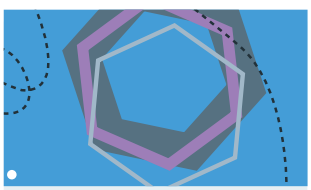
Construction of a reference genome sequence for barley

Open Research

GOLD OPEN ACCESS IN THE UK: SPRINGER NATURE'S TRANSITION

Case study

ADVANCING DISCOVERY



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Journals Data
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Contents

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This case study has been made openly available in the Figshare repository.

Access case study:
https://doi.org/10.6084/m9.figshare.6230813.v1

Foreword

At Springer Nature, our focus is on helping researchers advance discovery by making their findings as accessible, understandable, discoverable, usable, reusable, and shareable as possible.

An important way in which we are doing this can be seen in our commitment to open research. Providing authors with the ability to publish with us via gold OA forms a key part of this commitment, and I am extremely proud of this new case study which showcases the outstanding growth of gold OA at Springer Nature within the UK and the factors that have made this possible. I hope it will improve understanding of all interested parties in UK and around the world.

While the UK was already a leader in OA before the Finch report in 2012, this report shows the importance of having partnerships across the research community to make a successful transition to OA. When we change the system with all participants adapting – governments, funding bodies, institutions, authors, and publishers – we see real progress in advancing open research.

However, the move to open access is complex as evidenced by the fact that OA has been around for 20 years, yet still only accounts for a small proportion of overall global research output. For a number of reasons, demand for subscription content remains high.

This is why expanding our OA portfolio in journals and books is very important but only one of the initiatives we are deploying at Springer Nature to ensure the benefits of open research can be felt by all.

We encourage self-archiving of author accepted manuscripts and have some of the most liberal policies of any publisher. We are actively engaging with developments in the preprint space, having long supported the posting of original submitted versions of research manuscripts on community preprint servers such as arXiv and bioRxiv.

We also encourage the sharing and dissemination of research in our subscription-only titles via our free content-sharing initiative, SharedIt, which provides authors and subscribers with shareable links to view-only versions of their published papers. In addition, our new agreement with ResearchGate will enable us to work together on the sharing of articles on that platform in a way that allows us to maintain the version of record and, importantly given our responsibility to our authors and customers, track and report on how our content is being used.

Steven Inchcoombe, Chief Publishing Officer, Springer Nature

It is also important that publishers make their content available via machine readable interfaces and share the bibliographic reference lists of all publications cited in their publications to further advance discovery and reuse. We are achieving this by making our references available under a non-commercial Creative Commons licence via CrossRef and making these reference lists together with broader open linked data available via SciGraph.

Springer Nature is also pioneering new approaches to data sharing and open data and are committed to supporting researchers who want to take open approaches to their data, helping to make data sharing the new normal.

The rise of open research in all its manifestations is one of the major forces reshaping the way that researchers communicate and collaborate to advance the pace and quality of discovery. As partners with the research community in this enterprise, we will continue to play a supporting role in enabling the community to take full advantage of all that open research offers, including OA books, open data and open peer review. We are on a journey, and this case study illustrates what is possible for Springer Nature to achieve with its authors when all elements of the research ecosystem are aligned.

Executive summary

In 2012, the Finch group brought stakeholders together to collaborate in the development of the UK's OA policy. This resulted in a bold yet sustainable policy which, along with OA mandates by funders such as the Wellcome Trust, has led to the UK becoming a global leader in OA publication[1].

In Springer Nature's case, this has led to a significant transition to OA in the UK: in 2017, 77% of all Springer Nature publications with UK corresponding authors were published via gold OA. In the five years since Finch, we have published nearly 28,000 gold OA articles with a UK corresponding author. In total, this represents a 174% increase in gold OA Springer Nature articles from 2013 to 2017.

The rapid growth in the number and proportion of Springer Nature UK articles published via the gold OA route has been driven by strong uptake of both our fully OA and hybrid OA journals. As of 2017, 53% of gold OA articles with UK corresponding authors were published in our fully OA journals, while 47% were published via the gold OA route in our hybrid journals. Hybrid journals have thus played a key role in this transition and demonstrate the impact that the UK Springer Compact agreement has had on bringing about a transition to OA for hybrid authors.

The Springer Compact agreement has also made gold OA publication a simple option for UK authors in disciplines where gold OA publication has traditionally been more challenging. In 2013, UK corresponding authors publishing in Springer Nature's mathematics, humanities, and social sciences journals were making between 8% and 11% of their articles accessible via gold OA. From 2016, these disciplines saw a large jump in gold OA, rising to between 57% and 62% of articles with UK corresponding authors publishing gold OA.

Overall, growth in Springer Nature OA publications from the UK has been made possible by a collaborative environment, with support from a government and institutions that back OA, funders who have developed policies in support of OA and provided the funds necessary for article processing charges (APCs), authors who are willing to publish via OA, and a publisher providing authors with a range of publishing options alongside providing effective workflows.

If we are to see a further increase in OA in the UK, it is vital that the UK government and research funders make a long-term commitment to immediate gold OA, and acknowledge the role that both fully OA and hybrid journals play in delivering this. For institutions and publishers to commit to transitional models, there needs to be confidence that the funding infrastructure to support these will remain in place.

While countries like the UK are leading the way in transitioning to OA, globally the picture is mixed[2], and this means that a range of publishing options is likely to continue to be necessary in the longer term. Given this mixed picture, we need to remain flexible and continue to offer authors across the global research community a genuine choice of where to publish.

We continue to work with all stakeholders to support the transition to OA, and we call upon funders, institutions, researchers and publishers to join us in ensuring that the benefits of open research are available to all.

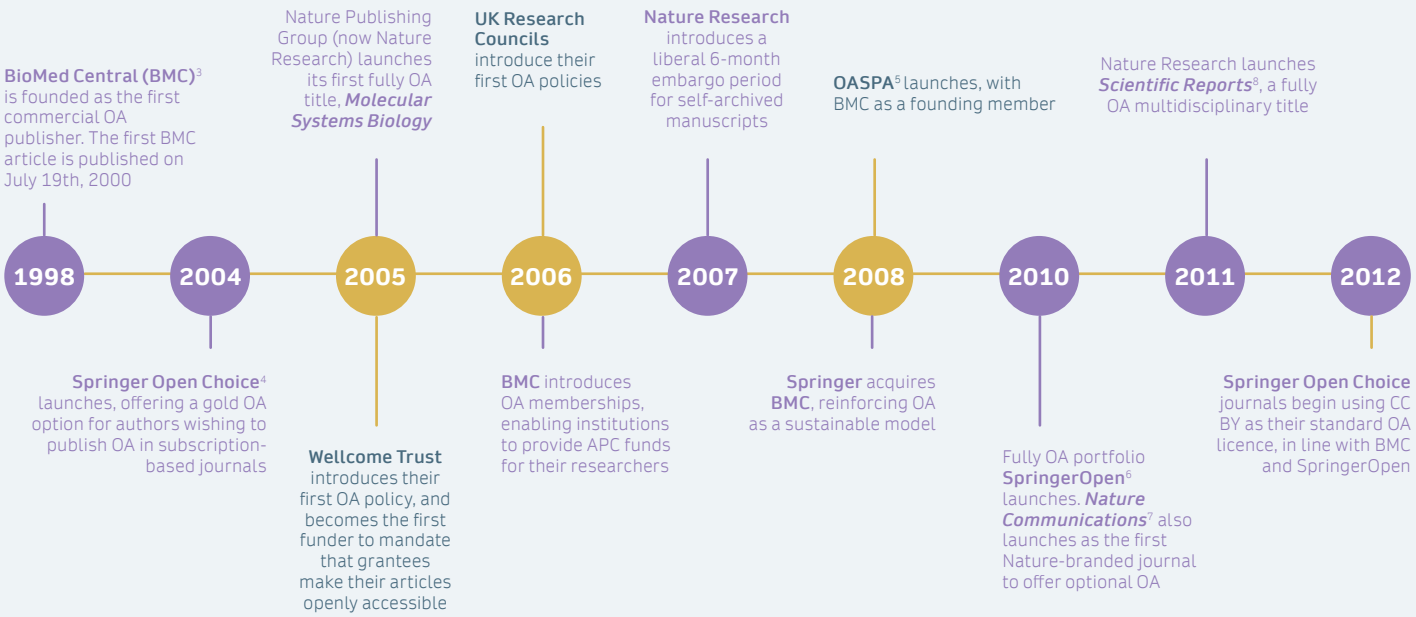
In 2017, 77% of corresponding authors based in the UK who published in a Springer Nature journal had published via gold OA.

