



Mapping Trends and Patterns in Tuberculosis and Tobacco Use: Insights from a Bibliometric Analysis of 25 Years of Research

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ARTICLE INFO

Article History:

Received Jun, 13th, 2025

Accepted Jun, 26th, 2025

Published online Jun, 30th, 2025

Keywords:

Tuberculosis;

Tobacco Use;

Smoking;

Mapping;

Bibliometric Analysis;

Publication Trend;

Research Themes;

ABSTRACT

Tuberculosis (TB) and tobacco use represent two of the most pervasive global health challenges, with a particularly profound impact in Low and Middle-Income Countries (LMICs). Although numerous reviews have explored the clinical and epidemiological associations between TB and smoking. A systematic analysis of publication trends is lacking. This study aims to address this gap by providing a comprehensive bibliometric analysis of the intersection between TB and tobacco use, mapping its evolution, key research themes, collaboration networks, and underexplored areas. This study utilized a bibliometric method. Data from 13,876 articles indexed in Scopus were analyzed using RStudio, VOSViewer, and OpenRefine. PLOS ONE emerged as the most prolific journal, with Wang Y being the leading author, having published 178 articles. The University of California was identified as the leading institution with 707 publications. Emerging research topics include mathematical modeling and numerical simulation, reflecting increasing attention to computational approaches in respiratory disease research. Country collaboration networks revealed the United States as the dominant contributor, with significant partnerships with African countries. These findings emphasize the importance of smoking prevention in TB control strategies, offering insights to inform public health policies and guide future research on TB and smoking's health impacts.

INTRODUCTION

Tuberculosis (TB) and tobacco use represent significant global health challenges, often strongly associated, particularly in low and middle-income countries.^{1,2} In 2023, an estimated 10.8 million people fell ill with TB worldwide, and the disease claimed 1.25 million lives, including 161,000 individuals coinfecting with HIV.³ Concurrently, tobacco use represents another major public health crisis. Globally, tobacco use is responsible for over 8 million deaths annually, with a significant portion of these deaths occurring in low and middle-income countries, which are often the focus of intensive tobacco industry marketing.^{4,5} The intersection of these two global health issues is a critical concern. Tobacco use is a well-established risk factor that significantly exacerbates the TB epidemic.⁶ Evidence consistently demonstrates that tobacco smoking increases the risk of TB infection, progression to active TB disease, and mortality from TB.⁷⁻¹¹ Smokers are estimated to have an approximately twofold increased risk of TB infection compared to non-smokers.⁶ Furthermore, smoking adversely affects TB treatment response, leading to delayed sputum conversion, lower cure rates, and a higher risk of relapse after treatment completion.¹² The biological mechanisms underlying this synergy are complex, involving impaired immune responses in smokers, such as downregulated alveolar macrophage efferocytosis of neutrophils, which can promote *Mycobacterium tuberculosis* growth and tissue damage.¹³ If current smoking trends continue, smoking could result in more than 18 million TB cases and 40 million TB deaths globally between 2010 and 2050.¹⁴

Given the long-standing recognition of the intricate links between tuberculosis and tobacco use and the persistent public health challenges posed by their syndemic (co-occurring and mutually reinforcing) interaction, a systematic and quantitative overview of the research landscape is timely and essential. A substantial volume of research has accumulated over the decades, and there is a critical need for an up-to-date bibliometric analysis that reflects the latest developments in this field. Bibliometric analysis provides a robust set of statistical and mathematical methods to achieve this by examining research publications, analyzing citation patterns, authorship, keywords, and institutional affiliations to map the evolution, structure, and key focus areas

within a defined scientific field.¹⁵ Such analyses are invaluable for understanding historical trends, identifying influential research and researchers, discerning emerging topics and research fronts, visualizing collaborative networks, and uncovering knowledge gaps that may warrant further investigation.¹⁶

Although numerous reviews have explored the clinical and epidemiological associations between TB and smoking, a comprehensive and up-to-date bibliometric analysis of the entire research landscape remains a critical knowledge gap.¹⁷⁻¹⁹ Existing reviews have typically addressed either TB or tobacco use in isolation.²⁰⁻²³ This study seeks to fill this gap by offering a comprehensive bibliometric analysis of the intersection between TB and tobacco use.

