

“[Plan S and Open Access \(OA\) in Quebec: What does the revised FRQ OA policy mean for researchers](#)” by Rachel Harris, Jessica Lange, and Pierre Lasou is the accepted manuscript or post-print 2023 version of an article for publication in the journal *Evidence Based Library & Information Practice*. Our accepted manuscript or post-print is licenced under a [CC BY 4.0](#) licence.

# Plan S and Open Access (OA) in Quebec: What does the revised FRQ OA policy mean for researchers?

## Abstract

**Objective:** Our article examines the effects of Quebec’s provincial funding agency (FRQ)’s revised 2022 OA policy on researchers. Following FRQ’s participation as a cOAlition S funding agency, which involves endorsing Plan S principles, we provide an overview of the OA options for researchers. We examine these options under the FRQ 2019 and FRQ 2022 policy years, account for the effect of transformative agreements (TA) on OA publishing options, as well as the financial implications for researchers under the revised policy.

**Methods:** The researchers extracted a list of FRQ-funded publications from years 2020 to 2022 using the DOI registration agency Crossref. Using this sample set, we, the researchers, quantitatively analyzed OA options under the previous policy and the revised one, comparing the two. To determine the effect of transformative agreements (TAs)s, we reviewed current agreements offered through Canada’s national licensing agency Canadian Research Knowledge Network (CRKN).

**Results:** We found that the self-archiving method for open access (OA) is reduced under the revised 2022 policy. Our results lead us to anticipate the pressure felt by authors who will be required to pay article processing charges (APCs) to meet grant requirements.

**Conclusion:** The current publishing patterns of FRQ-funded researchers are primarily concentrated in hybrid journals not covered by transformative agreements. As such, researchers will face additional financial costs should these publishing patterns continue. Concerted efforts among all stakeholders (researchers, universities, libraries, and funders) are needed to sustainably transition to immediate OA.

## Introduction

The Fonds de recherche du Québec (FRQ) is among a growing number of funding agencies worldwide with open access (OA) policies aimed at increasing equitable access to research. In 2019, the FRQ launched its first OA policy, which required grant-funded, peer-reviewed articles to be open within twelve months; then, in 2021, Quebec’s FRQ joined cOAlition S, an international consortium of funding agencies, with the launch of the revised OA policy in summer 2022. By aligning its OA policy with Plan S, the FRQ has become part of an initiative designed to “shock” scholarly publishing agents into making publicly funded research immediately available. The shift marks a radical adjustment to FRQ’s OA requirements for researchers. Compared to the 2019 policy, the new policy that launched in 2022 has three main changes: articles must be made OA immediately (rather than within a

twelve-month timeframe), they must bear one of the two more open Creative Commons licences (CC-BY, CC-BY-ND, or equivalent), and hybrid OA articles fees are no longer grant-eligible expenses except under certain conditions.

This paper analyzes recent article publishing practices from FRQ grant recipients in the years 2020, 2021, and 2022 in light of the two policies. Specifically, we look at how grant-recipient publishing patterns mapped onto the options for OA compliance with the former and revised policies, and we identified the gap between the publishing patterns and the current policy. While factoring in the effect of transformative agreements on OA options, our findings reveal that publishing options within the revised 2022 policy have been greatly reduced, impacting the success of the revised policy. For the FRQ 2022 policy to successfully align with Plan S principles of rapidly increasing access to grant-funded publications, changes to current publishing practices and joint actions among researchers, institutions, publishers, and granting agencies will be necessary.

## Literature Review

### Background: OA Publishing Landscape

The OA movement persists within an academic publishing landscape that is primarily concentrated in the hands of five academic publishers. Elsevier, Springer Nature, Wiley, Taylor & Francis and the American Chemical Society collectively publish 50% of academic outputs (Johnson, 2019; Larivière et al., 2015; Smits & Pells, 2022, pp. 11–13). The success of these publishers has long rested upon uncompensated academic labour in the peer-review process (Smits & Pells, 2022), the importance that researchers give to closed-access, high-impact factor journals for perceived prestige and tenure metrics (Smits & Pells, 2022; Vézina, 2006), and the undisclosed sums in the millions that libraries have long paid for closed-access subscriptions, with costs increasing beyond library budgets and inflation (Khoo, 2019, p. 13). Although the pay-walled subscription model is changing within the OA movement, dominant publishers have found new ways to adapt and maintain profitability, such as with article processing charges and Plan S compliant licences (Frantsvag & Strømme, 2019).

Demand for access to publicly funded research is at the centre of the global OA movement that gained momentum throughout the 1990s onwards and in Canada in the 2000s (Coughlan & Swartz, 2020; Greyson et al., 2010). Notable Canadian developments include the Canadian Institute of Health Research (CIHR)'s OA policy in 2008, followed by the Tri-Agency Open Access Policy Statement on Publications in 2015, which will be renewed in 2025. Situated within these Canadian developments, the FRQ's OA policy, launched in 2019, was renewed in 2022 to align with Plan S. Alongside grant agency initiatives, several initiatives support OA publishing in Canada, including the Public Knowledge Project (founded in 1998 at Simon Fraser University), known for its development of the open-source publishing software Open Journal Systems (OJS), as well as the joint-initiative Coalition Publica between PKP, and the non-profit publishing platform Érudit in Quebec.

Launched in 2018, Plan S is a fast-expanding OA initiative that grew out of Europe, weaving into the Canadian branch of the OA movement's timeline with FRQ's signature in 2021 and new OA policy in 2022. As support and desire for OA increased nationally and especially globally, Plan S is a response to the growing frustration that the OA movement had not fully achieved its intended aims, as a significant amount of research remains closed (Smits & Pells, 2022). To meet its global vision of rapidly increasing timely and ethical access to research, Plan S acknowledges twelve principles (cOAlition S, 2023b) supported by the implementation of three mechanisms for authors to make their work open (cOAlition S, 2023a).