1. Jubb *et al.* (2017), "Monitoring the transition to OA", http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf, Universities UK
2. Burgess (2015), "Review of the implementation of the RCUK Policy on Open Access", https://www.ukri.org/files/legacy/documents/openaccessreport-pdf/, RCUK 2015

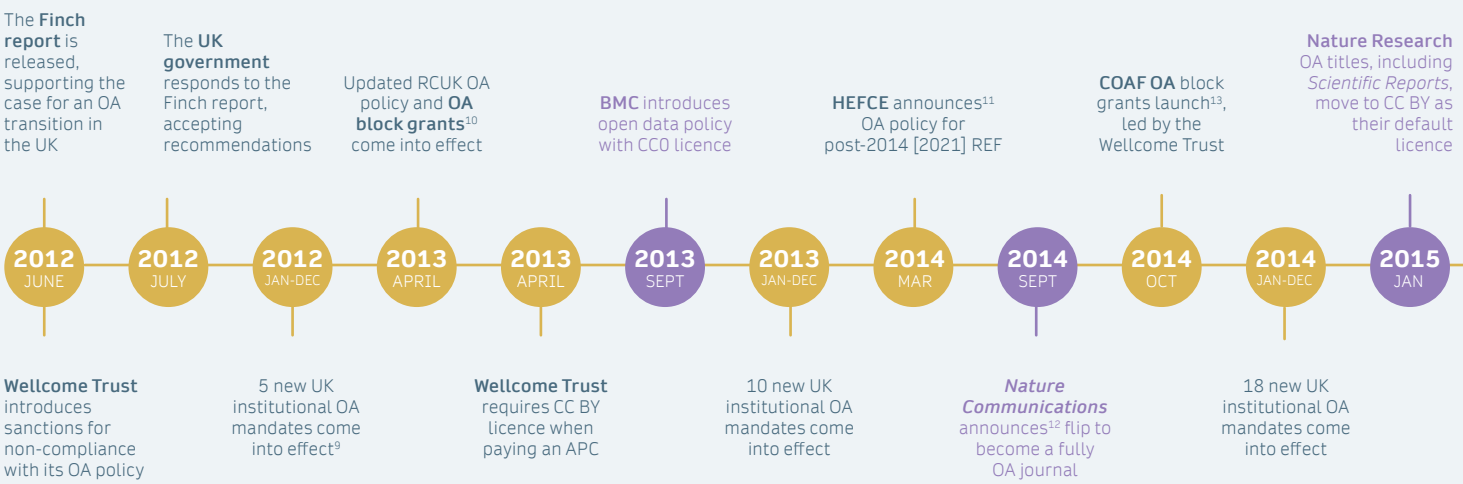
Where are we now? Gold OA in the UK after Finch

The publication of the Finch report in June 2012 marked a milestone in the UK's transition towards OA, prompting a revision of OA policy in the UK and introducing strong support for gold OA through dedicated OA block grant funding from RCUK and later the Charity OA Fund (COAF). In the years that have followed, many UK institutions have introduced their own OA policies in an effort to support the transition, and Springer Nature has embarked on a number of initiatives and partnerships to support gold OA in the UK and beyond.

OA developments pre-Finch



OA since Finch



3. https://www.biomedcentral.com/
4. http://www.springer.com/de/open-access/springer-open-choice/springer-open-choice/4534
5. https://oaspa.org/
6. https://www.springeropen.com/
7. https://www.nature.com/ncomms/
8. https://www.nature.com/srep/
9. Data on institutional OA policies taken from ROARMAP metadata extract on 19-03-2018; numbers based on records for UK "research_org", using policy "effective" or "adoption" dates https://roarmap.eprints.org/
10. http://webarchive.nationalarchives.gov.uk/20180319141218/http://www.rcuk.ac.uk/media/news/121108/
11. http://www.hefce.ac.uk/pubs/year/2014/201407/
12. https://www.nature.com/press_releases/ncomms-oa.html
13. https://wellcome.ac.uk/press-release/charity-alliance-launches-fund-make-charitably-funded-research-open-access
14. http://webarchive.nationalarchives.gov.uk/20180319141136/http:/www.rcuk.ac.uk/media/news/150305/
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16. https://www.springernature.com/gb/group/media/press-releases/uk-researchers-will-now-benefit-from-innovative-open-access-agreement-between-springer-and-jisc/836742
17. http://webarchive.nationalarchives.gov.uk/20180319141419/http:/www.rcuk.ac.uk/media/news/161019
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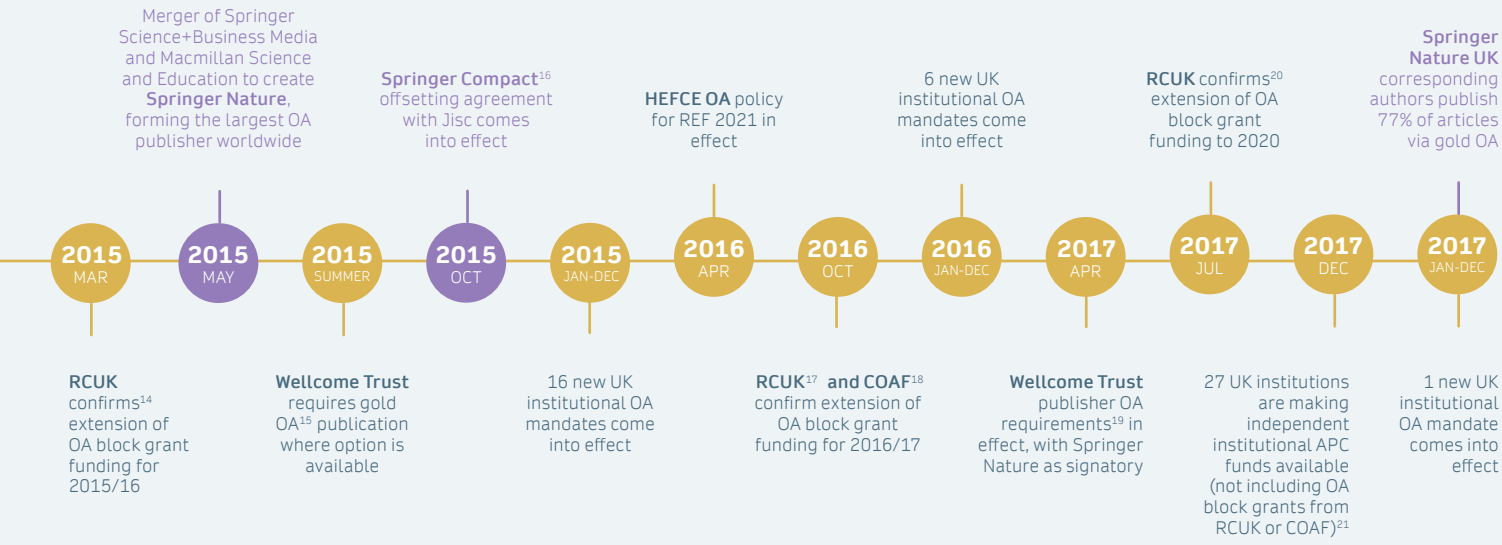
19. https://wellcome.ac.uk/funding/managing-grant/publisher-requirements
20. http://webarchive.nationalarchives.gov.uk/20180319141255/http:/www.rcuk.ac.uk/media/news/180717/
21. Data from Springer Nature's OA funding and policy database. For our public list of organisations supporting APCs see https://www.springernature.com/gp/open-research/funding/articles



Springer Nature's UK transition

In 2012, the Finch group brought stakeholders together to collaborate in the development of the UK's OA policy. This resulted in a bold yet sustainable policy which, in Springer Nature's case, has led to a significant transition to OA in the UK: in 2017, 77% of all Springer Nature publications with UK corresponding authors were published via gold OA.

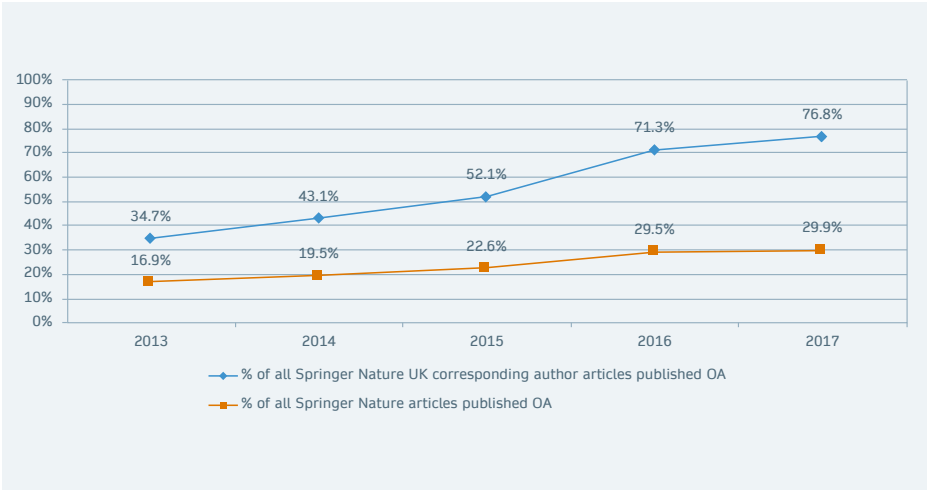


Figure 1. Percentage gold OA uptake 2013-2017: UK vs. all Springer Nature articles

Looking back to 2013, the year in which the first post-Finch OA policy and funding developments came into effect, Springer Nature UK authors were already publishing a higher-than-average proportion of content via the gold OA route, with 35% of articles with a UK corresponding author published via gold OA compared with 17% across all Springer Nature articles (Figure 1). This was due, in part, to the number of UK institutions that chose to become early supporters of gold OA through BMC and SpringerOpen memberships covering all or part of the OA publication costs for affiliated researchers. The Wellcome Trust's efforts to promote OA in the UK are also likely to have been a factor: Wellcome were the first research funder to introduce an OA mandate, back in 2005, and followed this with provision of funds for gold OA publication costs from at least 2008, enabling Wellcome grantees to publish their research OA.[22]

Over the five years that followed the Finch report, the proportion of all Springer Nature articles published via the gold OA route increased to 30%, but gold OA uptake among UK-authored Springer Nature articles rose even more dramatically to reach 77% in 2017. This rapid increase in gold OA uptake, combined with growth in the volume of our UK-authored articles between 2013 and 2017, resulted in a rising number of gold OA Springer Nature articles with UK corresponding authors published each year – from 3,049 in 2013, to 8,353 in 2017, a 174% increase (Figure 2). In the five years since Finch, we are proud to have published a total of almost 28,000 gold OA articles with a UK corresponding author.