The primary objective of this study is to analyze publication trends, identify key research themes and their evolution, map collaborative networks among authors, institutions, and countries, and highlight the most influential research contributions in this vital area of public health. The findings are intended to guide researchers, policymakers, and public health practitioners in their efforts to mitigate the synergistic burden of TB and tobacco use.

MATERIAL AND METHOD

This study employed a bibliometric analysis approach to systematically map the research landscape concerning tuberculosis and tobacco use over 25 years. The methodology was designed to ensure transparency and reproducibility, adhering to the "Preliminary guideline for reporting bibliometric reviews of Biomedical Literature (BIBLIO)."²⁴

A comprehensive and systematic literature search was conducted using the Scopus (Elsevier) database. Scopus is one of the most comprehensive and extensive bibliographic databases in the world, Scopus filters and indexes only those publications that have gone through a rigorous peer-review process. This guarantees the quality and credibility of the data available for bibliometric analysis. The comprehensive search across the databases until the final manuscript was conducted from March to April 2025.

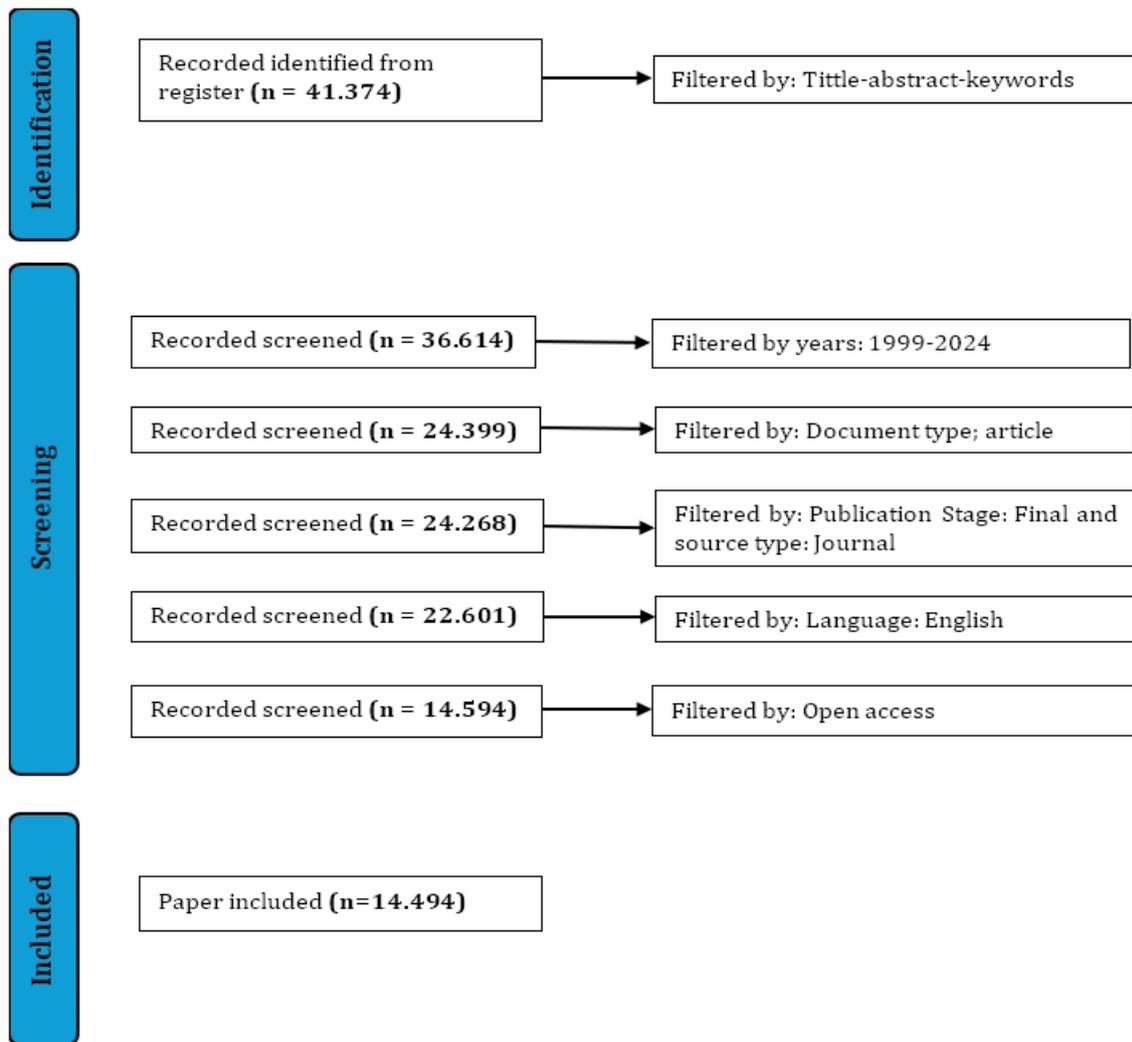
The search strategy was as follows: tuberculosis OR tb AND "tobacco use" OR

