



**Researchers'
attitudes
towards
sharing code:
Findings from
a survey and
policy
implementation**

Lauren Cadwallader, Open Research Manager

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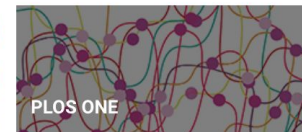
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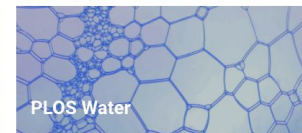
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- Started in 2005
- Published ~900 research articles in 2021
- Publishes work “that further[s] our understanding of living systems at all scales—from molecules and cells, to patient populations and ecosystems—through the application of computational methods.”

How much code sharing was already happening?

1

Anecdotally, many Academic Editors and peer reviewers, already expected code to be shared.

2

Independent analysis suggested 41% of authors already provide a link to shared code with their papers^[1].

3

Supported by Serghiou *et al.* (2021)^[2] data: 42% code sharing rate for PLOS CB in 2019, compared to 3.7% for all of PMC.

4

43% of competitor journals (n=40) had a mandatory code sharing policy

[1] Boudreau *et al.* (2021) DOI: [10.1371/journal.pcbi.1008725](https://doi.org/10.1371/journal.pcbi.1008725)

[2] Serghiou S *et al.* (2021) DOI: [10.1371/journal.pbio.3001107](https://doi.org/10.1371/journal.pbio.3001107)

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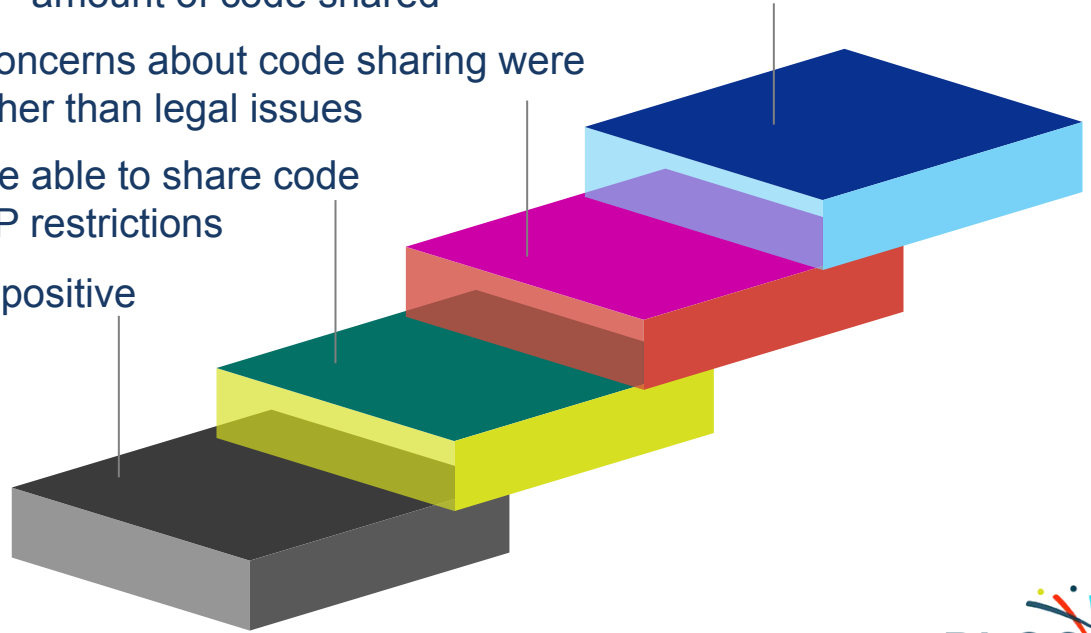
Research hypotheses

Mandating code sharing would increase the amount of code shared

Majority of concerns about code sharing were practical, rather than legal issues

Few papers would not be able to share code publicly due to legal or IP restrictions

