

Letter to the Editor

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The impact of COVID-19 on citations of laboratory medicine journals

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To the Editor,

Coronavirus disease 2019 (COVID-19) is a life-threatening infectious disease originally identified at the end of November 2019 in the Chinese town of Wuhan, when the underlying responsible pathogen, called severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), has been isolated and sequenced [1]. Since that first “officially” diagnosed case, the disease has then spread all over the world with unprecedented virulence and aggressiveness, causing nearly 6.6 million confirmed deaths at the time of writing this letter (November 14, 2022), and making COVID-19 the seventh more deadly pandemic throughout the traceable human history [2].

The universal spread of SARS-CoV-2 not only has generated devastating impacts on human life, disrupting healthcare, economy and society of many (if not all) countries [3], but has also turned out to be one of the “hottest” topic in scientific and medical publishing. A search carried out in PubMed on November 14, 2022 using the keywords “SARS-CoV-2” OR “COVID-19”, has retrieved as many as 312,791 documents published between the years 2020 and 2022, while a similar search using the keyword “myocardial infarction” (i.e., the first cause of worldwide mortality) has generated exactly tenfold less documents (i.e., 31,486) over the same period of time. It is hence

undeniable that COVID-19 has attracted so much focus in the scientific and medical communities during the past three years, that more traditional topics may have become secondary. Moreover, the huge number of articles published on COVID-19 and/or SARS-CoV-2 has also catalyzed a paramount number of citations, which have contributed to boost (or even inflate) some scientometric indices, such as the impact factor (IF) [4]. This brief article is hence aimed at providing an objective estimation of the real impact that COVID-19 has had on laboratory medicine journals, as reflected by the number of citations to articles dealing with this specific topic during the past three years.

The top-ten laboratory medicine journals were first identified based on their 2021 impact factor (IF) value as available in the online version of the Clarivate Journal Citation Reports (ICR; Clarivate, Chandler, AZ, United States) within the “MEDICAL LABORATORY TECHNOLOGY” category. The ten journals with higher IF which publish the vast majority of their articles in the field of laboratory medicine were then selected, thus excluding three other journals prevalently oriented towards (anatomic) pathology (i.e., *Semin Diagn Pathol*; ISSN: 0740-2570), pharmaceutical biology (*Pharm Biol*; ISSN: 1388-0209) and clinical cytometry (*Cytometry B Clin Cytom*; ISSN: 1552-4949). A first electronic search was then conducted in all databases of the online version of Clarivate Web of Science (Clarivate, Chandler, AZ, United States) using the journal name in the field “Publication/Source title”, to retrieve all citations to all articles published in these journals between January 2020 and present time (i.e., in 2020, 2021 and 2022 up to November 14), followed by a second search where the “Publication/Source title” was combined with “COVID-19” AND “SARS-CoV-2” in the search field “Topic” during the same period of time. Data were downloaded and manually entered within a Microsoft Excel worksheet (Microsoft, Redmond, WA, United States), where they were graphically plotted and analyzed with Analyse-it (Analyse-it Software Ltd, Leeds, UK). This analysis was performed in accordance with the Declaration of Helsinki, under the terms of relevant local legislation, using publicly available repositories, so that no

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informed consent or Ethical Committee approvals were necessary.

The list of the top-ten laboratory medicine journals is summarized in Table 1, along with their ISSN (International Standard Serial Number), and 2019 and 2021 IF. The main results of the following analysis are also summarized in Table 1, and in Figure 1. Briefly, the number of citations to articles dealing with COVID-19/SARS-CoV-2 published since January 2020 to present time in the top-ten laboratory medicine journals was 17,938 out of 38,319 citations to all articles published by these journals during the same period, thus yielding to an exceptional rate of 47% (i.e., one in two citations was for COVID-19/SARS-CoV-2 articles). Nonetheless, such percentage decreased linearly over time, from 69% in 2020, to 51% in 2021 and, finally, to 33% in 2022 (up to November 14), respectively (Pearson's correlation, $r=1.00$; 95% CI, 1.00 to 1.00; $p=0.014$). Although this trend was substantially consistent across most of the journals, the rate of COVID-19/SARS-CoV-2 articles to all articles citations between 2020 and 2022 varied substantially, being the highest for Clin Chem Lab Med (67%), closely followed by Crit Rev Clin Lab Sci (62%), and was the lowest for Adv Clin Chem (0%), which only published a single article on the topic of COVID-19/SARS-CoV-2, in 2022 (Table 1). Importantly, no significant correlation was found between the 2021/2019 IF ratio and the ratio between citations to COVID-19/SARS-CoV-2 articles and those to total articles (Pearson's correlation, 0.25; 95% CI, -0.45 to 0.72 ; $p=0.490$).

