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Review article

# Bibliometric analysis on pediatrics bronchiolitis in the Scopus database

*Análise bibliométrica sobre o tema bronquiolite pediátrica na base Scopus*

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## ABSTRACT

Bronchiolitis is one of the most common acute viral infections of the lower respiratory tract affecting children. It is responsible for the majority of respiratory hospitalizations worldwide. This study examines the bibliometric analysis of acute viral bronchiolitis to demonstrate the increase of research in this area in Brazil and worldwide. It also analyzes the evolution of publications on "Pediatrics Bronchiolitis" over the last few years and the changes in the approach to this pathology that may contribute to its diagnosis, clinical management, and treatment. To do so, this research uses bibliometric methods of performance analysis and mapping. Data was collected from the Scopus database in August 2023. The search was carried out with the expressions "bronchiolitis" and "pediatrics". In this study, the search was for articles that included these terms in the title or keywords, limiting the search to articles published in periodicals. Bibliometric indicators were obtained, including the number of publications per year, country, institution, number of citations of articles by country, journals, authors who publish articles in their country and publications with collaborators from other countries. Network mapping was also performed using the co-citation method for authors and documents, co-authorship for countries, and co-occurrence for keywords and overlap network mapping using co-occurrence for keywords. Results: The United States is the country that has published the most on the subject, as well as its institutions and journals; American authors also contribute the most to publications from other countries. The increasing number of studies conducted in recent years shows the growing interest of the scientific community in one of the most frequent respiratory diseases in children under the age of 2. Conclusion: Bronchiolitis is still the leading cause of hospitalization in this age group, presenting secondary bacterial infection as a complication, as well as having a worse prognosis and greater severity in children who have some underlying pathology. Clinical manifestations were reported–among them, cough and fever were the most frequent–as was the therapy used, with clinical support and oxygen therapy still being the mainstay of treatment. Respiratory effort was the main cause of intervention measures, such as invasive ventilation and longer hospital stays. Between 2020 and 2021, a decrease in the number of cases was observed, probably because of the use of masks and social distancing during the peak of the COVID-19 pandemic.

## RESUMO

A bronquiolite é uma das infecções virais agudas do trato respiratório inferior que mais acometem crianças, sendo responsável por grande parte das hospitalizações por quadros respiratórios em todo o mundo. O objetivo deste estudo foi realizar uma análise bibliométrica sobre o tema bronquiolite pediátrica, no Brasil e no mundo. A pesquisa foi realizada na base Scopus, em agosto de 2023, por meio das expressões de busca: bronquiolite e pediatria. Foram obtidos indicadores bibliométricos relacionados ao número de publicações por ano, por país, por instituições, por número de citações de artigos por país, por periódicos, por autores que publicam artigos em seu país e por publicações com colaboradores de outros países. Realizou-se também o mapeamento de rede, utilizando o método de cocitação para autores e documentos, coautoria para países e coocorrência para palavras-chave, além do mapeamento de rede de sobreposição, com base na coocorrência de palavras-chave. Os Estados Unidos são o país que mais possui publicações sobre o tema, assim como as suas instituições e periódicos; os autores norte-americanos também estão entre os que mais contribuem com publicações em parceria com outros países. O número crescente de estudos ao longo dos últimos anos demonstra o aumento do interesse da comunidade científica por uma das doenças respiratórias mais frequentes em crianças menores de dois anos. A bronquiolite ainda é responsável por grande parte das internações nessa faixa etária e apresenta, como complicação, a infecção bacteriana secundária, além de estar associada a pior prognóstico e maior gravidade em crianças com alguma patologia de base. Foram constatadas manifestações clínicas, sendo a tosse e a febre as mais frequentes, assim como a terapêutica utilizada, tendo o suporte clínico e a oxigenoterapia como base do tratamento. O esforço respiratório foi o principal responsável pela adoção de medidas de intervenção, como ventilação invasiva e prolongamento do tempo de internação hospitalar. Entre os anos de 2020 e 2021, observou-se uma redução no número de casos, provavelmente em decorrência do uso de máscaras e do distanciamento social durante o pico da pandemia de COVID-19.


## INTRODUCTION

Bronchiolitis, like upper respiratory tract infections, are highly prevalent pathologies in children up to two years of age, causing high morbidity and mortality worldwide, with an increased incidence during the autumn and winter months[1]. Characterized by respiratory symptoms such as fever, cough, and difficulty breathing, bronchiolitis is responsible for a high number of emergency room visits and hospitalizations[2]. The need for respiratory support and associated antibiotics for the treatment of secondary bacterial infections — its main and most frequent complication — underscores the importance of updating and expanding knowledge on the topic of "pediatric bronchiolitis."

The number of published articles and journals has significantly increased in recent years; however, the therapeutic methods used are still under discussion[3,4]. Therefore, the subject requires further in-depth studies and research, either due to the existing uncertainties or its relevance in the pediatric clinical context.

The growth of scientific production in recent years has made it difficult to track and update the literature in real-time. Bibliometric methods allow for a systemic, transparent, and reproducible evaluation of the literature, mapping the research field and thus guiding the researcher towards the most influential works[5, 6].

According to Guedes and Borschiver (2005)[7], "[...] bibliometrics is a set of empirical laws and principles that contribute to establishing the theoretical foundations of Information Science." In a more classical approach, bibliometrics is defined as any research that at-

tempts to measure the communication processes of writing, either by mathematical methods or statistical methods[8].

There are two main uses of this technique: one focused on performance analysis and the other on mapping science. The first aims to evaluate groups of scientific actors, such as countries, universities, and researchers, while the second aims to reveal the dynamic structure of scientific research or represent the cognitive arrangement of a research area[6].

The objective of this study is to present bibliometric indicators on the topic of "Pediatric Bronchiolitis," using the Scopus database as the data source.

***Literature Review***

*Acute Viral Bronchiolitis*

Bronchiolitis is one of the most common acute viral infections of the lower respiratory tract in children, especially those between zero and two years of age, being responsible for a significant proportion of hospitalizations due to respiratory conditions worldwide. It is most often caused by the respiratory syncytial virus (RSV) and results from its presence in the lower bronchiolar pathways, leading to an intense inflammatory reaction with the formation of mucus plugs — the main predisposing factor for secondary bacterial infections, such as pneumonia and otitis[9, 10].

In many cases, the symptom that leads to seeking medical attention is fever, which is present in approximately 70% of the cases[3]. The children most affected by bronchiolitis are, as expected, those under one year of age. Risk factors include prematurity, heart diseases, bronchopulmonary dysplasia, and exposure to passive smoking, with these patients being at a higher risk of developing more severe forms of the disease[4].

Although respiratory syncytial virus (RSV) is widely recognized as the primary etiological agent associated with cases of acute bronchiolitis, human rhinovirus has also been identified in a large number of cases of respiratory infections in young children, particularly in those associated with wheezing[11]. Many of these cases require hospitalization, particularly those caused by rhinovirus C. A prospective study showed an increased risk of developing asthma in these children compared to those with less severe respiratory conditions[2,12,13].

Bronchiolitis has been the subject of studies over time with the aim of improving the quality of pediatric care. It is a disease that presents few universally effective interventions and is often associated with a significant amount of unnecessary care, such as antibiotic therapy and the prolonged use of corticosteroids in patients with viral involvement but without concomitant bacterial infections.

