

# ECONOMICS OF ACADEMIC PUBLISHING

## Open Access Trends Placemats

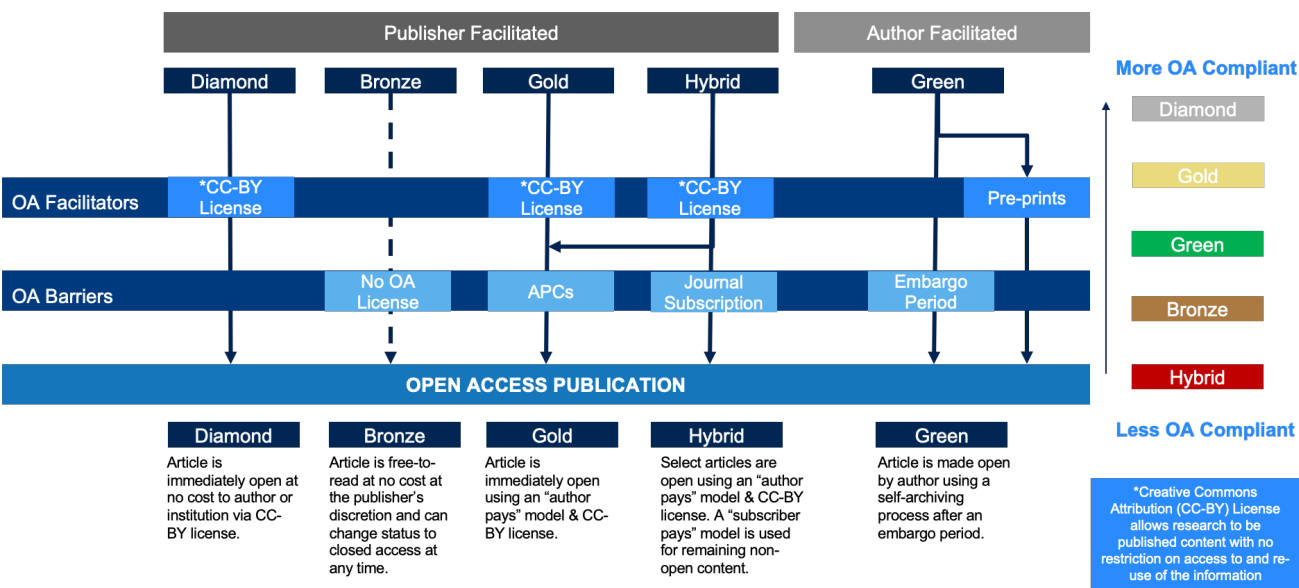
*Placemats are meant to be printed on 11x17 paper, and not used as slides. The purpose of these placemats are to thematically display data. Each placemat represents the data using visual elements such as charts, graphs, and quotes. They are designed to guide readers to a mutual understanding of information contained in the data placemats.*



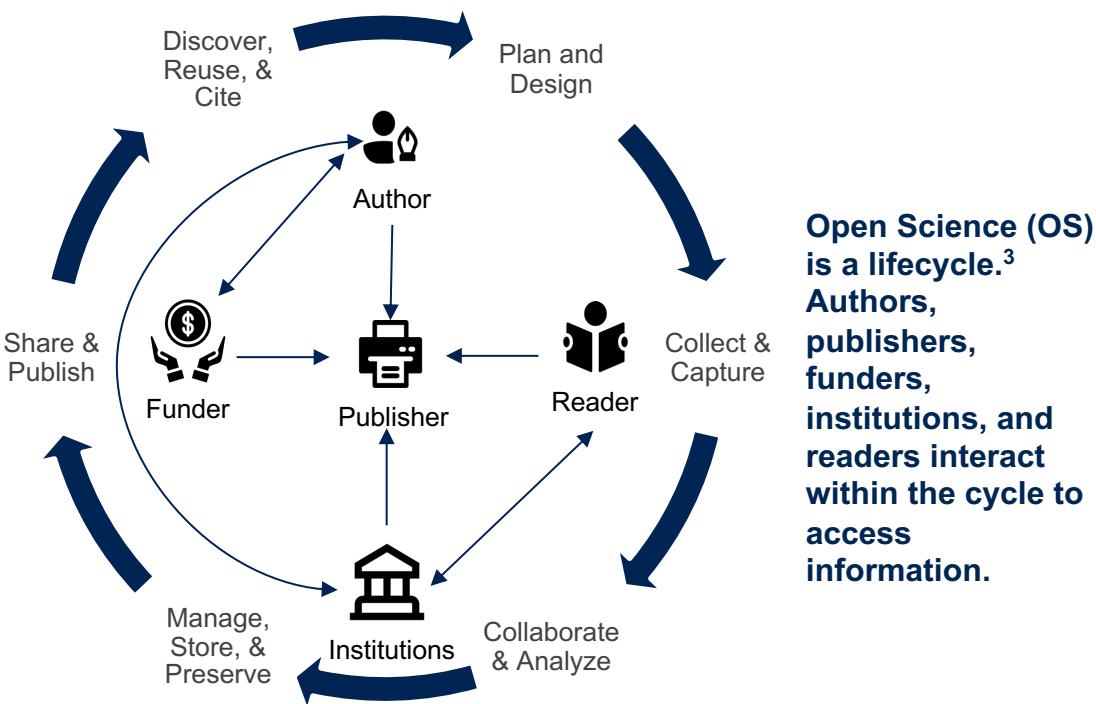
**START CENTER**  
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# OPEN ACCESS ECOSYSTEM AND DECISION FACTORS

