

## Impact of COVID-19 on IUPUI Authors from March - August 2020

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Recent reports on the impact of working conditions under COVID-19 have begun to account for expected losses in research productivity for scholars and universities. Research labs and academic workplaces have adopted safety protocols to minimize the risks of spreading the virus to students and coworkers. In addition, many scholars (and the colleagues that support them) are now working from home. For most universities in the United States, (including Indiana University Purdue University Indianapolis (IUPUI)), this transition in the working environment began in early March 2020. At roughly the same time, schools, camps, and daycare facilities shutdown their face-to-face operations. Thus, scholars caring for young, elderly, or disabled dependents, have been juggling increased workloads, uncertainty, and stress in both the workplace and at home. In August, the Council on Governmental Relations released a report predicting a "research output loss" for a public university with a medical school of 21% as a result of the "pandemic normal" that many universities have established at the beginning of the fall 2020 semester. The COGR also predicts that this could grow to 38% if a "wave" of the virus prompts a shutdown in November (COGR, p. 15). The COGR calculates these losses by measuring expected declines in external funding and negative impacts as a result of increased expenditures and lost investments. To measure the loss, the COGR's Research Impact Metric (RIM) divides current or expected productivity during a "pandemic normal" by productivity during non-pandemic "normal" conditions (p. 5). The RIM's approach focusses on grants and expenses, in part, because the COGR is forewarning funders that (without a vaccine) they should expect fewer returns on their investments or else, to generate the same returns, funders will need to streamline funding mechanisms and increase their investments:

The scope of research promised on a \$1 million award (pre-COVID-19) will now require more than \$1 million to complete. And, the scope of research to be delivered in one year (pre-COVID-19) will now require more than one year. In order to operate effectively and efficiently under the "Pandemic Normal," new measures such as redefining proposal and budgeting guidelines, eliminating overly-burdensome regulations, and related measures are necessary. (p. 2)

The report also notes, somewhat in passing, that the U.S. is "at risk of losing a whole cohort of graduate and post-doctoral students ... our future scientists" (p 2). The COGR, however, mentions a possible decline in publishing, a key contributor to career advancement for researchers, only once:

The careers of academic personnel (faculty, graduate students, post-docs) and at-risk populations (minorities, women, and other under-represented populations) that rely on the outcomes of research (peer-reviewed publications, dissertations) will be negatively impacted. (p. 11)

Rather than applying the RIM to article production, the COGR cites two *Nature* stories to support this assertion. These stories report on the impact of COVID on the careers of women, particularly those that carry a disproportionate load of childcare responsibilities. The impacts of these social inequities have already begun to reveal themselves in measures of publication frequency. Vincent-Lamarre, et al., for



example, found that women as first authors of medRxiv preprints declined by 15 percentage points from December 2019 to April 2020 (Vincent-Lamarre, 2020).

With women authors writing less and with other authors struggling to balance additional, COVID-related demands on their time and budgets, one should also expect to see a decline in scholarly productivity reflected in subject repositories, institutional repositories, university researcher information systems, and academic citation databases. The complete picture of this impact may not take shape for a few years; it often takes more than a year to do the work of reading, researching, writing, submitting, revising, and resubmitting an academic article for publication. Furthermore, editors and reviewers are likely experiencing similar pressures on their budgets and time. In the same way that a minor accident in busy traffic can cause delays that last long after the initial cause is resolved, without some kind of intervention, the pandemic may depress the production of scholarly knowledge (and the careers that depend on it) for many years.

This brief analysis seeks to measure the impact of the pandemic on scholarly article production on one university campus, Indiana University Purdue University Indianapolis (IUPUI). To create an early measure of the impact of COVID-19 on IUPUI authors, I compare article production across two six-month periods, March - August 2019 and March - August 2020.

## Methods

To establish a data set of articles\* by month across two ranges of six month, I ran affiliation searches in three databases: Lens.org, Web of Science (WoS), and Scopus. Each of these databases create challenges for researchers that want to establish the number of articles per institution per month. For example, Scopus does not provide a controlled, institutional affiliation value for IUPUI—and while, WoS does provided a controlled affiliation value for IUPUI, the month that the article was made available to readers must be inferred by comparing dates in three different fields. WoS complicates the matter by using month ranges for some journals (e.g., “SPRING,” or “APR-JUN”). Scopus date fields report publication date, but not release date. Scopus, however, does allow a searcher to retrieve database records by the date that they were added to Scopus—however, this includes older articles by recently digitized or acquired journals. Lens, in comparison, provides a controlled affiliation search and an exact date for article release, but also includes releases on preprint servers and other early-releases as separate data items for the same article. In addition, all databases (and especially Scopus and WoS), provide misleading document types—that is, a poster abstract or comment on an article, for example, may be mislabeled in the metadata as an article. Finally, no single search tool provides complete or unique coverage of an institution’s article production. Therefore, the data for this analysis were compiled, deduplicated, and prepared in the following ways:

- *Results were deduplicated by DOI and Title:* with Lens as the first retained data source and Scopus and the second retained source. Thus, the minority of items retained from the WoS searches were unique to WoS and not found in Lens or Scopus.
- *Retained document types:* this analysis focusses on the authorship of new work and not secondary writings (e.g., comments on or reviews of older works or the publication of last-year’s conference abstracts). Thus, the following document types were excluded: Meeting Abstracts, Editorials, Erratum, Letters, Note, Book Reviews, Short Surveys, and Corrections.