Plan S's three mechanisms are: 1) publish in a fully OA journal, which may include APCs; 2) self-archive either the final published version or the author's accepted manuscript in a recognized OA repository or platform; 3) publish in a subscription journal for which a "transformative arrangement" exists, also known as hybrid journals (this option is considered a 'transitional step' in the move to OA) (cOAlition S, 2023a). Low-to-minimal-cost options for authors do exist, and they include self-archiving and APC waivers from transformative agreements. Authors might also publish in an open access journal without APCs, sometimes referred to as diamond open access.

For clarity, transformative journals in publishing refers to subscription journals committed to transitioning fully to OA. cOAlition S defines transformative journals as making their annual commitment to transition towards OA explicit and as having policies to avoid receiving double payments from both OA fees and subscription fees (cOAlition S, 2020).

Transformative journals are unlike hybrid journals which have not committed to fully transitioning from the subscription to full OA model. Meanwhile, transformative agreements refer to the agreements made by individual libraries or institutions and national and regional consortia with publishers, whereby subscription costs are repurposed to pay the open access costs for articles by an institution's researchers (ESAC, n.d.). It should be noted that these agreements also usually cover the costs to maintain access to existing subscription content.

Although Plan S supports multiple routes towards OA (cOAlition S, 2023b), the requirements of immediate OA with a CC-BY licence, effectively limit the self-archiving approach. The principle of immediate OA with a CC-BY licence, one of the most open Creative Commons licences, is contrary to the typical embargo periods and licensing set in publishers' self-archiving policies. Plan S has attempted to counter this issue by developing the Rights Retention Strategy (RRS) in the summer of 2022. The RRS addresses the copyright challenges faced by authors by encouraging cOAlitionS-funded researchers to submit articles with the understanding that a CC-BY licence be part of the accepted manuscript in advance of acceptance (cOAlition S, 2023c; Eglen, 2021; Smits & Pells, 2022, pp. 139–144). We will not, however, delve into the RRS in depth in this article because the FRQ has not employed this strategy as a part of its Plan S deployment.

## Granting Agency Compliance Studies

Conducting the first large-scale analysis of funding agency compliance between 2009 and 2017, Larivière and Sugimoto's (2018) study is based on the fifty funders worldwide that had OA mandates before Plan S, which includes National Health Institute (NIH), Wellcome Trust alongside Canada's NSERC, SSHRC, and CIHR. They found that mandates requiring the immediate deposit of articles tended to be in a greater state of compliance, regardless of whether access co-occurs with publication. Notably, the impact of infrastructural support, such as direct feeds to PubMed Central and certain fields in health research, positively impacted compliance. Compliance levels varied greatly within Canada's Tri-Agency; for example, 55% of CIHR-funded research had an open copy available compared to 21% of SSHRC-funded papers (Larivière & Sugimoto, 2018, p. 484). Meanwhile, granting agencies that monitor and provide sanctions and repository support have increased overall levels of compliance compared to the Tri-Agency's encouragement approach (Debat & Babini, 2020; Huang et al., 2020; Larivière & Sugimoto, 2018).

As OA mandates for funding agencies have been rapidly changing since the launch of Plan S in 2018, several studies have examined the effects of Plan S on researchers' publishing options. In Poland's national context, Korytkowski and Kulczcki (2021) produced an anticipatory study examining the gap between Plan S requirements implemented with the National Science Centre (NCN) Poland's OA policy and authors' publishing practices. They found that nearly 30% of the articles funded by the NCN between 2014-2019 would not meet Plan S requirements. Of the three possible OA routes to meet Plan S requirements (1) OA journals, 2) self-archiving, or 3) publishing via transformative journals or agreements as per their national context), publishing via their transformative route was the mechanism by which most papers would meet OA compliance. As cOAlition S will stop support of transformative journals and transformative agreements after 2024, the authors noted the time-limited application of this option. Notably, transformative agreements are limited in that they may perpetuate the current high-cost system of inequities between large publishers and society journals, and between researchers who benefit and others who do not (Borrego et al., 2021; cOAlition S, 2020; Farley et al., 2021).

In addition to the Polish study, recent compliance studies show that Plan S adoption has consequences on researchers publishing options with slight differences depending on the national context. Looking at the potential effects of Plan S using Web of Science data over four years in Spain's national context, Martínez-Galindo et al. (2019) determined that articles achieved OA with approximately one-third via fully OA journals, 11% via hybrid journals and over 50% via OA repositories (Martinez-Galindo et al., 2019, p. 3). Similarly, using Web of Science and Scopus data, Pinhasi et al. (2020) analyzed the publications of Austrian researchers from the University of Vienna. For Austrian research output in 2018, nearly 75% of publications were either in OA journals or covered by a transformative agreement (Pinhasi et al., 2020, p. 4). While all three studies note that the lack of transparency around costly APCs and the management of transformative agreements as challenges in implementing Plan S, several contextual details are worth noting. Although self-archiving was high in Spain,

their analysis only reviewed if an article appeared in a repository; it did not factor in the requirements of an open licence nor the immediate availability requirement. Given the different national contexts and study design, both the Spanish and Austrian study makes for less of a comparison point with this Quebec study.

To our knowledge, there has not been a North American study of Plan S' implications for researchers. As Quebec is the first North American funding agency to join Plan S, our analysis will provide Canadian context for the effects of this movement. Our analysis is important as the OA landscape in Canada varies greatly from that of Europe, particularly regarding transformative agreements negotiated regionally by consortia.

## Aims

To understand the effects of these principles within the revised policy on FRQ-funded researchers and their publishing options, we sought to answer three research questions:

RQ1: What are the OA options (i.e., OA journals, hybrid journals, self-archiving) for researchers under the FRQ 2019 versus the FRQ 2022 policy?

RQ2: What is the effect of transformative agreements on OA publishing options for researchers under the FRQ 2022 policy?

RQ3: What are the financial implications for researchers under the FRQ's revised OA policy?