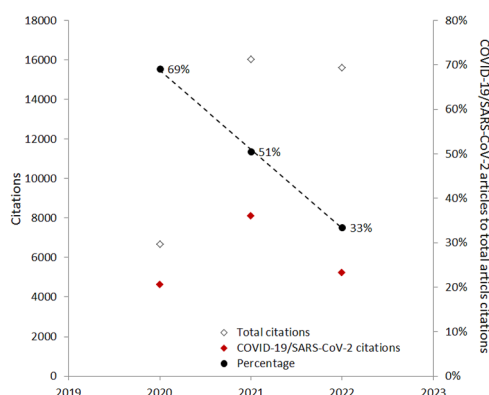


Figure 1: Evolution of citations to COVID-19/SARS-CoV-2 articles, total article citations and the ratio between these two (reported as percentage) in the top-ten 2021 impact factor (IF) laboratory medicine journals between the years 2020 and 2022.

The results of this analysis reveal that the top-ten 2021 IF laboratory medicine journals have taken enormous advantage from articles published on COVID-19/SARS-CoV-2, whereby nearly half of all their citations have originated from this topic. Nonetheless, such effect has clearly declined over time, whereby citations to articles dealing with COVID-19/SARS-CoV-2 have become 33% of total in 2022. Moreover, the lack of a significant correlation between IF 2019 and 2021 variation and COVID-19/SARS-CoV-2 articles to total article citations testifies that such enormous volume of citations to papers dealing

Table 1: Top laboratory medicine journals, with their ISSN, impact factor and COVID-19/SARS-CoV-2 articles to total citations ratio between the years 2020 and 2022.

Journal abbreviation	ISSN	IF		COVID-19/SARS-CoV-2 articles to total articles citations			
		2019	2021	2020	2021	2022	2020–2022
Clin Chem Translational Research	0009–9147	7.292	12.114	659/910 (72%)	1,156/2,107 (55%)	688/1,967 (35%)	2,530/4,984 (50%)
Clin Chem Lab Med	1434–6621	3.595	8.490	1,645/1,992 (83%)	2,377/3,447 (69%)	1,369/2,617 (52%)	5,391/8,056 (67%)
Crit Rev Clin Lab Sci	1040–8363	4.677	7.721	32/73 (44%)	295/444 (66%)	369/609 (61%)	696/1,126 (62%)
Clin Chim Acta	0009–8981	2.615	6.315	1,192/1,753 (68%)	2,296/4,324 (53%)	1,238/3,723 (33%)	4,726/9,800 (48%)
Adv Clin Chem	0065–2423	3.367	6.303	0/63	0/253	1/373 (0%)	1/689 (0%)
Arch Pathol Lab Med	0003–9985	4.094	5.686	339/567 (60%)	598/1,435 (42%)	428/1,301 (33%)	1,365/3,303 (41%)
Ann Lab Med	2234–3806	2.803	4.941	86/170 (51%)	167/410 (41%)	180/549 (33%)	433/1,129 (38%)
Clin Biochem	0009–9120	2.573	3.625	35/146 (24%)	136/604 (23%)	98/677 (14%)	269/1,427 (19%)
J Clin Lab Anal	0887–8013	1.540	3.124	63/323 (20%)	349 (21%)	367 (16%)	779 (18%)
Total	–	–	–	4,606/6,672 (69%)	8,110/16,041 (51%)	5,222/15,606 (33%)	17,938/38,319 (47%)

COVID-19, coronavirus disease 2019; IF, impact factor; ISSN, international standard serial number; SARS-CoV-2, severe acute respiratory syndrome coronavirus 2.

with laboratory aspects of the ongoing pandemic could not be considered the only cause of the IF increase occurred for all laboratory journals during the past three years (Table 1).

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