In the five years since Finch, we are proud to have published a total of almost 28,000 gold OA articles with a UK corresponding author.

As highlighted by the recent Universities UK (UUK) report "Monitoring the transition to OA", the impact of post-Finch UK OA policy and funding can be seen in the rising rate of immediate gold OA publication across UK publications as a whole.[23] Jubb and his co-authors note that the proportion of UK-authored articles published via the immediate gold OA route rose from 12% in 2012 to 30% in 2016, an increase that they attribute to "the effects of the policies of RCUK and major research charities led by the Wellcome Trust, and of the funding they have provided to support Gold OA".[24]

22. https://wellcome.ac.uk/press-release/wellcome-trust-announces-open-access-plans; https://web.archive.org/web/20080312133358/http://www.wellcome.ac.uk:80/About-us/Policy/Policy-and-position-statements/WTD002766.htm
23. Jubb *et al.* (2017), "Monitoring the transition to OA", http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf, Universities UK 2017
24. Ibid.

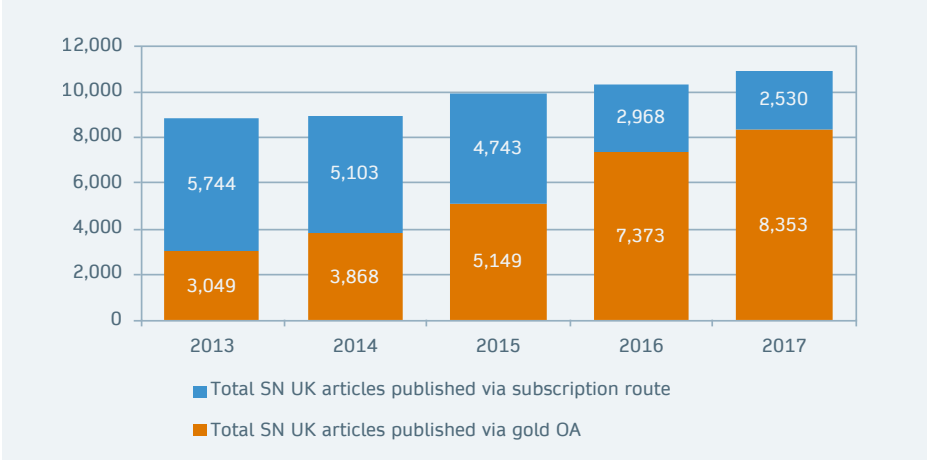


Figure 2. Springer Nature articles with UK corresponding authors 2013-17: volume of gold OA vs. subscription articles

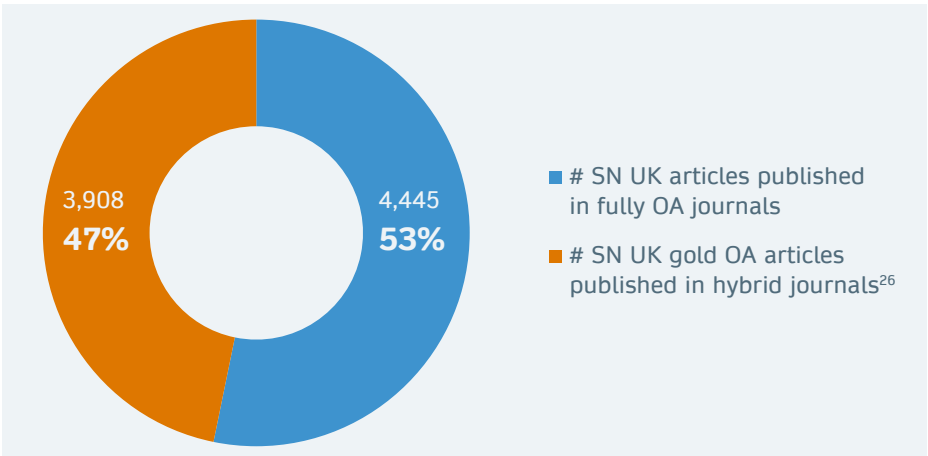
Springer Nature is pleased to have contributed to this increase, which demonstrates the positive impact of a supportive environment for gold OA. However, when comparing UK-wide OA figures with those of Springer Nature, it is evident that it is possible to reach even greater levels of gold OA uptake by combining supportive OA policies and dedicated funding with innovative business models and partnerships with the research community.

- **30%** of UK articles were published via the gold OA route in 2016 (this includes OA articles from Springer Nature)[25].
- **71%** of articles with UK corresponding authors published in Springer Nature journals were gold OA in 2016, rising to 77% in 2017.

Springer Nature's UK publications in fully OA and hybrid journals

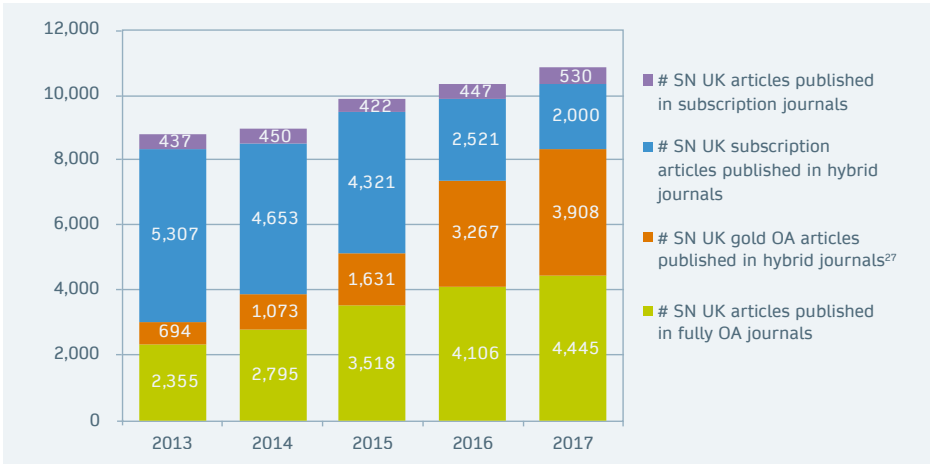
The rapid growth in the number and proportion of Springer Nature UK articles published via the gold OA route has been driven by strong uptake of both our fully OA and hybrid OA publishing options. As of 2017, 53% of gold OA articles with UK corresponding authors were published in our fully OA journals, while 47% were published via the gold OA route in our hybrid journals (Figure 3).

Figure 3. Springer Nature UK articles published via gold OA, 2017



25. Ibid.
26. The total of Springer Nature UK gold OA articles published in hybrid journals is higher than the number of hybrid OA articles published via the Springer Compact agreement with Jisc, as these figures also include gold OA articles published in hybrid academic journals on the nature.com platform and in Palgrave Macmillan titles, which are not part of the Compact agreement, as well as gold OA articles in Springer Open Choice hybrid titles with UK corresponding authors that were not affiliated with Compact-eligible institutions.

Between 2013 and 2017, the number of articles with UK corresponding authors published in our fully OA journals increased from 2,355 to 4,445, a rise of 89%. Meanwhile, the number of gold OA articles with UK corresponding authors published in our hybrid journals grew from 694 to 3,908, an increase of 463% (Figure 4).



89%
publications in fully OA journals

463%
publications in hybrid OA journals

Figure 4. Springer Nature articles with UK corresponding authors 2013-17, split by journal type and article OA status

In 2013, 12% of hybrid journal articles with UK corresponding authors were published via the gold OA route, whereas in 2017 the proportion was 66%. This increase is a very positive step towards gold OA, and shows the impact that the UK Springer Compact agreement (discussed below) has had on bringing about a transition toward gold OA for hybrid authors.

While their number is decreasing, some UK authors are still publishing via the subscription route in Springer Nature hybrid journals, as Figure 4 shows. In part, this is due to some UK authors opting out of gold OA for their articles in Springer Open Choice titles. We are working closely with Jisc and with UK institutions to bring down the level of Springer Compact opt-outs, and achieving higher levels of Compact uptake each year, as discussed later in this case study. The other reason for the continued publication of UK subscription articles in hybrid titles is that hybrid journals on the nature.com platform and in the Palgrave Macmillan portfolio were not included in the Springer Compact agreement with Jisc in October 2015. Levels of gold OA uptake from UK corresponding authors are therefore not as high in these titles as among Springer Open Choice journals.

Again we see significantly higher levels of gold OA uptake among Springer Nature's UK hybrid articles than in UK hybrid articles as a whole. In the UUK OA monitoring report, Jubb *et al*. found that the proportion of UK-authored OA articles in hybrid journals rose from 6% in 2012 to 28% in 2016.[28] Among Springer Nature hybrid authors, the level of gold OA uptake reached 56% in 2016: double the level of OA uptake of UK hybrid authors as a whole.

27. The total of Springer Nature UK gold OA articles published in hybrid journals is higher than the number of hybrid OA articles published via the Springer Compact agreement with Jisc, as these figures also include gold OA articles published in hybrid academic journals on the nature.com platform and in Palgrave Macmillan titles, which are not part of the Compact agreement, as well as gold OA articles in Springer Open Choice hybrid titles with UK corresponding authors that were not affiliated with Compact-eligible institutions.
28. Jubb *et al*. (2017), "Monitoring the transition to OA", http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf, Universities UK 2017

Springer Nature's UK publications by discipline

Research funding varies significantly by discipline, and this can affect authors' ability to publish via the gold OA route, particularly if they do not have access to dedicated OA funds for APCs. Interestingly at Springer Nature, however, we are seeing an increasingly high level of gold OA in a number of disciplines that do not traditionally publish large numbers of articles via gold OA.

