

The Research Trends and Hotspots of Sepsis and Multiple Organ Failure: A Bibliometric Analysis

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Background: Sepsis, a life-threatening response to infection, frequently leads to multiple organ failure (MOF), creating a critical challenge for healthcare systems worldwide. However, a systematic bibliometric analysis is lacking to map global research efforts, identify emerging hotspots, and reveal innovative directions in this field. This study aims to analyze research trends in sepsis and MOF through a comprehensive bibliometric analysis.

Methods: A comprehensive literature search was conducted using the Web of Science Core Collection on December 31, 2024. The analysis utilized three bibliometric tools, namely VOSviewer, CiteSpace, and the R package “bibliometrix”, to ensure comprehensive evaluation.

Results: The study included a total of 4,061 articles, authored by 19,602 researchers from 4,045 institutions spanning 99 countries and regions. The USA emerged as a prominent country in this field, with the Pennsylvania Commonwealth System of Higher Education making significant contributions to this field. Chaudry IH was identified as the most influential author. The journal *Critical Care Medicine* distinguished itself as a leading publication. Keyword analysis identified four significant clusters: Clinical Outcomes and Patient Health, Molecular and Cellular Mechanisms in Sepsis, Immune Responses and Pathogenesis, and Physiological Processes and Experimental Models. Recent keyword bursts included “acute kidney injury”, “guidelines”, “risk factors”, “oxidative stress”, “inflammation”, “mortality”, “epidemiology”, and “cytokine storm”.

Conclusion: This bibliometric analysis provides novel insights into research trends and hotspots in sepsis and MOF research. Research hotspots focus on clinical outcomes, molecular mechanisms and immune responses. The findings underscore the need for future studies to prioritize epidemiological investigations, patient prognosis assessment, and the development of effective therapeutic strategies to improve clinical management.

Keywords: sepsis, multiple organ failure, inflammation, bibliometrics, citation analysis

Introduction

Sepsis is a critical condition that arises from a dysregulated host response to infection, leading to life-threatening organ dysfunction.¹ Globally, sepsis affected an estimated 48.9 million individuals and caused approximately 11 million deaths in one year, representing 20% of all global fatalities and disproportionately impacting low- and middle-income regions.² Sepsis mortality ranges from 15% to 25% in high-income countries, whereas septic shock mortality might reach 30% to 40%.³ Defined by the Sepsis-3 guidelines, sepsis occurs when an infection triggers an acute change in the total Sequential Organ Failure Assessment (SOFA) score of 2 points or more, indicating significant organ impairment.⁴ The pathophysiological mechanisms underlying sepsis are complex and multifaceted, involving an intricate interplay between the immune system, inflammatory responses, and various organ systems.⁵ Sepsis is not merely an infectious process but a systemic condition that can lead to multiple organ failure (MOF) due to the overwhelming inflammatory response it triggers.⁶

MOF is defined as the simultaneous failure of two or more organ systems, which can arise as a direct consequence of sepsis.⁷ In intensive care settings, nearly half of patients with sepsis develop MOF, with such patients facing markedly higher short- and long-term mortality rates.⁸ Numerous studies have reported on the relationship between sepsis and MOF. Endothelial dysfunction is a central feature of sepsis-induced MOF. Targeting endothelial function with small molecules

may attenuate sepsis and subsequent multi-organ damage, offering a promising therapeutic strategy.⁹ Verra et al found that spleen tyrosine kinase inhibition could reduce systemic inflammation and multi-organ failure in a murine model of sepsis, suggesting a potential therapeutic target for sepsis-related MOF.¹⁰ Despite rapid growth in publications related to sepsis and MOF, no study has yet provided a comprehensive, quantitative overview of global research trends, hotspots, and emerging frontiers in this area.

Bibliometric analysis is a quantitative research method used to analyze academic literature, providing insights into research trends, publication patterns, and the impact of specific studies within a field.¹¹ This methodology provides valuable insights into the development of scientific disciplines.¹² Yao et al conducted a bibliometric analysis that highlights the increasing research focus on sepsis and the host immune response.¹³ Currently, there has been no comprehensive bibliometric analysis specifically focusing on the relationship between sepsis and MOF. This study aims to fill this gap by performing a detailed bibliometric analysis of research trends in sepsis and MOF, clarifying the field's structure and informing collaborative and translational efforts.

Material and Methods

Search Strategies and Data Collection

The literature search on sepsis and MOF was conducted using the Web of Science Core Collection (WoSCC). The WoSCC is recognized as a comprehensive and authoritative database that provides access to high-quality academic publications across various disciplines.¹⁴ The search formula used was: (TS = (sepsis* OR “septic shock*” OR “endotoxemia*” OR SIRS* OR “systemic inflammatory response syndrome*)) AND TS = (“Multiple organ failure” OR “MOF” OR “Multiple organ dysfunction syndrome” OR “MOD” OR “MODS”).^{11,13,15} Only English-language publications were selected, with a focus on “articles” from various document types. Literature retrieval was conducted on December 31, 2024, to avoid discrepancies arising from database updates. Bibliographic information was exported in the “Full record and cited references” and “plain text” formats during the filtering process. Data in text format included publication and citation counts, titles, author affiliations, institutions, countries/regions, keywords, and journal names for bibliometric analysis.

Statistical Analysis

Three bibliometric tools were utilized for the visualization and comprehensive analysis of academic data: VOSviewer (version 1.6.20), CiteSpace (version 6.3.R1), and the R package “bibliometrix” (version 4.3.3). Unlike most previous bibliometric studies that are often limited to a single tool or a narrow analytical dimension, our integrated approach aimed to provide a more nuanced and in-depth analytical framework. VOSviewer, recognized for its versatility, played a key role in mapping institutional, country, journal and author collaborations, as well as keyword co-occurrence networks, and journal coupling networks.¹⁶ It visually clustered these relationships to help rapidly identify global collaboration patterns and research communities. This tool enabled the visualization and analysis of complex collaborative networks in academia.