However, some medications and tests may be useful in specific situations. One example is that most viral infections of the lower respiratory tract are not associated with concomitant bacterial infections; however, in cases of bronchiolitis, a small percentage of children may develop clinical signs suggestive of secondary bacterial pneumonia, which justifies, in selected cases, the performance of a chest X-ray and the concurrent use of antibiotics[13,14].

Similarly, some children with bronchiolitis may present a history or clinical features suggestive of true bronchospasm, in which cases treatment with bronchodilators may be indicated[3].

Although viral testing is not yet recommended as routine practice by most studies, it may be indicated in certain circumstances to avoid additional tests or the inappropriate use of antibiotics[12]. The multiplex PCR test for virus detection in the respiratory tract has shown a positive impact on reducing antibiotic use, thus helping to decrease the risk of bacterial resistance in children[15].

In the definitions, management, and research related to acute respiratory syndrome, bronchiolitis is one of the leading causes of

hospitalization in hospitals with intensive care units (Pediatric ICU). Respiratory syncytial virus and bacterial coinfection are associated with more severe cases and longer stays in Pediatric ICU[11]. Additionally, respiratory syncytial virus is responsible for 22% of acute respiratory syndromes in children, and most of those who progress to death are in developing countries[1].

The treatment of bronchiolitis varies considerably and is still widely discussed, as there is no well-established drug recommendation. This leads to considerable divergence in clinical practices, despite many years of research on the topic, with bronchiolitis being considered one of the diseases with the greatest social and economic impact due to its high incidence and prevalence[9].

However, some studies show benefits in reducing the use of bronchodilators[12,14,16]. The use of nebulization with hypertonic solution and corticosteroids has limited benefits, as demonstrated in a study conducted from 2010 to 2017 with more than 700 children hospitalized with severe bronchiolitis[13].

Hospitalization usually occurs in children under 18 months of age. In 30% of cases, respiratory syncytial virus can be detected by viral PCR testing in the nasopharynx. Additionally, the length of hospitalization in these patients was longer[11].

Regarding hospitalization, it is more frequent in children under 6 months, infants who were premature or have some comorbidity. The main comorbidities associated with hospitalization were heart diseases, lung diseases, neuropathies, and prematurity[13].

Furthermore, the total number of hospitalizations has been increasing over the years, as well as the use of non-invasive ventilation[17].

A major concern is respiratory failure and the need for mechanical ventilation, which tends to occur frequently. When required for more than seven days, it is associated with a worse prognosis and increased mortality[18].

Another issue is the higher mortality rate in children under 1 year of age. Additionally, children with underlying conditions, such as heart diseases, hematological diseases, neurological disorders, and associated malnutrition, have higher morbidity and mortality. Further studies are still needed for a more effective approach and treatment for this higher-risk group[19].

The use of associated antibiotics and systemic corticosteroids, as well as intensive interventions and treatment, was more commonly observed in children who already had a history of atopy and previous wheezing[20]. Most physicians treating bronchiolitis cases in emergency settings use bronchodilators as part of the initial treatment. Additionally, admission for hospitalization is also based on oxygen saturation, considered at 94% in this study[21].

Respiratory syncytial virus, when compared to metapneumovirus and influenza virus, showed a lower correlation with pneumonia and, therefore, lower antibiotic use and less exacerbation of asthma symptoms. However, RSV is more closely associated with the use of bronchodilators[22].

The consensus treatment recommended is supportive care, and adopting a conservative approach seems appropriate for most patients, particularly those of younger age. The fact that most cases evolve favorably over time, regardless of the chosen therapeutic option, likely explains why certain medications that do not show clinical benefits are still used, based on professional or institutional preferences.

The treatment of bronchiolitis remains a significant issue, as most medications have proven to be of little help, and current guidelines recommend that medication treatment be limited to specific situations[3]. As a result, there is widespread variability regarding overtreatment and undertreatment. Evaluating adherence to international recommendations by the medical community is very important, though still rarely observed.

Therefore, bronchiolitis presents a challenge for the management of each patient, in

their specific treatment and in providing adequate ventilatory support when needed[13]. A multidisciplinary approach has been used in bronchiolitis; however, some interventions and therapeutic modalities still require further study[14].

*Bibliometrics*

The term bibliometrics was cited by Otlet (1934)[23] in his work Traité de Documentation. "Bibliométrie" was mentioned by the author as an integral part of Bibliology, which deals with the measure or quantity applied to books. All the elements outlined by Bibliology are, in principle, measurable, requiring their data to be expressed precisely in numbers, moving from a qualitative or descriptive state to a quantitative state.

In research centers and higher education institutions, researchers and students need and seek information to conduct a bibliographic survey, develop a theoretical and methodological approach, identify the main authors, and the sources of documents related to the development of their research[24].

The number of academic publications is increasing at an accelerated pace, making it increasingly unfeasible to keep up-to-date with everything being published[25]. With the technologies currently available, searching for and retrieving scientific information in specific journals may initially seem like simple tasks, as they are available on the internet. However, depending on the field and the subject being researched, the search may return thousands of documents or a very restricted set[24].

Bibliometric indicators have been gaining increasing importance as tools for analyzing scientific activity and its relations with economic and social development. These indicators are constructed by counting the number of publications by document type, institution, field of knowledge, country, among others[26].

Scientific mapping is becoming an essential activity for scholars of all scientific disciplines. As the number of publications continues to expand at increasing rates and as publications develop in a fragmented manner, the task of accumulating knowledge becomes more complex. Determining the intellectual structure and the research front of scientific domains is important not only for research but also for policy formulation and practices[25]. Thus, it is observed that bibliometrics has been applied in various areas of knowledge with the aim of identifying characteristics of the topics addressed[27]. Bibliometric methods employ a quantitative approach to the description, evaluation, and monitoring of published research[5]. These methods have the potential to introduce a systematic, transparent, and reproducible review process, thus improving the quality of reviews.

According to Zupic and Čater (2014)[5], the five main bibliometric mapping methods are: citation analysis, co-citation analysis, bibliographic coupling, co-authorship analysis, and co-word analysis. The first three use citation data to construct measures of influence and similarity. Co-authorship analysis uses co-authorship data to measure collaboration. Co-word analysis identifies connections between concepts that co-occur in document titles, keywords, or abstracts.

Ding (2022)[28] reported, in the methodology, the analyses used in scientific mapping. Author co-citation analysis aims to identify authors who stand out through citation record analysis. Journal co-citation analysis contributes to understanding scientific journals related to a particular area[23]. According to Danvila-del-Valle, Estévez-Mendonza, and Lara (2019)[29], co-citation analysis reflects the importance that researchers assign to a cited article, which, consequently, the more it is cited, the more predominant it becomes in the development of a particular area. Keyword co-occurrence analysis of articles can be applied to build a network in a specific field, with the aim of exploring and displaying the intellectual structure of a given research area[30].

*Scopus database*

Scopus is a database of abstracts and citations of peer-reviewed literature, including scientific journals, books, and conference proceedings. It provides a comprehensive view of global research output in the fields of science, technology, medicine, social sciences, arts, and humanities[31].

Scopus contains information in over 92 million records. It is updated daily, featuring tools and filters that enhance research efficiency, allowing users to identify trends in key topics. Bibliographic research in the Scopus database was developed to filter large volumes of information in order to locate the most relevant documents and data in less time. With Scopus, it is possible to search and filter results in the following ways: document search; author search; affiliation search — identify and evaluate academic output of an affiliation, collaborating institutions, and leading authors; advanced searches; refining results; and a multi-language interface[32].

