as an open enterprise*. The Royal Society Science Policy Centre report 02/12. June 2012; *Sharing and archiving of publicly funded research data*. Report to the Research Council of Norway. (2014).

³⁰ *Offentlighet och sekretess i myndighets forskningsverksamhet*, Alf Bohlin 1997

Motivation for the researchers to share research data

The proposal for national guidelines is formulated as requirements; and a greater focus on a voluntary approach and “carrots instead of the stick” to advance the development has been asked for. Even today free sharing and reuse of research data is seen as self-evident in some scientific fields, whereas within other fields the same practice does not exist. In general, it can be said that within fields where there is a practice of open access to research data, there is also a common view that everyone gains from sharing data with one another. The researcher who reuses research data recognises the work that lies behind the collection and documentation of data through referring to an associated publication. In this way, open research data gives more citations and contributes to qualifications. A further development of this is to refer directly to data collections where there is not an associated publication. The importance of positive models should not be underestimated; in line with ever more research funding providers introducing guidelines for open access, there is an increasing pressure on others to follow the same trend.

Great need for supporting infrastructure

The basis for making research data accessible is that they are archived and preserved in a structured and secure way, which is the responsibility of the higher education institution concerned³¹. However, this is insufficient for making research data easily and freely accessible; there is also a need for additional infrastructure addressing the dissemination and accessibility to data. This concerns, for example, technical infrastructure such as databases and web portals that primarily categorise metadata, and also competence support for researchers. Note that the primary focus of the technical infrastructure should be to actively make metadata and links to raw data accessible, since the actual storage of research data is the responsibility of higher education institutions. At present, there is no naturally indicated stakeholder responsible for constructing and operating infrastructures for dissemination of data. Since the work and costs for this may be assumed to be fairly high in the longer term, the responsibility needs to be assigned to at least one stakeholder. It will also be necessary to allocate funds for this purpose. The form for this needs to be investigated further.

The proposal for national guidelines focuses on raw data, sometimes also called primary data—that is, results from measurements, experiments, observations, questionnaire responses and so on. In addition to such data, there is frequently a need to make accessible and reuse aggregated data – that is, data from different sources that is merged – and processed data with a higher abstraction level, where raw data is interpreted and placed in context. For all types of data it is necessary that they are properly documented (through adequate metadata).

Infrastructure for making research data available is a necessary prerequisite for implementation of the proposed guidelines. It is not absolutely necessary that this is in place at the time of the pilot calls covered by the guidelines, but planning and development of necessary infrastructure must take place in parallel so that they are in place when the first projects from the pilot calls end.

Swedish Research Council's new model for financing of research infrastructure

At present, the Research Council provides funding for a smaller number of research infrastructures (e.g. BILS, ECDS and SND), which provide support for researchers in handling, documenting, disseminating and reusing research data. One possible scenario is that the Research Council expands its support for this type of infrastructure and takes an overall responsibility for this. It is, nevertheless, partly up to the higher education institutions to determine if they wish to see such a development. The Research Council is now in the process of reviewing the funding model for planning, construction and operation of national research infrastructure. In the new funding model the higher education institutions acquire will have a greater responsibility for identifying and prioritising research infrastructure. Broad national interest in infrastructure will also be required, and more extensive co-financing than previously is expected.

³¹ The Archives Act, SFS 2003:460

Swedish Research Council's mandate concerning infrastructure for register-based research

In parallel with the task of proposing national guidelines for open access to research data, the Swedish Government has instructed³² the Research Council to implement an infrastructure that supports register-based research. The purpose of this is to improve accessibility to, and facilitate the use of, register data for research purposes. Both these Research Council tasks touch upon one another, since both involve making data accessible for research. The technical solutions that are expected to be proposed for register data may also be relevant for other types of research data. Nevertheless, the register task only addresses one specific type of data and it is not certain that the same technical solutions can be used within all scientific areas.