Policy would have no difference or a positive impact on likelihood to submit

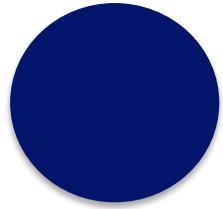




Online survey with PLOS
Research Team



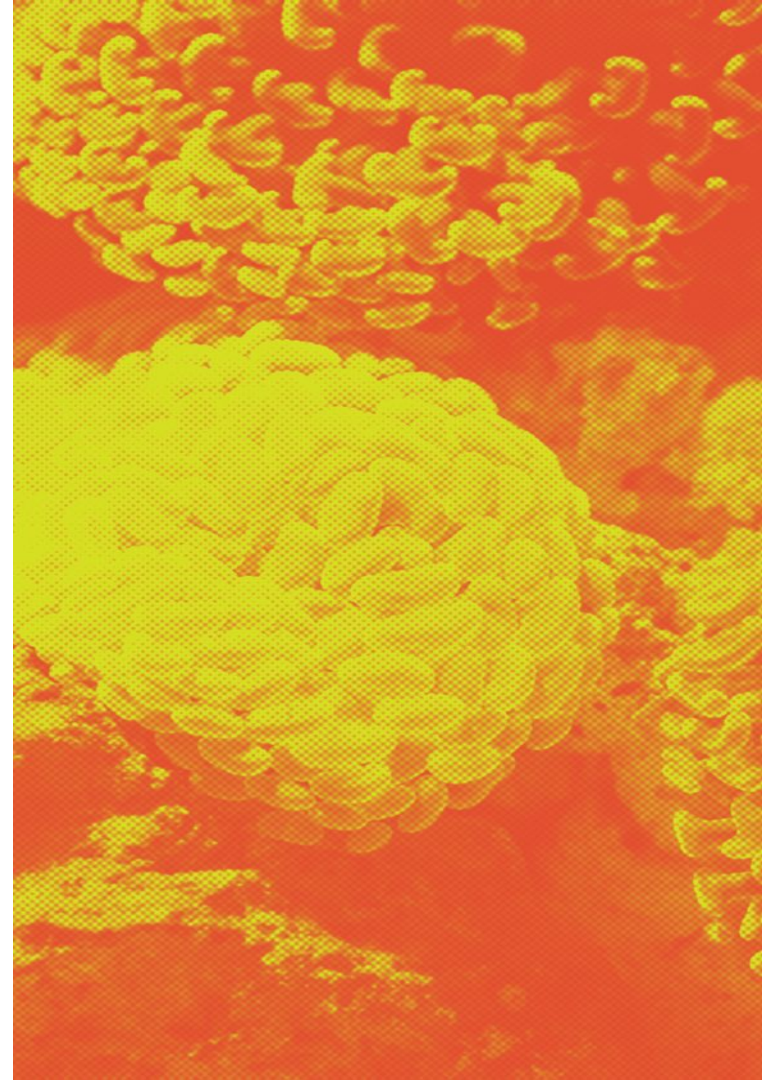
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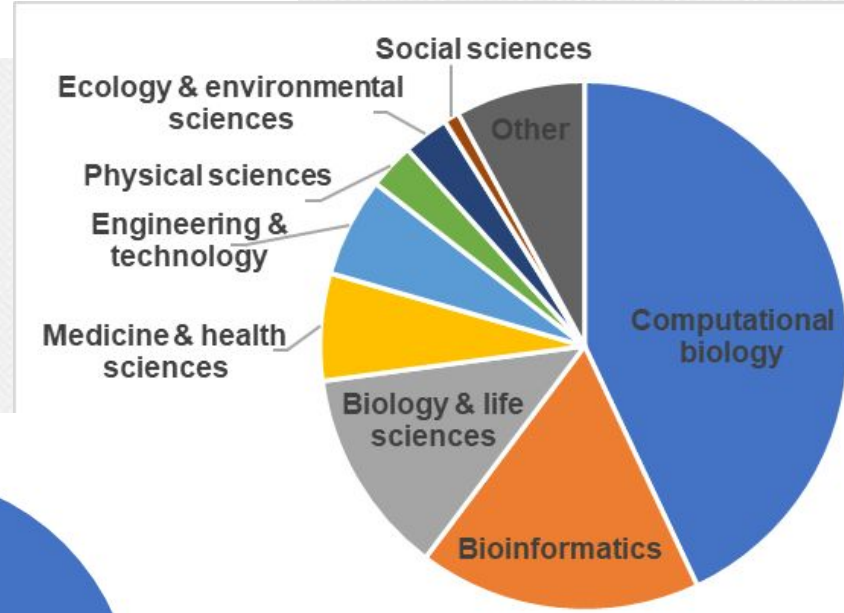
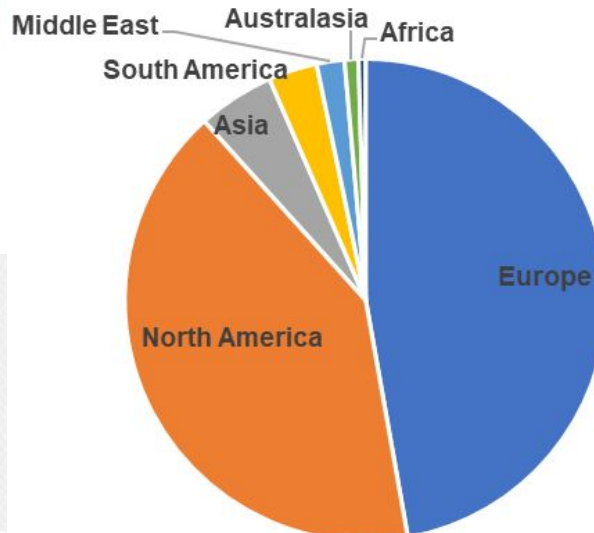
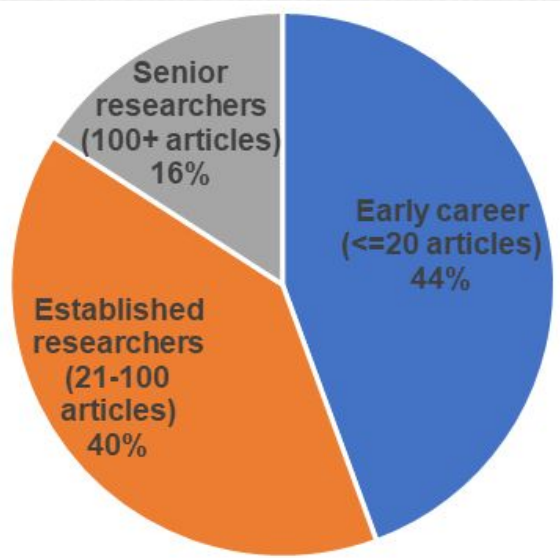
Open for 2 weeks