In 2013, UK corresponding authors publishing in Springer Nature's mathematics, humanities, and social sciences journals were making between 8% and 11% of their articles accessible via the gold OA route (Figure 5). There were rises in levels of gold OA uptake in 2014 and 2015, reflecting the increased access to gold OA funding for UK authors through the RCUK OA block grants. From 2016, however, these disciplines saw a huge jump in gold OA, rising to between 57% and 62% of articles with UK corresponding authors publishing gold OA, with further increases in 2017. We see a similar boost in UK gold OA uptake between 2015 and 2016 among Springer Nature journals publishing content in engineering, computer science, and energy and Earth sciences.

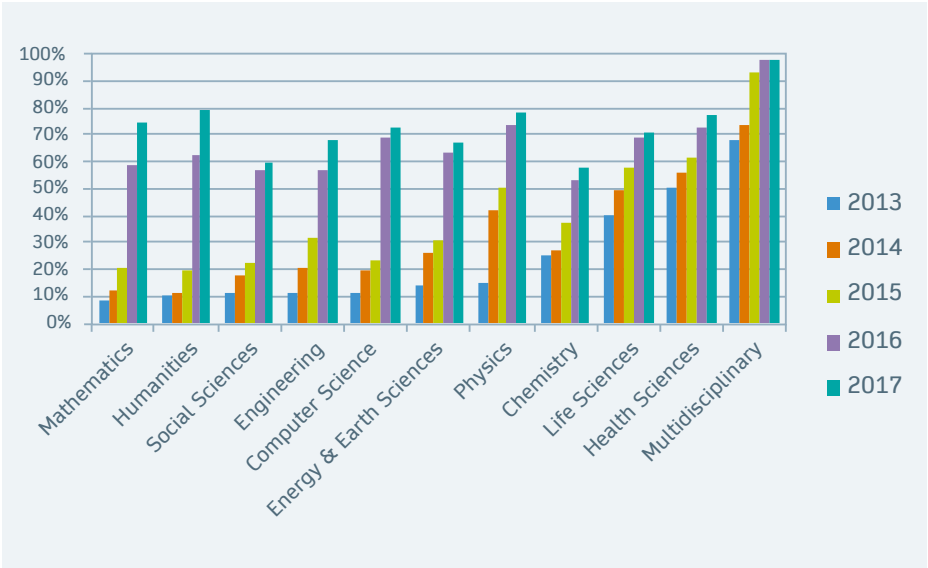


Figure 5. Springer Nature UK articles: OA uptake split by journal discipline

The timing of this jump coincides with the implementation of the Springer Compact agreement with Jisc in late 2015. By removing the burden of finding APC funding and arranging APC payment, Springer Compact made gold OA publication a simple option for hybrid authors in disciplines where gold OA publication has traditionally been more challenging. The uptake of gold OA from authors in mathematics, humanities and social sciences once funding and administrative barriers are removed is a clear indicator that a transition can be achieved provided the right factors are in place.

The uptake of gold OA once funding and administrative barriers are removed is a clear indicator that a transition can be achieved provided the right factors are in place.

Springer Nature's transition in Europe

The UK is not alone in having accomplished a significant transition to OA over the past five years: similarly high levels of OA in Springer Nature publications have been achieved in the Netherlands, Austria, and Sweden. Like the UK, all three countries have Springer Compact agreements. These three countries also have national policies which are strongly supportive of gold OA, and funders, governments, and institutions in those countries that have worked closely with us to effect a transition. As a result, amongst corresponding authors based in these countries, in 2017 we achieved OA take-up rates of 73% in Austria, 84% in the Netherlands, and 90% in Sweden.

73%
in Austria
84%
in the Netherlands
90%
in Sweden

The Association of Universities in the Netherlands (VSNU), which in 2014 was the first group to sign a Springer Compact agreement, has recently renewed the agreement to secure OA publishing for Dutch universities up to 2021, demonstrating the ongoing value that they see in our approach.

"The shift between paywalled and open content between 2013 and 2017 stands as a powerful example of the sort of transition to OA that the Finch report hoped for. Hybrid publication can, when approached strategically, be used to achieve a real transition to OA. By developing and rolling out the Compact deal, the effort saved by publishers and universities by avoiding many many payments at the article level should not be underestimated. That Springer Nature have not only just rolled this model out in the UK but are seeking to do so globally gives me hope that there is a route to affordable, manageable, global OA."

Chris Banks, Assistant Provost (Space) & Director of Library Services, Imperial College London

Choosing the gold route

For many, gold OA provides the simplest, most open, and most sustainable route to OA, as well as offering the greatest benefit to the research community and beyond.

Gold OA options in Springer Nature journals

Springer Nature has led the way in developing OA options for authors at all levels and across all disciplines. This includes an OA portfolio of nearly 600 journals – the largest in the world – and additionally the option to publish gold OA in more than 1,900 hybrid journals.

We have leveraged our brand equity to increase the credibility of OA: in 2010 we launched *Nature Communications* as a Nature-branded journal offering an OA option. In 2014 we announced that it would become fully OA, making it the premier OA journal in the world. We have also established a home for scientifically valid research in our multidisciplinary OA title *Scientific Reports*, now the largest journal in the world, as well as in our *BMC* series titles. *BMC Research Notes* provides a platform for scientifically valid research outputs that cannot be considered as full research or methodology articles. This includes, but is not limited to: updates to previous work, additions to established methods, short publications, null results, case series, research proposals, and data management plans.

The role of hybrid

Hybrid OA plays a critical role in supporting the wider transition to OA: in 2017, 48% of Springer Nature's gold OA articles in the UK were published in hybrid journals.

Notably, support for hybrid OA enables the offsetting agreements that are key to the OA transition. At Springer Nature, our achievement of publishing 77% of our UK output via gold OA in 2017 was in no small part due to the Springer Compact offsetting agreement we have in place with Jisc. We recognise that institutions and countries such as the UK that are supporting gold OA see costs increase, when more authors choose this option, yet continue to pay subscription fees.[29] Our Springer Compact agreement combines reading access to subscription content with OA publishing in one agreement, and aims to contain the costs providing a solution to this dilemma, and ensuring we can work together to support the transition.

We have had policies in place since 2010 to ensure we do not 'double-dip' on OA and subscription revenues: our subscription list prices are based only on subscription content and any change in the share of OA content is reflected in pricing. The complexity of consortia agreements bring other elements, like the portfolio of licensed journals, into consideration.

In 2017, 48% of Springer Nature's gold OA articles in the UK were published in hybrid journals.

29. Tickell (2016), "Open access to research: independent advice", https://www.gov.uk/government/publications/open-access-to-research-independent-advice, Gov.uk, 2016

While countries like the UK and others in northern Europe are leading the way in transitioning to OA, globally the picture is mixed, and this means that the hybrid model is likely to continue to be necessary in the longer term. Given this mixed picture, we need to remain flexible and continue to offer authors a genuine choice of where to publish. Any model which either forces existing journals down a fully-OA route, or prevents some authors from publishing via the hybrid OA route, is likely to lead to the effective removal of publication options for some groups of authors: such a system would also risk the long-term sustainability of established journals that play an important role in connecting research communities and helping authors reach their desired readership.

Critically, hybrid OA also supports author engagement with OA: we know authors don't make publishing decisions based on whether OA options are available to them. Rather, authors prioritise publishing in journals with a strong reputation in their community that offer rigorous peer-review processes.[30] The provision of hybrid OA publishing options and hybrid funding helps ensure authors choose OA rather than reverting to subscription publishing. Given the benefits that gold OA brings (discussed later in this case study), support for hybrid OA helps ensure the increased reach and impact of UK research.

30. Graaf *et al*. (2018) "The Role of Hybrid OA in Extending Author Choice". https://www.publishers.org.uk/news/press-releases/2018/hybrid-journals-vital-for-extending-author-choice-research-shows/, Publishing Research Consortium, 2018

Supporting the transition to OA

Partnering with the research community

Throughout our history, our goal has always been to find and evolve sustainable ways to meet the needs of those who rely on our industry – authors, funders, libraries, and the wider academic community. Twenty years ago, the world of scientific publishing was very different, with articles available primarily through a subscription model. At BMC, we sensed it was time to develop a new model that would not only maximize the exciting potential of emerging digital technologies, but also meet the needs of authors, their institutions and funders. The sustainable OA model that BMC pioneered has become industry standard: immediate gold OA gives readers free and instant access, enabling faster discovery of the latest research. This new approach placed authors firmly at the heart of the publishing process for the first time: authors retain copyright of their work, and a Creative Commons attribution license clearly states how readers can copy, distribute, and use their attributed research, free of charge. All of this helps make articles available to the widest audience, and contributes to the furthering of research in ways that would have seemed impossible two decades ago.

Our goal today is to reduce the burden of transition for our institutional partners.

BMC memberships

When it launched in 2006, BMC's OA membership programme was one of the first publisher-led solutions to address the challenges faced by authors and their institutions in supporting payment for APCs. Innovative at the time, the membership programme enabled institutions to centralise funds (removing some or all of the cost of OA from individual authors, at a point when there were few or no other sources of funding available) and to show their support for gold OA as a sustainable model. The membership model was welcomed by the library community, with more than 500 institutions continuing to benefit from a membership agreement with BMC and SpringerOpen, including 49 institutions in the UK.