CiteSpace was utilized to identify keyword bursts, with the aim of enhancing the understanding of emerging trends and research hotspots. By generating a timeline of these keywords, it clearly demonstrated the evolution of research topics and their prominence over time. The parameters were configured as follows: time slicing was set from January 1980 to December 2024, with keywords designated as the node type. A keyword node threshold of 5 was applied to each fragment, and pruning was performed using the pathfinder and clip merge network methods. Visualization analysis was performed based on these parameters to generate a keyword timeline within the research domain.

The R package “bibliometrix” was employed for an in-depth bibliometric analysis. This tool was instrumental in consolidating various bibliographic metrics from the database, effectively highlighting high-impact journals, authors, and countries. The h-index quantified the academic impact of individuals and journals, providing a balanced measure of scholarly influence.^{17,18} The g-index and m-index were included in the analysis as well. The g-index assigns greater weight to highly cited publications, thus providing a more refined assessment of a researcher's citation impact.¹⁹ The m-index normalizes the h-index based on the number of years since a researcher's first publication, offering a valuable measure of the consistency and sustainability of their academic contributions.²⁰ Journal Citation Reports (JCR) quartiles and the Impact Factor (IF) were used to assess journal prestige and citation influence.

Results

An Overview of Publications

Based on [Figure 1A](#), a total of 4,061 studies were ultimately included in the analysis. The investigation revealed contributions from 19,602 authors affiliated with 4,045 institutions across 99 countries/regions. These studies were published in 997 journals and referenced a total of 92,276 citations.

Research on the topic has steadily increased in quantity since the 1990s. A notable surge occurred in the early 2000s. From 2016 onward, there was a significant acceleration in publication numbers, with a peak of 172 articles in 2021. The overall trend highlighted sustained research activity and continued progress in this critical field ([Figure 1B](#)).

Analysis of the Countries

As illustrated in [Figure 2A](#) and [Supplemental Table 1](#), the USA led with a total of 854 publications, achieving the top position in both total publications (TP) (3,215) and total citations (TC) (56,636). The USA also exhibited a moderate Multiple Country Publications (MCP) ratio of 0.158, with an overall MCP count of 135. China followed closely with 752 publications, ranking second in TP with 2,290, but third in TC with 12,717, and an MCP of 52. Germany secured the third spot in TP with 1,088 publications and the second position in TC with 16,300 citations, showing an MCP ratio of 0.22 and an MCP count of 75.

The visualization map highlighted international collaborations among countries in sepsis and MOF research ([Figure 2B](#)). Among the 91 countries involved in international collaborations with a minimum of 1 article, the USA emerged as the most collaborative country, with the highest total link strength of 627. The UK followed with a total link strength of 389. Germany (380) and Italy (350) also demonstrated significant collaborative efforts. Furthermore, the co-occurrence network analysis indicated that collaboration clusters were predominantly concentrated in Europe and North America. Anchored by the USA, a robust transatlantic cooperation network became evident, which was characterized by close ties with countries in the Americas, such as Canada and Brazil, as well as strong connections to key European nations like the UK and Spain.

Analysis of the Institutions

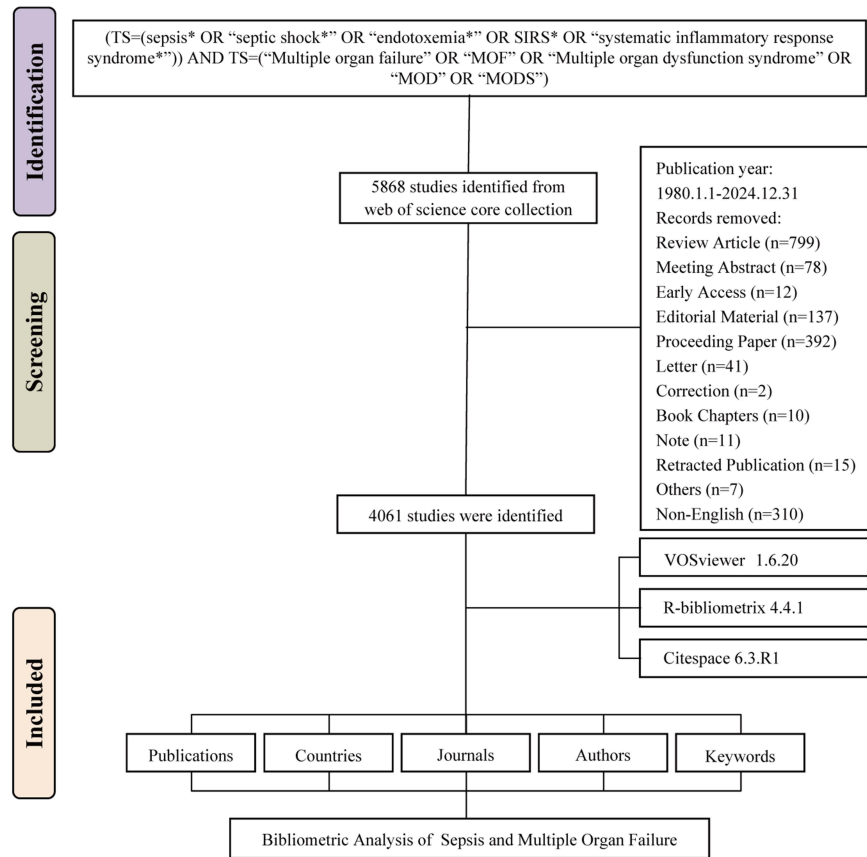
The top ten institutions by article count in sepsis and MOF research were presented in [Figure 3A](#). The Pennsylvania Commonwealth System of Higher Education (PCSHE) emerged as the leading institution with a total of 242 articles published. The University of Pittsburgh secured the second position, contributing 213 articles to the discourse. Assistance Publique Hôpitaux Paris (APHP) ranked third with 167 articles. Other prominent institutions included Harvard University, which published 152 articles, and the University System of Ohio, with 151 articles.