## MATERIAL AND METHODS

Data collection was conducted on August 12, 2023, in the Scopus database, available through the Capes Periodicals Portal. This database offers comprehensive academic literature with up-to-date information and analytical tools, containing over 91 million records from 27,950 active journal titles and 292,000 books. It is the only database that combines automated data and manual curation to generate profiles of current authors, totaling more than 17 million profiles, which allows for precise author searches, just as with article searches: with efficiency and operational simplicity[33] (**Table 1**).

The research was carried out using the search expressions (query): bronchiolitis and pediatrics. In this study, articles containing these terms in the title or keywords were sought, limiting the search to those published in journals. The search expressions with Boolean operators were:

TITLE-KEY ((TITLE (pediatrics AND bronchiolitis) OR (KEY (pediatrics AND bronchiolitis)) AND (LIMIT-TO (DOCTYPE, "ar"))).

Of the 469 articles found, 21 countries published at least five papers related to the analyzed topic. Regarding co-occurrence, it was observed that 54 articles met the criteria, and concerning the citation of references, 42 met the criteria.

The ten most cited papers on the topic of "Pediatric Bronchiolitis" in the Scopus database were selected, and for those that were relevant to the topic, a summary was prepared with the goal of identifying which research lines are prioritized worldwide.

The maps were generated using the VOSviewer program, version 1.6.19[34], based on Scopus database.

**Table 1.** Analyzed variables: authors, countries, keywords, and papers, with respective visualizations in maps, methods, and filters.

| Map Visualization | Method | Variable | Filter |
|---|---|---|---|
| Network | Co-citation | Author | 22 citations |
| Network | Co-authorship | Countries | 5 documents per country |
| Network | Co-occurrence | Keywords | 4 words |
| Overlap Network | Co-occurrence | Keywords | 4 words |
| Network | Co-citation | Documents | 4 citations |

## RESULTS AND DISCUSSION

*Bibliometric Indicators*

The research in the Scopus database on the topic of "Pediatric Bronchiolitis" covered the period from 1968 to 2023, during which 250 sources (journals) were consulted. This allowed access to the following information for consultation and data retrieval: 469 documents (articles), 2,647 authors, 884 keywords, 12,106 references, average document age (9.81 years), annual growth rate of documents (5.69%), and average citation of documents (18.91).

**Table 2** shows the indicators on the topic of "Pediatric Bronchiolitis" obtained from the Scopus database.

*Annual Production*

As shown in **Figure 1**, the publication process began in 1968 with the work of the author Chusid (1968), who observed in his study an improvement in respiratory discomfort in babies with bronchiolitis and whooping cough when placed in a plastic seat in a reclined supine position, demonstrating how a simple measure brought significant improvement in

**Table 2 .** Indicators on the topic of "Pediatric Bronchiolitis" with general information, document data, author data, and document types obtained from the Scopus database.

| INDICATORS | |
|---|---|
| **General** | |
| Period | 1968:2023 |
| Source (journals, books, etc.) | 250 |
| **Documents** | |
| Documents | 469 |
| Average age of documents | 9.81 |
| Annual growth rate (%) | 5.69 |
| Average citation per document | 18.93 |
| References | 12.106 |
| Keywords (author) | 884 |
| **Authors** | |
| Authors | 2.647 |
| Average co-authorship per document | 42 |
| International co-authorships (%) | 14.5 |
| **Document types** | |
| Article | 469 |

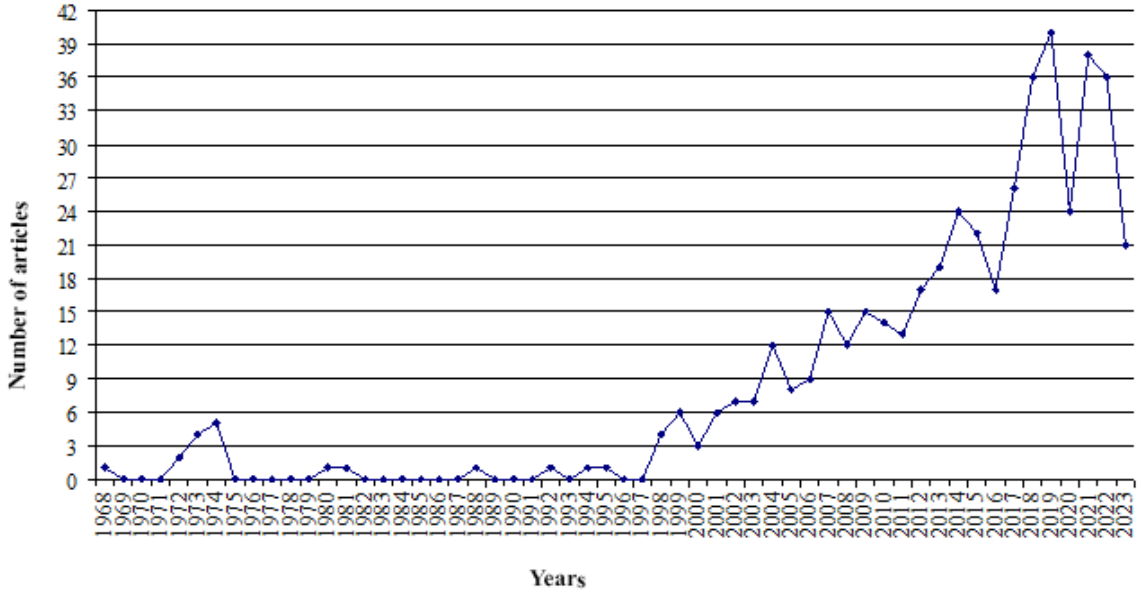


**Figure 1.** Number of publications per year related to the topic "Pediatric Bronchiolitis" in the Scopus database.

the babies' symptoms.

**Figure 1** displays the number of publications per year related to the topic of "Pediatric Bronchiolitis" in the Scopus database.

After this document, there was a steady increase until 1974, after which a decrease in the number of publications is observed, which then starts to grow again in 1997. From then on, interest in the topic increases, and the number of publications peaks in 2019, with 40 articles published.

*Countries*

It can be seen that the United States was the country with the highest number of published articles (191), followed by the United Kingdom and Spain, both with 34 published articles. Brazil occupied the 17th position, with seven articles, indicating the contribution of Brazilian researchers to the researched topic in the global scenario.

**Figure 2** shows the article production by country published on the topic "Pediatric Bronchiolitis" in the Scopus database

*Institutions*

It can be observed that Baylor College of Medicine stood out with the highest number of published articles (23), followed by the University of Cincinnati College of Medicine, with 22 published articles. It is also noted that, out of the 12 institutions that stood out in terms of publication numbers, eight are located in the United States (USA), indicating the significant contribution this country has made to research on the topic "Pediatric Bronchiolitis."

*Countries – Citations*

It can be observed that the United States (USA) was the most cited country (3,908 citations) on the topic "Pediatric Bronchiolitis" in the Scopus database. This fact can be explained by the country housing the institutions that publish the most on the researched topic (**Figure 3**). Following are Canada and Spain, with 553 and 486 citations, respectively. Brazil occupies the 29th position, with 17 citations — a relatively low number considering the seven articles published, as shown in **Figure 2**.