## Methodology

### Sample Set

Publishing patterns can help reveal how the revised FRQ policy affects researchers. We used as a sample set existing journal publications funded by the FRQ's three agencies (Santé; Nature et technologies; Société et culture) from 2020, 2021, and 2022. This data enables comparisons between the OA options for researchers under the 2019 and 2022 policies. We limited the sample to the last three years because recent publications have a likelihood of anticipating the future publishing choices of FRQ-funded researchers. The comparative approach identifies potential inconsistencies between researchers' current publishing patterns and what is expected under the revised FRQ policy.

To compile a sample list of publications funded by the FRQ, we utilized Crossref's public rest API Funder Endpoints (<https://api.crossref.org/funders/>; documentation: <https://api.crossref.org/swagger-ui/index.html>). Crossref is the primary DOI registration agency for scholarly publications, which includes over 140 million metadata records (Crossref, 2023). As such, it is a major data source of scholarly publication data, enabling us to extract journal-article data on February 17, 2023.

The search parameters for extracting data from Crossref were:

- Publication year=2020 OR 2021 OR 2022
- FRQ's three agencies, funder=
  - Fonds de recherche du Québec – Santé (10.13039/501100000156)
  - Fonds de recherche du Québec – Nature et technologies (10.13039/501100003151)
  - Fonds de recherche du Québec -Société et Culture (10.13039/100008240)

After removing duplicates from our 4797 results and limiting the remaining to journal-articles, we had a set of 4590 articles, which we used to understand researchers' OA options. The full dataset is publicly available (Lange & Lasou, 2023).

### Additional variables

For both policy years, we needed to collect four additional pieces of information for each article: the journal's OA status, embargo periods for self-archiving, licensing permissions for self-archived articles, and the article's journal status as transformative or not. Table 1 identifies each of these points, and the data sources used to obtain information. We did not gather embargo period nor licensing permissions for OA journals since this information would be redundant.

Table 1: Data sources for OA options

Data variable	FRQ policy (years applicable)	Data source
Journal's open access status	2019, 2022	<a href="#">Unpaywall Simple query tool</a>
Embargo periods for self-archiving (subscription journals only)	2019, 2022	Publisher websites
Licensing permissions for self-archived papers (subscription journals only)	2022	<a href="#">Plan S approved self-archiving journals</a> (consulted February 15, 2023) + publisher websites
Journal's status as transformative	2022	<a href="#">Plan S' list of transformative journals</a> (consulted February 15, 2023)

We employed a similar methodology to Laasko (2014), reviewing publishers' websites directly and coding their policies in a standard template. Appendix A offers a full list of publisher websites consulted for the embargo period and self-archiving data points. We

assumed that journal policies and OA status stayed the same between 2019 and now and that any OA journals found in the dataset permit publishing under one of the approved CC licences. Notably, searching in the Directory of Open Access Journals (DOAJ) for the licensing status of the OA journals from the five major publishers, Wiley, Springer, American Chemical Society, Taylor & Francis, Elsevier, reveals that nearly 98% permit a CC BY or CC BY-ND licence (DOAJ, 2023.)

### Comparing policy years

After compiling the necessary data, we compared the OA options under the 2019 and 2022 policies. In the dataset under the 2019 policy, we confirmed the OA status of each individual journal title. If the journal was not OA, we then determined whether the publisher permits self-archiving of either the accepted manuscript or publisher PDF in an open repository within twelve months of publication. Similarly, in the dataset under the 2022 policy, we confirmed whether each individual journal title was OA, as well as the permissions to archive an accepted manuscript or publisher PDF in an open repository immediately with either a CC BY or CC BY-ND. Since the FRQ has not made provisions for Plan S' RRS, our analysis assumes that this is not a possibility. Finally, for the 2022 policy, we additionally analyzed if the journal was transformative or not because, under FRQ's implementation of Plan S, APCs are eligible for FRQ grant expenses only if the journal is transformative or OA.

### Transformative agreements

To determine the effects of transformative agreements on OA publishing options for researchers under the FRQ 2022 policy, we reviewed the CRKN list of transformative agreements (CRKN, 2023) and included in our analysis any agreements for which at least one Quebec university had signed and which covered 100% of the APCs. We limited our list to agreements that cover 100% of these OA costs because they align with how CRKN follows the ESAC definition of transformative agreements (ESAC, n.d; CRKN, 2022). For the transformative agreements in place for 2021-2023, for example, APCs are entirely "waived for all hybrid journal articles published by CRKN-affiliated corresponding authors" (CRKN, 2022). For these agreements, which included six publishers: Sage, Institute of Physics (IOP), Wiley, Canadian Science Publishing, PloS Community Action Publishing, and Cambridge, we assumed that the articles in our sample set could have corresponding authors at eligible Canadian institutions. We reviewed the terms of each agreement and accounted for if the agreement covered only hybrid journals (i.e., Wiley, IOP, Sage, Canadian Science Publishing) or included gold journals as well (i.e., Cambridge, *PLOS Biology*, *PLOS Medicine*).