International aspects

Swedish researchers often operate in an international environment; from several different quarters there is concern about how the national guidelines will affect Swedish researchers' opportunities for competing internationally. Given that the mandate from the government is based on a recommendation from the EU Commission, and that they introduced a pilot for open research data in Horizon 2020, it is reasonable to assume that other European countries will adopt similar guidelines. Some countries, such as Great Britain and Norway, already have national guidelines; and within the EU there is rather extensive policy work concerning open access ongoing. Regarding the introduction of national guidelines, Sweden should strive to keep in step with developments within the rest of the EU. Whether or not Sweden should be at the forefront or adopt a 'wait and see' approach is ultimately a political question.

Another international aspect is that, in principle, all work on developing standards takes place internationally. This may concern standard formats for research data and metadata, licenses for reuse, the link between authors/publications and associated data collections etc. This work should necessarily take place internationally and a leading initiative at present is the Research Data Alliance (RDA).

Data that is not covered directly by the proposed guidelines and data that may require special attention

In addition to the research data that is directly covered by the proposed guidelines for 2015–2020, there are several types of data and many aspects that may need to be investigated further, either as part of the pilot calls or as separate studies.

Data that has already been collected

The proposed guidelines are focussed forward in time and are not intended to apply to research data that has already been collected. This has been brought up as a weakness, since there may be older data collections that are surely of interest to make accessible. Related to this, the focus on digital information has been discussed, as some older data is only available in paper format and must first be digitalised before it can be made accessible through the Internet.

Data collected through major international collaborations

It is proposed that the guidelines should apply to all research data that is wholly or partly financed through public funding, which immediately raises questions concerning how Swedish researchers who participate in large international collaboration projects should act. The implementation of national guidelines needs to take this into consideration, and the exact forms must be drawn up within the planned pilot calls.

³² The Government's Appropriation Directions for the Swedish Research Council 2013 and 2014.

Data with potential to be patented and commercialised

In some cases, researchers wish to patent and commercialise the results of their research and this has been highlighted as a potential problem in relation to the proposed guidelines. It should, nevertheless, not be problematic since the guidelines for 2015–2020 focus on research data that underpins a scientific publication and a patent is obtained before the results are published.

Within a number of fields, a large part of the research takes place in collaboration with industry or other commercial stakeholders. Commercial interests may then come into conflict with the assumed societal benefit of making the research data openly accessible. The extent to which research data from industrial collaboration can be made openly accessible should be investigated further.

In the web forum, attention was drawn to the fundamental conflict of interest that exists; on one hand the Government promotes making research data openly accessible and, on the other hand it encourages researchers to commercialise their research results. This is an ideological issue that should be discussed at the political level.

Data collected in case of research infrastructures

Data produced at research infrastructures with public funding from the Swedish Research Council should be made openly available. The conditions and forms for this are being looked over prior to the Research Council's call for infrastructure grants in 2015.

Clinical data produced for a purpose other than research, including data from clinical trials

Clinical data from patients is important for research in medicine and healthcare. A large part of this data is presently found within the county councils and to a certain extent also in the municipalities, and it is important to further analyse to which extent such data can be made accessible. Where sensitive personal data is concerned, far-reaching confidentiality legislation is in place as protection for personal integrity, and open access should primarily be interpreted as the metadata being made openly accessible. To obtain access to the whole data set the researcher must be subject to the customary inquiry against Sweden's Personal Data Act and the Law on Ethical Review of Research.

Another aspect being highlighted is data collected within the framework of clinical studies. Since clinical studies, as a rule, are undertaken by pharmaceutical companies, this lies outside the real mandate to the Research Council. Nevertheless, we note that there is a general interest in making the data from clinical studies openly accessible, to the extent that this is legally possible. Positive results from clinical studies normally become known but there is a wider public interest in the negative results also becoming accessible.

Software

One viewpoint that was raised is that also software developed with public funding should be made openly accessible. In certain cases the software may be vital in itself; in other cases, it may be needed so that others will be able to reuse and benefit from open research data. Making software accessible partly raises other questions than publications and research data. If the researchers have used commercial software it is not possible, for copyright reasons, to make it available together with the data. If, on the other hand, the researchers have developed their own software it may be made accessible as *open source*. One concern, however, that has been noted is the fact that it may be very time-consuming, and thereby also costly, to include software in the guidelines for open access. In many cases, the software developed within a research project is highly specialised, which means that it is developed for a specific purpose and to be used by knowledgeable users. One consequence of this is that software developed within research projects seldom lives up to the demands for user-friendliness, stability and documentation that users outside the research team may expect from it. This does not prevent that the software is made accessible so that a knowledgeable user can use it.