## Main Publishing Models of Open Access (OA)



Faculty Publishing Values <sup>1</sup>	
1	Has a readership that I want to reach
2	Overall prestige of the journal/publisher/venue
3	Journal/publisher/venue that my peers regularly read
4	Journal/publisher/venue that I regularly read
5	Impact factor of the journal
6	How often the journal appears to be cited
7	The cost (or lack of cost to publish)
8	Journal of a society to which I belong
9	That the publication makes my article available to the public
10	Receive direct support/funding for publication in specific journals



### Barriers to OS life cycle:<sup>4</sup>

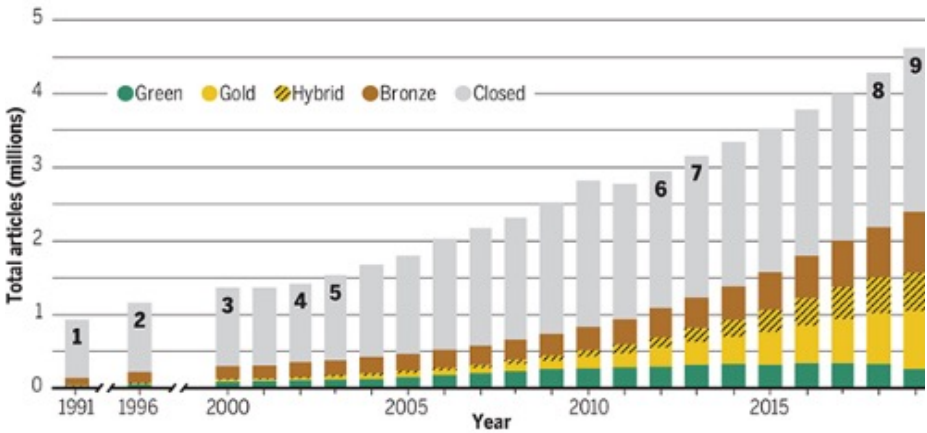
- Lack of awareness and training
- Increased time commitments
- Restrictions on open practices by supervisors

### Early Career Researcher (ECR) considerations:

- Cultural values, such as 'saving face', may limit participation in open peer-review and scrutiny in some regions
- Perceived high costs of OA publication (due to gold model emphasis) and few incentives limits ECRs from publishing OA, especially in the Global South

# GLOBAL TRENDS IN ACADEMIC PUBLISHING: OA JOURNALS

The amount of OA literature has grown substantially. In 2017, for the first time, more than 50% of academic articles published annually were OA.<sup>7</sup>



The number of OA journals has more than doubled in a 10-year period.<sup>12</sup>

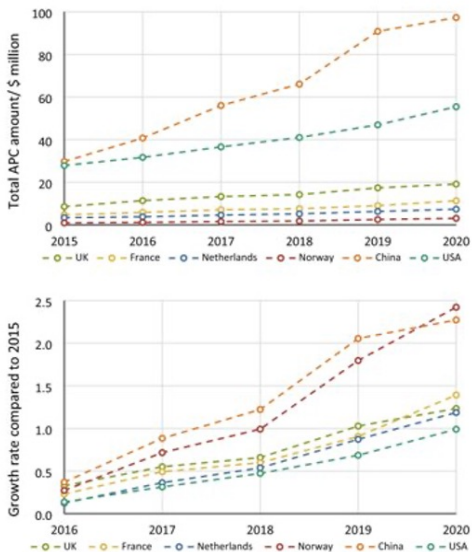
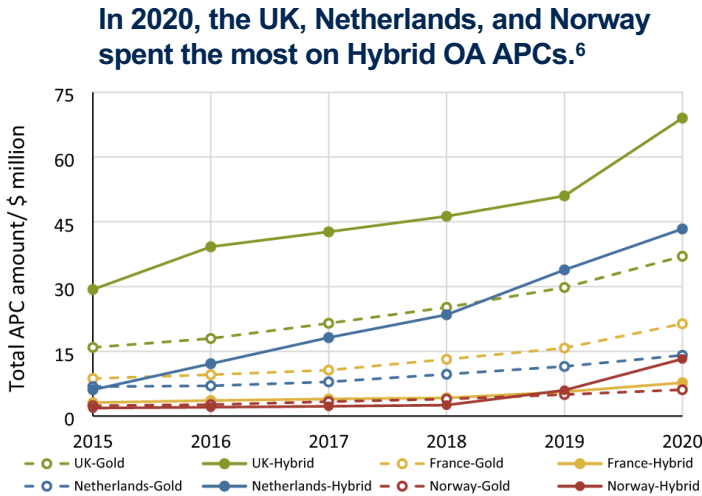


Growth and type of OA publication varies by discipline and country. Multidisciplinary fields are mainly OA (86.2%), followed by other medical sciences (55.7%). European countries publish the greatest proportion of OA.<sup>5</sup>