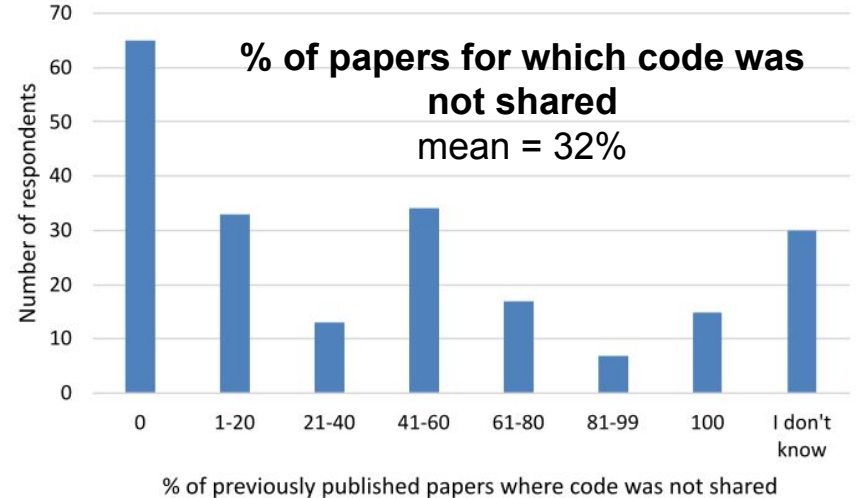
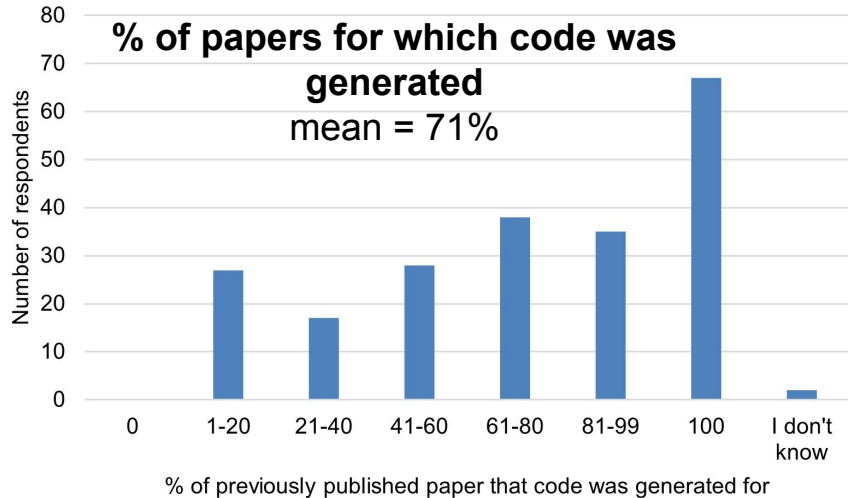
No incentive to complete the
survey