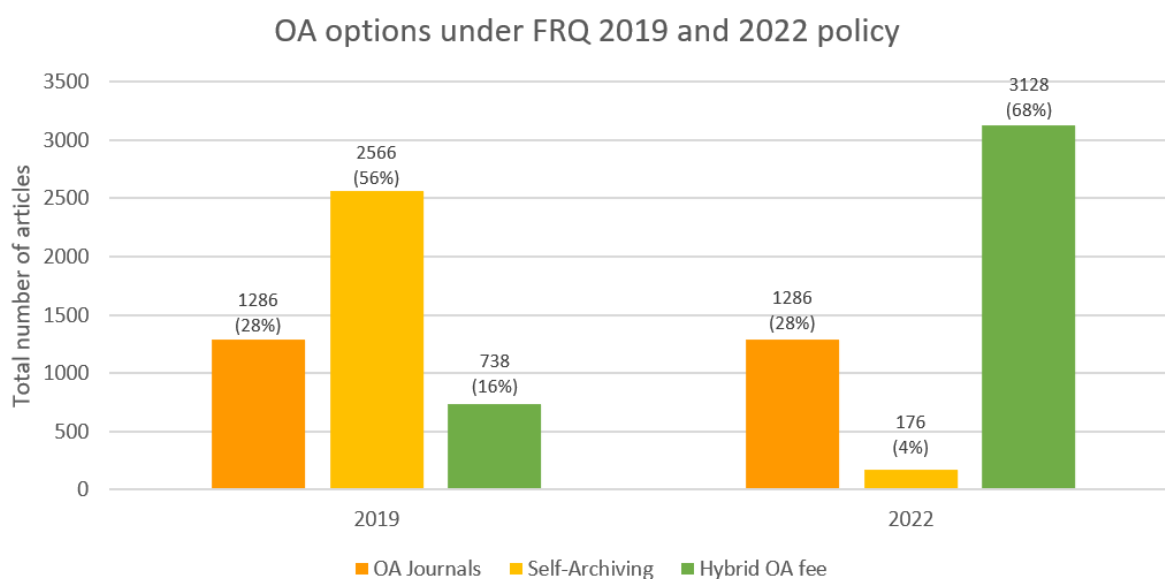


## Results

### RQ1: Available publishing options for researchers under the FRQ 2019 and FRQ 2022 policy

As noted previously, under the FRQ's 2019 OA policy, articles must be available within twelve months following their publication, while under the 2022 policy, articles must be open immediately and under select open licences. In comparing the OA options for the articles in our dataset 100% (n=4590) under the 2019 and 2022 policies, 28% (n=1286) of articles were published in OA journals for both years. The primary difference between policy years is the greatly reduced option to employ self-archiving as a means to make an article OA. Under the 2019 policy, more than half, or 56% (n=2566), of the articles could use the self-archiving option, whereas, under the 2022 policy, that number is reduced to less than 4% (n=176).

Figure 1: Overview of OA options for the 4590 articles under 2019 and 2022 policies



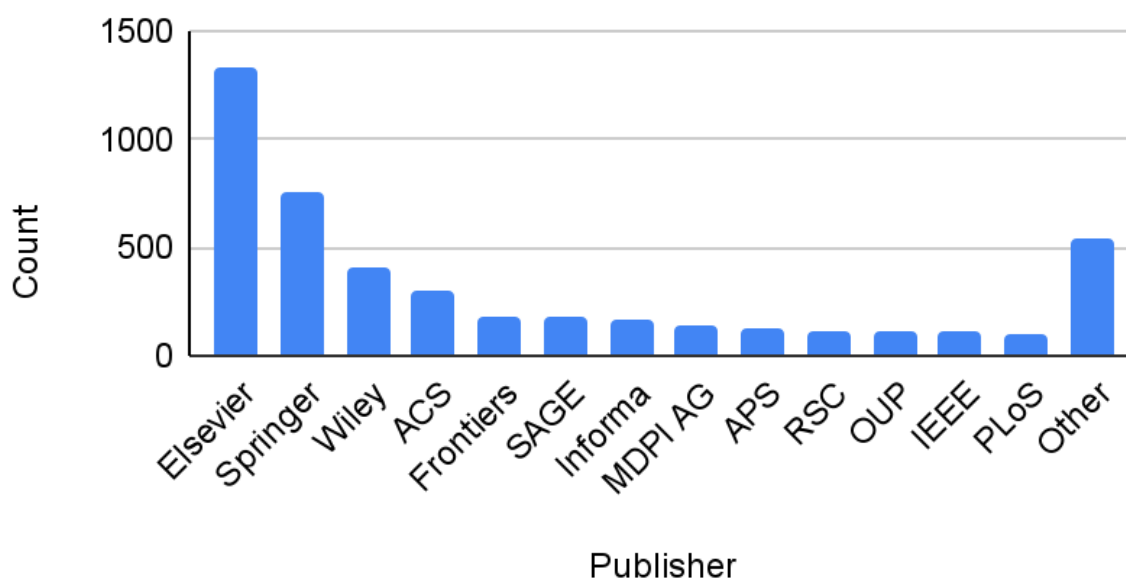
### RQ2: Effect of transformative agreements on publishing options for researchers

Canadian libraries have negotiated several transformative agreements that benefit researchers at participating institutions. Figure 2 illustrates the number of publishers represented in the full sample of 4590 articles.. Here we recall that some publishers, such as Wiley, PLoS, Sage, have transformative agreements with CRKN, and that only articles in these publishers' fully OA journals can benefit from the APC waiver.

In our sample set, 12 articles published in fully OA journals could benefit from these CRKN agreements (less than 1% of the articles in OA journals) (Lange & Lasou, 2023). For hybrid journals, 551 articles (17%) published in hybrid journals under the 2022 analysis, could potentially benefit from these agreements.

Figure 2 Count of articles by publisher in full sample set

## Count of publishers by number of articles



RQ3: What are the financial implications for researchers under the FRQ's revised OA policy?

The revised OA policy has financial implications for researchers if they intend to meet its requirements. For the 2022 policy year, the majority of authors choose the hybrid option with subscription journal publications 72% (n=3304); and only a minority of which permit self-archiving under the necessary conditions (n=176). Though FRQ is not prohibiting researchers from publishing in hybrid journals, unless the journal is transformative (n=538) or covered under a transformative agreement (n=551), any OA fees will be the researchers' responsibility. These out-of-pocket fees would apply to 44% (n=2039) of the articles in our dataset, marking close to a threefold increase from the hybrid journal article option under the 2019 policy which applied to 16% (n=718). As such, should researchers continue to publish the same venues, they will face the additional financial burden of hybrid OA fees in order to be compliant.