Control over research data – a major issue

In our dialogue with researchers and their representatives it emerged that they regard research data they have collected as “theirs”, a perception that is not, however, based on the current legal framework. Autonomy and self-determination are put forward as arguments by the researchers, and they wish to have the last word concerning how data is (re)used. Several researchers also expressed concern that open access implies them losing control over research data they have produced. The concern relates to the fact that open access would mean them losing competitiveness if the incentives for collaboration would disappear, also data could be misunderstood by other users or in the worst case used in a damaging way.

One aspect of the same subject is the concern expressed that certain types of research will have lower priority if open access to research data is introduced within all scientific fields. This relates to studies that encompass large and costly data collections, often collected over a long period, and where the research team that collected the data can expect to publish results based on the data collection over a long period. Examples highlighted are longitudinal population studies and interdisciplinary studies within medicine and social science. The criticism that has been levelled is that open access to such data sets may remove the incentive to; either collect supplementary data, or to initiate new data collections. This would naturally counter its purpose if open access leads to the end of data collection within certain research fields. It cannot be ruled out that there may be a need for special support actions to stimulate such data collection.

A further complication that has been mentioned is if the original data set contains errors³³ not detected during collection, which may then consequently be spread to other studies when the data set becomes openly accessible. In this context it may be pointed out that the more groups analysing the same data set, the greater the probability that possible mistakes are discovered. It can also be noted here that there is a general concern about the quality assurance of research data that is made openly accessible. Open access to research data presupposes that data is accompanied by correct metadata and that any software is well documented. Both these measures should even today be part of good research practice, and the responsibility for this lies with the researcher who develops the data and any software. In connection with publication of research results based on underlying data, the journal has a responsibility for ensuring that the articles published are correct; it should be the responsibility of the journal and its reviewers to ensure that the results are supported by data. If another researcher chooses to reuse published research data for new studies, he or she has full responsibility for ensuring that the analyses and interpretations of data carried out are correct and properly substantiated, in the same way as when the researcher publishes results based on research data produced through own measurements, experiments, questionnaires etc.

The aforementioned viewpoints are important, and should be taken into consideration and monitored during implementation of the pilot project. The forms for this may be developed by the proposed national coordination function.

³³ Either owing to mistakes or deliberate cheating.

APPENDICES—SCIENTIFIC PUBLICATIONS AND ARTISTIC WORKS

Appendix 1: List of terms and abbreviations used – scientific publications

Different types of open access publishing

There are different methods for publishing articles in journals on the basis of open access; these are often referred to as gold, green and hybrid publishing. The interpretation and use of the term gold is not always identical.

Gold – in the present document, the term gold is used for publishing in an open access publication which can be read by all free of charge. In other contexts, hybrid publishing is frequently included in ‘gold’.

Green – self archiving: the publication is archived in an institutional repository (digital open archive) and published on the Internet, possibly after an embargo period.

Hybrid publishing – the researcher publishes in a traditional subscription-based journal and pays the publisher to make the paper openly accessible. This is necessary when the publishers have long embargo periods, longer than what the funding providers can accept.

Fees

Author fees – instead of the reader paying, the author of a paper in an open access journal pays an ‘author fee’ or Article Processing Charge (APC).

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Embargo period

If the researcher chooses to publish in a subscription-based journal, many research funding providers require that he or she also commits to parallel publishing of the paper so that it is made openly accessible. Many smaller journals often give the researchers permission to publish the reviewed manuscript, or even the finished paper, directly at the time of publishing. Other publishing companies may demand exclusive rights to the dissemination of articles, at least during a limited period. This period, between original publication and open access publication, is referred to as the embargo period.

OA/Open Access

OA is an established abbreviation of Open Access, even here in Sweden from at least the mid-1990’s, when both the abbreviation and the term were established in discussions on the subject. At the Research Council, which introduced the demand for open access in 2010, lower case letters - not capitals - are used: ‘open access’.

In the Swedish Government's Research and Innovation Bill of 2012, the Swedish translation ('öppen tillgång') is used. The terms are synonymous.