Among the 149 institutions engaged in international collaborations with at least 10 articles, the University of Pittsburgh stood out with the highest total link strength of 122 ([Figure 3B](#)). The University of Michigan and the University of Washington followed closely, each with a total link strength of 95. The University of Cincinnati (88) and the Children's Hospital of Philadelphia (72) also demonstrated strong connectivity. The co-occurrence network analysis revealed several major clusters of institutional cooperation. The most prominent was a dense, central cluster (green and light blue) anchored by institutions like the University of Pittsburgh, Michigan, and Pennsylvania. Another significant cluster (dark blue and yellow) indicated an intra-European cooperation network, comprising institutions from Germany, the UK, and the Karolinska Institute. Lastly, the red and pink clusters represented close intra-regional collaboration within the East Asian region, consisting of prominent Chinese universities (eg, Nanjing and Shanghai Jiao Tong) and Japanese universities (eg, Osaka and Kyoto).

Analysis of the Authors

The top 20 high-impact authors ranked by h-index in sepsis and MOF research were detailed in [Supplemental Table 2](#). Chaudry IH exhibited an impressive academic profile, leading with an h-index of 28. He ranked first in TP with 39 articles and seventh in TC with 1,948. Following closely, Gando S demonstrated an h-index of 25, securing second place in TP with 38 publications and sixth in TC with 2,005 citations. Vincent JL distinguished himself with an h-index of 25 and a remarkable total citation count of 5,742, positioning him second in TC while securing third place in TP with 34

A



B

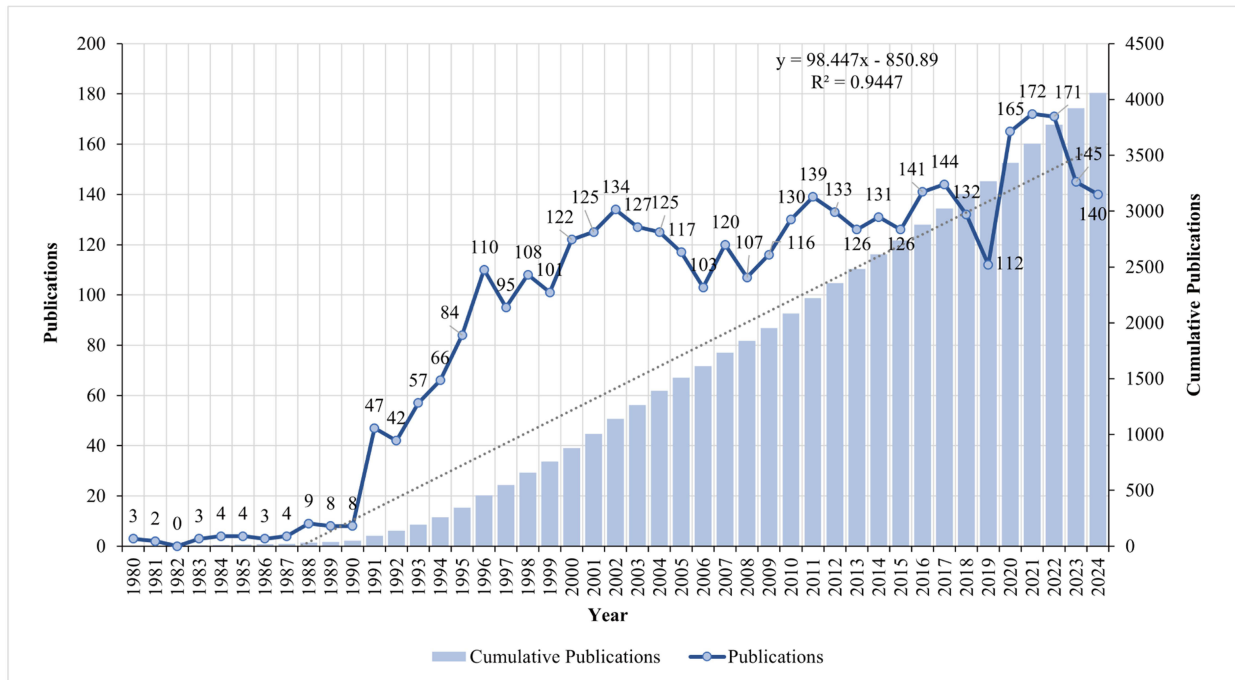
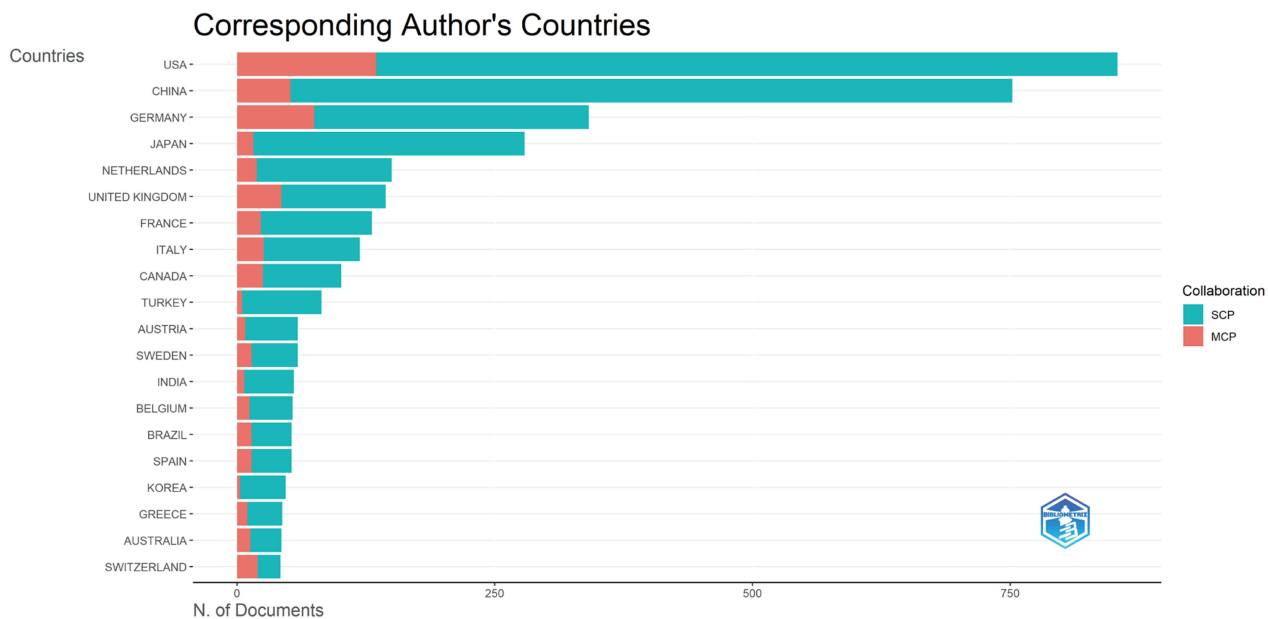