**Figure 4** shows the most cited countries on the topic "Pediatric Bronchiolitis" in the

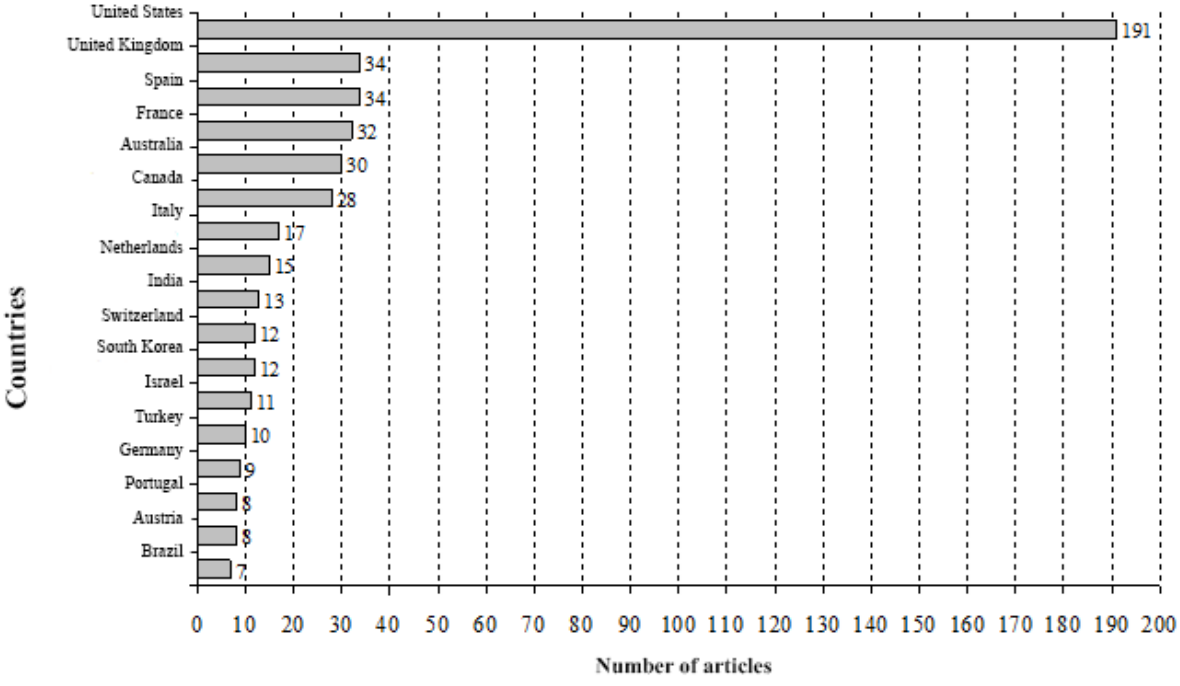


**Figure 2.** Number of articles published by country on the topic "Pediatric Bronchiolitis" in the Scopus database.

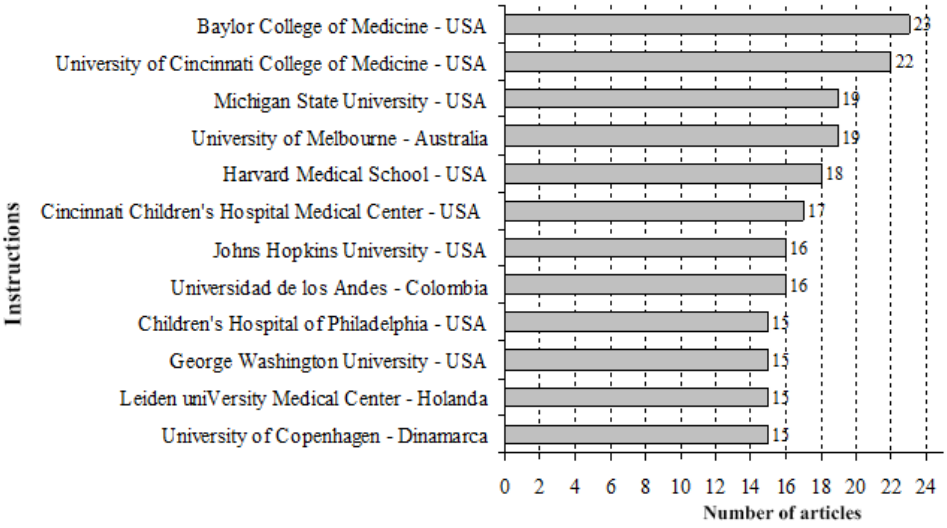


**Figure 3.** Institutions with the number of articles published on the topic "Pediatric Bronchiolitis" in the Scopus database.

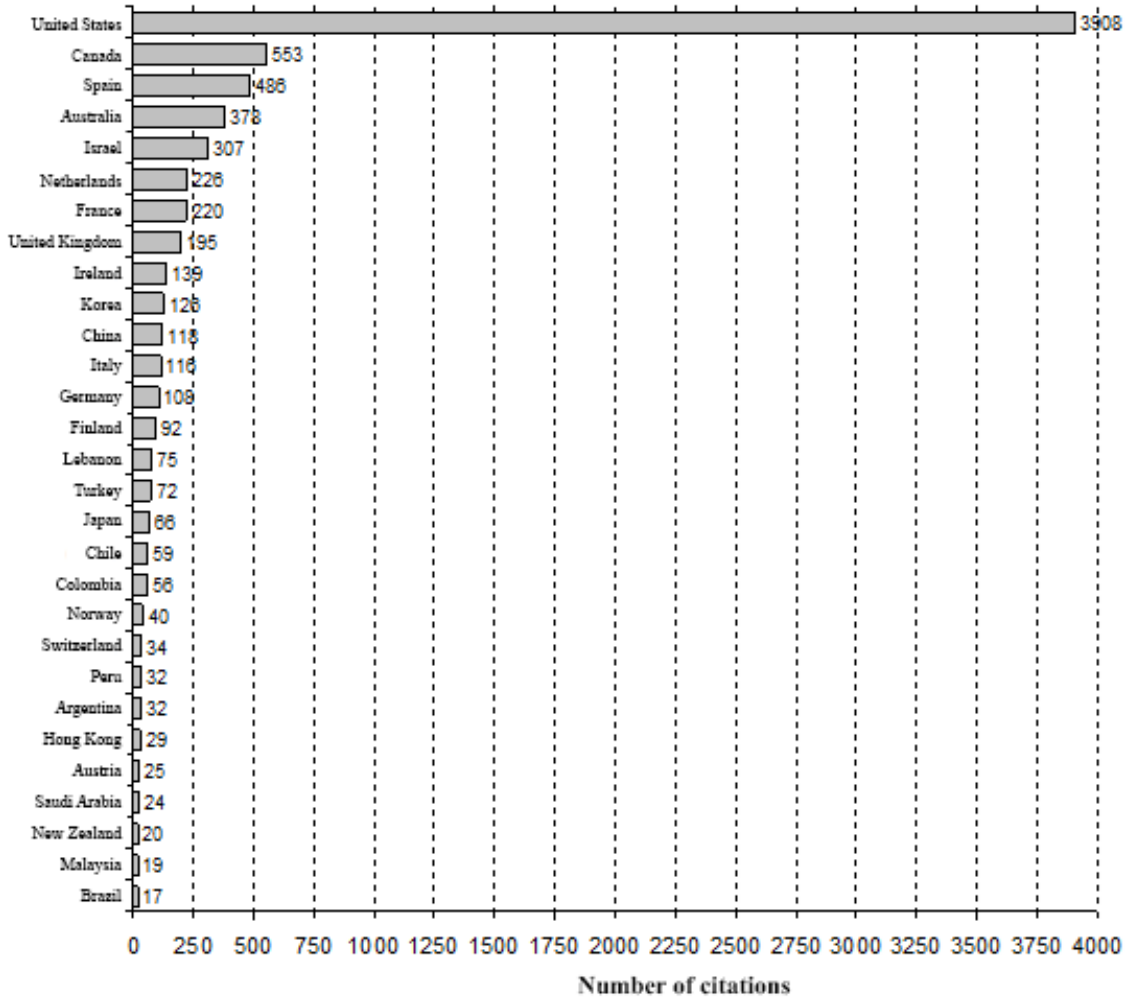


**Figure 4.** Countries with the highest numbers of citations of articles on the topic "Pediatric Bronchiolitis" in the Scopus database.