smoking OR "tobacco consumption". To increase relevance, searches focused on the article's title, abstract, and keyword fields (TITLE-ABS-KEY), a standard practice in bibliometric studies to capture the essence of scientific content (Figure 1).

The inclusion criteria were publication year from 1999 to 2024; document type limited to journal articles; language restricted to English; and availability as open access. Documents that were incomplete, such as abstracts, editorials, and letters to the editor, were excluded. The search results were exported in the CSV format.

The analysis was conducted in multiple stages. Initially, data exported from Scopus were refined using Open Refine to eliminate duplications, standardize terms (including keywords

and author names), and ensure the completeness of metadata. Subsequently, the analysis was executed utilizing VOS Viewer and Bibliometrics (RStudio), focusing on scientific productivity analysis, the annual number of publications, the most prolific authors, and leading journals. The collaboration analysis involved examining the collaborative network among authors, institutions, and countries. Co-word analysis was employed to identify dominant keywords and emerging research topics. Finally, trend and network visualizations were generated using VOS Viewer and Bibliometrics to facilitate the interpretation of results. Terms maps were used to represent keywords, while network maps illustrated the relationships between authors or institutions.



Source: Primary Data, 2025

Figure 1. Study Flow Chart

RESULTS

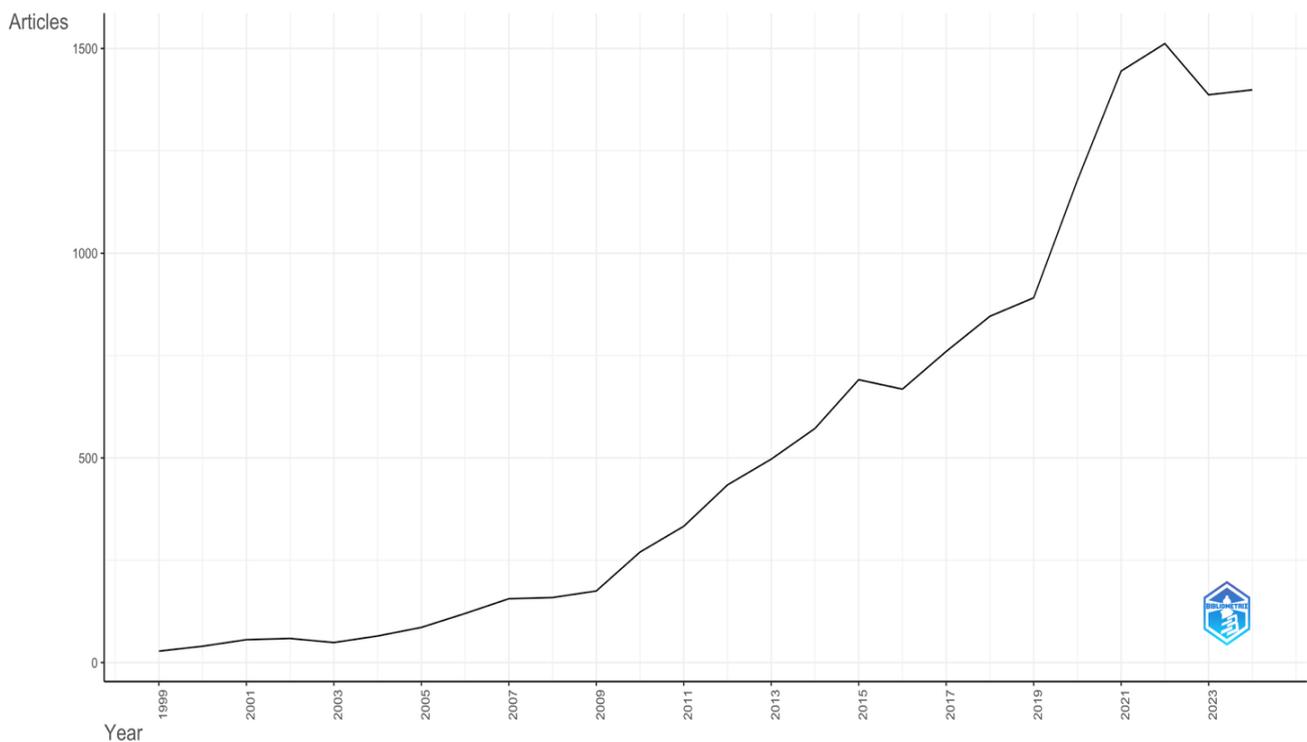
A systematic search in Scopus from 1999 to 2024 resulted in 14,494 articles. An analysis of annual publication trends revealed a steady and significant increase in the number of articles published regarding the intersection of tuberculosis and tobacco use during the study period, which then experienced a noticeable surge in 2022, approximating more than 1500 articles (Figure 2). This exponential increase demonstrates the growing recognition of the dual burden of TB and tobacco as well as the urgency of research in this area.