Demographics (n=214)



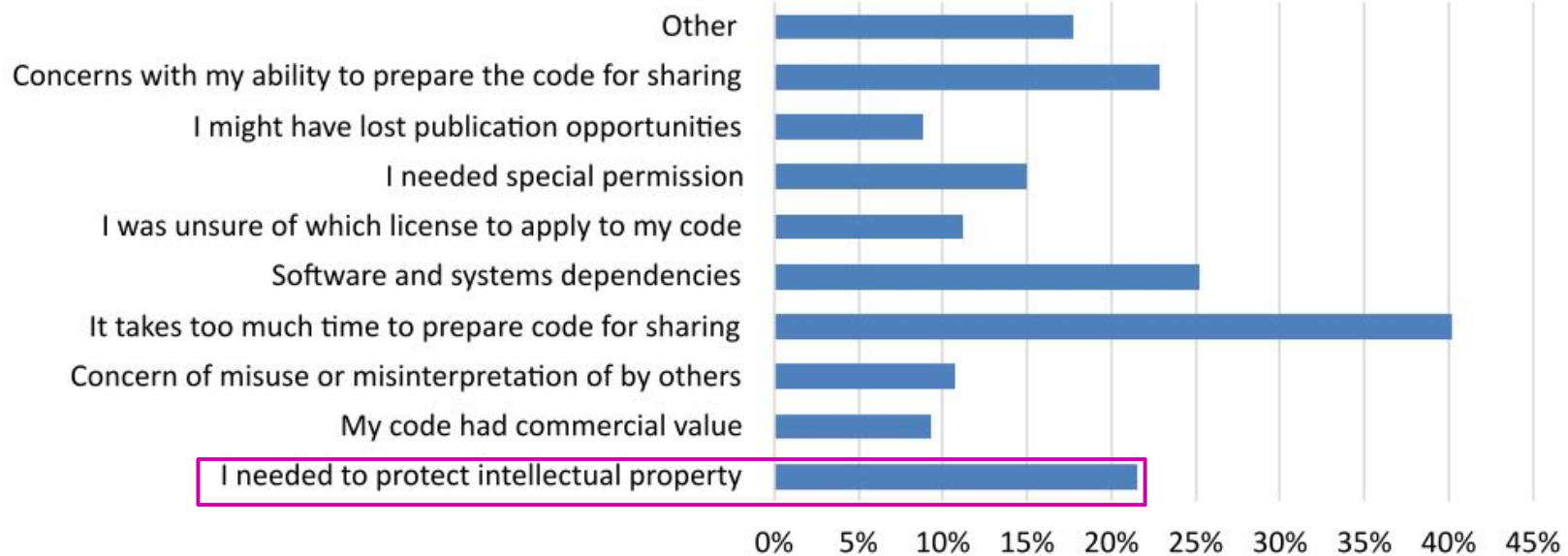
How much code is generated and shared?



Hypothesis 1: Mandating code sharing would increase the amount of code shared

Why isn't code shared?

Why have you not shared your code publicly in the past? [select all that apply]



Hypothesis 2: Majority of concerns about code sharing were practical, rather than legal issues .

Hypothesis 3: Few papers would not be able to share code publicly due to legal or IP restrictions

