

Continuing progress: Wellcome and COAF open access spend 2015-16

Hannah Hope and Robert Kiley from Wellcome's Open Research team analyse what the 2015-16 open access data reveals.

We ask all institutions in receipt of a grant from the Charity Open Access Fund (COAF) to provide details on their open access (OA) publications and their associated article processing charges (APCs). This article summarises our analysis of the spend by these institutions between October 2015 and September 2016, and covers research funded by Arthritis Research UK, Breast Cancer Now, Bloodwise, British Heart Foundation, Cancer Research UK, Parkinson's UK and Wellcome. It provides details of the costs of OA publishing incurred by COAF and to what extent the published articles comply with the COAF OA policy.

Overall, full compliance with the COAF policy - articles freely accessible through Europe PMC and made available under a CC-BY licence - has risen to 91%. This is a significant improvement on last year's 74%, which we are delighted to see.

The cost of OA publishing continues to rise. While hybrid journals remain more expensive than fully OA journals, the increasing popularity of several high-cost fully OA journals from traditional subscription publishers is contributing to the growing cost.

Cost analysis

More and more articles are being published under an APC model using COAF grants. In 2015-16 we saw a **21%** increase from the previous year in the number of articles for which an APC was paid, with the total rising to 3,552 articles. In parallel with this, total COAF spending also rose, by **32%** to £6.6 million. The average APC was £2,044 and the median was £1,944 - rises of 6.7% and 6% respectively. Table 1 shows how these figures compare with previous years.

Table 1: APC spend for 2012-13, 2013-14, 2014-15 and 2015-16

#	Item	2012-13	2013-14	2014-15	2015-16
		<i>Wellcome data</i>	<i>Wellcome data</i>	<i>COAF data</i>	<i>COAF data</i>
a	Number of articles for which an APC was paid	2126	2556	2942	3552
b	Total cost of APCs	£3,884,788	£4,694,428	£5,629,970	£7,252,915
c	Total Wellcome/COAF spend on APCs (<i>some APCs' costs were split between COAF and another funder</i>)	£3,884,788	£4,383,939	£4,992,434	£6,600,690
d	Average APC [#b/#a]	£1,821	£1,837	£1,914	£2,044
e	Median APC [median of #b]	£1,837	£1,800	£1,834	£1,944

Our analysis split journals into fully OA journals (in which every article is made OA - eg *PLOS One*, *Cell Reports*) and hybrid journals (which are published under a subscription model, but where individual articles can be made OA). Table 2 provides a breakdown of the number of publications and average and median costs by publication type.

Table 2: APC spend by publication type

	Fully OA journals			Hybrid journals		
Year	2013-14	2014-15	2015-16	2013-14	2014-15	2015-16
Number of articles published in:	607	775	1,038	1,894	2,065	2,514
Average APC:	£1,241	£1,396	£1,644	£2,030	£2,104	£2,209
Median APC	-	£1,352	£1,397	-	£2,005	£2,125

Publication in hybrid journals remains the predominant publication route for COAF-funded researchers in 2015-16, representing some 71% of articles for which an APC was levied. Hybrid journals also remained more costly, with an average APC of £2,209, compared with £1,644 for a fully OA journal.

However, this year we saw a dramatic 18% rise in the average APC cost of fully OA journals, though the median APC showed a more modest 3% increase. Investigation revealed that this sharp average rise is due mainly to the reclassification of *Nature Communications* (cost per article charged to COAF £3,800) as a fully OA journal since we carried out our analysis in 2014-15. Removing the 78 *Nature Communications* publications reduces the average APC for fully OA journals to £1,478 - a 6% increase over the past 12 months (in line with 5% price increase in hybrid journals). The range of fully OA journal APCs reported can be seen in figure 1.

Figure 1: Histogram of APC costs from fully OA journals (data grouped into ranges of £200).