Figure 1 Overview of publications. **(A)** Flowchart of the literature screening process. To conduct the literature search, we employed Boolean operators (eg, AND and OR) to combine search terms and used the asterisk wildcard (eg, sepsis*) to find word stems. The search was performed within the title, abstract, and keyword fields (TS, or Topic Search). **(B)** Annual number of publications on sepsis and multiple organ failure.

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B

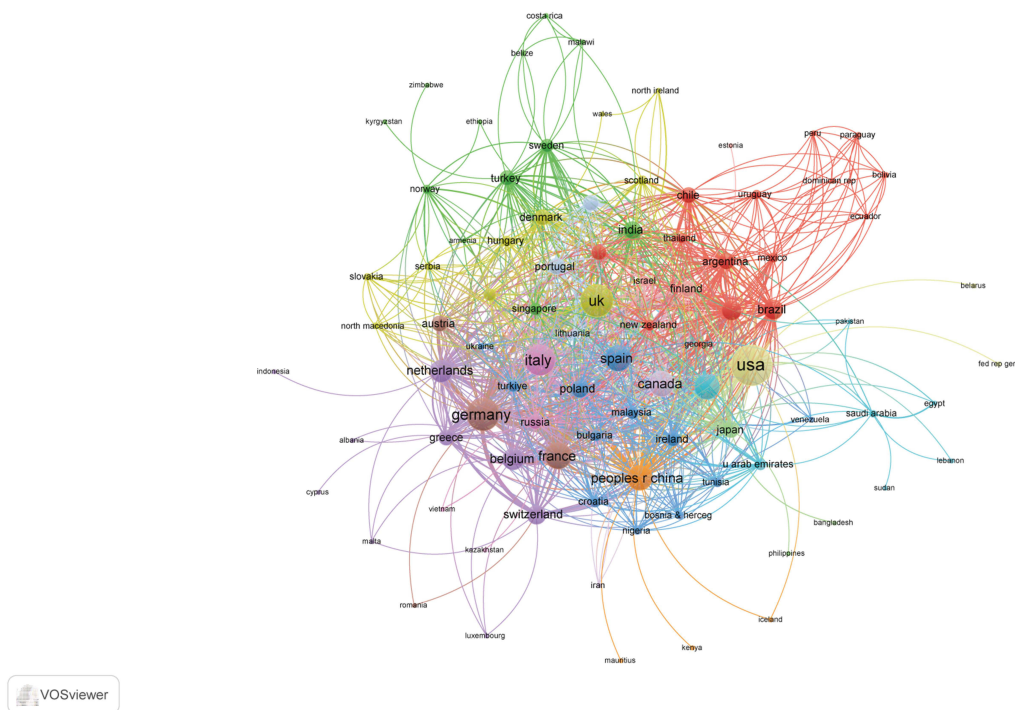
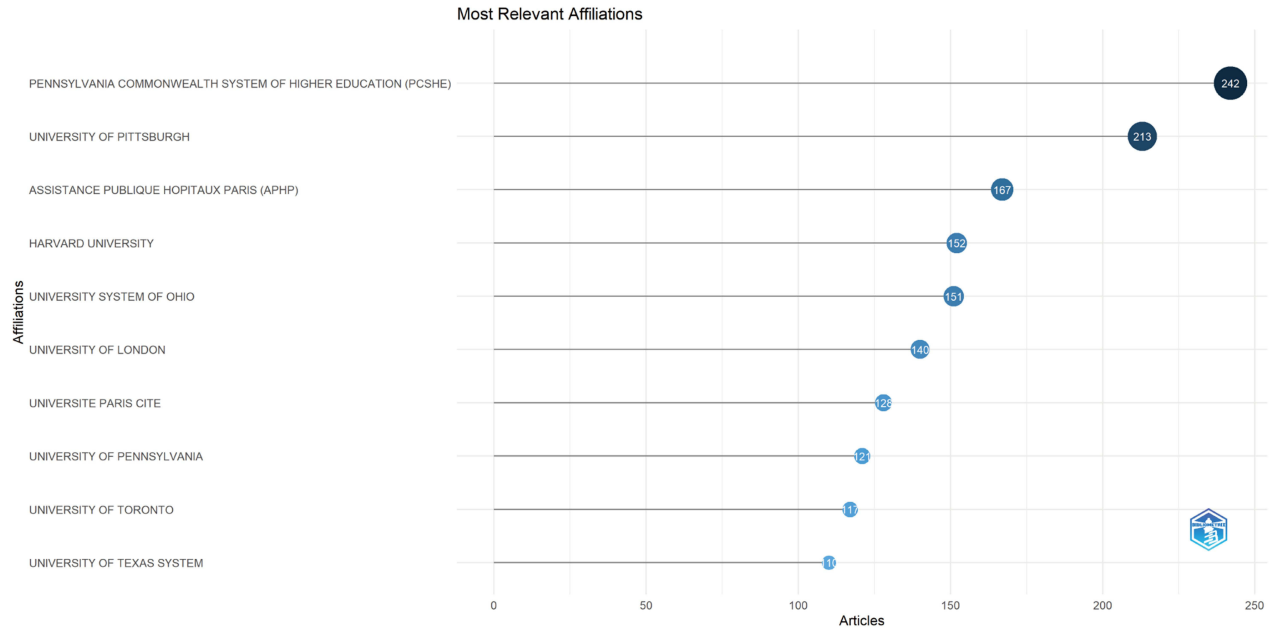