As many as 2858 different journals indexed publications in the dataset. Figure 3 presents the top ten journals based on the number of publications. PLOS ONE is the most prolific journal, publishing 693 articles, followed by BMC Public Health Control with 247 articles, and Scientific

Reports with 239 articles. These journals have consistently demonstrated a high citation impact in their fields, demonstrating their central role in disseminating research on TB and tobacco use.

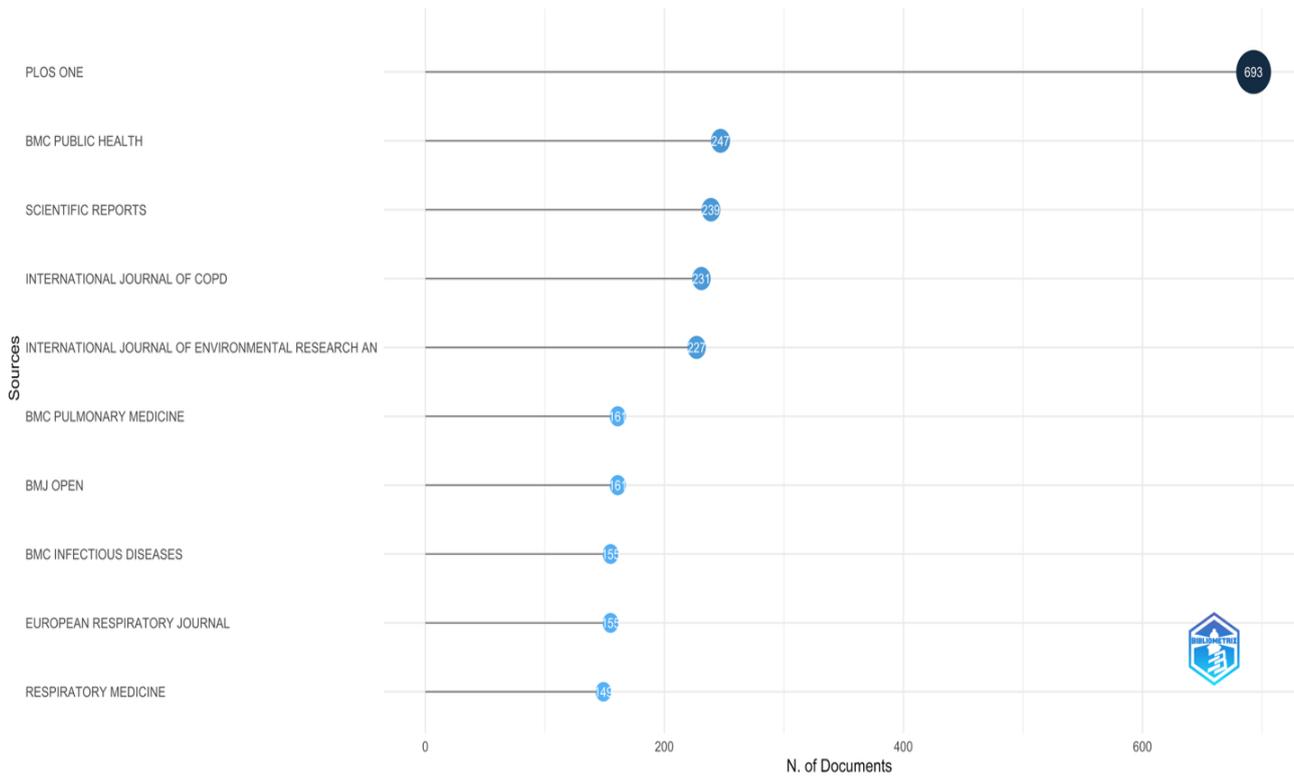
The authorship analysis identifies 64270 unique authors. Figure 4 presents the top ten authors based on the number of publications. Wang Y was the most productive with 178 publications, followed by Zang Y (139) and Li Y (135).