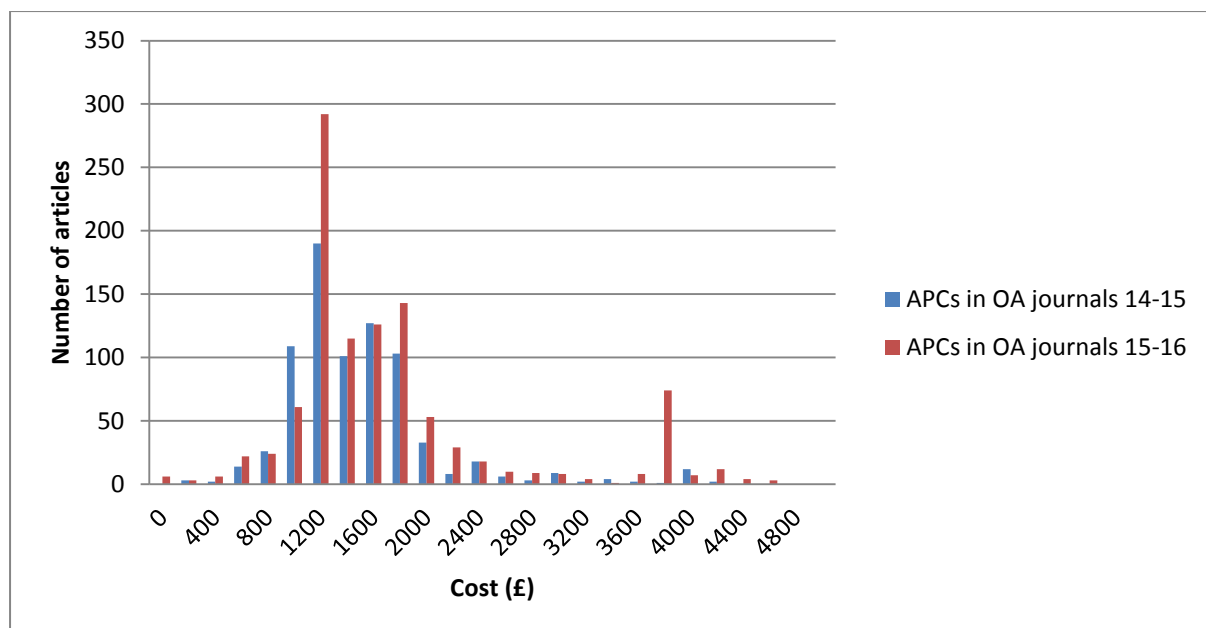


Table 3: Top five publishers (by volume of COAF-supported research) and APC spend

Publisher	Journal type	No. of articles	Average APC	Total spend
Elsevier	Fully OA	63	£2,957	£186,299
	Hybrid	767	£2,473	£1,896,812
Totals		830		£2,083,111
Springer Nature	Fully OA	444	£1,781	£790,974
	Hybrid	193	£1,910	£368,665
Totals		637		£1,159,639
Wiley	Fully OA	20	£1,289	£25,782
	Hybrid	403	£2,021	£814,374
Totals		423		£840,156
OUP	Fully OA	39	£1,415	£55,169
	Hybrid	230	£2,192	£504,214
Totals		269		£559,383
PLOS	Fully OA	258	£1,379	£355,759
	Hybrid	N/A		
Totals		258		£355,759

Table 3 breaks down the publication costs reported to us for the top five publishers by volume of COAF-funded articles published in 2015-16. Elsevier continues to have the most expensive APCs, with an average APC for fully OA journals of £2,957, more than double that charged by PLOS, OUP and Wiley.

Included in the data this year were a number of articles which were published OA at £0 cost to COAF, we presume as a result of publisher-institution offsetting agreements. A total of 48 articles were reported as being published at £0; 35 of these articles were published by Springer Nature. A further 54 articles were reported as having an APC cost, but that the cost to COAF was £0 due to the use of article credits from publishers. As offsetting agreements are becoming increasingly common, it is important that we begin to understand their impact on our OA costs. We discuss how this might be achieved in the Conclusions and Actions section, below.

Compliance data

In addition to understanding how much OA is costing us, we also want to know whether publishers are delivering a service that complies with the COAF OA policy. In brief, the policy requires that when COAF funds are used to pay for an APC, the publisher must deposit the final version of the article in PubMed Central (PMC)/Europe PMC and ensure that the article is clearly licensed CC-BY on their own site and in PMC/Europe PMC.

As in previous years, we used the Cottage Labs [compliance checking tool](#) to programmatically determine whether a paper is in the Europe PMC repository and if so what licence is attached to it (see table 4). This analysis was run on 28 January 2017 and non-compliant papers were re-checked on 7 March 2017.

Last year the compliance figures were determined based on *all* publications, which included some early-view/ahead-of-print articles. However, as these articles have not yet been assigned to an issue and thus cannot be deposited to PMC, this year we have removed these articles prior to calculating compliance figures.

Table 4: Compliance with COAF OA policy (2014-15 figures recalculated with early-view/ahead-of-print articles removed for comparison)

	Numbers		Percentage	
	2014-15	2015-16	2014-15	2015-16
Articles for which an APC has been paid	2,942	3,552		
Published articles for which an APC has been paid (excluding the ahead-of-print articles)	2,800	3,340	100	100
Availability in Europe PMC				
Number of these articles available via Europe PMC as full text (as of 7 March 2017)	2,408	3,210	86	96
Presence of correct licence				
Number of articles with a CC-BY (or CC-0) licence either in Europe PMC or on the publisher's website	2,201	3,122	79	93
Number of articles with other licence (or no programmatically identifiable licence)	599	218	21	7

Full compliance				
No. of articles for which full text was available via Europe PMC with a CC-BY or CC-0 licence	2,074	3041	74	91

This year we are pleased to see very strong improvements in overall compliance, with the percentage of fully compliant articles rising from 74% last year to 91%. This increase comes at a time when even more articles are being made OA via the APC route. The percentage of articles available via Europe PMC as a full text rose to 96%, and the number of articles with a correct and programmatically identifiable licence also rose to 93%.