Figure 2 Visual analysis of country. **(A)** Distribution of corresponding author's publications by country. SCP: Single Country Publications. MCP: Multiple Country Publications. **(B)** Visualization map depicting the collaboration among different countries.

A



B

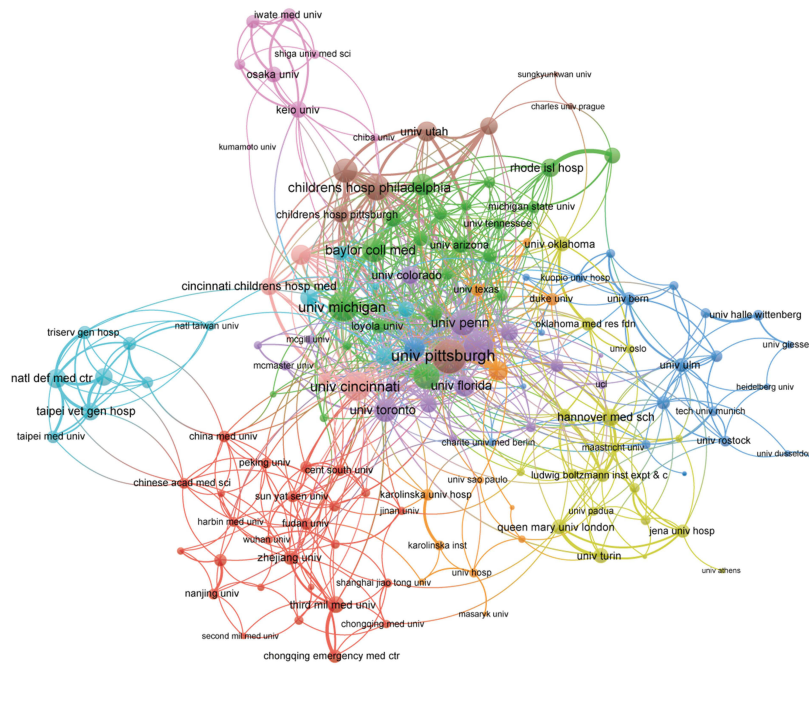


Figure 3 Visual analysis of institutions. **(A)** Top ten institutions by article count and rank. Circle size shows article count. Darker shades indicate higher ranks. **(B)** Visualization map depicting the collaboration among different institutions.

articles. Other notable contributors included Marshall JC, who ranked first in TC with 6,542 citations and an h-index of 16, and Takala J, who held third place in TC with 3,292 citations, also with an h-index of 16.

The collaboration network among 71 authors engaged in international collaborations with at least 6 articles was illustrated in Figure 4. Frank Hildebrand emerged as the leading author with the highest total link strength of 70. Joseph A. Carcillo followed closely with a total link strength of 67. Wei Gu also demonstrated substantial collaboration, with a total link strength of 63. Other notable authors included John C. Lin (62), and Robert A. Berg (61). The author co-occurrence network revealed several cooperation clusters. The most prominent was a green cluster, a cohesive and influential team centered around authors like Carcillo, Joseph A. Lin, John C. Hall, and Mark W. Another significant cluster (blue) was located on the left side, centered on Hildebrand, Frank and Horst, Klemens. A yellow cluster, centered on Fitzgerald, Julie C. and Zangarelli, Basilia, also had a strong connection to the core green cluster, suggesting close collaboration between the two teams.

Analysis of Journals

A comprehensive overview of the leading high-impact journals ranked based on h-index in sepsis and MOF research was presented in Supplemental Table 3. *Critical Care Medicine* topped the list, boasting an impressive h-index of 93 and a total of 308 publications, thereby ranking first in TP within this domain. *Intensive Care Medicine* followed closely, securing third place in TP with 128 articles and second place in TC with 3,947, accompanied by an exceptional IF of 29.6. *Shock* ranked second in TP with 229 publications and maintained a robust TC of 3,480, despite having a lower IF of 2.7. Other notable journals included the *American Journal of Respiratory and Critical Care Medicine* and *Chest*, which also made significant contributions, with TP of 34 and 36, respectively.

The co-occurrence networks of journals contain 160 with at least 5 articles. The three key journals with the highest total link strength in co-occurrence networks were *Critical Care Medicine* (1746), *Shock* (699), and *Intensive Care Medicine* (558) (Figure 5A). The coupling networks of journals contain 160 with at least 5 articles. The three key journals with the highest total link strength in coupling networks were *Critical Care Medicine* (104733), *Shock* (56868), and *Intensive Care Medicine* (47335) (Figure 5B).