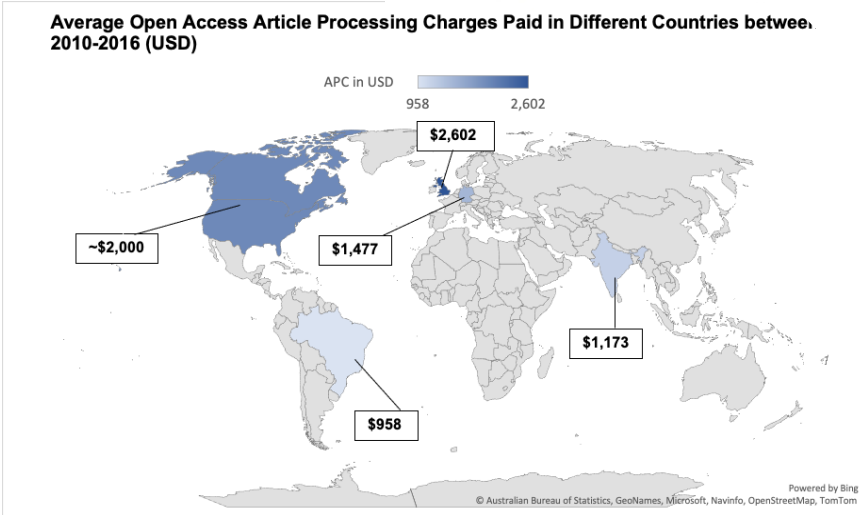


Globally, APC spending on OA publishing has increased at an alarming rate.

The UK, France, Netherlands, Norway, China, and the USA have spent increasing amounts of APCs since 2015.<sup>6</sup>



The U.K. had the highest average paid OA APC charges between 2010-2016, followed by the U.S. and Canada, whereas Brazil had the lowest.<sup>8</sup>



# TRENDS IN ACADEMIC PUBLISHING: PRE-PRINTS

Pre-print servers can facilitate the sharing of research findings upon discovery, while waiting for formal review, and can have a broader role in displaying the whole research arc from proposal to final analysis.

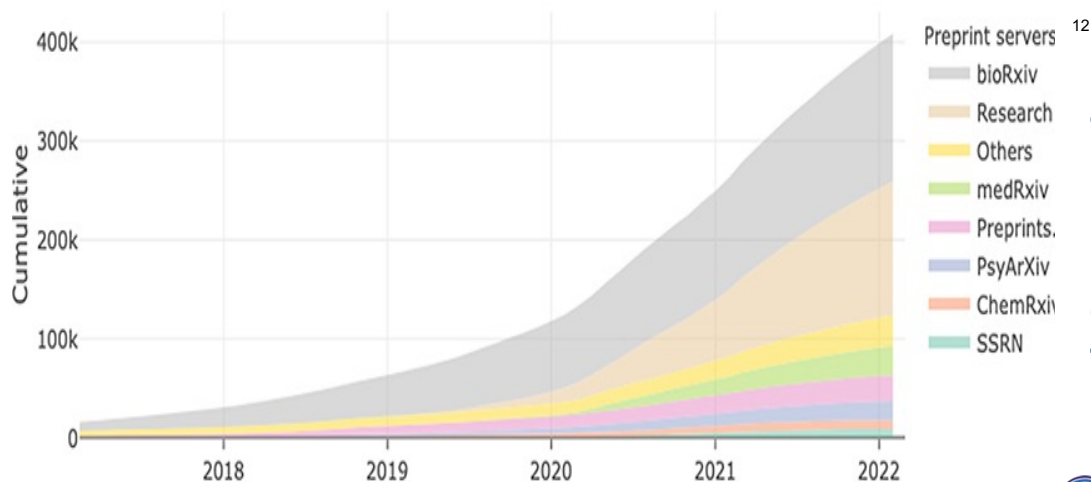
## Pre-prints can increase article visibility and citations.<sup>24</sup>

63%

Journal articles with a bioRxiv pre-print had a citation advantage of 63% compared those without pre-prints

50%

The citation advantage persists for 3 years post publication, with average monthly per paper citations ~50% greater for articles with a pre-print than without



The number of papers printed on pre-print servers has increased exponentially over the past five years.<sup>9</sup>

## Benefits of pre-prints:



Integration into traditional publishing



Facilitates Green OA or self-archiving



Engagement from community



Timely dissemination:  
May protect against scooping +/- facilitate faster scientific discovery



No cost to the author or funder

## Cons of pre-prints:



Lack of peer review can lead to dissemination of inaccurate information



Speed may be prioritized over evidence quality and credibility



1/5 of journals do not allow pre-print publishing before submission and up to 2/5 have unclear pre-print policies<sup>10</sup>

# OPEN ACCESS (OA) POLICIES

Comparison of Open Access Policies					
	BMGF <sup>1</sup>	Coalition S	White House OSTP <sup>2</sup>	RCUK <sup>3</sup>	The São Paulo Research Foundation
OA must be immediate, no embargo period	Yes	Yes	Yes	Preferred	Up to 12-month embargo permitted
All authors?	Yes	Yes	Yes	Yes	Yes
All publications (i.e., book chapters, editorials, symposia)		Partial	Yes	No, but encouraged	Yes
Multiple routes to OA compliance?	Yes	Yes	Unknown	Yes (Green, Gold).	Yes (Green & Gold preferred)
Support for Hybrid	No	No	Unknown	No	Yes
Effective Date	2015. Last Revised in 2021	2018. Last Revised in 2021	December 31st, 2025	2005. Last Revised in 2020	2019. Last Revised in 2021