Likelihood to submit

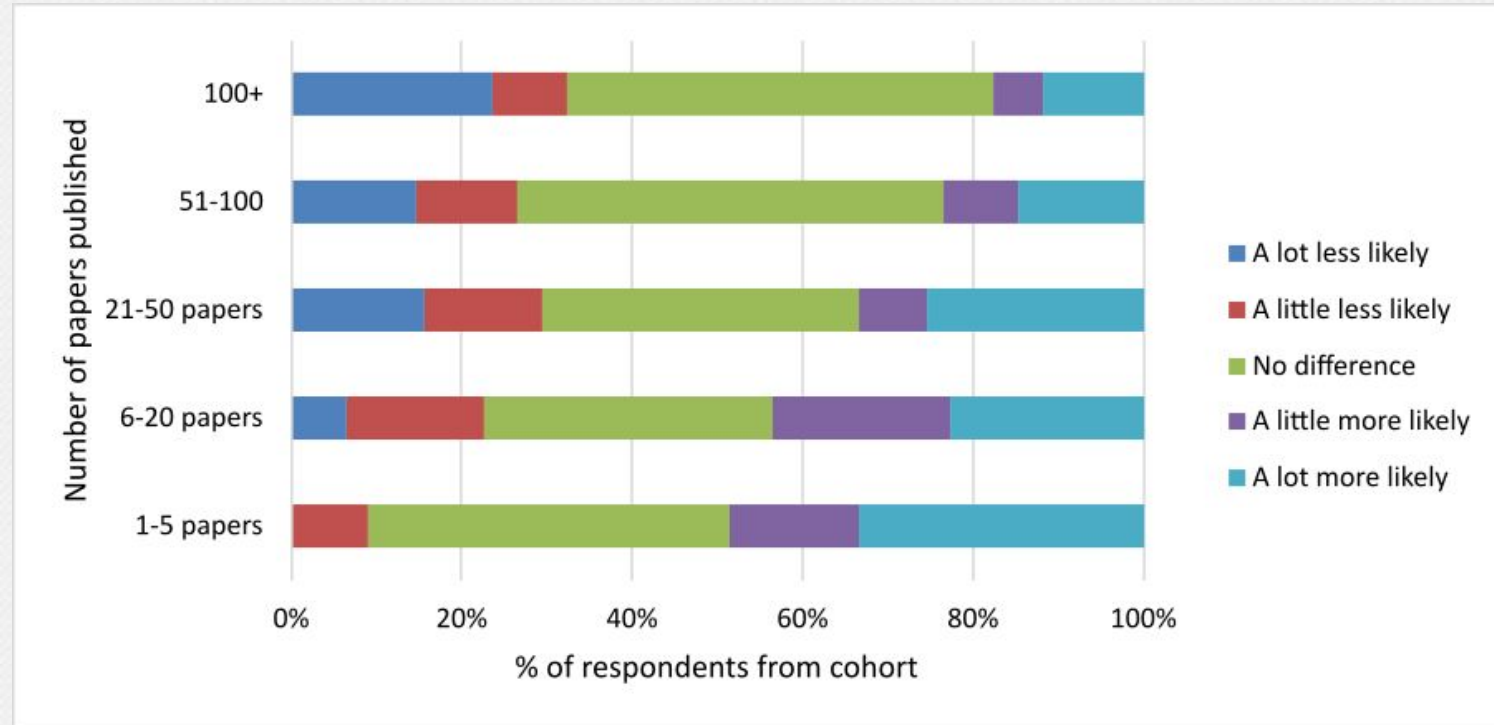
Segment of respondents	Mean likelihood to submit if journal brings in policy (max = +2; min = -2)	Standard deviation	Confidence interval (95%)
All respondents	0.21	1.25	0.04, 0.37
US based respondents	0.33	1.31	0.03, 0.62
By discipline:			
Computational Biology	0.22	1.27	-0.04, 0.48
Bioinformatics	0.27	1.26	-0.15, 0.69
Biology and Life Sciences	0.56	1.28	0.05, 1.06
Medicine and Health Sciences	-0.14	0.53	-0.24, -0.04

73% of respondents

7% of respondents

Hypothesis 4: Policy would have no difference or a positive impact on likelihood to submit

Likelihood to submit



Hypothesis 4: Policy would have no difference or a positive impact on likelihood to submit

Important findings

- 1 Code sharing could potentially increase by 25%
- 2 IP concerns need to be addressed
- 3 Concerns of medicine and health researchers need to be addressed
- 4 Need to support researchers around technology/cultural barriers

PLOS Computational Biology policy

- Code that supports the findings presented in the article must be shared
- Location of the code must be specified in the Data Availability Statement
- Exemptions will be made for legal and ethical reasons
- Applies to all manuscript submitted from 30 March 2021
- Code can remain private until publication
- Peer reviewers are encouraged but not required to look at the code
- Best practices for code sharing are encouraged