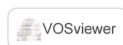
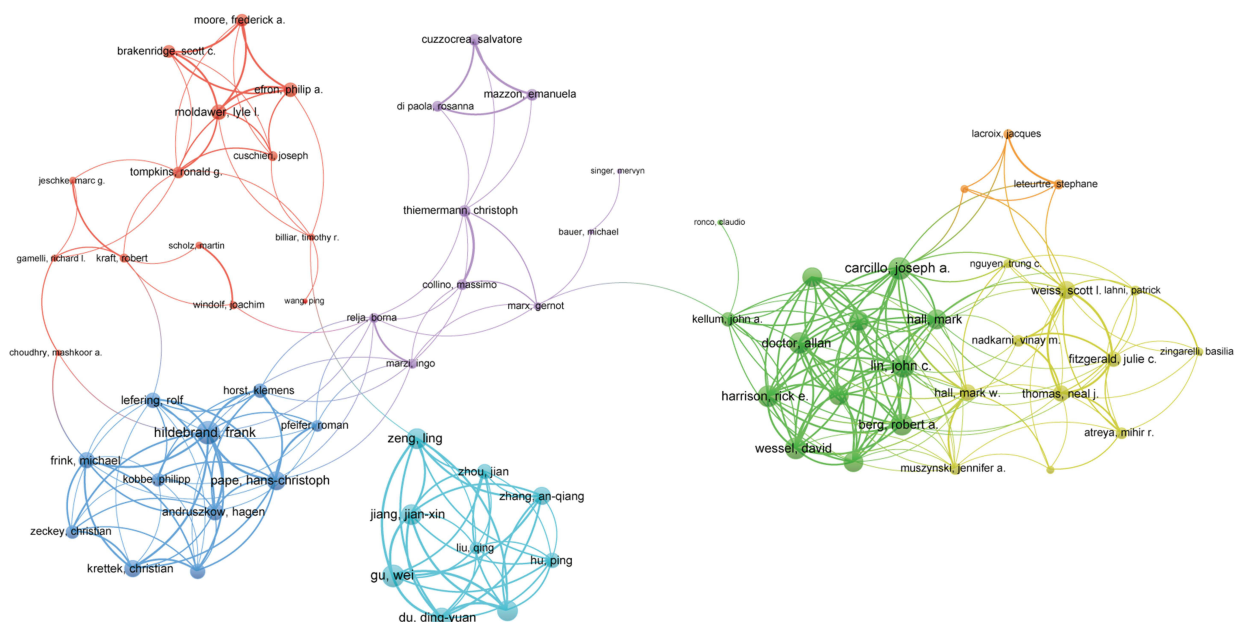


Figure 4 Visualization map depicting the collaboration among different authors.

Analysis of the Keywords

Keyword co-occurrence analysis explored the relationships between frequently paired terms. From an analysis of 158 keywords with a minimum of 30 occurrences, “mortality” emerged as the most influential keyword, with the highest total link strength (2,207) and 527 occurrences (Figure 6A). Other prominent terms included “tumor necrosis factor” (311 occurrences, link strength 1,354) and “injury” (292 occurrences, link strength 1,272). The transition from purple keywords (2004–2008), including “tumor necrosis factor” and “inflammation”, to green keywords (2008–2012), such as “expression” and “mechanism”, and ultimately to yellow keywords (2012–2016), exemplified by “management” and “mortality”, illustrates the temporal evolution of research emphasis within this discipline.

A total of four clusters were identified in this study (Figure 6B). The red cluster centered on clinical outcomes and patient health, including key terms like “acute kidney injury”, “critical illness”, and “mortality”. Green cluster focused on molecular and cellular mechanisms, with terms such as “cytokines”, “apoptosis”, and “inflammation”. Blue cluster highlighted immune responses and pathogenesis, featuring terms like “endotoxin”, “tumor necrosis factor”, and “interleukin-1”. Lastly, the yellow cluster focused on physiological processes and experimental models, encompassing terms such as “bacteremia”, “hemodynamics”, and “systemic inflammation”.

A burst analysis of keywords revealed shifting research priorities in sepsis and MOF (Figure 6C). Early bursts included “respiratory distress syndrome” (1990–2003) and “endotoxin” (1992–2003), “inflammatory response syndrome” (1997–2015) and “endothelial cells” (1993–2003). More recent bursts included “acute kidney injury” (2009–2024), “epidemiology” (2004–2024), “oxidative stress” (2004–2024), “guidelines” (2004–2024), “risk factors” (2004–2024), “inflammation” (2016–2024), “mortality” (2016–2024), “international consensus definitions” (2017–2024) and “cytokine storm” (2017–2024).

Discussion

General Information

This study identified a total of 4,061 articles authored by 19,602 researchers from 4,045 institutions across 99 countries and regions. The USA emerged as a leader in both publication volume and citation impact. The upward trend in annual publications highlights the growing recognition and emphasis on these critical conditions within the medical community.