<sup>1</sup> Bill and Melinda Gates Foundation, <sup>2</sup> White House Office of Science and Technology Policy, <sup>3</sup> Research Councils United Kingdom

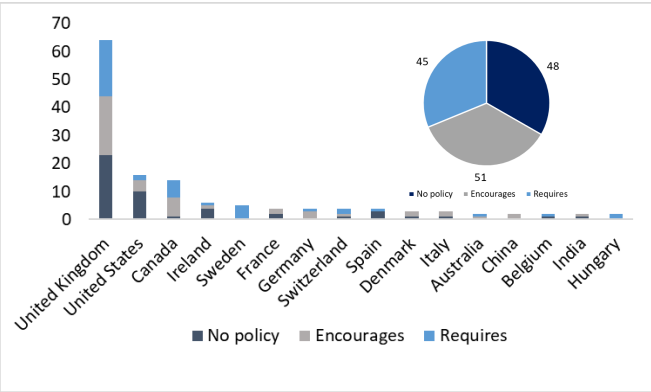
As of 2021, there are 2,173 journals reporting data to the Coalition S Transparency Framework.<sup>23</sup>

## Funders Open Access Publishing Policies

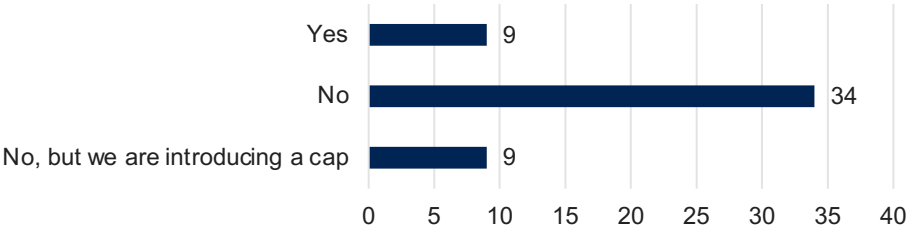
# of Funders with OA publishing policies, by mandate type & country

In 2019, 2/3 of Funders\* had a policy requiring (31%) or encouraging (35%) OA publishing.<sup>5</sup>

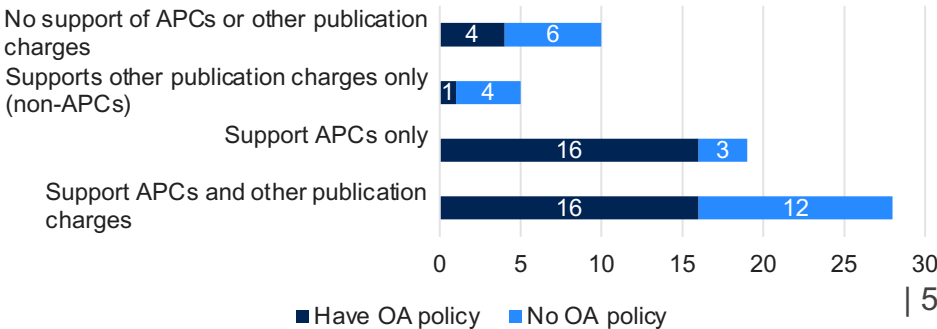
\*Policies for 144 Funders in 23 countries were assessed. Only countries with >1 funder are shown.



## Number of European organizations applying a cap on Article Processing Charge (APC) expenditure (n=52)<sup>11</sup>



## European Funder support for publication charges (n=62)<sup>11</sup>



# OPEN ACCESS APC PRICING AND REPORTED COSTS

Historical average Article Processing Charges (APC) are difficult to determine, as depending on the sample of journals, prices varied substantially.

Average APC varies depending on which journals are included. Reported avg. OA APC charges (USD):

- 2011: \$660<sup>25</sup> ; range: \$461-\$5,550<sup>26</sup>
- 2012: \$900<sup>27</sup> ; \$1,292<sup>28</sup>
- 2014: \$1,418<sup>27</sup>
- 2015: \$964<sup>2</sup>
- 2016: ~\$1,800<sup>27</sup>
- 2018/19: \$3,087<sup>29</sup>
- 2020: \$899<sup>28</sup>


Current APC pricing also frequently varies. One study found that 90% of journals with APCs offered some variation in pricing<sup>2</sup>, in part due to differences in fees and discounts for each stakeholder.

Variation in Stakeholder APCs		
Author	Institution	Funder
<ul style="list-style-type: none"><li>• List Price</li><li>• Editorial Staff Discount</li><li>• Society Membership</li><li>• Corresponding Author Discount</li><li>• Reviewer Discount</li><li>• LMIC Fee-waiver</li><li>• Subscriber Discount</li></ul>	<ul style="list-style-type: none"><li>• List Price</li><li>• Transformative Agreement Price</li><li>• Library Affiliations</li><li>• Lifetime Journal Memberships</li></ul>	<ul style="list-style-type: none"><li>• List Price</li></ul>


Another study found the following factors to be related to increases in APCs:<sup>17</sup>

- Journal reputation
- Market power of publishers
- Hybrid model
- Concentration of disciplines

There has been a decrease in academic budgets combined with an increase in journal related costs.