As the rate of OA uptake in the UK has increased, so too has the administrative burden on institutions, who are: ensuring that articles have been made OA; handling reporting; invoicing hundreds of payments individually; and helping researchers navigate processes and policies. In a 2017 survey of authors[31], 64% of respondents replied that an "Agreement between Springer Nature and my funder or institution that OA articles in Springer Nature journals are automatically funded, so I do not have to apply for APC funding" would be "very helpful". In a 2017 survey of librarians[32], 63% agreed or strongly agreed that "It is a challenge for my institution to manage compliance with institutional and funder OA requirements". Just as we led the way in OA innovation with APC payments and memberships in the past, our goal today is to reduce the burden of transition for our institutional partners. For example, we're introducing unified, consolidated billing for APCs where desirable over individual manuscripts (in development); releasing new research data training and research data curation services; and providing free helpdesk services for OA funding[33] and research data[34].

31. Unpublished market research data, Springer Nature. A summary of methodology is included in Appendix 4
32. DOI: 10.6084/m9.figshare.5783232
33. https://www.springernature.com/gp/open-research/funding
34. https://www.springernature.com/gp/authors/research-data-policy/helpdesk/12327114

Springer Compact

Through the Springer Compact model, we are working to find a solution for those partners who choose to support gold OA publication costs, but also need to maintain journal subscriptions.

Jisc was one of the first[35] to enter into a Springer Compact agreement back in 2015. Through this agreement, UK institutions receive a combination of OA publishing in Springer's hybrid Open Choice journals with full access to subscription-based licensed journals on SpringerLink. Springer Nature and Jisc wanted the agreement to reduce the cost and administrative burden of open access for institutions and make it easier for UK researchers to publish open access. At the same time, both parties aimed to increase the number of articles published compliant with HEFCE's Research Excellence Framework, RCUK's open access policy, and the policies of other major funders such as the Wellcome Trust and other participants in COAF.

Compact is proving a crucial mechanism in driving the OA transition in the UK and in Europe more widely, as already discussed in this case study. As announced during OA Week in 2017, we have reached a significant milestone in advancing discovery through open research. In four European countries we have achieved a gold OA share of over 70%. All of these countries are Compact partners.[36] In the UK, 77% of Springer Nature's journal articles are being published via the gold OA route, an achievement that has only been possible as a result of the landmark Compact agreement with Jisc.

The Springer Compact agreement with the UK has played an important role in increasing the volume of OA article publications. In its first full year, the agreement saw in excess of 3,000 articles made OA, and UK publications made OA via Compact have continued to grow significantly, rising by over 20% in 2017:

- In 2016, UK institutions published 3,085 gold OA articles via Springer Compact
- In 2017, this rose to 3,818 gold OA articles published via the UK Springer Compact agreement

This Compact partnership is only possible as a result of the supportive environment for gold OA that has prevailed in the UK since the Finch report. In the UK, as in our other Compact countries, we benefit from a government and institutions who champion gold OA publishing, research funders providing APC funding support (RCUK, Wellcome Trust), and most importantly institutions establishing OA policies and communicating effectively to their researchers about OA.

As a result of this and the Compact agreement, the obstacles and burdens on authors are removed and we see a significant uptake of gold OA within the UK. In 2016, 75% of UK corresponding authors affiliated with a Compact partner institution chose the gold OA route when publishing in Springer Open Choice titles, and the share was increased significantly in 2017, with 84% of eligible authors opting for gold OA under the Compact agreement.

The number of UK institutions participating in this Compact agreement has risen in each year of the agreement, and there are now 97 UK institutions whose authors are able to publish their research via Springer Compact in Open Choice journals.

In its first full year, the agreement saw in excess of 3,000 articles made OA.

"The Springer Compact agreement has been the most transformational combined subscription and APC agreement we have implemented so far. It has achieved huge growth in OA output from UK authors, improvements in workflow for authors and institutions as well as increasing compliance with funder requirements."

Liam Earney, Director, Jisc Collections

35. https://www.springernature.com/de/group/media/press-releases/uk-researchers-will-now-benefit-from-innovative-open-access-agreement-between-springer-and-jisc/836742
36. Springer Nature (October 2018), "Springer Nature is delivering on OA and calls for continued partnership", https://group.springernature.com/gp/group/media/press-releases/springer-nature-is-delivering-on-open-access-and-calls-for-conti/15152888

Efficiencies in workflows

Springer Nature has invested in clear, trusted, simple workflows for OA, bridging customer needs and scalability. Providing efficiencies in OA workflows, reducing administrative burdens and improving OA publishing service experience for authors, institutions, and research funders has been our mission from day one.

When setting up the "Compact OA publishing workflow" we asked our Compact partners for input to ensure that we met customer demands. We also tested interfaces with authors and continued to adapt process and systems by evaluating data and monitoring performance indicators like turnaround times. To further improve the efficiency of our workflow, our partners continue to provide feedback to the current system, enabling us to shape the workflows according to market needs.

According to feedback received from Compact partner institutions, including UK HEIs, Springer Compact offers economic and administrative ease and has established a best-practice framework for how this type of agreement should ideally be administered. For authors, it makes OA publishing even more straightforward and enables them to comply with policies easily and instantly. If an author is clearly affiliated with the institution, approval of the article is usually done within 1-2 business days of the institution being notified.[37] Institutions report that it takes account administrators only a couple of minutes per article to approve or reject Compact eligibility.

This workload is to be compared with the effort it would otherwise take each researcher to individually arrange separate billing (when choosing to publish OA) and the institution or research funder to initiate payment for single APCs. Instead of tracking individual payments, Compact partners benefit from access to article status reports listing all identified articles via a reporting web-service. Article as well as author metadata is made available; another great benefit for institutions. For institutions, the total cost and administrative burden of OA publishing is significantly reduced.

Springer Compact offers economic and administrative ease and has established a best-practice framework.

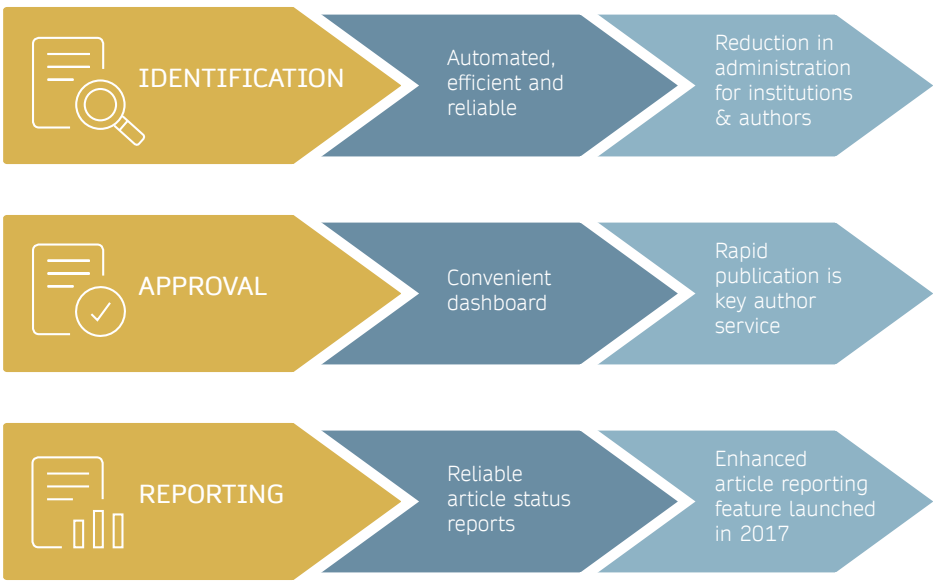


Figure 6. Key elements of the Springer Compact workflow

37. Compact verification service and turnaround time analysis, status August 2017

In a study undertaken by the UK consortium conducted with member institutions:

> "86.7% of HEIs rated the overall deal either as positive or very positive. Some of the highlighted positive aspects included a reasonable price, a simple workflow process, and little overall administration".[38]

Writing in *Times Higher Education*, Helen Blanchett highlighted the value of the Springer Compact model:

> "Practically speaking, to be affordable and less burdensome, we need to see more innovative models for OA such as the model from Springer, where there is a far easier way to manage fees for OA".[39]

Springer Nature is committed to continuing to invest in OA workflows and services to improve service standards further as the market and the models develop.

Managing compliance - the policy stack

Managing compliance can be hard for authors, institutions, funders, and publishers alike. Taking into account the variation in OA policies from HEFCE, the UK research councils, the Wellcome Trust, and the EC, alongside the range of different journal policies, and OA publishing options within publisher portfolios, the UK 'policy stack' has become a real issue for authors and institutions.

Springer Nature has a diverse portfolio, with a variety of OA options in place, but has worked hard to develop policies that ensure authors and institutions are not burdened by confusion or the risk of non compliance. UK authors publishing in any English language Springer Nature-owned journal can feel confident that whichever journal or route they choose to publish in, they will be able to comply with all UK OA policies, gold or green.

Some of the ways we help make complying with funders' policies more straightforward include:

- **CC BY**: Our preferred and default licence for gold OA publication is the Creative Commons Attribution v4.0 International licence[40] (CC BY). In 2017 98% of our gold OA articles were published under CC BY and this proportion continues to increase.
- **Springer Compact**: Via Springer Compact, we support increased gold OA publication of UK papers, providing a simple route to compliance.
- **Hybrid OA options**: 92% of our English-language subscription-based journals offer a hybrid OA option.
- **Liberal self-archiving policies**: We encourage self-archiving of author accepted manuscripts (AAMs) and have some of the most liberal policies of any publisher. Our standard embargo period for self-archiving in institutional and funder repositories is 12 months from first publication. For the Nature journals it is 6 months.
- **Article and manuscript deposition**: We deposit all OA articles, as well as subscription manuscripts associated with relevant funders, in PubMed Central. We also send all OA content to the Jisc Router service[41] to support deposition to institutional repositories.