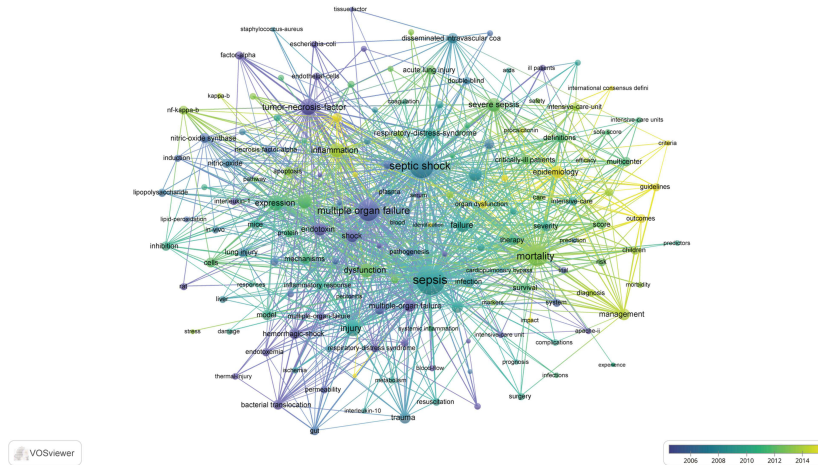
The notable surge of publications in the early 2000s reflects a growing interest in this area, likely spurred by emerging evidence linking sepsis to significant morbidity and mortality.² Furthermore, the substantial increase in publication numbers from 2016 onward indicates a heightened focus on sepsis research, possibly influenced by global health crises such as the COVID-19 pandemic.²¹

The USA leads the field of sepsis and MOF research, with a particularly strong contribution from PCSHE. Its leadership is reinforced by its high total publication count and total citations. Given that severe sepsis is a prevalent and costly condition in the USA, with an estimated annual incidence of 751,000 cases and a mortality rate of 28.6%, it underscores the urgent need for continued research in this area to address its significant impact on public health and healthcare costs.²² The extensive output from PCSHE and its significant citation metrics underscore its central role in advancing knowledge in sepsis and MOF. PCSHE is dedicated to enhancing healthcare through research, education, and clinical practice. Its contributions to sepsis and MOF research are particularly noteworthy, as the system focuses on various areas including the epidemiology, mechanisms, and innovative treatment strategies.²³

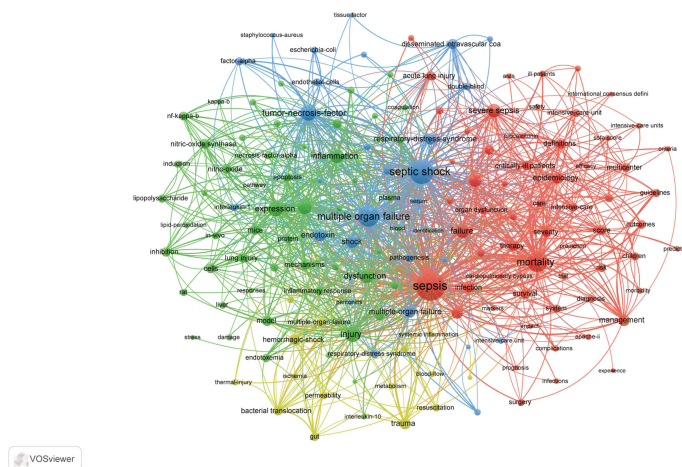
In terms of authorship, Chaudry IH emerges as a leading contributor in the realm of sepsis and MOF research, boasting an impressive h-index of 28 and a g-index of 39. Chaudry’s work is pivotal in advancing our understanding of critical care issues related to sepsis. One of Chaudry’s studies demonstrated that hepatocellular dysfunction occurs during early hyperdynamic sepsis. The research revealed that despite increased cardiac output and hepatic blood flow, hepatocellular function is markedly depressed due to elevated levels of circulating pro-inflammatory cytokines.²⁴

Compared with Yao et al’s 20-year bibliometric analysis of sepsis and host immune response, which encompassed 1,225 publications and highlighted trends in immunosuppression research, our work expands the scope to include multiple organ failure and employs three complementary bibliometric tools for deeper network and thematic insights.¹³ Our analysis revealed broader international collaboration patterns and identified novel research hotspots beyond those reported by Yao et al, such as

A



B



C

Keywords	Year	Strength	Begin	End	1980 - 2024
respiratory distress syndrome	1990	27.82	1990	2003	████████████████████
shock	1990	10.7	1990	2003	████████████████████
cachectin	1991	9.62	1991	2003	████████████████████
endotoxin	1992	19.22	1992	2003	████████████████████
inflammatory response syndrome	1997	13.26	1997	2015	████████████████████
endothelial-cells	1993	12.57	1993	2003	████████████████████
cytokines	1994	11.54	1994	2003	████████████████████
monoclonal-antibody	1992	11.52	1992	2003	████████████████████
interleukin-1	1992	11.46	1992	2003	████████████████████
bacterial translocation	1992	11.33	1992	2003	████████████████████
acute kidney injury	2009	19.36	2009	2024	████████████████████
epidemiology	2004	12.21	2004	2024	████████████████████
guidelines	2004	10.6	2004	2024	████████████████████
risk factors	2004	10.49	2004	2024	████████████████████
oxidative stress	2004	10.24	2004	2024	████████████████████
activated protein c	2004	9.28	2004	2015	████████████████████
international consensus definitions	2017	15.07	2017	2024	████████████████████
inflammation	1992	14.79	2016	2024	████████████████████
mortality	1992	12.77	2016	2024	████████████████████
cytokine storm	2017	9.4	2017	2024	████████████████████

Figure 6 Visual analysis of keyword. (A) Visual analysis of keyword co-occurrence network analysis. (B) Keyword cluster analysis. (C) Top 20 keywords with the strongest citation bursts.

oxidative stress and cytokine storm. These comparisons underscore the enhanced comprehensiveness and the added value of our study in mapping the evolving landscape of sepsis and MOF research.

Emerging Topics

The keyword co-occurrence analysis and burst analysis provide valuable insights into the evolving research priorities.