- Decrease in university library budgets (~40% of library budgets allocated to journal subscriptions)
- Fewer institution-publisher subscription deals
- Decrease in market competition
- Decrease in time-to-publication
- Fewer print publications



- Increase in APC & subscription costs
- Rising # of journals, especially those charging APCs
- Rising administrative costs for institutions
- Increased government & funder support for OA
- Growing body of OA literature (especially in STEM)

Between 2011-2021, average per-article and per-journal APC pricing rose globally, exceeding the 10-year global inflation average of 2.6%<sup>13</sup>. High-impact journals had the sharpest increases over those 10 years.<sup>12</sup>

17-99%

Low-impact journal *per-article* average APC increase

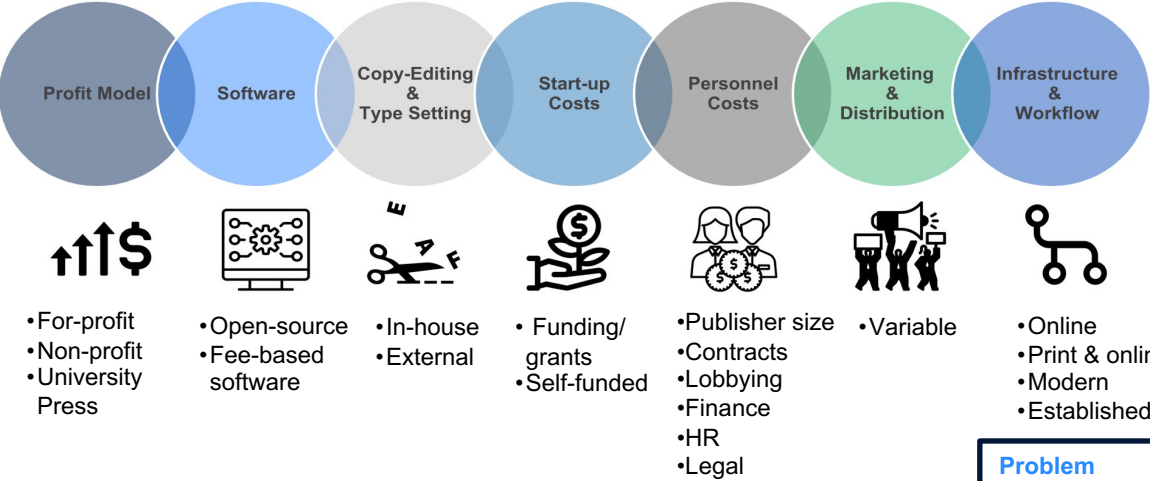
83-200%

High-impact journal *per-article* average APC increase



# BUSINESS MODELS OF JOURNALS AND PUBLISHERS

OA publisher costs vary depending on inputs and business model. Cost per article can range from \$10-\$40,000 USD (as reported in literature & by publishers)<sup>25, 26, 30, 31, 32</sup>.



The business model for publishers is similar, however depending on the model of OA, *how* and *through which customer segments* publishers earn revenue differs

One publisher, MDPI, provides the following breakdown of costs for two levels of APCs<sup>15</sup>

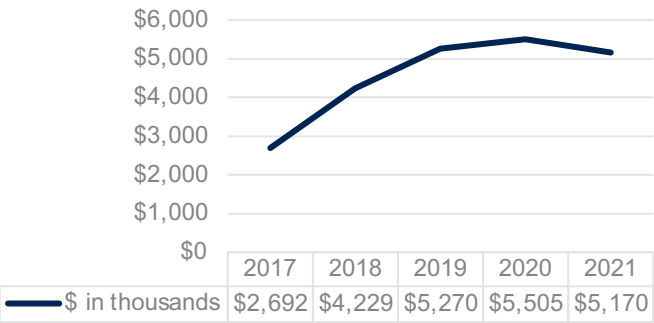
Service Functions	% of Total		Amount (Swiss Francs, CHF)	
	CHF 2000	CHF 1000	CHF 2000	CHF 1000
Publishing Operations and Projects	17%	34%	336	336
Journal Publication	40%	79%	790	790
Editorial Fees	1%	2%	22	22
Marketing and Communication	4%	4%	80	40
General	6%	12%	118	118
Discounts and Waivers	19%	19%	370	185
Surplus	13%	-50%	284	-491

## Publisher Business Model<sup>16</sup>



# BMGF: SUPPORTED PUBLICATION AND SPENDING TRENDS

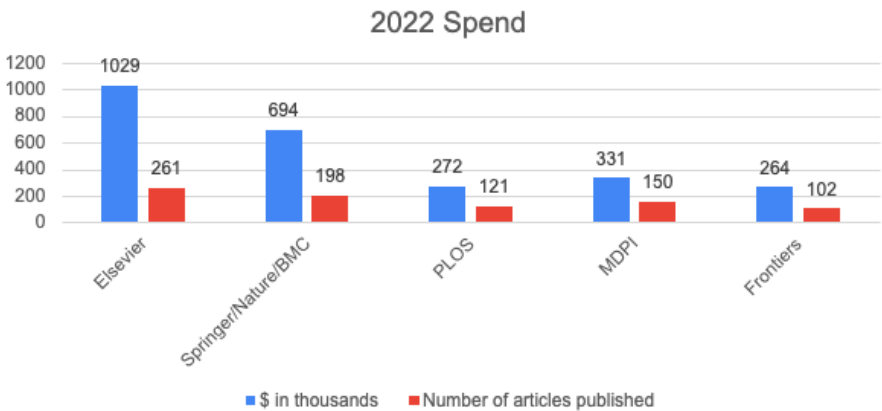
BMGF academic publication related spending has almost doubled from \$2.69 million USD in 2017 to \$5.17 million USD in 2021.