\* Data available from IUPUI DataWorks: Odell, J. D. (2020). Impact of COVID-19 on IUPUI Authors from March - August 2020 (dataset), v1. IUPUI University Library: Indianapolis, IN. DOI: 10.7912/D2/18

- *Assigned a month of release:* Lens items were assigned the month reported in the Publication Date field. Scopus items were assigned a month based on the Scopus Electronic ID date after removing all items with a publication year that was outside the range for this analysis. Finally, WoS records were assigned a month based on data prioritized in the following order: Early Access Date and then Publication Date. In the Publication Date field, date ranges were shortened to the first month of the range (e.g., JUN-AUG = June) and seasons were assigned the first month of the academic season (e.g., SPRING = January).

After deduplication, these searches created a data set of 4,671 unique articles, conference papers, book chapters, and books with an assigned month of release.

## Results

In 2019 this analysis found that publishers released 2,418 original works by IUPUI authors from March through August of that year. In 2020, during the same months, that number decreased to 2,253 works--a decline of 6.82% (Table 1).

	YR 2019	YR 2020	Change
<b>March</b>	419	438	+4.5%
<b>April</b>	384	338	-12%
<b>May</b>	427	434	+1.6%
<b>June</b>	379	363	-4.2%
<b>July</b>	405	390	-3.7%
<b>August</b>	404	290	-28.2%
<i>Total</i>	2418	2253	-6.8%

Table 1. Works published by IUPUI authors, March-August.

The months with the largest shortfalls when compared with the prior year were April and August (Figure 1.)

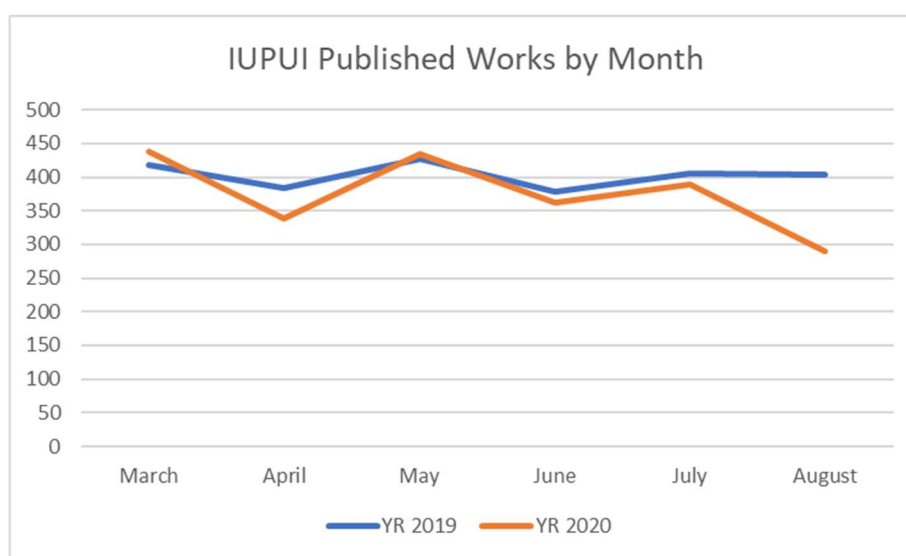


Figure 1. Published IUPUI works by month from March to August—2019 compared to 2020.

## Discussion

This analysis shows a decline of 6.8% in the number of works by IUPUI authors that were published in the first six months of the COVID-19 pandemic in the United States when compared to the same six-month period from the prior year. This decline, however, should be understood in the context of an expected growth in the number of works by IUPUI authors. In the last five years (2015-2019), a WoS search shows average annual increase of 3.3% for publications authored by IUPUI authors (Figure 2.)