Red Cluster: Clinical Outcomes and Patient Health

The red cluster includes key terms such as “critical illness”, and “mortality”. This emphasis on clinical outcomes underscores the importance of understanding how sepsis impacts patient health and survival. A study in a surgical ICU revealed that among 301 septic patients, the 30-day mortality rate was 9.6%, with a notable 20.9% mortality at 12 months, especially among those developing chronic critical illness (CCI) due to persistent organ dysfunction.⁸ Additionally, a study on ICU-acquired weakness indicated that irreversible shock with MOF was the leading cause of death in patients with sepsis.²⁵

Green Cluster: Molecular and Cellular Mechanisms in Sepsis

The green cluster focusing on molecular and cellular mechanisms, featuring terms like “cytokines”, “apoptosis”, and “inflammation”. A study examining cytokine levels in patients with MOF revealed distinct patterns of IL-1 β and IL-6 concentrations, which were significantly elevated in the hepatic sinusoidal blood of patients with hepatic involvement compared to those with adult respiratory distress syndrome (ARDS).²⁶ Furthermore, a prospective study found that an imbalance between pro-inflammatory and anti-inflammatory cytokines was associated with the development of MOF in severe sepsis.²⁷ Investigating apoptosis pathways also provides insights into how cell death contributes to tissue damage during sepsis.²⁸ Research into the role of microRNA-29a revealed that it promotes apoptosis in monocytes by targeting the STAT3 pathway.²⁹

Blue Cluster: Immune Responses and Pathogenesis

The blue cluster highlights immune responses and pathogenesis, with key terms such as “endotoxin”, “tumor necrosis factor”, and “interleukin-1”. One study demonstrated that endotoxin administration significantly increased TNF- α levels and contributed to tissue damage in a cecal ligation and puncture model, indicating that locally produced TNF plays a vital role in the inflammatory response and subsequent organ failure during sepsis.³⁰ Additionally, research indicated that LPS-induced activation of the MAPK/NF- κ B signaling pathway led to increased production of inflammatory cytokines, including TNF- α , which was linked to acute lung injury and sepsis in murine models.³¹

Yellow Cluster: Physiological Processes and Experimental Models

The yellow cluster centered on physiological processes and experimental models, indicated by terms such as “hemodynamics”, and “systemic inflammation”. Kato et al focused on the effects of polymyxin B-immobilized fiber column direct hemoperfusion (PMX-DHP) on hemodynamics in patients with septic shock, which significantly improved mean arterial pressure and reduced the requirement for vasoactive agents.³² In a study by Hwang et al, ginseng sprout extracts were shown to significantly reduce pro-inflammatory cytokines such as TNF- α , IL-6, and IL-1 β in a lipopolysaccharide (LPS)-induced sepsis model, indicating that modulation of systemic inflammation can mitigate organ failure in septic conditions.³³

Research Trends

The recent bursts of keywords such as “acute kidney injury” and “oxidative stress” indicate a significant shift toward exploring organ-specific damage. Kwak et al found that elevated levels of lactate and kynurenine were significantly associated with non-recovery from AKI, indicating that these biomarkers could help clinicians assess prognosis for patients with AKI.³⁴ A meta-analysis concluded that flavonoids possess antioxidant properties that significantly reduce oxidative stress and improve survival rates in sepsis models by inhibiting inflammatory mediators.³⁵ Notably, keywords like “international consensus definitions” and “cytokine storm” reflect the field’s response to global challenges, including the refinement of diagnostic criteria and the exploration of hyperinflammatory states. Seymour et al evaluated the predictive validity of various clinical criteria for identifying patients at risk of sepsis, finding that the SOFA score was superior in predicting in-hospital mortality, which emphasizes the importance of recognizing organ dysfunction as a key

component in diagnosing sepsis.³⁶ Another research highlighted the potential of autologous cryo-shocked neutrophils to neutralize pro-inflammatory cytokines and endotoxins.³⁷ These terms underscore a concerted effort to standardize definitions and improve clinical management strategies in light of evolving understandings of sepsis pathophysiology.

Limitations

This study has several limitations that should be acknowledged. First, the analysis was limited to English-language publications, which may exclude significant research published in other languages. Second, the reliance on the WoSCC as the sole database may introduce bias, as it may not capture all relevant studies in sepsis and MOF available in other databases or grey literature. Third, the bibliometric analysis primarily focuses on quantitative metrics such as publication counts and citation rates, which may not fully reflect the quality or impact of individual studies.

Conclusion

This study reveals a significant growth trend in the field of sepsis research and global collaboration patterns, identifying four thematic clusters: clinical outcomes and patient health, molecular and cellular mechanisms, immune responses and pathogenesis, and physiological processes and experimental models. Research hotspots focus on the interconnections between clinical outcomes, molecular mechanisms, and immune responses. Emerging frontiers—such as acute kidney injury, guideline development, and risk factor investigation—underscore a shift toward translational, evidence-based, and mechanism-driven research. Future studies should further explore the epidemiological characteristics of the disease, patient prognosis, and effective treatment strategies to improve the management of disease and overall patient care.

Abbreviations

MOF, Multiple organ failure; SOFA, Sequential Organ Failure Assessment; WoSCC, Web of Science Core Collection; JCR, Journal Citation Reports; IF, Impact Factor; TP, Total publications; TC, Total citations; APHP, Assistance Publique Hôpitaux Paris; PCSHE, Pennsylvania Commonwealth System of Higher Education; CCI, Chronic critical illness; ARDS, Adult respiratory distress syndrome; PMX-DHP, Polymyxin B-immobilized fiber column direct hemoperfusion; LPS, Lipopolysaccharide.

Data Sharing Statement

All data generated or analyzed during this study are included in this published article. Further details and datasets supporting the findings of this study are available from the corresponding author upon reasonable request.

Author Contributions

All authors made a significant contribution to the work reported, whether that is in the conception, study design, execution, acquisition of data, analysis and interpretation, or in all these areas; took part in drafting, revising or critically reviewing the article; gave final approval of the version to be published; have agreed on the journal to which the article has been submitted; and agree to be accountable for all aspects of the work.

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Disclosure

The authors report no conflict of interest in this work.

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