Scopus database.

*Journals*

The journals that stand out the most in terms of publications related to the topic "Pediatric Bronchiolitis" are Pediatric Pulmonology, with 23 publications, and Pediatrics, with 17 publications, followed by Pediatric Critical Care Medicine, with 14 publications.

**Figure 5** shows the most relevant journals based on the number of articles published on the topic "Pediatric Bronchiolitis" in the Scopus database.

*Authors*

**Figure 6** presents the number of publications by the corresponding author's country, with the origin of each article defined based on the institutional affiliation of the author. Additionally, the index of international collaborations, called Multiple Country Publications (MCP), was calculated. This index represents the proportion of articles with co-authors affiliated with institutions from different countries.

It can be observed that the United States is the country with the highest number of article publications (139), with 124 being exclusive to the country and 15 in collaboration with other countries. France and Spain each total 24 publications, with the number of exclusive publications being 20 and 22, respectively. In the case of Brazil, the number of publications was five articles, four of which were exclusive to the country and one publication with collaboration from multiple countries. South Korea, Israel, India, Turkey, and Argentina had only exclusive publications, with 10, nine, seven, seven, and four publications, respectively. The other countries had both types: exclusive publications and those with collaboration from multiple countries.

*Most Cited Works*

**Table 3** shows the ten most cited papers on the topic "Pediatric Bronchiolitis" in the

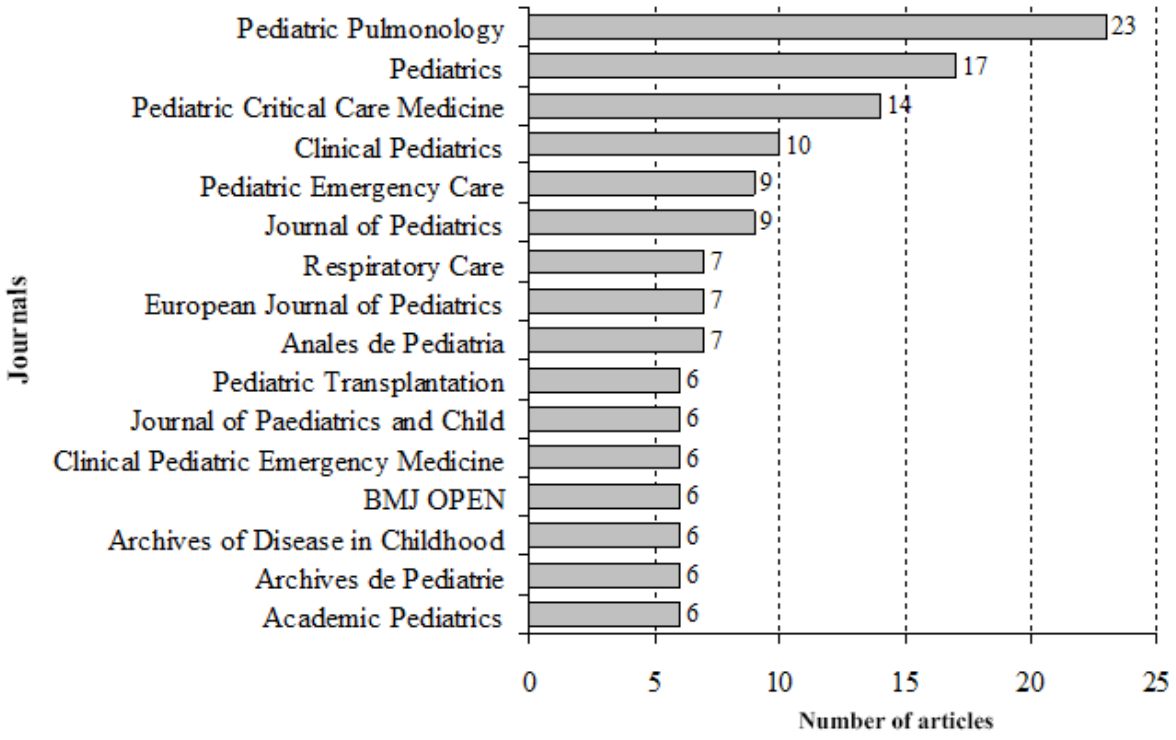


**Figure 5.** Journals with the highest number of citations of articles on the topic "Pediatric Bronchiolitis" in the Scopus database.

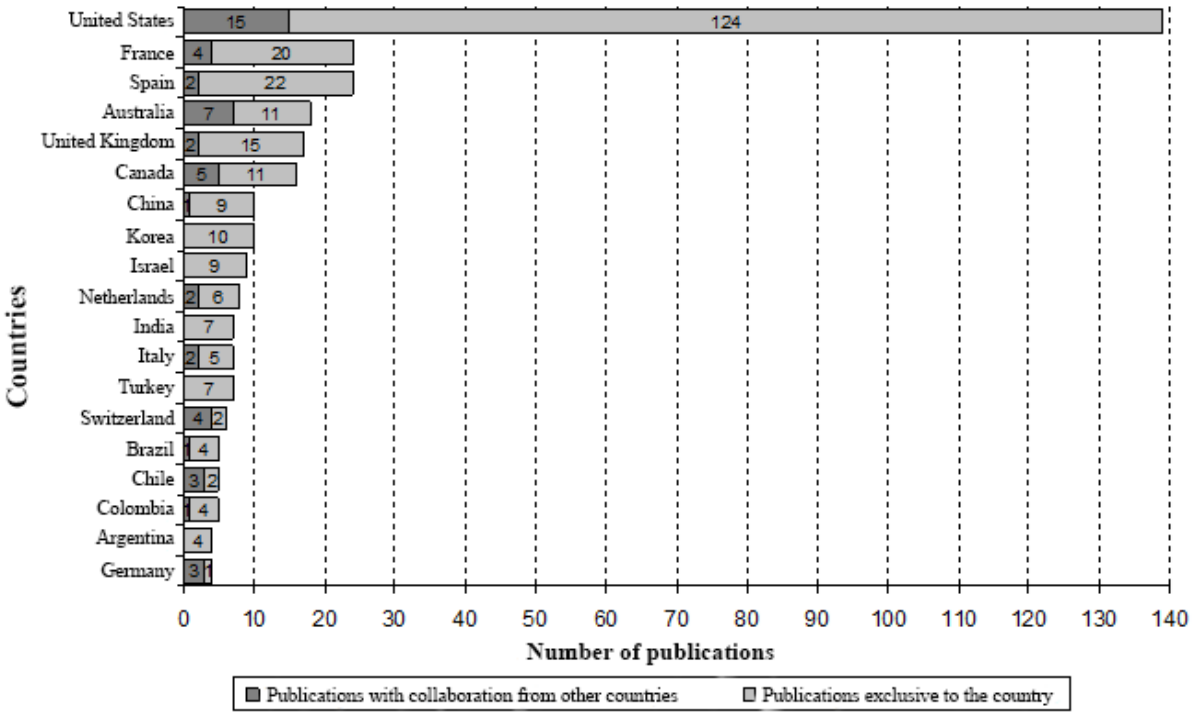


**Figure 6.** Number of publications by the corresponding author's country on the topic "Pediatric Bronchiolitis" in the Scopus database.