## Discussion

### Implications for Researchers

Our sample clearly shows that dominant commercial publishers are still the primary places where researchers are publishing (see RQ2 Figure 2). In other words, researchers are continuing to publish in the same non-OA journal venues as previously discussed (Vézina, 2006). Recalling figure 2, not surprisingly, Elsevier, Springer, Wiley, and the American Chemical Society (ACS) were among the top four publishers. Although several Quebec universities have signed the Declaration on Research Assessment (DORA), a deep cultural shift is needed to overcome decades of entrenched publication patterns and beliefs. These patterns are deeply rooted in institutional pressures in assessing hiring and the tenure and promotion process (Korytkowski & Kulczycki, 2021; Smits & Pells, 2022; Vézina, 2006).

If these publishing patterns continue, researchers may face financial implications under the new 2022 FRQ OA policy. Nearly half of authors with FRQ grants will need to pay out of pocket to cover hybrid OA journal fees to meet OA grant requirements. Transformative agreements could have a small mitigating effect but their complexities require systematic institutional support (Borrego et al., 2021; CKRN, 2020; cOAlition S, 2020; Farley et al., 2021). We would add that support includes increasing researchers' awareness of these agreements and any changes resulting from continual negotiations between publishers, libraries, and consortia. While Plan S has also indicated the end of its support for transformative agreements, the FRQ has not yet declared whether it will follow suit. Limitations around the low-to-no-cost self-archiving option and the growing number of journals charging costly OA fees can impact the researcher, especially those who are early in their career.

The affordability of the new OA policy for graduate students offers a case in point. As the FRQ's requirements apply to student grants as well, a livability concern quickly emerges: the FRQ master's training scholarships are \$17 500/year, while many OA fees are between \$2000-4000 and can be as high as \$10,000. For a single article, this would represent a significant proportion of the scholarship (11-22%) typically used for living expenses during research. Canadian graduate students already face significant financial concerns, and the new OA requirements will push students to balance career advancement in choosing the "right" journal against significant financial constraints (Laframboise et al., 2023).

If researchers are to comply with Plan S, those without the funds to cover OA fees may be disappointed. Their library might not have a discount with a preferred publisher or might decide no longer to pursue transformative agreements. Should the FRQ move in Plan S's recently announced direction that it will no longer support OA fees for transformative journals (cOAlition S, 2023d), the monetary effects will increase. As the economic burden on researchers increases, so will the need for help identifying journals which permit compliant self-archiving or for which libraries have transformative agreements. Without viable and

affordable publishing options and adequate financial support, if researchers are required to pay, it cannot be taken for granted that authors will comply with Plan S (Scaffidi et al., 2021).

### Implications for granting agencies

As the FRQ has implemented Plan S in a specific fashion, and the Canadian context for transformative agreements is much different from that of Europe, any direct comparison to other Plan S compliance studies must account for contextual differences. We are able to draw some similar patterns to Korytkowski and Kulczcki's (2021) study of the NCN in Poland. OA journal publishing occurs at similar rates with approximately a quarter of publications in both studies. Meanwhile, self-archiving is the least-likely route to be employed for OA compliance, and hybrid journals are the majority publication venues for authors in both studies. Their study, however, shows a compliance gap of 30% because hybrid journals are non-compliant in their context, which is irrelevant to Quebec under the FRQ's Plan S implementation. In Quebec, authors can publish in hybrid journals and be compliant, albeit with the caveat that they will forgo support for the APC as a grant-eligible expense. In our study, over 44% (n=2039) of researchers would be required to pay out-of-pocket fees to be compliant.

Several additional studies directly suggest that supporting repository infrastructure will be less costly than increasing funding support for APCs and meeting the vision of globally increasing access to research (Debat & Babini, 2020; Huang et al., 2020; Korytkowski & Kulczycki, 2021). As per Huang et al. (2020) finding, self-archiving rates increased during the implementation of the UK Research Excellence Framework, which mandated universities to increase mediated deposits in institutional repositories. Such a Quebec or Canada-wide research excellence award could complement the future implementation of a provincial RRS and SFU-type OA policy at the institutional level.

Whether the FRQ implements strategies to support self-archiving or not, it will be of interest for the FRQ to assess the feasibility of OA routes to compliance and to align with Plan S principles. Granting agencies are to not only monitor compliance and sanction non-compliant grantees (as per Plan S' principles), but also, they are to contribute to the coverage of OA fees so that "all researchers should be able to publish their work Open Access" (cOAlition S, 2023b). Monitoring the sustainability of fees for OA journals that charge APCs will also be important, as nearly a third of articles in our sample are published via this pathway.

Comparing compliance and sustainability differences between the major publishers and society journals with Plan S will be of equal importance (Frantsvåg & Strømme, 2019; Wise & Estelle, 2020). Evidence shows that OA fees are not price sensitive and are prone to hyperinflation (Khoo, 2019), a worrying trend if there are additional pressures to publish primarily in OA journals.

## Implications for libraries

To increase the feasibility of OA publishing options, Quebec libraries in Canada will likely see a campus push for additional transformative agreements and other OA-related discounts. A 2023 webinar series by CRKN identified a diminishing appetite for the renewal of these agreements in the long run due to sustainability concerns. Meanwhile, library collections budgets are not increasing and are unable to support new OA initiatives and infrastructure. Therefore, economically sustainable OA agreements with publishers, such as cost reductions with large commercial publishers and supporting community-led open initiatives, are to be prioritized (CRKN, 2023; CRKN & CARL, 2023). Libraries with publishing programs may continue promoting their efforts and journals, including the library and information studies journals in Canada that predominantly use a non-APC or diamond OA model (Betz, Nason, & Uhl, 2023).