38. Marques, M. (July 2017). "Findings from institutional survey on the Springer Compact agreement" Jisc Scholarly Communications Blog, https://scholarlycommunications.jiscinvolve.org/wp/2017/07/12/institutions-survey-on-the-springer-compact-agreement/
39. https://www.timeshighereducation.com/blog/uks-approach-open-access-sustainable-we-must-move-further-faster (Helen Blanchett)
40. http://creativecommons.org/licenses/by/4.0/
41. https://pubrouter.jisc.ac.uk/

The impact of gold

Open approaches benefit the whole scientific and research community, facilitating collaboration, aiding the application of research to solve real-world problems, fostering economic growth and increasing the public's appreciation of research. To fulfil its ambitions of accelerating the pace of scientific discovery, research must be as open as possible, with minimal restrictions on re-use.

Benefits of gold OA

Immediate publication: Gold OA enables access by anyone with an internet connection anywhere in the world, immediately on publication. This includes researchers, but also a much broader readership, from patients seeking medical research to businesses developing new services. For green OA, research is usually subject to minimum embargo periods of six months or more.

Liberal re-use: The CC BY licence is the most open licence available and considered the industry 'gold standard' for OA; it is also preferred by many funders. This licence allows readers to copy and redistribute the material in any medium or format, and to alter, transform, or build upon the material, including for commercial use, providing the original author is credited. Under the green route, rights and reuse may be limited.

Ready access to the Version of Record: The gold OA route makes immediate, permanent access available from all platforms to the publishers' Version of Record (VOR). This ensures readers have access to the final, peer reviewed and type-set article. Typically green OA policies only permit deposition of the author manuscript.

Evidence for increased citations and usage: Increased visibility helps researchers to demonstrate their personal impact, secure funding and progress in their careers. A number of research papers have shown that OA articles are viewed more often than articles that are only available to subscribers, and are cited more often and earlier.[42] These findings are supported in a forthcoming analysis of more than 70,000 Springer Nature hybrid articles, comparing usage, citations and attention (assessing public and policy interest, based on Altmetric data). The analysis shows that for articles in Springer hybrid journals, OA articles are read four times more than articles available only to subscribers, and are cited 1.7 times more, on average.

42. https://sparceurope.org/what-we-do/open-access/sparc-europe-open-access-resources/open-access-citation-advantage-service-oaca/oaca-list/

UK impact case study

Within the UK, analysis reported in the Universities UK report on the transition to OA shows that gold OA articles are downloaded more frequently than non-OA articles, on average between twice and four times as much.[43] In 2018, Springer Nature commissioned Digital Science to undertake a bibliometric analysis of publications in Springer hybrid journals to consider the impact of gold OA within the UK, looking at downloads, citations, and broader attention (based on data from Altmetric).[44] The sample was selected to look specifically at the implementation of the Jisc Compact agreement, providing a comparison of articles published before and after the introduction of Compact in the UK. 3,087 articles published OA through this deal in 2016 were compared with 6,027 non-OA articles published from January 2014 to December 2015. All articles in the sample had corresponding authors based at a specific set of institutions in the UK. To account for other common factors known to affect the performance of academic papers, the study also considered the prestige of the journal and academic discipline as potentially confounding variables.

The most recent articles in the dataset were published in December 2016, so at the time of analysis were just 15 months old. It is relatively early therefore to assess scholarly impact, so these results should be considered as directional.

Key findings:
Despite being a relatively young sample, OA gave a significant advantage on all metrics.

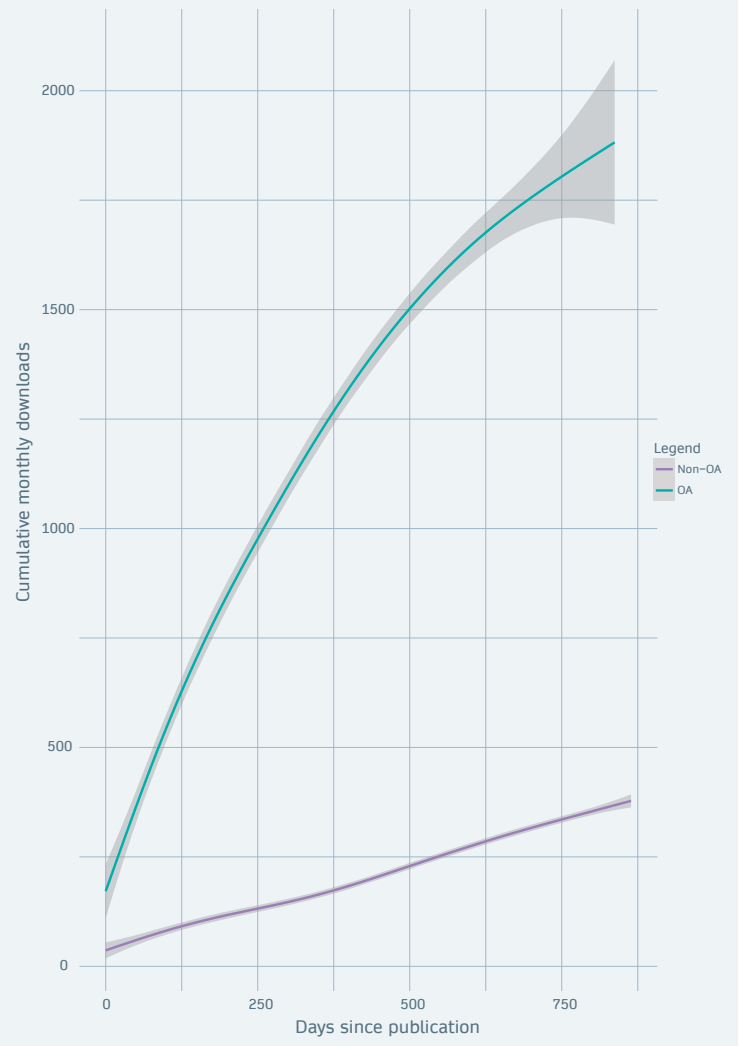


Figure 7: cumulative monthly downloads for Springer Nature in the UK (OA vs. non-OA). Grey shading indicates confidence interval.

Usage: OA articles have 3.2 times more downloads per month than non-OA articles.

- During their lifetime (shorter for OA articles), OA articles were downloaded 3.2 times more than non-OA articles.
- Even though OA articles were published later than non-OA articles, the average of cumulative downloads since publication was 3.2 times higher for OA articles (1,772 vs. 555).

Citations: OA articles cited 1.6 times more than non-OA on average.

- After 2 years, OA articles had received 1.6 times more citations than non-OA articles.
- Across all subjects, OA articles had on average more citations two years after publication than non-OA.

The non-OA articles in the UK study were published between January 2014 and December 2015, and the OA articles in the sample were published only in 2016. For a fair comparison, the study looked at citations occurring over the same period of time: the longest that all articles have been published for. Publication date was distributed evenly throughout the year for both sub-samples.

43. Jubb *et al*. (2017), "Monitoring the transition to OA", http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf, Universities UK 2017
44. https://www.altmetric.com/

Altmetric: average Almetric scores for OA 3.2 times higher than non-OA after 1 year. Altmetric tracks mentions of research articles in mainstream media, policy sources, blogs, social media, online references (Wikipedia), and videos.

- In the first year after publication, 22.4% of OA articles attracted mentions, while only 5.4% of non-OA articles were mentioned.
- For every article tracked, Altmetric provides the historical score one year after publication. The average score for OA after one year was 3.2 times higher than non-OA.

This is a snapshot of findings from a hybrid usage study, forthcoming from Springer Nature and Digital Science. The UK data is further supported by an analysis of some 70,000 articles published in Springer hybrid journals globally. The results support previous research that finds an impact advantage through publishing under the gold OA route.

Increasing impact – author and funder perspectives

Thanks to increased visibility and accessibility, OA accelerates the process by which researchers can build upon existing research, accelerating scientific progress, and advancing discovery. It can enable greater levels of collaboration on a global scale, often fostering greater dialogue across discipline boundaries, which has helped to find novel approaches to global grand challenges.

In a 2017 survey of more than 7,500 researchers conducted by Springer Nature, an overwhelming majority saw OA as the future for scholarly research: 62% agreed or strongly agreed that "OA is the future of academic and scientific publishing". The most popular reason why authors chose OA was because they "believe that research should be OA, so freely available immediately to all" (55%). A further 46% chose OA because "OA publications are thought to be read more widely". In the UK, there was even stronger sentiment towards these statements: 70% of respondents agreed or strongly agreed that "OA is the future of academic and scientific publishing."[45]

"All research outputs should be published as OA"

"As a scientist mainly funded by public money, I strongly believe that my research outcomes must be accessible to everybody free of charge. Furthermore, publishing my research in an OA journal increases significantly its visibility and therefore impact. More funding will be needed to cover the costs of OA. RCUK-funded researchers have access to a special fund from UK universities but this fund is not available for research that is not RCUK-funded. I believe that all research publications should be made OA and that a national/international fund should cover the costs or that discussion between governments and publishers should reach an agreement on increasing OA publication. However, I think that things are going in the right direction and OA is becoming more and more accepted and standard."

Dr. Cyril Dominguez, Lecturer, Institute of Structural and Chemical Biology, University of Leicester

"Make new findings as accessible as possible"

"I believe that new findings should be shared freely, so that everyone can access. I suspect that OA primarily benefits individuals not affiliated with larger institutions, which tend to have subscriptions giving access to more journals, including those without OA. It is likely that our discoveries published as OA have been accessed broader than they would have been, had they not been published as OA."