Of all published articles the median BMGF APC spend was \$3,112.16. This is similar to the median APC of \$3,055 paid by the Wellcome Trust in 2020/21.

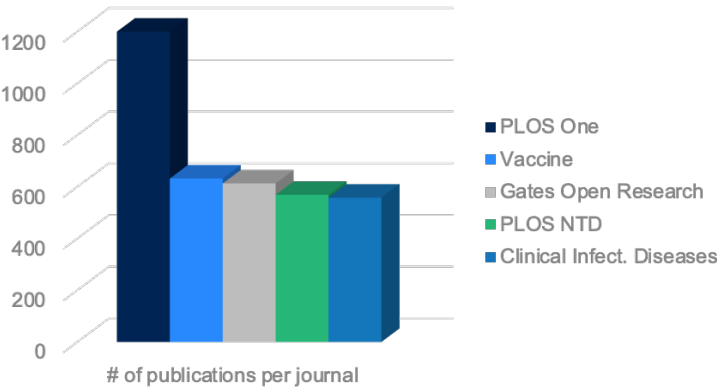
BMGF paid >\$6,899,400 in OA publishing costs in 2022

In the first 10 months of 2022, the top supported publisher by BMGF was Elsevier, with \$1.029M dollars spent on 261 publications. This represents an average cost of \$3,943.



In the past 7 years (2015-2022), BMGF published the most articles in PLOS ONE, with 1,200 publications representing almost half (43%) of all BMGF academic publications.

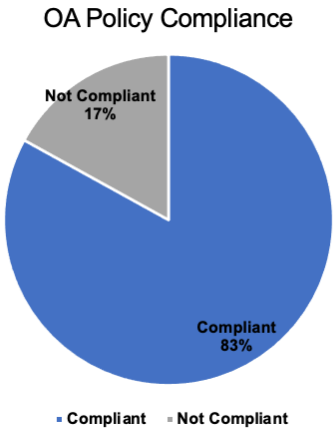
Top 5 Journals where BMGF Funded Researchers Published between 2015-2022



Although BMGF spend is a small fraction of publisher total revenues, BMGF has influence over the research environment.

Journal	2022 BMGF Spend (thousands USD)	Total Revenue (thousands USD)
		679,000 (from transactions, not subscriptions)
Elsevier <sup>22</sup>	2,084	
Springer/Nature/BMC <sup>21</sup>	1,200	1,700,000 (total)
PLoS <sup>20</sup>	4781	37,700
MDPI <sup>18</sup>	385	204,610
Frontiers <sup>19</sup>	723	667,800

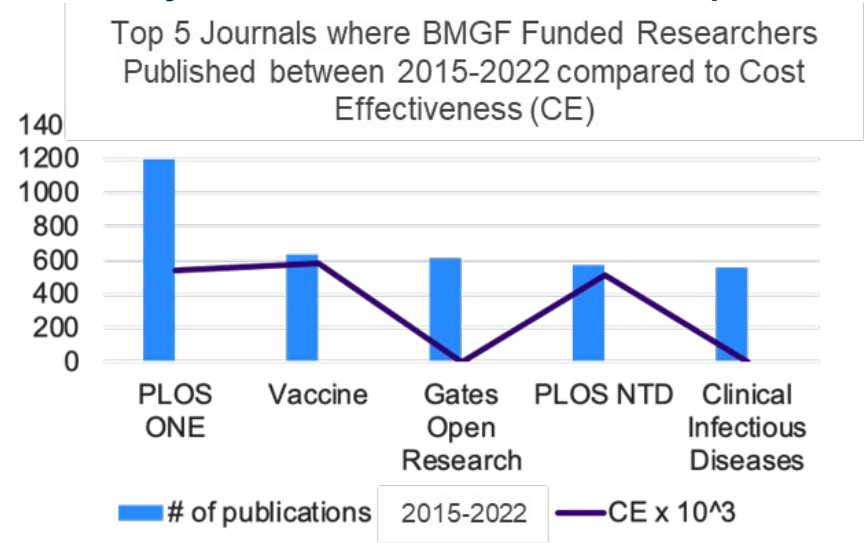
BMGF researchers published 2,758 articles in the first 10 months of 2022. 83% were compliant with the BMGF Open Access Policy.





# BMGF: DATA ANALYSIS AND POLICY REVIEW

Journals where BMGF researchers have published the most are not necessarily the most cost effective or transparent.



No CE for Gates Open Research per CE table to right

Only three out of the five highest volume journals that BMGF funded between 2015-2022 report price transparency information.