Preliminary results

- Partnered with DataSeer to use AI to analyse code generated and shared



DataSeer

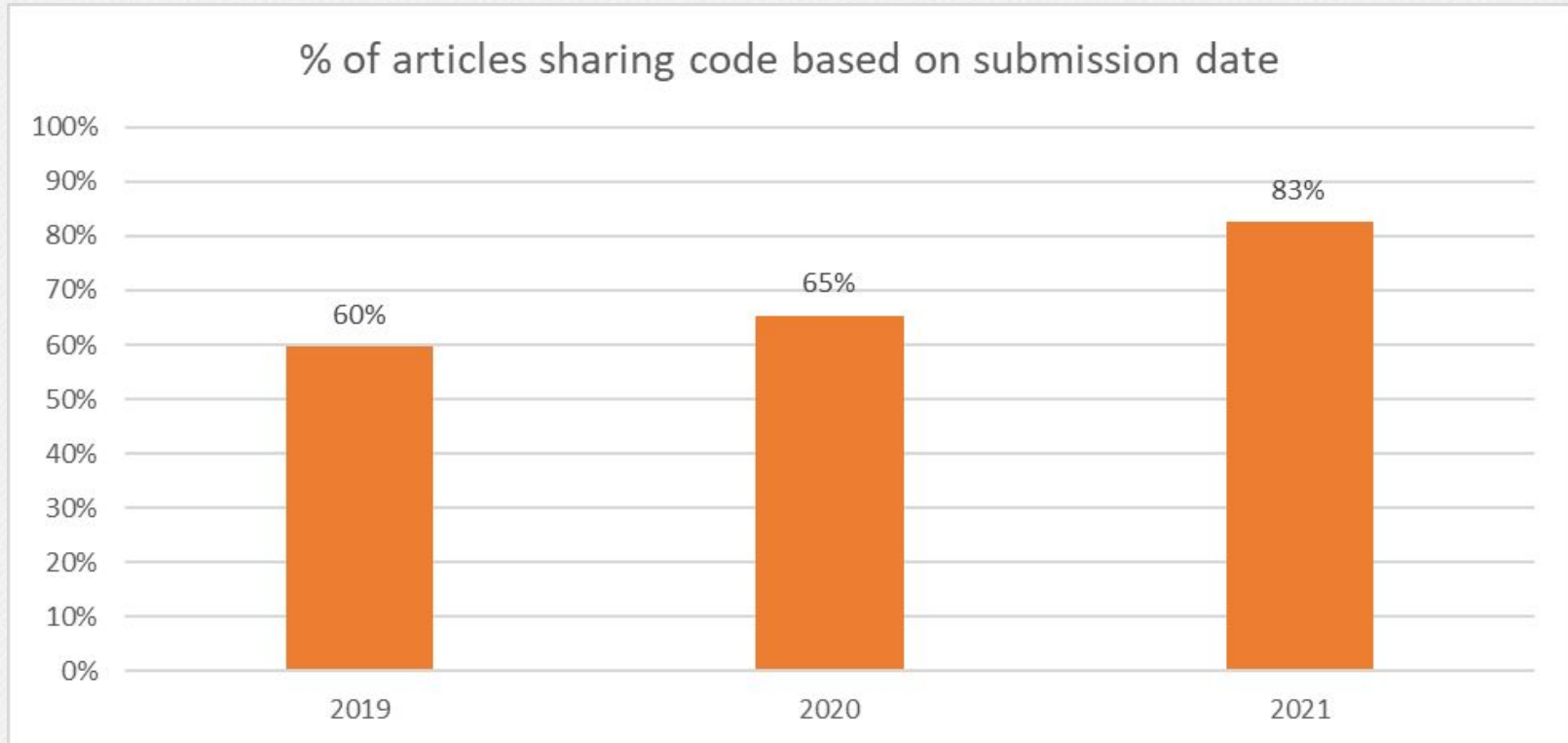
<https://dataseer.ai/>

- Methodology is different to the analysis we based our initial work on
 - original analysis by NeuroLibre = 41% of articles share code^[1]
 - DataSeer analysis = 53% of articles share code in 2019

