

## The “Big Five” Lung Diseases in CoViD-19 Pandemic – a Google Trends analysis



To the Editor:

Google Trends (GT), a popular and freely accessible tool in big data analytics, has been widely used to study perceptions in various medical topics. The monitoring of online queries using GT may provide insight into human behaviour in the CoViD-19 pandemic, as this field is continuously growing and uses data that could not have been accessed otherwise.<sup>1</sup>

In December 2019, a novel coronavirus was identified in Wuhan City, Hubei Province, China and later the disease was named coronavirus disease 2019 (CoViD-19).<sup>2</sup> On March 11, 2020, the World Health Organization (WHO) officially announced that CoViD-19 had reached global pandemic status.<sup>3</sup> In the first months of the pandemic, not only the research community, but also the global population, urged for more information about CoViD-19.

The Forum of the International Respiratory Society identified, in 2017, five major lung diseases, the “big five”, which include asthma, chronic obstructive pulmonary disease (COPD), acute lower respiratory tract infections, lung cancer and tuberculosis. These diseases are among the most common causes of severe illness and death worldwide.<sup>4</sup>

To identify a possible increase in online interest about lung diseases in the first months of the CoViD-19 pandemic, we conducted a GT worldwide search of five topics measuring the Relative Search Volume (RSV) over time. GT topics are a group of terms that share the same concept in any language. RSV represents search interest relative to the highest point on the chart for the given region and time, but doesn't convey absolute search volume.

Our search included five GT topics: “Asthma (Disease)”; “Chronic Obstructive Pulmonary Disease (Disease)”, “Pneumonia (Medical condition)”, “Lung Cancer (Topic)” and “Tuberculosis (Disease)”. We conducted a visual analysis of the worldwide RSV over the past 5 years (May 2015 till April 2020) (Fig. 1a). In addition, we compared four major European countries RSV-timelines (Spain, Italy, United Kingdom and France) in the past 5 years (May 2015 till April 2020) (Fig. 1b–e).

We uncovered a worldwide peak in RSV-timelines of Pneumonia, Asthma, COPD and Tuberculosis in the first months of the CoViD-19 pandemic (Fig. 1a). Comparing the RSV-timelines from different European countries we perceive peaks with different magnitudes for the four GT topics above and a flat or downward RSV-timeline of Lung Cancer in this pandemic (Fig. 1b–e).

To measure the possible variation in worldwide RSV we compared the median-RSV in March-April 2019 with median-RSV in March-April 2020 of the five GT topics separately. Pneumonia, Asthma, COPD and Tuberculosis median-RSV had a 244%, 50%, 16% and 14% increase, respectively. Lung cancer had a 21% decrease in median-

RSV. Using Wilcoxon-test (IBM SPSS Statistics Version 25.0. Armonk, NY: IBM Corp), every score between median-RSV of March-April 2019 and 2020, was statistically significant ( $p < 0.001$ ).

The GT topic that had the highest percentage increase of worldwide median-RSV was Pneumonia, with a two peaks RSV-timeline: first peak in January-February 2020 and a second peak in March-April 2020. These peaks may be explained by the fact that pneumonia is a major and already well-known phenotype of CoViD-19.<sup>5</sup> Asthma worldwide RSV-timeline revealed a visual peak in March-April 2020, with a substantial gain in the median-RSV compared to the same period in 2019. Bousquet et al.<sup>6</sup> stated that in most countries searches for asthma are made during local thunderstorm-induced asthma outbreaks. Our findings suggest also a worldwide online peak search after outbreaks of other diseases masquerading asthma exacerbations, such as CoViD-19, which was particularly relevant in the UK and in France, as asthma surpassed the “pneumonia” searches (Fig. 1d, e). COPD and Tuberculosis topics showed less relevant visual peaks, but still a gain in the median-RSV compared to the same period in 2019. Lung cancer showed no visual peak, and less median-RSV in the first months of the CoViD-19 pandemic compared with the same months of 2019. We note this decrease in online search interest about lung cancer, as opposed to other lung diseases, with concern as cancer mortality and morbidity might be on the rise because of late diagnosis in CoViD-19 pandemic.<sup>7</sup>

In conclusion, GTs of the “big five” lung diseases, except lung cancer, have increased during CoViD-19 epidemics. It is clear from the 5-year trends that these peaks are not related to the diseases but to a variation in alertness or a misinterpretation of respiratory symptoms. Besides every recent clinical guidelines and efforts by hospitals to admit, treat and follow patients in the pandemic, a possible late diagnosis and/or treatment of lung diseases, especially cancer,<sup>7</sup> is still a major concern. We believe that this pandemic is a unique opportunity to increase awareness in the global population about lung-health and, lung diseases other than CoViD-19 which remain important causes of severe illness and death worldwide.