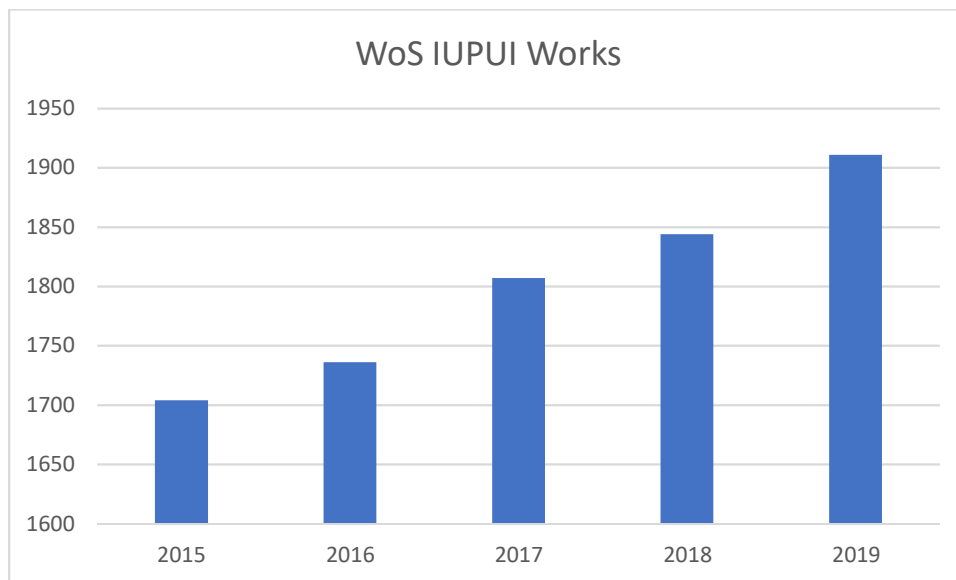


Figure 2. Number of works (articles, chapters, conference papers, and books) by authors affiliated with IUPUI, Web of Science.

Given an expected annual increase of 3.3%, if this six-month decline holds for the entire 2020 publication year, IUPUI could see an effective decline of over 10% from what would be expected from its authors (Figure 3.)

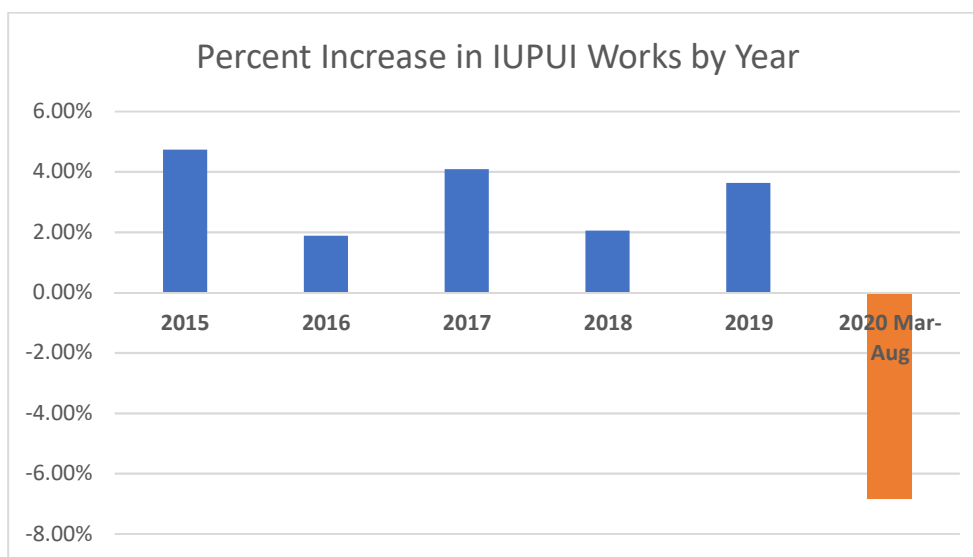


Figure 3. Percent increase in IUPUI works by year with a decrease reported for Mar-Aug. 2020.

While the results of this analysis are discouraging, a 10% short-fall in published works by IUPUI authors is less than the 21% in “research output loss” predicted by the COGR. Even so, this is a downward trend that universities will want to monitor. As many authors can affirm, the timeline of authorship depends on the speed of peer review and editing. Therefore, the results reported here should be thought of as a snapshot in time. In other words, it is possible that authors have works in the publication pipeline that were delayed as a result of the COVID-19 strain on peer reviewers and publishing staff. These works could arrive at a later date in a wave or could accumulate in gradual increases as the publishing ecosystem adjusts to the impacts of COVID-19. Alternatively, the six-month snap shot reported here could be the beginning of a longer and much deeper downturn. It is worth remembering the impact of the 2008 financial collapse on scholarly productivity. While COVID-19 is a very different crisis, the 2008 financial collapse was followed by a four-year decline in publications by IUPUI authors—from 1,859 works in 2008 to a low of 1,248 works in 2012 (WoS Search, Nov. 25, 2020). Finally, readers of this analysis should keep in mind that databases are not accurate records of an institution’s publication profile over time. Databases add and remove titles to suit their purposes—likewise, journals in some disciplines (particularly in the humanities and social sciences) are less likely to be indexed by sources such as Scopus and Web of Science. University annual review systems or other institutional researcher information systems will provide a better measure of the pandemic impact on publishing, but analyses based on these data sources will have to wait for the conclusion of the subsequent annual review seasons.

## References

COGR. (2020). *Research Impact Under COVID-19: Financial Crisis and the “Pandemic Normal.”* Council on Governmental Relations.

[https://www.cogr.edu/sites/default/files/Research\\_COVID\\_August2020\\_COGR\\_FINAL.pdf](https://www.cogr.edu/sites/default/files/Research_COVID_August2020_COGR_FINAL.pdf)

Vincent-Lamarre, Philippe, Sugimoto, Cassidy R., & Larivière, V. (2020). The decline of women’s research production during the coronavirus pandemic. *Nature Index*. <https://www.natureindex.com/news-blog/decline-women-scientist-research-publishing-production-coronavirus-pandemic>