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## The impact of the COVID-19 pandemic on the global assessments of rheumatology clinimetrics: Data from a mobile application. A comment on article by Nagy E, et al.: “The impact of the COVID-19 pandemic on autoimmune diagnostics in Europe: A lesson to be learned”

Dear editor

We read the article by Nagy E, et al., titled “The impact of the COVID-19 pandemic on autoimmune diagnostics in Europe: A lesson to be learned” with great interest [1]. We have observed a very similar impact of the pandemic on the usage of mobile application RheumaHelper for rheumatologists.

RheumaHelper is currently used by more than 8000 physicians in 110 countries. Among the clinical tools provided in the application, the Disease Activity Score 28 (DAS28) calculator is among the most popular. DAS28 is a composite measure of disease activity of rheumatoid arthritis (RA) and is recommended as one of the tools to follow the treat-to-target strategy in RA patients [2]. As the calculation of DAS28 requires the assessment of tender and swollen joint counts by a healthcare professional, DAS28 may be considered a surrogate marker of outpatient visits for RA patients.

Anonymous DAS28 calculator usage counts were collected between January 2019 and December 2020 with an analytics solution provided by Mixpanel. We have analyzed cumulative global data and data for countries with the highest monthly DAS28 calculator use in the pre-pandemic year 2019. We chose countries with over 400 uses per month: Argentina, Brazil, China, India, Italy, Malaysia, Mexico, Romania, the Russian Federation, Spain, and the United Kingdom.

Globally, the number of DAS28 calculations was reduced by 46.8% in the first COVID-19 wave and by 36.5% in the second wave. In the group of countries with the highest number of DAS28 calculations the median reduction was 51.3% (IQR 34.6–57.6), ranging from 12.7% (the Russian Federation) to 71.7% (Romania) during the first COVID-19 wave (March to May 2020), while during the second pandemic wave (October 2020 to December 2020) the median reduction was 53.4% (IQR 40.5–62.1), ranging from 8.6% (the Russian Federation) to 64.8% (Mexico).

The monthly counts of DAS28 calculations in 2019 and 2020 are shown in Fig. 1. The reduction in the number of DAS28 calculations for the first and second pandemic wave is presented in Table 1.

Our global data are in line with the Nagy E, et al., findings – the first COVID-19 wave had a greater impact on number of DAS28 calculations than the second wave (46.8% vs. 36.5%). Similarly, Moynihan R, et al., reported a median reduction of healthcare visits of 42.3% across 20 European countries in the first wave [3]. Interestingly, we have noticed that the median reduction was higher during the first pandemic wave in European countries (57.3% vs. 51.9%), but in the non-European countries the reduction was higher during the second wave (45% vs. 57.1% for first and second wave, respectively).

In conclusion, the novel approach of using the number of DAS28 calculations stratified by country as a proxy for rheumatology outpatient visits led to similar observations as the more conventional approach of assessing the impact of the COVID-19 pandemic on the access to rheumatology services.

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### Ethics approval

The research did not involve human participants, human tissue and/or personal data and therefore qualifies as an exemption for obtaining an ethics committee approval.

### Declaration of Competing Interest

Nejc Tomšič is a co-founder of the software company that has developed the RheumaHelper mobile application. Žiga Rotar and Matija Tomšič have been providing expert advice for the development of the RheumaHelper application.