Libraries will need to strategize and engage in campus conversations on their educational and economic role in supporting select OA initiatives. While continuing to support successful community-based OA initiatives such as Coalition Publica, SCOAP3 or Érudit Partnership for OA, libraries have yet to overturn the large commercial publishers and incentivize researchers to fundamentally change their publishing habits. They should anticipate that without increased funding for publishing costs from the FRQ, pressures from faculty members requesting help to pay for OA fees will invariably be redirected to libraries, where budgetary constraints will be increasingly felt. As financial concerns rise, greater information literacy and outreach efforts will be needed to address copyright comprehension (Kohn & Lange, 2018), the negotiation of publishing agreements (Byl, 2021), and the identification of low-to-no cost OA journals. Finally, should more granting agencies pursue similar requirements as FRQ without self-archiving strategies, the value of institutional repositories housed by libraries will continue to have a place on campus, but their role in assisting researchers in meeting grant requirements will be jeopardized.

## Future Research

Compliance studies, including increased attention to rights retention strategies, can further illustrate the success of OA policies over time. Future research might compare publishing patterns before and after the new FRQ OA policy to see if there are any changes in publishing practices. Continuing to analyze researcher response and awareness of OA publishing options, Plan S, copyright, and open licensing will be necessary as the landscape continues to shift rapidly. Changes in disciplinary practices towards OA publishing between grantees from FRQ: -Sante -Health, FRQNT: natural sciences, and FRQSC: social science and humanities either over time or compared with the Tri-Agency's equivalents within its current policy and its anticipated revised policy will be worth further study. Additionally, further studies investigating the uptake of diamond OA journals, which do not charge APCs, will be important as this is a model with great potential for supporting affordable open access of the published version.

However, outside the scope of our paper, in the Quebec context, further understanding and examining how French language publishing incentives intersect with OA policies will be of interest (Winter, 2022). The FRQ encourages researchers to publish their research in French (FRQ, n.d.), but how these intentions align with authors' publishing patterns remains to be seen. Past research has indicated that articles in French and those published by Quebec authors are more likely to be OA, albeit in the form of bronze' OA. In bronze, OA papers are free to read on a publisher's website without an open licence, which would not meet Plan S criteria (Paquet et al., 2022).

## Limitations

The dataset relied on the Crossref DOI registration service and Unpaywall. While the Crossref service is among the largest dataset for publications, we note that there are FRQ-funded publications which would not have been captured if a) the journal used a different DOI registration agency or b) the journal did not use a DOI registration at all. Additionally, publications may exist which were not captured by Crossref because either the author neglected to identify such funding or the metadata was not adequately captured by the journal to be distributed to Crossref. As many journals transition, some which are now fully OA may not have been when we ran our query using Unpaywall for the OA status of journals. Similarly, embargo lengths are also subject to change at any time.

Finally, our analysis was based on the assumption that all journals would permit authors publishing open access to select either a CC-BY or a CC-BY-ND licence. It is possible that some journals might only permit more restrictive licences or not permit the application of a Creative Commons licence at all.

## Conclusion

The FRQ's revised policy has the potential to increase access to Canadian research. However, the implementation of this policy creates challenges for many stakeholders, especially the researcher. Our results show that most articles were published in hybrid journals and publisher permissions around self-archiving are not aligned with FRQ's revised OA policy. Even our finding that nearly 30% of FRQ-funded papers are published in OA journals should be treated with cautious optimism as APC fees continue to rise in commercial publishers, potentially making these journals unsustainable and unaffordable for many researchers. The growth of diamond OA journals has the potential to disrupt this trend if researchers can locate a relevant journal in their discipline. Despite these issues, the FRQ may achieve its goals by looking at neighbouring OA statements (B16, 2023; Council of the EU, 2023; OSTP & Nelson, 2022). Where the EU supports OA without author fees (Council of the EU, 2023), the Berlin OA final statement urges an accelerated global OA transition while fostering author rights in the selection of CC licences (B16, 2023). Following these recent developments, the Canadian Federation of Library Associations, urges Canada to catch up with these Euro-American examples in its approach to author rights to deposit in institutional repositories (CFLA, 2023).

While engaging in the wider OA movement and acknowledging researchers' needs, Quebec's institutions, universities, funders, and governments will need to transition to immediate OA sustainably. Libraries will be called upon to develop OA strategies, which include their approach to transformative agreements, OA awareness and literacy, and conversations around prestige and tenure at both the university and funder levels. Ultimately, critical conversations around rights retention on campus and across the province may be needed to address the misalignment between author publishing patterns and OA policies. Until these issues have been addressed, researchers will need to be strategic to meet OA requirements, balancing affordable options and career advancement alongside their grant requirements.

## Author Contributions

Rachel Harris: Conceptualization (equal), Methodology (equal), Writing - original draft (lead), Writing - review & editing (lead), Project administration (supporting)

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Pierre Lasou: Data curation (equal), Formal analysis (equal), Investigation (equal), Methodology (equal), Writing - original draft (supporting) , Writing - review & editing (supporting)

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## Appendix A

Publisher websites consulted to determine self-archiving policy and embargo period. All websites consulted March 6-9, 2023.