Martin Cohn, Ph.D., Department of Biochemistry, University of Oxford

"Open science is a critical part of Cancer Research UK's mission to beat cancer sooner. By sharing discoveries faster, researchers can increase the impact of their work, develop new collaborations, improve reproducibility, reduce research waste and, ultimately, accelerate progress towards patient benefit."

Charmaine Roberts, Funding Policy and Governance Manager, Research & Innovation, Cancer Research UK

45. Springer Nature Author survey 2017. Methodology and survey data summarised in Appendix 4

An open future

Challenges for transitioning to OA

We are committed to supporting the transition to OA, but a number of areas present significant challenges. We welcome a collaborative discussion amongst all stakeholders about what success looks like for the UK transition to OA, and how we can jointly achieve our goals to meet the needs of the research community and enable authors to publish in the journal of their choice.

Disciplines
Funding varies significantly by discipline, impacting scholars' ability to choose the OA route. The UK's block grant system has been critical in supporting the transition to OA, particularly for scholars in less-well funded disciplines. A recent Publishing Research Consortium report[46] found that publishing gold OA is largely driven by, and reliant upon, external funding, and that there is great resistance among authors to the use of discretionary budgets for APC payments, even where this is an option. Any shift away from the current block grant approach risks a regression in OA take-up, with the least-funded disciplines most affected.

As Springer Nature's UK publications show, it is possible to radically improve levels of gold OA in less well-funded disciplines such as mathematics and humanities by providing accessible funding routes in these disciplines:

- 74% of articles with UK corresponding authors published in Springer Nature's mathematics titles in 2017 were gold OA, up from 8% in 2013.
- 80% of articles with UK corresponding authors published in Springer Nature's humanities titles in 2017 were gold OA, up from 10% in 2013.

However, maintaining and improving gold OA uptake in these disciplines will only be possible if UK funders continue to provide dedicated funding for this OA publication in both hybrid and fully open access journals, which in turn will enable institutions and publishers to invest in agreements that support gold OA uptake in disciplines where funding can prove a barrier.

Selective journals
Not all authors are able to publish via the OA route – and for a small number of journals it is not financially viable to offer an OA option with a competitive APC – so we offer green OA options across our journal portfolios, ensuring that authors can comply with major public access mandates through our liberal self-archiving policies and related services. As the green OA route is codependent with subscription publishing, embargo periods are applied in order to ensure the sustainability of the journals.

Selective journals like *Nature* and the Nature-branded research and reviews titles — which involve substantial editorial development, aim to provide high levels of author service and publish informative, accessible content beyond primary research — require investment. At present, we believe that the fairest way of producing these journals, which ensures their long-term sustainability as a resource for the widest possible community, is to spread these costs among many readers — instead of having them

46. Graaf *et al.* (2018) "The Role of Hybrid OA in Extending Author Choice". https://www.publishers.org.uk/news/press-releases/2018/hybrid-journals-vital-for-extending-author-choice-research-shows/

borne by a few authors.

We continue to extend access to our subscription-only titles via our Springer Nature SharedIt content-sharing initiative[47], which provides authors and subscribers with shareable links to view-only versions of their published papers; via our liberal self-archiving policy[48], which permits authors to self-archive their accepted manuscript soon after first online publication; and through our collaboration with the Research4Life programme[49] to provide access to institutions in low-income countries.

Books

We helped pioneer OA book publishing, first piloting OA publication for books in 2011. We publish OA books across a wide range of areas in science, technology, medicine, and humanities and social sciences, under our SpringerOpen and Palgrave Macmillan imprints, and now have one of the largest OA book portfolios, with more than 500 OA books.

However, OA books still represent a much smaller proportion of our portfolio than OA journals, and this continues to be a challenging area for OA. Scholarly monographs are most valued by disciplines in the humanities and social sciences, areas which are typically less well-funded than STM subjects and so less able to support OA fees. The publishing landscape for scholarly monographs is diverse and fragmented, reflecting the needs of individual disciplines, and consequently a range of solutions may be needed to support the transition. Meanwhile, green OA solutions deliver poor utility for long-form content. Significant cultural change is also needed, including work to convince scholars in these disciplines of the value of OA for monographs.
We have seen commitments to gold OA for books in the Netherlands, Austria, and Switzerland, and believe bold policies and funding commitments of this kind are critical to helping shift the debate in the UK.

Beyond OA

Data

In recent years there has been a shift from thinking about "open access" to "open research". Central to this has been a focus on open data publishing and services. Good data practice makes research more efficient, effective, and fulfilling for researchers. If data is findable, accessible, reusable, and easily readable by machines, it enables researchers to build on previous data, verify findings, and advance the pace of discovery. In turn, this helps to provide return on investment and societal impact for research funders.

Many researchers are motivated to share their data but are often faced with challenges in doing so. As a publisher we want to advance discovery and drive the development of open research by supporting data sharing and accessibility. Springer Nature is pioneering new approaches to data sharing and open data. We're committed to supporting researchers who want to take open approaches to their data, helping to make data sharing the new normal.

Springer Nature is supporting data sharing and good data practice:

- *By leading the way*: We were one of the first to introduce a comprehensive set of standardised journal data policies.
- *By being FAIR*: We support the FAIR data principles, making data findable, accessible, reusable, and easily readable by machines.
- *By helping researchers get credit*: We experiment with new article types such as

47. http://www.springernature.com/gp/group/media/press-releases/springer-nature-to-extend-content-sharing/7837106
48. http://www.nature.com/authors/policies/license.html#Self_archiving_policy
49. http://www.nature.com/npg_/community/research.html

the Data Descriptor and Data Note, and we are piloting badges to help researchers get the recognition they deserve.
- *By setting data free*: We recommend and partner with community repositories, rather than keeping data in a proprietary publisher ecosystem.
- *By offering our own expertise*: We provide free advice to help authors comply with their research data policies, and on finding research data repositories. We're also delivering data deposition and curation support through our Research Data Support service.
- *By going beyond the publishing process*: Building on a foundation in data publishing, we will partner with the research community on a research data ecosystem, from study design and funding, to discovery and reuse. We will demonstrate return on investment to funders, the research community, and society.

Preprints

We are actively engaging with developments in the preprint space. We have long supported posting of the original submitted version of primary research manuscripts on community preprint servers such as arXiv[50] and bioRxiv[51], and authors submitting to Nature Research journals may deposit their preprints under the CC BY licence. We also have a number of pilots in place across our portfolios to allow journals to accept direct submissions from preprint servers like bioRxiv. Meanwhile, our 'Under Consideration' initiative at *Nature Communications* allows authors with manuscripts under review at the journal to link to their deposited preprint from our website[52].

What do we need to keep moving towards more OA in the UK?

As a community, we need to come to a shared agreement of what success looks like for the UK transition to OA, with shared targets for achieving these goals. There have been suggestions recently that OA in the UK is not transitioning fast enough, but Springer Nature's example in the UK is a real success story, and demonstrates that a sustainable OA transition is achievable under the current policy framework.

We believe there are four key factors in the recipe for success:

- Support from governments and institutions who back OA.
- Funders who fund APCs.
- Authors who are willing to publish via OA.
- A publisher providing authors with a wide range of attractive publishing options alongside providing effective workflows.

Stakeholders also need to continue to work together to demonstrate why gold OA is a great investment for the UK. We're proud to be in a position to contribute to the debate, not least via this case study.

We need a long-term commitment to gold OA in the UK as this will enable all stakeholders to be bolder in their support for the model. Springer Nature is on a journey from traditional publishing methods to OA, open research, and beyond – but no single stakeholder can succeed alone. We need continued partnership between the research community, from funders to institutions, authors, and editors, to achieve the transition to OA we all want to see.

We need continued partnership between the research community, from funders to institutions, authors, and editors, to achieve the transition to OA we all want to see.

50. http://www.arxiv.org/
51. https://www.biorxiv.org/
52. https://nature-research-under-consideration.nature.com/

Conclusion

The UK has achieved considerable growth in both fully OA and hybrid OA article publication in the five years since the Finch report, as this case study and others have demonstrated.[53] The supportive policies and dedicated funding for gold OA implemented by UK funders and institutions have been instrumental in enabling this rise in gold OA, with 30% of UK-authored articles published via the gold OA route in 2016.[54] Amongst Springer Nature UK authors, however, the transition to gold OA has been even more dramatic, with 77% of articles with a UK corresponding author being published via gold OA in 2017.

As this case study has shown, our partnerships with the research community have been a crucial element in bringing about this transition, with innovative models such as our OA memberships and the Springer Compact agreement enabling many more of our UK authors to publish via the gold OA route.

If we are to see further transition to OA in the UK, it is vital that the UK government and research funders make a long-term commitment to gold OA. For institutions and publishers to commit to transitional models, there needs to be confidence that the funding infrastructure to support these will remain in place. At Springer Nature, we will continue to work with all stakeholders to support the transition to OA, and we call upon funders, institutions, researchers and publishers to join us in making open research a reality.

53. Jubb *et al*. (2017), "Monitoring the transition to OA", http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Documents/2017/monitoring-transition-open-access-2017.pdf, Universities UK 2017

54. Ibid.

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University of Oxford	Martin Cohn, Ph.D.	Department of Biochemistry
University of Leicester	Dr. Cyril Dominguez	Lecturer, Institute of Structural and Chemical Biology
Cancer Research UK	Charmaine Roberts	Funding Policy and Governance Manager
Jisc Collections	Liam Earney	Director
	Caren Milloy	Deputy Director
Imperial College London	Chris Banks	Assistant Provost (Space) & Director of Library Services
Springer Nature	Charlotte Coyte	Research & Development Officer, Open Research
	Susie Winter	Director of Communications and Engagement, Research
	Jenny Gimpel	Communications Director, Open Research

Appendices

Appendix 1: Notes on the data

UK data

- Articles have been included in UK publication totals where the first affiliation of the first corresponding author is a UK organisation/address.
- Only research or review article types have been included. Editorials, news, corrective articles, or other non-research/review article types are excluded.