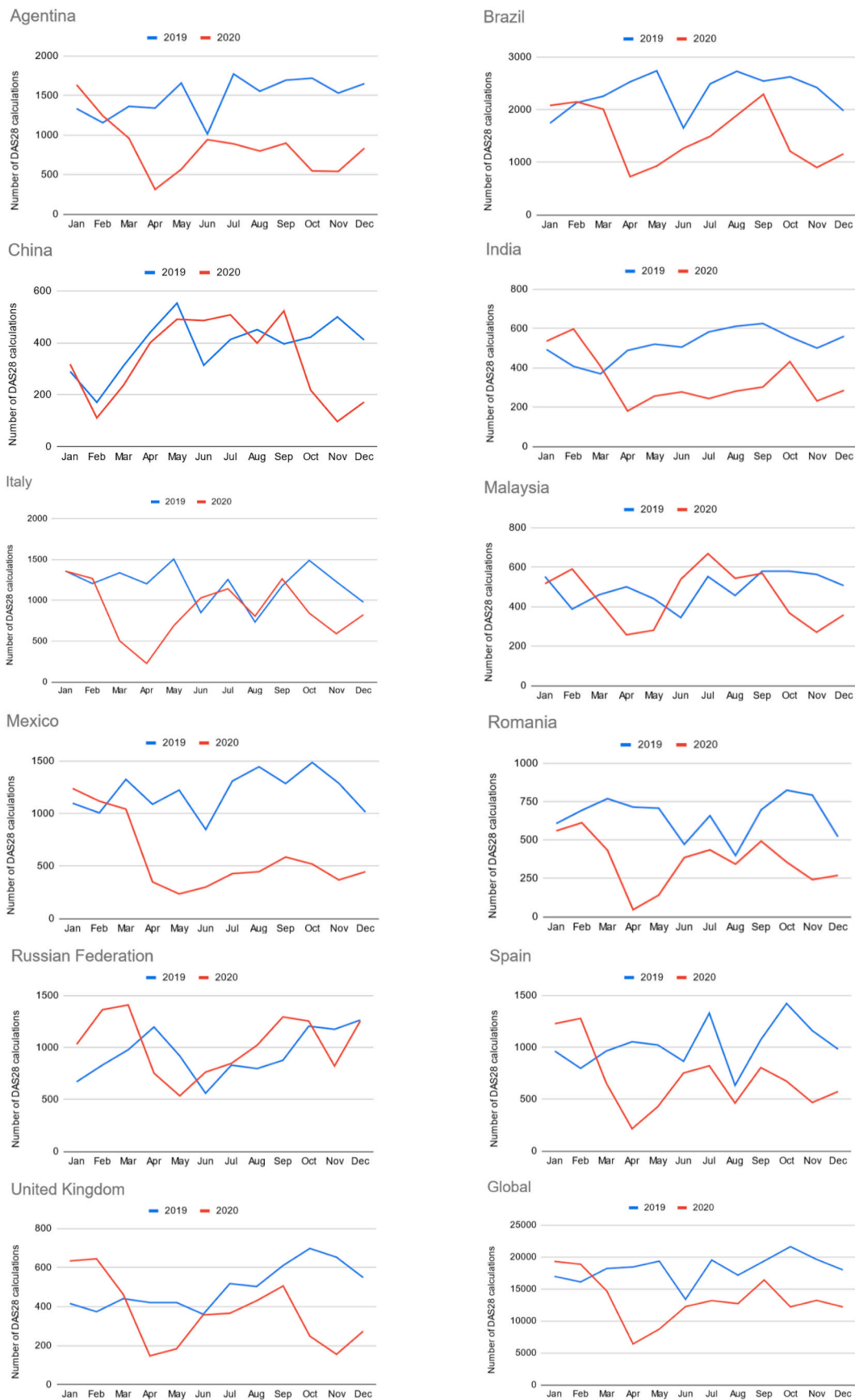


Fig. 1. Number of monthly DAS28 calculations in 2019 (blue line) and 2020 (red line).

**Table 1**

The percent reduction in number of DAS28 calculations for the first and second COVID-19 wave.

Country	March 2020–May 2020	October 2020–December 2020
Argentina	57.8	60.7
Brazil	51.3	53.4
China	13.6	63.5
India	38.7	41.4
Italy	64.9	38.9
Malaysia	31.2	39.6
Mexico	55.2	64.8
Romania	71.7	59.4
Russian Federation	12.8	8.6
Spain	57.3	51.9
United Kingdom	38	64.3
Global	46.8	36.5

## References

- [1] Nagy E, Infantino M, Bizzaro N, Andreeva H, Bontkes HJ, Bossuyt X, et al. The impact of the COVID-19 pandemic on autoimmune diagnostics in Europe: a lesson to be learned. *Autoimmun Rev* 2021;27:102985. <https://doi.org/10.1016/j.autrev.2021.102985> [Epub ahead of print].
- [2] Smolen JS, Aletaha D, Bijlsma JWJ, Breeveld FC, Boumpas D, et al. Treating rheumatoid arthritis to target: recommendations of an international task force. *Ann Rheum Dis* 2010;69:631–7. <https://doi.org/10.1136/ard.2009.123919>.
- [3] Moynihan R, Sanders S, Michaleff ZA, Scott AM, Clark J, To EJ, et al. Impact of COVID-19 pandemic on utilisation of healthcare services: a systematic review. *BMJ Open* 2021;11(3):e045343. <https://doi.org/10.1136/bmjopen-2020-045343>.

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