Scopus database.

Among the ten most cited papers, four[33–36] were not discussed in this study as they did not align with the researched topic. The remaining authors were cited in the review of subsection 2.1, Acute Viral Bronchiolitis.

### *Mapping Types, Methods, and Variable*

*Network Mapping, Co-citation Method, and Author Variable*

Out of a total of 25,889 cited authors, only 48 had at least 22 citations, forming four clusters. In the first cluster, in red, 19 authors were identified, with Mansbach J.M. standing out with 80 citations, followed by Meissner H.C. with 69 citations. In the second cluster, in green, made up of 13 authors, Gadomski A.M. stood out with 50 citations. In the third cluster, in blue, nine authors were identified, with Bush A. standing out with 36 citations. The fourth cluster, in yellow, was formed by seven authors, with Hall C.B. being the most prominent, with 96 citations — the most cited among all clusters.

**Figure 7** shows the author mapping through network visualization and the co-citation method on the topic "Pediatric Bronchiolitis" in the Scopus database.

*Network Mapping, Co-authorship Method, and Country Variable*

Out of the 469 articles found, 21 countries published at least five documents related to the analyzed topic. Thus, in the mapping, 21 items were visualized, grouped into five clusters. In cluster 1, in red, Spain stands out with 34 contributions. In cluster 2, in green, five countries contributed, with the United Kingdom standing out with 34 publications. In this cluster, it is important to highlight the presence of Brazil, with seven contributions. In cluster 3, in blue, Australia stands out, relating to 30 countries.

**Table 3.** The ten most cited papers on the topic "Pediatric Bronchiolitis" in the Scopus database, with the authors, respective references, DOI, total citations, and average citations per year.

| Paper | DOI | TC* | TCPA** |
|---|---|---|---|
| [35]Carver JR, Shapiro CL, Ng A, Jacobs L, Schwartz C, Virgo KS, et al. American Society of Clinical Oncology Clinical Evidence Review on the Ongoing Care of Adult Cancer Survivors: Cardiac and Pulmonary Late Effects. J Clin Oncol. 1o de setembro de 2007;25(25):3991–4008. | 10.1200/JCO.2007.10.9777 | 628 | 36.94 |
| [3]Pantell RH, Newman TB, Bernzweig J, Bergman DA, Takayama JI, Segal M, et al. Management and Outcomes of Care of Fever in Early Infancy. JAMA. 10 de março de 2004;291(10):1203. | 10.1001/jama.291.10.1203 | 232 | 11.60 |
| [36]McNally JD, Leis K, Matheson LA, Karuananyake C, Sankaran K, Rosenberg AM. Vitamin D deficiency in young children with severe acute lower respiratory infection. Pediatr Pulmonol. outubro de 2009;44(10):981–8. | 10.1002/ppul.21089 | 193 | 12.87 |
| [22]Wolf DG, Greenberg D, Kalkstein D, Shemer-Avni Y, Givon-Lavi N, Saleh N, et al. Comparison of Human Metapneumovirus, Respiratory Syncytial Virus and Influenza A Virus Lower Respiratory Tract Infections in Hospitalized Young Children: Pediatr Infect Dis J. abril de 2006;25(4):320–4. | 10.1097/01.inf.0000207395.80657.cf | 182 | 10.11 |
| [37]Routh JC, Graham DA, Nelson CP. Epidemiological Trends in Pediatric Urolithiasis at United States Freestanding Pediatric Hospitals. J Urol. setembro de 2010;184(3):1100–5. | 10.1016/j.juro.2010.05.018 | 170 | 12.14 |
| [18]Randolph AG, Meert KL, O'Neil ME, Hanson JH, Luckett PM, Arnold JH, et al. The Feasibility of Conducting Clinical Trials in Infants and Children with Acute Respiratory Failure. Am J Respir Crit Care Med. 15 de maio de 2003;167(10):1334–40. | 10.1164/rccm.200210-1175oc | 150 | 7.14 |
| [10]Alpern ER, Stanley RM, Gorelick MH, Donaldson A, Knight S, Teach SJ, et al. Epidemiology of a Pediatric Emergency Medicine Research Network: The PECARN Core Data Project. Pediatr Emerg Care. outubro de 2006;22(10):689–99. | 10.1097/01.pec.0000236830.39194.c0 | 147 | 8.17 |
| [21]Mallory MD, Shay DK, Garrett J, Bordley WC. Bronchiolitis Management Preferences and the Influence of Pulse Oximetry and Respiratory Rate on the Decision to Admit. Pediatrics. 1o de janeiro de 2003;111(1):e45–51. | 10.1542/peds.111.1.e45 | 142 | 6.76 |
| [2]Cox DW, Bizzintino J, Ferrari G, Khoo SK, Zhang G, Whelan S, et al. Human Rhinovirus Species C Infection in Young Children with Acute Wheeze Is Associated with Increased Acute Respiratory Hospital Admissions. Am J Respir Crit Care Med. 1o de dezembro de 2013;188(11):1358–64. | 10.10.1164/rccm.201303-0498OC | 139 | 12.64 |
| [38]Perlstein PH, Kotagal UR, Bolling C, Steele R, Schoettker PJ, Atherton HD, et al. Evaluation of an Evidence-based Guideline for Bronchiolitis. Pediatrics. 1o de dezembro de 1999;104(6):1334–41. | 10.1542/peds.104.6.1334 | 132 | 5.28 |

*TC: Total citations; **TCPA: Total citations per year

In cluster 4, in yellow, Argentina and Colombia stand out, relating to six countries. In cluster 5, in purple, the United States stands out, relating to 191 countries.

**Figure 8** shows the country mapping through network visualization and the co-authorship method on the topic "Pediatric Bronchiolitis" in the Scopus database.

*Network Mapping, Co-occurrence Method, and Keyword Variable*

It can be observed that, out of the 886 identified keywords, 54 were selected using the limit of four co-occurrences, which formed seven clusters. Cluster 1, in red, consisted of 13 items, with the term respiratory syncytial virus standing out with 28 occurrences. In cluster 2, in green, formed by 11 items, the term asthma stood out with 23 occurrences. In cluster 3, in blue, composed of eight items, the term children stood out with 29 occurrences. Clusters 4, in yellow, and 5, in purple, were both composed of