Springer Nature worldwide data, used for overall % gold OA uptake (Figure 1)

- Includes all articles, regardless of country of corresponding authors.
- For 2016 and 2017, only research or review article types have been included.
- For 2013-2015, prior to the merger of Springer Nature and alignment of reporting practices, data from former Macmillan portfolios (Nature Research, Palgrave Macmillan) includes only research or review article types, whereas data from former Springer portfolios (BMC, Springer) includes all article types except corrective articles.
- While this difference in approach for Springer articles prior to 2016 may have slightly affected the statistics on proportions of gold OA uptake, we believe that the effect should be minor. Unlike the Nature Research journals, which publish higher volumes of news, editorial content and commentary, the vast majority of articles published by Springer and BMC titles are research or review content.

Appendix 2: Springer Nature journal portfolios

Springer Nature publishes 2,937 academic journals (excluding magazines). Of these, 20% are fully OA titles (595), and 66% offer a hybrid OA option (1,929).
We also publish 413 subscription-only titles.

Springer Nature journal portfolio	# journals	% journals
Fully Open Access	**595**	**20.27%**
Hybrid (Open Choice)	**1,932**	**65.83%**
Subscription	**408**	**13.90%**
Nature Research & nature.com titles	**52**	**1.77%**
Palgrave Macmillan	**10**	**0.34%**
English language (society owned)	10	0.34%
Springer	**346**	**11.79%**
English language (society owned)	100	3.41%
Non-English language	35	1.19%
Eng. version of Russian content	211	7.19%
Grand Total	**2,935**	**100.00%**

Nature Research subscription titles
We publish 52 subscription journals in the Nature Research portfolio. At the moment we believe the subscription model is still the best way to provide sustainable and widespread access to such journals, which have significant editorial investment and very low acceptance rates. If we were to offer a hybrid OA option for these journals, the article processing charge (APC) would need to be very high in order to cover costs. These titles also offer a significant amount of additional highly valued material including commentary and journalism which are not well-served by an APC model.

The Nature Research journals have a very liberal 6-month self-archiving embargo period, which enables UK authors to comply with all major UK funder mandates, as well as those of the European Commission and European Research Council.

Palgrave Macmillan and Springer subscription titles
Wherever possible, Springer Nature offers a hybrid OA option across our Palgrave Macmillan and Springer journals. However, in a small proportion of cases our society partners do not choose to offer a gold OA option.

Of the 356 subscription journals published by Palgrave Macmillan and Springer:

- 110 are English-language titles that we publish on behalf of our society partners.
- 246 are not English-language titles, or are English-language versions of Russian content, so are unlikely to receive submissions from UK authors (see table above).

Springer Nature English-language journal portfolio	# journals	% journals
Fully Open Access	**592**	**23.1%**
Hybrid (Open Choice)	**1,812**	**70.6%**
Subscription	**162**	**6.3%**
Nature Research & nature.com titles	52	2.0%
Palgrave Macmillan (society owned)	10	0.4%
Springer (society owned)	100	3.9%
Grand Total	**2,566**	**100.0%**

Appendix 3: Compliance

✓✓ = exceeds requirement
✓ = meets requirement

Springer Nature funder compliance for UK authors

Funder policy	Fully OA	Nature.com hybrid	Springer hybrid	Palgrave hybrid	Nature Research subscription	Palgrave subscription
RCUK	✓	✓	✓	✓	✓	✓
Gold preferred; CC BY required if paid APC	✓✓ All gold CC BY	✓✓ CC BY default	✓✓ Spr. Compact	✓ CC BY default	n/a	n/a
Max embargo 6/12 months (STM/HSS) for subscription titles; 12/24 for hybrid (MRC exception below)	n/a	✓✓ 6 months	✓ 12 months, HSS exceeds STM complies	✓✓ 12 months (HSS only)	✓ 6 months	✓ 12 months (HSS only)
PMC required for MRC/biomed, 6 month embargo	✓ Publisher PMC	✓ Publisher PMC	No; must opt for Spr. Compact	n/a	✓ Publisher PMC	
NC re-use for deposited manuscripts inc. TDM*	✓ CC BY	✓	✓	✓	✓	✓
HEFCE	✓	✓	✓	✓	✓	✓
Gold or green OA required	✓✓ All gold & PMC if in scope	✓ Gold option & self-archiving	✓✓ Spr. Compact & Jisc Router	✓ Gold option & self-archiving	✓ Self-archiving	✓ Self-archiving
Max embargo 12/24 months (STM/HSS)	n/a	✓✓ 6 months	✓ 12 months, HSS exceeds STM complies	✓✓ 12 months (HSS only)	✓✓ 6 months	✓✓ 12 months (HSS only)
Deposit within 3 months of publication, green only	n/a	✓ Self-archiving	✓ Jisc Router	✓ Self-archiving	✓ Self-archiving	✓ Self-archiving
Free to read, download, and search electronically*	✓✓ CC BY	✓	✓	✓	✓	✓
Wellcome Trust	✓	✓	✓	✓	✓	✓
Gold OA required if available; CC BY if paid APC	✓ CC BY only	✓ CC BY default	✓ Spr. Compact	✓ CC BY default	n/a	n/a
PMC deposition required; by publisher if paid APC	✓ Publisher PMC	✓ Publisher PMC	✓ Publisher PMC	✓ Publisher PMC	✓ Publisher PMC	n/a
Max embargo 6 months for subscription journals	n/a	n/a gold required	n/a gold required	n/a gold required	✓ 6 months	n/a
European Commission Horizon 2020	✓	✓	✓	✓	✓	✓
Gold OA encouraged	✓✓ All gold	✓ Gold option	✓✓ Spr. Compact	✓ Gold option	n/a	n/a
Deposition to IR/subject repository required	✓ Publisher PMC	✓ Self-archiving	✓ Jisc Router	✓ Self-archiving	✓ Self-archiving	✓ Self-archiving
Max embargo 6/12 months (STM/HSS)	n/a	✓ 6 months	✓ 12 months (STM must go gold)	✓ 12 months (HSS only)	✓ 6 months	✓ 12 months (HSS only)

*Springer Nature re-use terms for AAMs are compliant with RCUK requirements, see footnote 6 in RCUK OA policy. They also meet HEFCE re-use requirements for outputs to be "presented in a form that allows anyone with internet access to search electronically within the text, read it and download it without charge." HEFCE states that CC BY-NC-ND meets these terms, but the policy does not require this licence. Note: A small portfolio of Springer's English-language society-owned titles do not offer a hybrid OA option. These titles do not comply with all funder mandates applicable to UK authors due to the 12 month embargo period, but we are working with our partners to improve these policies and are happy to discuss exceptions on a case by case basis.

Appendix 4: Springer Nature author survey

Methodology

The online survey was conducted by Springer Nature between 20 April and 16 May 2017. In total, Springer Nature invited 427,292 individuals to take part in the survey via email. In total the survey received completed responses from 7,546 respondents who had published at least one primary research article in the last three years, and of these 415 were based in the UK. As an incentive to complete the online survey, all respondents were eligible to enter a prize draw to win a £100/$150 Amazon gift card.

To what extent do you agree or disagree with the following general statements about OA "OA is the future of academic and scientific publishing"

	All countries		All countries except UK		United Kingdom	
Total	**100.0%**	**7,546**	**100.0%**	**7,131**	**100.0%**	**415**
Agree	29.0%	2,186	29.1%	2,078	26.0%	108
Disagree	8.3%	626	8.5%	606	4.8%	20
I don't know	4.2%	318	4.3%	307	2.7%	11
Neutral	19.7%	1,490	20.0%	1,427	15.2%	63
Strongly agree	33.2%	2,505	32.6%	2,323	43.9%	182
Strongly disagree	5.6%	421	5.5%	390	7.5%	31

Reasons for publishing OA

	All countries		All countries except UK		United Kingdom	
Total	**100.0%**	**4,864**	**100.0%**	**4,522**	**100.0%**	**342**
Because my funder mandates OA publication	12.5%	609	10.3%	465	42.1%	144
Because my institution mandates OA publication	7.2%	352	5.6%	251	29.5%	101
I believe that research should be OA, so freely available immediately to all	54.7%	2,663	54.3%	2,456	60.5%	207
The journal I chose to publish in only allows for OA	38.9%	1,892	39.3%	1,779	33.0%	113
Other (please specify)	9.7%	471	9.6%	433	11.1%	38
I thought that OA would allow for my paper to be published faster than the current standard	20.9%	1,015	21.6%	978	10.8%	37
OA publications are thought to generate higher citations	26.6%	1,294	27.0%	1,221	21.3%	73
OA publications are thought to be read more widely	45.8%	2,229	46.3%	2,092	40.1%	137
I don't know	0.9%	45	1.0%	45	0.0%	0

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Construction of a reference genome sequence for barley

A 10 year research study by a multi-nation consortium has reported the first high-quality reference genome sequence of barley, a cereal crop that is used around the world as animal fodder and as the raw material for popular beverages such as beer and whisky. The barley genome is almost twice as large as the human genome and 80 percent consist of highly complex repetitive structures. This research means that scientists can now locate all genes precisely in the genome and analyse complex gene families that play a key role in the malting and resilience of the crop.

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