Institutional Repository

An institutional repository is a digital archive. All Swedish universities and colleges (with one exception) have repositories, but there are Swedish organisations that conduct research activities without possessing one at all. Researchers belonging to these may publish in subject-specific repositories, such as Pub Med Central and Europe Pub Med Central, or in the EU Commission's repository, which is open to all researchers. The latter is called zenodo.org. (<http://zenodo.org/>)

Appendix 2: Collaborative meetings with stakeholders–scientific publications

Times and forms of collaborative meetings carried out within the mandate concerning National Guidelines for Open Access to Research Results:

| Collaborative Meeting | Date |
|---|---|
| Library directors for research libraries, information about the task | 26/09/2014 |
| Research agencies, via Network of Research Agencies (Nätverket för forskande myndigheter), information about the task | 08/05/2014 |
| Research funding provider network (representatives of Forte, Formas, RJ, SSF, Vinnova and Foundation for Baltic and East European Studies) information about the task and a workshop | 12/02/2014, 03/04/2014, 28/05/2014, 10/10/2014 |
| National Library of Sweden expert group for OpenAccess.se and publication management (representatives of the university sector, research agencies, research libraries and National Library of Sweden) information about the task and a workshop | 06/03/2014, 07/05/2014, 14/10/2014, 20/11/2014 |
| Open Access Meeting (mainly librarians at Swedish research libraries), information about the task | 01/04/2014 |
| Vice-Chancellors at Swedish universities via the ‘Principals Council’, information about the task | 07/05/2014 |
| Swedish Library Association, meeting, information about the task | 06/02/2014 |
| Research Council’s scientific councils and committees, meeting with representatives of the aforementioned | 19/08/2014 |

At all meetings, where only information has been submitted, the participants have been urged to come forward with viewpoints either via e-mail or via the Research Council’s web forum during the autumn of 2014.

Consultation and collaboration with the National Library of Sweden has taken place on an ongoing basis via Ulf Kronman, Coordinator of the programme OpenAccess.se and publication management.

APPENDICES–RESEARCH DATA

Appendix 3: List of terms and abbreviations used–research data

BILS

Bioinformatics In Life Sciences (BILS) is a national infrastructure funded by the Research Council. BILS provides bioinformatics support to researchers within life sciences and one part of this is to supply knowledge about data management.

ECDS

Environment and Climate Data Sweden (ECDS) is a national infrastructure funded by the Swedish Research Council. ECDS supplies a metadata catalogue and knowledge about data management for researchers within the field climate and the environment.

Research data

Research data is digital information collected in order to be analysed for scientific purposes³⁴. Examples of such research data include results from experiments and measurements, observations from field work, statistics, questionnaire responses, interviews and images³⁵. Physical objects such as scientific and archaeological collections, physical arts works or biobanks are not regarded *per se* as research data; however, digital information about such objects are to be regarded as research data.

Open access to research data

Open access to research data implies that research data is freely (i.e. free of charge and without any demand for collaboration) accessible via the Internet. Data is accessible in a digital, standardised format which is machine readable and the data can be freely reused. Open access to data must take place in accordance with applicable legislation.

SND

Swedish National Data Service, a national infrastructure that is financed by the Research Council. SND supplies a metadata catalogue and knowledge about data management for researchers within the humanities, social science and medicine.

Scientific publications

Refers mainly to publications in scientific journals. Within certain scientific disciplines, however, publication takes place in other channels, for example only through conference contributions; this too is included.

³⁴ Data that is collected for other purposes, e.g. other public authorities, county councils, municipalities or private companies may also be relevant for researchers but they are not covered by the national guidelines.

³⁵ Research data does not include preliminary analyses, draft publications, project plans for future projects, etc.