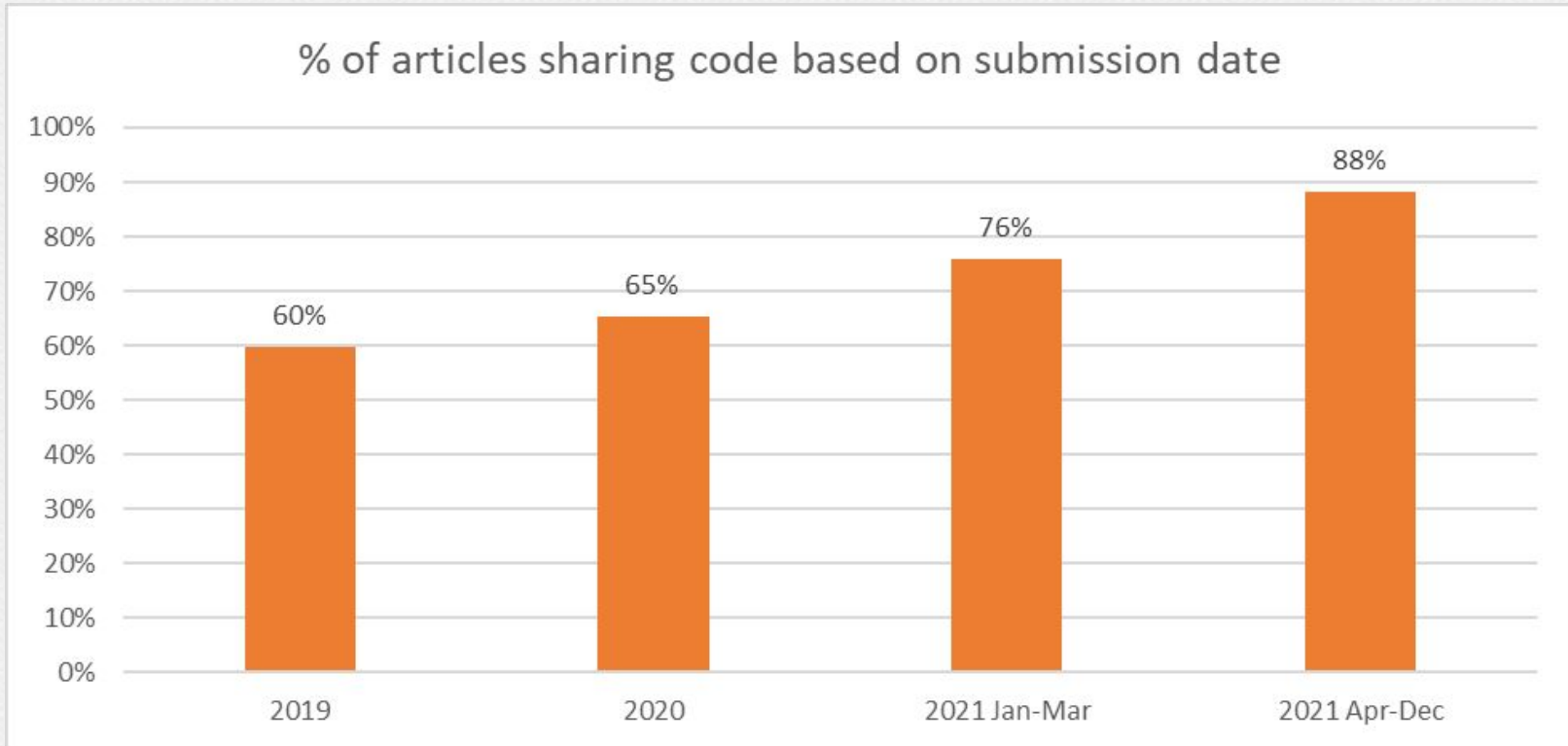


[1] Boudreau *et al.* (2021) DOI: [10.1371/journal.pcbi.1008725](https://doi.org/10.1371/journal.pcbi.1008725)

Has code sharing increased?



Has code sharing increased?



Other observations

- No evidence of policy changing:
 - the sub-disciplines submitting to the journal
 - the geographic demographic of corresponding authors
- No reported issues from Editorial staff (exemption requests, queries)
- Preliminary results agree with the findings from the survey
- Policy has been well received by the community

Preprint: <https://osf.io/f73a6/>

Dataset:

<https://doi.org/10.6084/m9.figshare.13366025>

PLoS Computational Biology policy:

<https://journals.plos.org/ploscompbiol/s/code-availability>



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lcadwallader@plos.org

**Thank you
for listening**