# Articles Funded (2015-2022)	Journal	Reports Price Transparency
1,200	PLOS ONE	Yes
632	Vaccine	No
613	Gates Open Research	Yes
569	PLOS Neglected Tropical Diseases	Yes
558	Clinical Infectious Diseases	No

2022 BMGF Top 20 OA Journals Paid For & Ranked by Cost Effectiveness\* (CE)<sup>32</sup>. The Lancet Global Health had the highest CE score of 2.07. The next closest CE is EClinical Medicine at 1.26.

Rank	Journal	AI	Price	CE
1	Lancet Global Health	13.484	\$6,500	2.07
2	EClinicalMedicine	5.684	\$4,500	1.26
3	PLOS Medicine	5.599	\$5,300	1.06
4	Journal of the International Aids Society	2.586	\$2,600	0.99
5	Nature Communications	5.617	\$5,890	0.95
6	BMJ Global Health	3.038	\$3,500	0.87
7	Vaccine	1.267	\$2,200	0.58
8	PLOS One	0.974	\$1,805	0.54
9	PLOS NTD	1.274	\$2,495	0.51
10	Scientific Reports	1.208	\$2,390	0.51
11	BMJ Open	1.099	\$2,200	0.50
12	Vaccines	1.089	\$2,200	0.495
13	Nutrients	1.125	\$2,600	0.43
14	BMC Public Health	1.186	\$2,790	0.43
15	AJTMH	1.007	\$2,500	0.40
16	Malaria Journal	0.948	2,590	0.37
17	Frontiers in Plant Science	1.167	\$3,225	0.36
18	Maternal & Child Nutrition	1.079	\$3,400	0.32
19	Agronomy	0.498	\$2,000	0.249
20	Gates Open Research	n/a	\$1,150	

AI = Article Influence per Clarivate statistics 11/2022. CE = Cost-effectiveness \*based on AI  
Calculated according to: <https://jevinwest.org/papers/West2014EconInquiry.pdf>  
Publisher for Gates Open Research (20) uses alternative metrics, hence no AI.