This data is extremely positive and we are pleased to see publishers delivering a far more consistent service.

For articles with non-compliant licences we recognise that this is a more complicated issue and can be due to both author and publisher errors. We know that authors do not always select the specified licence - maybe through active choice, but perhaps also through confusion or a lack of awareness of COAF requirements (particularly where a non-COAF-funded collaborator is the corresponding author). We continue to work with publishers, and through our [publisher requirements](#) we seek to ensure that if a choice is presented to Wellcome/COAF-funded authors, they are made aware that they must select CC-BY (or CC-0) to be compliant with COAF policy. We will also continue to communicate with our researchers, directly and via their institutions, to raise their awareness of our OA requirements.

Looking further into the sources of non-compliance, we find that hybrid journals continue to be the main source of non-compliance (table 5). Of the 272 non-compliant hybrid articles, just under half are missing from Europe PMC, while the remainder are in Europe PMC with a non-compliant or unknown licence.

This subset of articles reveals another issue: updates to the copyright licence of an article that been made on the publisher website but not on Europe PMC. Unlike changes to the rest of the article, which are tracked by a published Erratum or Correction, changes to copyright licences are currently harder to follow.

Table 5: Non-compliance - fully OA journals vs hybrid journals, 2015-16

	Published articles	Non-compliant articles	% of articles that are non-compliant
Fully OA journals	1,032	27	3%
Hybrid journals	2,308	272	12%
Total	3,340	299	9%

Looking at the top five publishers (see table 3 above) reveals that Elsevier has the largest number of non-compliant articles (table 6); however, the number is small relative to the number of COAF-

funded articles that they published. Last year Wiley had a compliance rate of 50%, which we're pleased to report has this year risen to 95% of their articles.

Table 6 Non-compliance - top 5 publishers by volume.

Publisher	Journal type	No. of articles	Non-compliant	Non-compliant (%)
Elsevier	Fully OA	63	11	17%
	Hybrid	736	65	11%
Totals		799	76	11%
Springer Nature	Fully OA	443	2	0%
	Hybrid	167	21	13%
Totals		610	23	4%
Wiley	Fully OA	19	0	0%
	Hybrid	369	20	5%
Totals		388	20	5%
PLOS	Fully OA	258	0	0%
	Hybrid	n/a	n/a	n/a
Totals		258		0%
OUP	Fully OA	38	1	3%
	Hybrid	202	11	5%
Totals		240	12	5%

Conclusions and actions

Overall compliance rates have risen strongly, and though there are still some non-compliant articles, the number is rapidly decreasing. As in previous years, we will be working with publishers and institutions to ensure that these articles are made compliant as soon as possible.

We also recognise that the data reported to us can contain errors. Where we identify these (for example when an APC was not actually paid, or where a publication charge has been claimed as an APC) we will endeavour to correct the [published data set](#).

Looking forward, our [publisher requirements](#) come into force on 1 April 2017. We believe these will have a positive impact on next year's compliance figures and we would like to see overall compliance (full text article available within Europe PMC with a CC-BY licence) over 95% next year. Publishers who are unable to deliver the services that make up the requirements, and repeatedly publish non-compliant articles, will be deemed ineligible to receive Wellcome/COAF funds for APCs.

Compliance is only half of the story, and the continuing increase in the cost of OA publishing also needs to be addressed. By way of example, a number of European funders have instigated caps on APC charges, such as the FP7 Post-Grant Open Access Pilot and DFG, who both set the cap at €2,000.

COAF funders are not at the point of setting a cap, but if APCs continue to rise at what appear to be above inflation levels, we could consider this option in the future.

We also need to understand better the potential of publisher-institution offsetting deals as a mechanism to reduce OA costs. We know that we and the other members of COAF are benefiting from these agreements, as we are seeing an increasing number of articles reported with zero cost. However, due to different reporting practices we're not sure how much we're benefiting, nor how best to support institutions with the costs of these deals. As a first step, we will work with institutions, JISC and RCUK to develop standardised methods for reporting publications made OA as part of these deals. We hope that this will lay the groundwork for us to better understand the value of these deals.

In conclusion, we are pleased to see the significant increase in compliance, and we hope and expect this trend to continue. The rising costs, however, are a matter of concern, and exploring how we can best restrain these will become an increasing focus of our activity in the years ahead.

Note

The data used for this analysis was provided by institutions in November 2016. The analysis was carried out using Wellcome's CottageLabs Compliance Tool on 28 January 2017, with a reanalysis of non-compliant papers on 7 March 2017. The analysis was conducted using the raw data provided by institutions. While every effort has been made to provide accurate information, there may be errors within the analysed data. Where errors are identified we will endeavour to make corrected versions of the data available.

The data is available on [Figshare](#).