<b>Publisher</b>	<b>Link</b>	<b>Archived link</b>
Elsevier BV	<a href="https://www.elsevier.com/__data/promis_misc/external-embargo-list.pdf">https://www.elsevier.com/__data/promis_misc/external-embargo-list.pdf</a> ; <a href="https://www.elsevier.com/open-access/journal-embargo-finder">https://www.elsevier.com/open-access/journal-embargo-finder</a>	<a href="https://web.archive.org/web/20230306101307/https://www.elsevier.com/__data/promis_misc/external-embargo-list.pdf">https://web.archive.org/web/20230306101307/https://www.elsevier.com/__data/promis_misc/external-embargo-list.pdf</a>
Springer Science and Business Media LLC	<a href="https://www.springernature.com/gp/open-research/policies/journal-policies">https://www.springernature.com/gp/open-research/policies/journal-policies</a>	<a href="https://web.archive.org/web/20230424000629/https://www.springernature.com/gp/open-research/policies/journal-policies">https://web.archive.org/web/20230424000629/https://www.springernature.com/gp/open-research/policies/journal-policies</a>
Wiley	<a href="https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html">https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html</a>	<a href="https://web.archive.org/web/20230417070714/https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html">https://web.archive.org/web/20230417070714/https://authorservices.wiley.com/author-resources/Journal-Authors/licensing/self-archiving.html</a>
American Chemical Society (ACS)	<a href="https://acsopenscience.org/funders/plans/">https://acsopenscience.org/funders/plans/</a>	<a href="https://web.archive.org/web/20230426134305/https://acsopenscience.org/funders/plans/">https://web.archive.org/web/20230426134305/https://acsopenscience.org/funders/plans/</a>
Informa UK Limited	<a href="https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/open-access-cost-finder/">https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/open-access-cost-finder/</a>	<a href="https://web.archive.org/web/20230412080356/https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/open-access-cost-finder/">https://web.archive.org/web/20230412080356/https://authorservices.taylorandfrancis.com/choose-open/publishing-open-access/open-access-cost-finder/</a>
SAGE Publications	<a href="https://us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use">https://us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use</a>	<a href="https://web.archive.org/web/20230419005818/https://us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use">https://web.archive.org/web/20230419005818/https://us.sagepub.com/en-us/nam/journal-author-archiving-policies-and-re-use</a>
American Physical Society (APS)	<a href="https://journals.aps.org/copyrightFAQ.html#free">https://journals.aps.org/copyrightFAQ.html#free</a>	<a href="https://web.archive.org/web/20230316172023/https://journals.aps.org/copyrightFAQ.html">https://web.archive.org/web/20230316172023/https://journals.aps.org/copyrightFAQ.html</a>
Institute of Electrical and Electronics Engineers (IEEE)	<a href="https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-ethics/guidelines-and-">https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-ethics/guidelines-and-</a>	<a href="https://web.archive.org/web/20230424004304/https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-">https://web.archive.org/web/20230424004304/https://journals.ieeeauthorcenter.ieee.org/become-an-ieee-journal-author/publishing-</a>

	policies/post-publication-policies/#accepted	ethics/guidelines-and-policies/post-publication-policies/
Royal Society of Chemistry (RSC)	<a href="https://www.rsc.org/journals-books-databases/author-and-reviewer-hub/authors-information/licences-copyright-permissions/#time">https://www.rsc.org/journals-books-databases/author-and-reviewer-hub/authors-information/licences-copyright-permissions/#time</a>	<a href="https://web.archive.org/web/20230301142106/https://www.rsc.org/journals-books-databases/author-and-reviewer-hub/authors-information/licences-copyright-permissions/">https://web.archive.org/web/20230301142106/https://www.rsc.org/journals-books-databases/author-and-reviewer-hub/authors-information/licences-copyright-permissions/</a>
Oxford University Press (OUP)	<a href="https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods">https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods</a>	<a href="https://web.archive.org/web/20230501155221/https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods">https://web.archive.org/web/20230501155221/https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods</a>
IOP Publishing	<a href="https://publishingsupport.iopscience.iop.org/author-rights-policies/">https://publishingsupport.iopscience.iop.org/author-rights-policies/</a>	<a href="https://web.archive.org/web/20230315051712/https://publishingsupport.iopscience.iop.org/author-rights-policies/">https://web.archive.org/web/20230315051712/https://publishingsupport.iopscience.iop.org/author-rights-policies/</a>
AIP Publishing	<a href="https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-online/">https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-online/</a>	<a href="https://web.archive.org/web/20230318152642/https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-online/">https://web.archive.org/web/20230318152642/https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-online/</a>
Optica Publishing Group	<a href="https://opg.optica.org/submit/review/copyright_permissions.cfm">https://opg.optica.org/submit/review/copyright_permissions.cfm</a>	<a href="https://web.archive.org/web/20230315231145/https://opg.optica.org/submit/review/copyright_permissions.cfm">https://web.archive.org/web/20230315231145/https://opg.optica.org/submit/review/copyright_permissions.cfm</a>
American Physiological Society	<a href="https://journals.physiology.org/author-info.permissions">https://journals.physiology.org/author-info.permissions</a>	<a href="https://web.archive.org/web/20230426135442/https://journals.physiology.org/publication-process">https://web.archive.org/web/20230426135442/https://journals.physiology.org/publication-process</a>
American Society for Microbiology	<a href="https://journals.asm.org/author-self-archiving-permissions">https://journals.asm.org/author-self-archiving-permissions</a>	<a href="https://web.archive.org/web/20230501153358/https://journals.asm.org/author-self-archiving-permissions">https://web.archive.org/web/20230501153358/https://journals.asm.org/author-self-archiving-permissions</a>
BMJ	<a href="https://www.bmj.com/company/wp-content/uploads/2018/09/Non-Open-Access-Articles-September-2018.pdf">https://www.bmj.com/company/wp-content/uploads/2018/09/Non-Open-Access-Articles-September-2018.pdf</a>	<a href="https://web.archive.org/web/20230501153609/https://www.bmj.com/company/wp-content/uploads/2018/09/Non-Open-Access-Articles-September-">https://web.archive.org/web/20230501153609/https://www.bmj.com/company/wp-content/uploads/2018/09/Non-Open-Access-Articles-September-</a>