# APPENDIX

# REFERENCES

1. Niles, M. T., Schimanski, L. A., McKiernan, E. C., & Alperin, J. P. (2020). Why we publish where we do: Faculty publishing values and their relationship to review, promotion and tenure expectations. *PLoS ONE*, 15(3). <https://doi.org/https://doi.org/10.1371/journal.pone.0228914>
2. Morrison, H., Salhab, J., Calve-Genest, A., & Horava, T. (2015). Open access article processing charges: DOAJ survey. *Publications*, 3(1), 1–16. <https://doi.org/https://doi.org/10.3390/publications3010001>
3. Open Science and Research Handbook (1st ed.). (2014). Open Science and Research Initiative. <https://www.fosteropenscience.eu/content/open-science-and-research-handbook>
4. Gownaris, N. J., Vermeir, K., Bittner, M.-I., Gunawardena, L., Kaur-Ghumaan, S., Lepenies, R., Ntsefong, G. N., & Zakari, I. S. (2022). Barriers to Full Participation in the Open Science Life Cycle among Early Career Researchers. *Data Science Journal*, 21, NA-NA. <https://go.gale.com/ps/i.do?p=AONE&sw=w&issn=16831470&v=2.1&it=r&id=GALE%7CA689920937&sid=googleScholar&linkaccess=abs>
5. Trends for open access to publications. (n.d.). Research and Innovation European Commission. [https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/open-science-monitor/trends-open-access-publications\\_en#open-access-to-publications](https://research-and-innovation.ec.europa.eu/strategy/strategy-2020-2024/our-digital-future/open-science/open-science-monitor/trends-open-access-publications_en#open-access-to-publications)
6. Zhang, L., Wei, Y., & Sivertsen, G. (2022). Should open access lead to closed research? The trends towards paying to perform research. *Scientometrics*, 127, 7653–7679. <https://doi.org/https://doi.org/10.1007/s11192-022-04407-5>
7. Brainard, J. (2021). Open Access Takes Flight. *Science*. [https://www.science.org/content/article/new-mandate-highlights-costs-benefits-making-all-scientific-articles-free-read?utm\\_source=Nature+Briefing&utm\\_campaign=59523ecf2a-briefing-dy-20210105&utm\\_medium=email&utm\\_term=0\\_c9dfd39373-59523ecf2a-45499146](https://www.science.org/content/article/new-mandate-highlights-costs-benefits-making-all-scientific-articles-free-read?utm_source=Nature+Briefing&utm_campaign=59523ecf2a-briefing-dy-20210105&utm_medium=email&utm_term=0_c9dfd39373-59523ecf2a-45499146)
8. Pavan, C., & Barbosa, M. C. (2018). Article processing charge (APC) for publishing open access articles: the Brazilian scenario. *Scientometrics*, 117(2), 805–823. <https://doi.org/https://doi.org/10.1007/s11192-018-2896-2>
9. Hallenbeck, K. (2022, September 22). What is better for your career than a publication? A preprint. *ASBMB Today*. <https://www.asbmb.org/asbmb-today/opinions/092222/preprints-better-for-career-than-pubs>
10. Klebel, T., Reichmann, S., Polka, J., McDowell, G., Penfold, N., Hindle, S., & Ross-Hellauer, T. (2020). Peer review and preprint policies are unclear at most major journals. *PLoS ONE*, 15(10). <https://doi.org/https://doi.org/10.1371/journal.pone.0239518>
11. Fosci, M., Richens, E., & Johnson, R. (n.d.). Insights into European research funder Open policies and practices. I: 10.5281/zenodo.340127
12. Hallenbeck, K. (2022, September 22). What is better for your career than a publication? A preprint. *ASBMB Today*. <https://www.asbmb.org/asbmb-today/opinions/092222/preprints-better-for-career-than-pubs>
13. Morrison, H., Borges, L., Zhao, X., Kakou, T.L., & Shanbhog, A. (2022). Change and growth in open access journal publishing and charging trends 2011-2021. *JASIST*, 73(12), 1793–1805. <https://doi.org/10.1002/asi.24717>
14. World Bank. (2021). Inflation, consumer prices (annual %) 2011-2021. The World Bank Data. <https://data.worldbank.org/indicator/FP.CPI.TOTL.ZG?end=2021&start=2011&view=chart>
15. MDPI | Article Processing Charges (APC) Information and FAQ. (n.d.). Retrieved March 4, 2023, from <https://www.mdpi.com/apc>
16. Fair Open Access | FOAA Breakdown of Publication Services and Fees. (n.d.). Retrieved March 4, 2023, from <https://www.faiopenaccess.org/foaa-breakdown-of-publication-services-and-fees/>
17. Budzinski, O., Grebel, T., Wolling, J., & Zhang, X. (2020). Drivers of article processing charges in open access. *Scientometrics*, 124, 2185–2206. <https://doi.org/https://doi.org/10.1007/s11192-020-03578-3>
18. Brockington, D. (2021, March 29). MDPI Journals: 2015-2020. *Dan Brockington*. <https://danbrockington.com/2021/03/29/mdpi-experience-survey-3-mins-completion/>
19. *Frontiers: Revenue, Competitors, Alternatives*. (n.d.). Retrieved March 4, 2023, from <https://growjo.com/company/Frontiers>
20. Financial Overview. (n.d.). *PLOS*. Retrieved March 4, 2023, from <https://plos.org/financial-overview/>
21. *Springer Nature releases first Annual Progress Report demonstrating value provided to the research community | Springer Nature Group | Springer Nature*. (n.d.). Retrieved March 4, 2023, from <https://group.springernature.com/gp/group/media/press-releases/springer-nature-releases-annual-progress-report/23572562>
22. *Annual Report 2022. (2022). RELX*. <https://www.relx.com/~media/Files/R/RELX-Group/documents/reports/annual-reports/relx-2022-annual-report.pdf>
23. Journal Checker Tool: Check which publishing options are supported by your funder's OA policy | List of publishers/journals that provide price and service data to the Journal Comparison Service. (n.d.). Retrieved March 4, 2023, from <https://journalcheckertool.org/jcs/>
24. Fraser, N., Momeni, F., Mayr, P. & Peters, I. (2020). The relationship between bioRxiv preprints, citations and altmetrics. *Quantitative Science Studies*, 1(2): 618–638. doi: [https://doi.org/10.1162/qss\\_a\\_00043](https://doi.org/10.1162/qss_a_00043)

# REFERENCES

25. Van Noorden, R. (2013). Open access: The true cost of science publishing. *Nature* 495, 426–429. <https://doi.org/10.1038/495426a>
26. Newton, M. P. & Cunningham, E. T. & O'Connell, K. (2014). Counting the Cost: A Report on APC-Supported Open Access Publishing in a Research Library. *Journal of Librarianship and Scholarly Communication* 2(4), eP1184. doi: <https://doi.org/10.7710/2162-3309.1184>
27. Solomon, D. and Björk, B. (2016). Article processing charges for open access publication—the situation for research intensive universities in the USA and Canada. *PeerJ* 4, e2264; doi: 10.7717/peerj.2264
28. Olejniczak, A.J., & Wilson, M.J. (2020). Who's writing open access (OA) articles? Characteristics of OA authors at Ph.D.-granting institutions in the United States. *Quantitative Science Studies*, 1(4): 1429–1450. doi: [https://doi.org/10.1162/qss\\_a\\_00091/](https://doi.org/10.1162/qss_a_00091/)
29. Wellcome Trust. Wellcome and COAF open-access spend 2018/19. (2020). <https://wellcome.org/grant-funding/wellcome-and-coaf-open-access-spend-201819>
30. Beverungen, A., Böhm, S., & Land, C. (2012). The poverty of journal publishing. *Organization*, 19(6), 929–938. <https://doi.org/10.1177/1350508412448858>
31. Fecher, B. & Wagner, G. (2015). Flipping journals to Open: Rethinking publishing infrastructure in light of Lingua/Glossa case. *LSE Blog*. <https://blogs.lse.ac.uk/impactofsocialsciences/2015/12/03/seizing-the-moment-is-our-understanding-of-open-access-too-shortsighted/>
32. West, J.D., Bergstrom, T., & Bergstrom, C.T. (2014). Cost effectiveness of Open Access Publications. *Economic Inquiry*, 52(4), 1315-1321. doi:10.1111/ecin.12117

# Main Publishing Models of Open Access (OA)