Appendix 4: Collaborative meetings with stakeholders—research data

During spring 2014, the project group conducted a dialogue with different interested parties in order to discuss and obtain viewpoints on the proposed guidelines. We met with the following groups:

- The research funding agencies Forte, Formas, Vinnova and the Swedish Polar Research Secretariat³⁶ for regular status meetings to inform on how the project is proceeding and to obtain viewpoints. One meeting during the spring, 1–2 meetings planned in the autumn.
- SUHF (Association of Swedish Higher Education) forum for library directors; the invitation went out via their mailing lists and in certain cases the library directors chose to send an employee instead. A three-hour workshop with presentation of the project and detailed discussions took place at the Research Council.
- Networks for IT managers at universities and colleges, the invitation was sent via their respective mailing lists and, in certain cases, the managers chose to send an employee instead. A three-hour workshop with presentation of the project and detailed discussions took place at the Research Council.
- SUHF's network for archivists. Presentation of the project and discussion for about 45 minutes.
- The Principals Council: the Vice-Chancellors at the eleven universities. Presentation of the project and discussion for about 40 minutes.
- The data management infrastructures BILC, ECDS and SND, heads and 1-2 employees took part from each infrastructure. Presentation of the project and discussion lasting about 1.5 h.
- Network for research agencies, coordinated by the Swedish Research Council. Presentation of the project and discussion for about 30 minutes.
- ORDER network (Open Research Data in E-archives for Reuse), a network formed following a previous workshop (2012) on open access to research data. Presentation of the project and discussion for about one hour.
- Reference group with members from the scientific councils. A four-hour workshop divided into two sessions, one for publications and one for data, with presentation of the project followed by discussions.

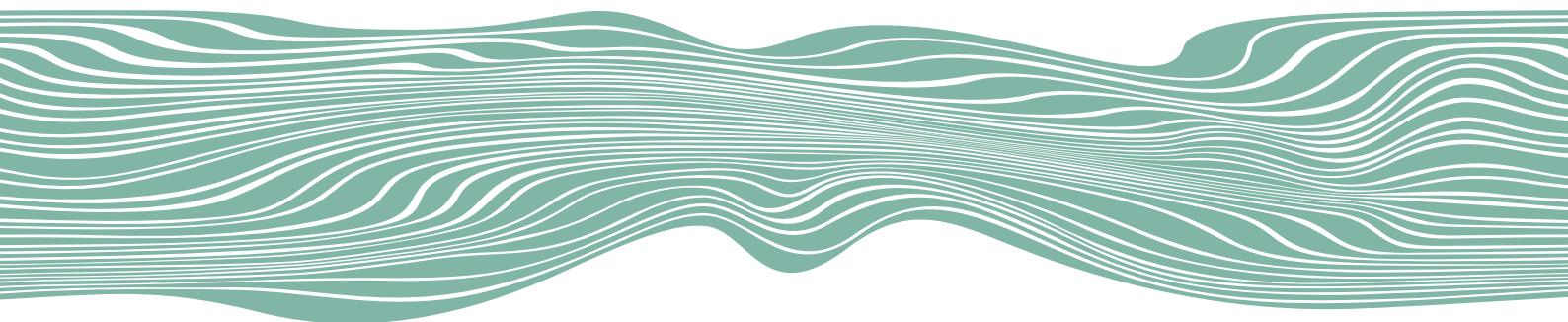
The purpose of these meetings has been to create awareness of open access to data, to inform about the task and to gather in both appropriate knowledge and views. Before each meeting, the groups were able to familiarise themselves with a preliminary version of the guidelines and an analysis of external factors and these have formed the foundation for the dialogue. We have specifically asked the following questions:

- What is the situation at Swedish higher education institutions today? (Only for certain groups.)
- What is your opinion about the proposed guidelines?
- Which obstacles remain to be solved before it is possible to introduce guidelines for open access to research data?
- How do you view the division of responsibilities and the time perspective for the establishment of open access to data?

All meetings have been documented and the participants have also been invited to submit additional viewpoints and comments via e-mail after the meetings. We have carefully noted all comments submitted and taken them into consideration.

³⁶ The Swedish Energy Agency was invited but did not participate.

The Swedish Research Council has been tasked by the Government to develop national guidelines for open access to scientific information and presents in this report its proposal for how the guidelines should be formulated. The report also includes suggestions for further assignments, investigations and allocation of responsibilities, together with a proposal that a national coordination function be set up at the appropriate authority, with the mandate to coordinate the work.



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The Swedish Research Council has a leading role in developing Swedish research of the highest scientific quality, thereby contributing to the development of society. Besides research funding, the agency advises the government on research-related issues and participates actively in the discussions to create understanding of the long-term benefits of research.