		2018.pdf
Proceedings of the National Academy of Sciences	<a href="https://www.pnas.org/author-center/publication-charges">https://www.pnas.org/author-center/publication-charges</a>	<a href="https://web.archive.org/web/20230422113813/https://www.pnas.org/author-center/publication-charges">https://web.archive.org/web/20230422113813/https://www.pnas.org/author-center/publication-charges</a>
American Association for the Advancement of Science (AAAS)	<a href="https://www.science.org/content/page/open-access-aaas">https://www.science.org/content/page/open-access-aaas</a>	<a href="https://web.archive.org/web/20230501153816/https://www.science.org/content/page/open-access-aaas?cookieSet=1">https://web.archive.org/web/20230501153816/https://www.science.org/content/page/open-access-aaas?cookieSet=1</a>
ASME International	<a href="https://www.asme.org/publications-submissions/journals/information-for-authors/open-access">https://www.asme.org/publications-submissions/journals/information-for-authors/open-access</a>	<a href="https://web.archive.org/web/20230223130600/https://www.asme.org/publications-submissions/journals/information-for-authors/open-access">https://web.archive.org/web/20230223130600/https://www.asme.org/publications-submissions/journals/information-for-authors/open-access</a>
American Geophysical Union (AGU)	<a href="https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Policies/Permission-policy">https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Policies/Permission-policy</a>	<a href="https://web.archive.org/web/20230327034757/https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Policies/Permission-policy">https://web.archive.org/web/20230327034757/https://www.agu.org/Publish-with-AGU/Publish/Author-Resources/Policies/Permission-policy</a>
Rockefeller University Press	<a href="https://rupress.org/pages/publication-fees-and-choices">https://rupress.org/pages/publication-fees-and-choices</a>	<a href="https://web.archive.org/web/20230327054130/https://rupress.org/pages/publication-fees-and-choices">https://web.archive.org/web/20230327054130/https://rupress.org/pages/publication-fees-and-choices</a>
ACM	<a href="https://www.acm.org/publications/openaccess">https://www.acm.org/publications/openaccess</a>	<a href="https://web.archive.org/web/20230426231740/https://www.acm.org/publications/openaccess">https://web.archive.org/web/20230426231740/https://www.acm.org/publications/openaccess</a>
The Electrochemical Society	<a href="https://www.electrochem.org/ecsnews/ecs-supports-green-open-access/">https://www.electrochem.org/ecsnews/ecs-supports-green-open-access/</a>	<a href="https://web.archive.org/web/20230501154656/https://www.electrochem.org/ecsnews/ecs-supports-green-open-access/">https://web.archive.org/web/20230501154656/https://www.electrochem.org/ecsnews/ecs-supports-green-open-access/</a>
American Association for Cancer Research (AACR)	<a href="https://aacrjournals.org/pages/open-access">https://aacrjournals.org/pages/open-access</a>	<a href="https://web.archive.org/web/20230501154710/https://aacrjournals.org/pages/open-access">https://web.archive.org/web/20230501154710/https://aacrjournals.org/pages/open-access</a>
American Diabetes Association	<a href="https://diabetesjournals.org/journals/pages/ada-journal-policies#copyright">https://diabetesjournals.org/journals/pages/ada-journal-policies#copyright</a>	<a href="https://web.archive.org/web/20230306005333/https://diabetesjournals.org/journals/pages/ada-journal-policies">https://web.archive.org/web/20230306005333/https://diabetesjournals.org/journals/pages/ada-journal-policies</a>
American Vacuum Society	<a href="https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-">https://publishing.aip.org/resources/researchers/rights-and-permissions/sharing-content-</a>	<a href="https://web.archive.org/web/20230317010322/https://publishing.aip.org/resources/researchers/rights-">https://web.archive.org/web/20230317010322/https://publishing.aip.org/resources/researchers/rights-</a>

	online/	and-permissions/sharing-content-online/
American Meteorological Society	<a href="https://www.ametsoc.org/ams/index.cfm/publications/ethical-guidelines-and-ams-policies/ams-copyright-policy/">https://www.ametsoc.org/ams/index.cfm/publications/ethical-guidelines-and-ams-policies/ams-copyright-policy/</a>	<a href="https://web.archive.org/web/20230416160327/https://www.ametsoc.org/ams/index.cfm/publications/ethical-guidelines-and-ams-policies/ams-copyright-policy/">https://web.archive.org/web/20230416160327/https://www.ametsoc.org/ams/index.cfm/publications/ethical-guidelines-and-ams-policies/ams-copyright-policy/</a>
Cambridge University Press (CUP)	<a href="https://www.cambridge.org/core/services/open-access-policies/open-access-journals/green-open-access-policy-for-journals">https://www.cambridge.org/core/services/open-access-policies/open-access-journals/green-open-access-policy-for-journals</a>	<a href="https://web.archive.org/web/20230315031116/https://www.cambridge.org/core/services/open-access-policies/open-access-journals/green-open-access-policy-for-journals">https://web.archive.org/web/20230315031116/https://www.cambridge.org/core/services/open-access-policies/open-access-journals/green-open-access-policy-for-journals</a>
The Company of Biologists	<a href="https://journals.biologists.com/dev/pages/rights-permissions">https://journals.biologists.com/dev/pages/rights-permissions</a>	<a href="https://web.archive.org/web/20230324170743/https://journals.biologists.com/dev/pages/rights-permissions">https://web.archive.org/web/20230324170743/https://journals.biologists.com/dev/pages/rights-permissions</a>
The Endocrine Society	<a href="https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods#J">https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods#J</a>	<a href="https://web.archive.org/web/20230501155221/https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods">https://web.archive.org/web/20230501155221/https://academic.oup.com/pages/open-research/open-access/charges-licences-and-self-archiving/accepted-manuscript-embargo-periods</a>
Future Medicine Ltd	<a href="https://www.futuremedicine.com/authorguide/archivesharearticle">https://www.futuremedicine.com/authorguide/archivesharearticle</a>	<a href="https://web.archive.org/web/20230501155234/https://www.futuremedicine.com/authorguide/archivesharearticle">https://web.archive.org/web/20230501155234/https://www.futuremedicine.com/authorguide/archivesharearticle</a>
Ovid Technologies (Wolters Kluwer Health)	<a href="https://www.asn-online.org/g/blast/files/CJASNandPolicies.pdf">https://www.asn-online.org/g/blast/files/CJASNandPolicies.pdf</a>	<a href="https://web.archive.org/web/20220531220859/https://www.asn-online.org/g/blast/files/CJASNandPolicies.pdf">https://web.archive.org/web/20220531220859/https://www.asn-online.org/g/blast/files/CJASNandPolicies.pdf</a>
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