### Conflict of interest

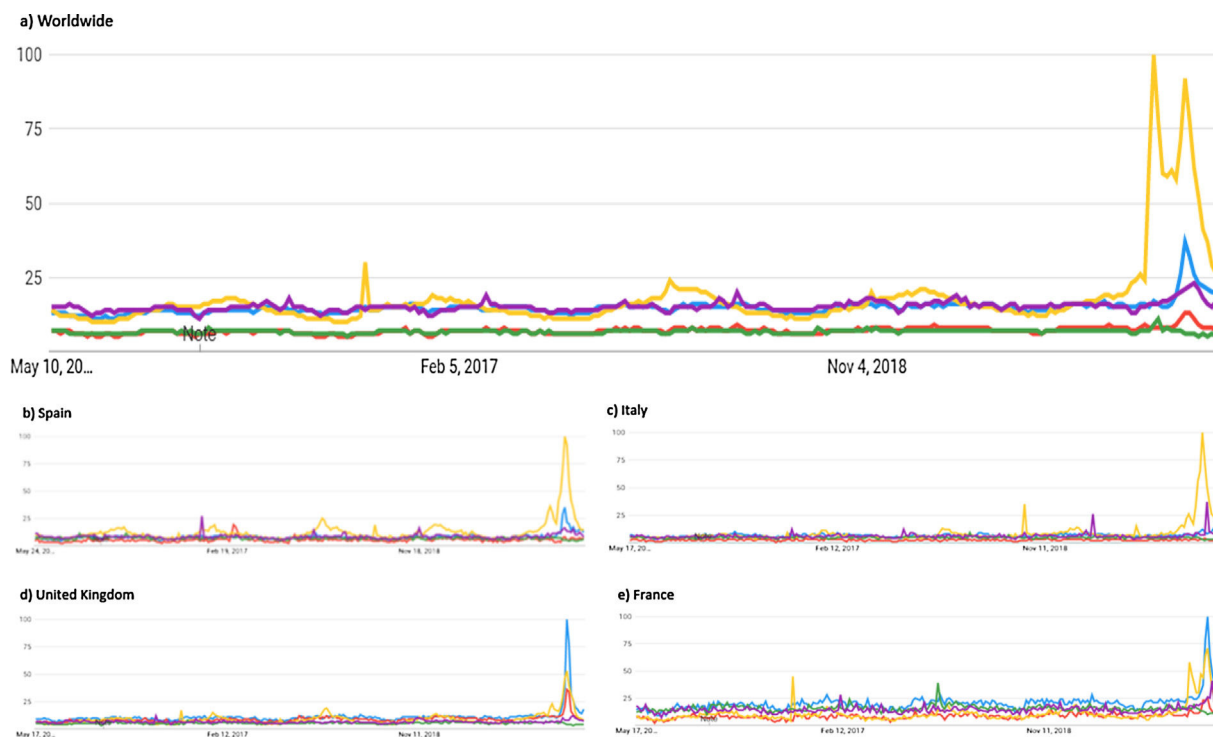
The authors have no conflicts of interest to declare.

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### Author's contributions

MTB and MMA participated in study design and study conception. MTB performed data analysis and drafted the manuscript. All authors provided critical review of the manuscript and approved the final draft for publication.



**Figure 1** Relative search volume over time in the past 5 years (May 2015 till April 2020): Pneumonia (yellow line), Asthma (blue line), COPD (red line), Tuberculosis (purple line) and Lung cancer (green line). The highest interest on a search query is quantified as 100 relative search volume (RSV), decreasing to 0 RSV, indicating no interest. - Data source: Google Trends (<https://www.google.com/trends>).

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M.T. Barbosa<sup>a,b,\*</sup>, M. Morais-Almeida<sup>b</sup>, C.S. Sousa<sup>b,c</sup>, J. Bousquet<sup>d</sup>

<sup>a</sup> Pulmonology Department, Hospital Centre of Barreiro-Montijo, Barreiro, Portugal

<sup>b</sup> Allergy Centre, CUF Descobertas Hospital, Lisboa, Portugal

<sup>c</sup> Pulmonology Department, Central Hospital of Funchal, Portugal

<sup>d</sup> Charité, Universitätsmedizin Berlin, Humboldt-Universität zu Berlin, and Berlin Institute of Health, Comprehensive Allergy Center, Department of Dermatology and Allergy, Berlin, Germany and MACVIA-France, Montpellier, France

\* Corresponding author at: Pulmonology Department, Hospital Centre of Barreiro-Montijo, Avenida Movimento das Forças Armadas, 2834-003 Barreiro, Portugal.

E-mail address: [migueltrbarbosa@gmail.com](mailto:migueltrbarbosa@gmail.com) (M.T. Barbosa).  
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