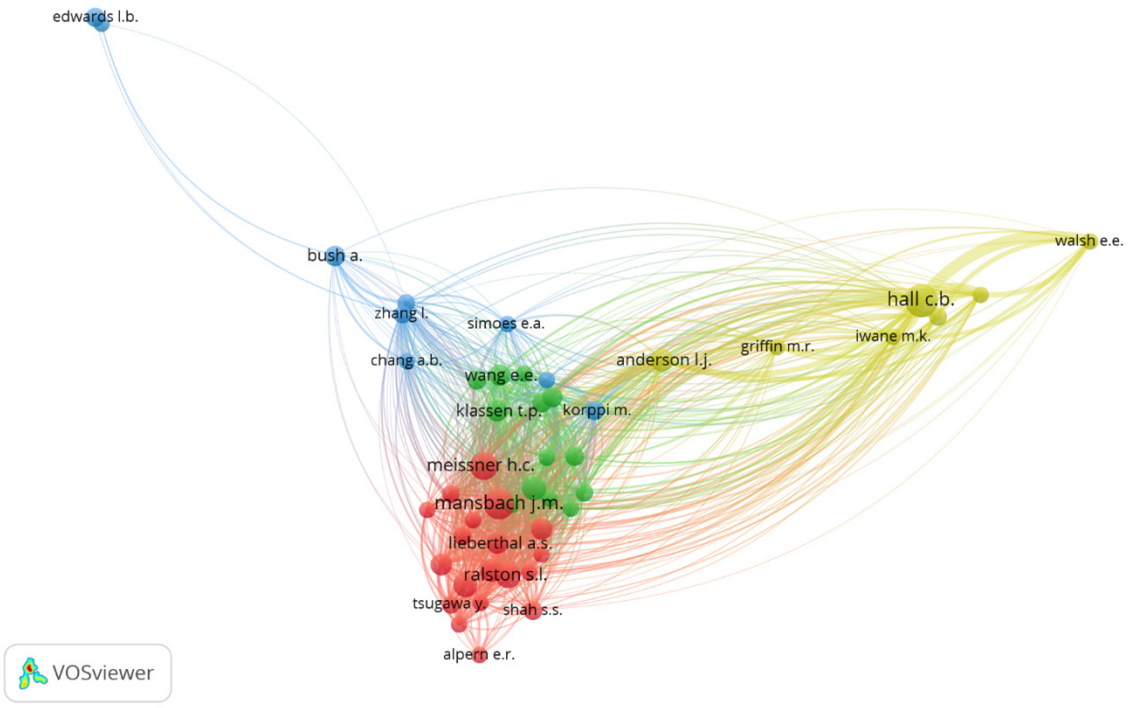


**Figure 7.** Author mapping with network visualization and co-citation method on the topic "Pediatric Bronchiolitis" in the Scopus database.

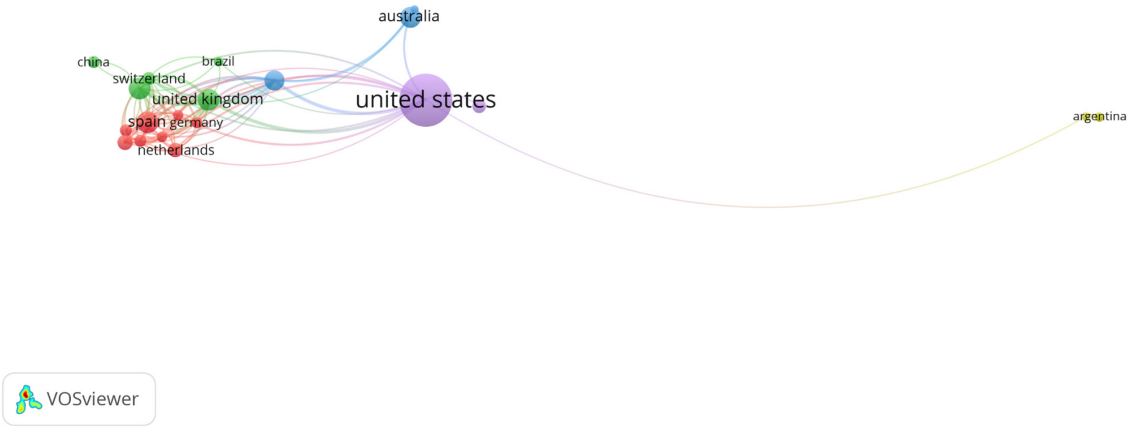


**Figure 8.** Country mapping using network visualization and co-authorship method on the topic "Pediatric Bronchiolitis" in the Scopus database.

seven items; in the yellow cluster, the term child stood out with 13 occurrences, and in the purple cluster, the term pediatrics stood out with the highest number of occurrences (166). Cluster 6, in light blue, was formed by five items, with the term bronchiolitis standing out with the second-highest number of occurrences (94). Cluster 7, in orange, was composed of three items, with the term lung transplantation standing out with 10 occurrences.

**Figure 9** shows the keyword mapping through network visualization and the co-occurrence method on the topic "Pediatric Bronchiolitis" in the Scopus database.

*Overlay Network Mapping, Co-occurrence Method, and Keyword Variable*

It can be observed that, out of the 886 identified keywords, 54 were selected using the limit of four co-occurrences, which formed seven clusters. In the temporal mapping, older publications are represented in dark blue, while more recent ones appear in lighter shades, with the most recent publication highlighted in yellow. The oldest publication was identified in Guidelines in 2008,75, related to the terms bronchiolitis and palivizumab, belonging to cluster 6, in light blue (**Figure 9**). The most recent publication refers to COVID-19, in 2021,89, associated with the terms asthma, epidemiology, emergency department, informatics, among others, in cluster 2, in green (**Figure 9**).

**Figure 10** shows the keyword mapping using overlay network visualization and the co-occurrence method on the topic "Pediatric Bronchiolitis" in the Scopus database.

*Network Mapping, Co-citation Method, and Document Variable*

In **Figure 11**, a total of 12,030 references were found. By applying a filter of at least four citations per reference, 47 documents were

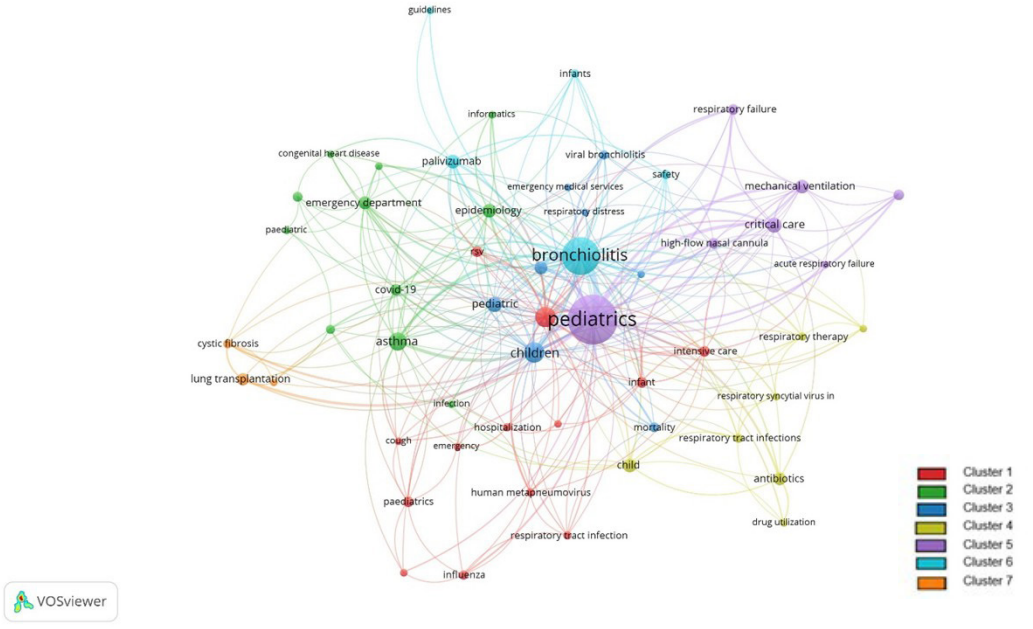


**Figure 9.** Mapping of keywords using network visualization and the co-occurrence method on the topic "Pediatric Bronchiolitis" in the Scopus database.

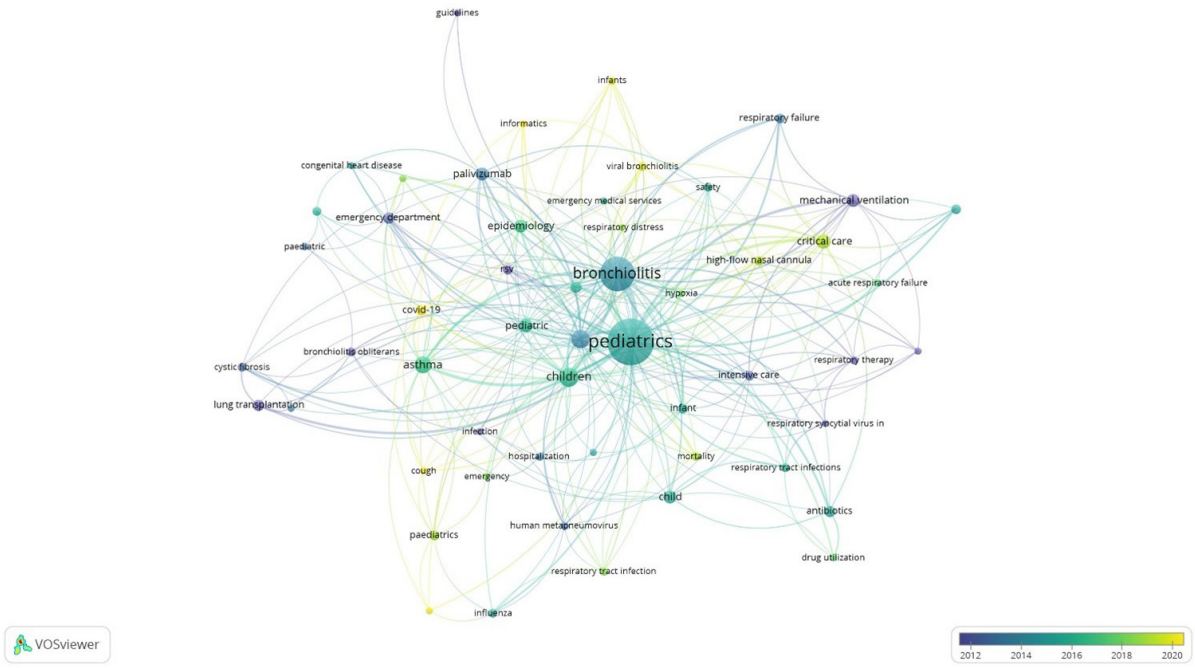


**Figure 10.** Mapping of keywords using overlay network visualization and the co-occurrence method on the topic "Pediatric Bronchiolitis" in the Scopus database.

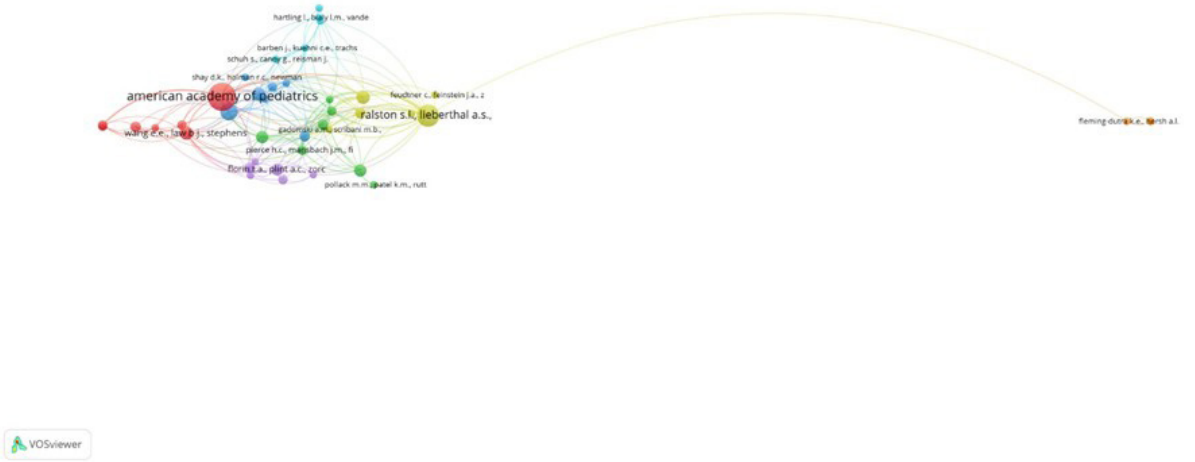


**Figure 11.** Mapping of documents using network visualization and the co-citation method on the topic "Pediatric Bronchiolitis" in the Scopus database.

grouped into seven clusters. In cluster 1, in red, the American Academy of Pediatrics stands out with 20 citations. In cluster 2, in green, Pelletier A.J., Mansbach J.M., and Camargo C.A. each have seven citations. In cluster 3, in blue, Florin T.A. and Plint A.C. also stand out, each with seven citations. In cluster 4, in yellow, Ralston S.L. stands out with 15 citations. In cluster 5, in purple, all authors were cited four times. In cluster 6, in light blue, Shay D.K. and Holman R.C. stand out with 11 citations. Finally, in cluster 7, in orange, all authors also have four citations.

**Figure 11** shows the document mapping through network visualization and the co-citation method on the topic "Pediatric Bronchiolitis" in the Scopus database

Based on the data found in the study, the evolution of publications and the continuous increase in interest in the topic "Pediatric Bronchiolitis" are evident. Through the bibliometric analysis performed, it can be observed that, starting from 1968 — the year of the publication of the first study —, there was a progressive increase in the number of publications, especially from 1997 onwards. This increase is related to the high prevalence of the disease in the pediatric population. The careful selection of studies, based on bibliometric analysis, contributes to a more assertive choice of the productions to be investigated.

The general bibliometric indicators on the topic "Pediatric Bronchiolitis" — related to documents and authors — highlighted the United States as the most relevant country, with the highest number of publications and the most significant volume of co-authorship collaborations. In this country, the journals and institutions with the highest number of publications on the topic are also located. Brazil appears with some publications, including collaborations with other countries.

The main authors, co-citations, co-authorships, and those who published the most were identified according to the search conducted in the Scopus database, as well as those considered the most relevant and with the greatest adherence to the studied topic. Additionally, the most recurring terms (keywords) were: bronchiolitis, pediatrics, respiratory syncytial virus, emergency, palivizumab, epidemiology, guideline, and asthma.

For future studies, it is recommended to use other databases, such as Web of Science, PubMed, SciELO, and ScienceDirect, in order to complement the information related to the bibliometric indicators used in this work.

## AUTHOR CONTRIBUTIONS

TRGO, AS, ES and FALM were responsible for the conception and design of the study, data analysis and manuscript writing. TRGO, AS, ES, FALM and FFS data collection, statistical analysis, and critical revision of the manuscript. TRGO, AS and FALM performed the final revision of the text. All authors read and approved the final manuscript version and agree to take responsibility for its content.

## CONFLICT OF INTEREST

We wish to confirm that there are no known conflicts of interest associated with this publication and that no significant financial support has influenced its results.

## DECLARATION REGARDING THE USE OF GENERATIVE AI

The authors declare that generative artificial intelligence tools (such as ChatGPT, Grammarly, Deepseek, etc.) were not used in the manuscript. However, the editorial board made the decision to utilize ChatGPT, an AI language model developed by OpenAI, for the translation of this manuscript from the original language, Portuguese, to English.

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