In terms of institutional affiliation, 15373 different institutions contributed to the literature (Figure 5). Notable institutions include the University of California (707), University of Cape Town (646), and Capital Medical University (616). These institutions are often global research centers that focus on public health, infectious diseases, and tobacco control.



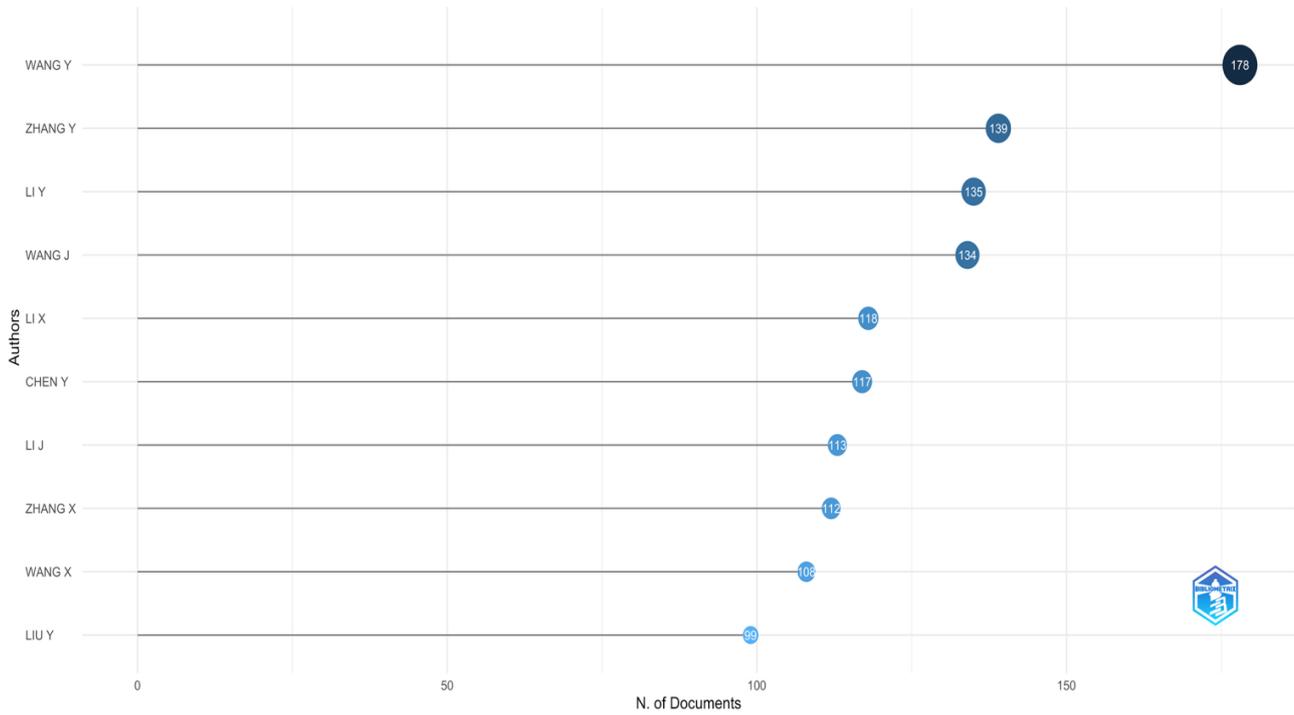
Source: Primary Data, 2025

Figure 2. Annual Scientific Production



Source: Primary Data, 2025

Figure 3. Most Productive Journal (1999-2024)

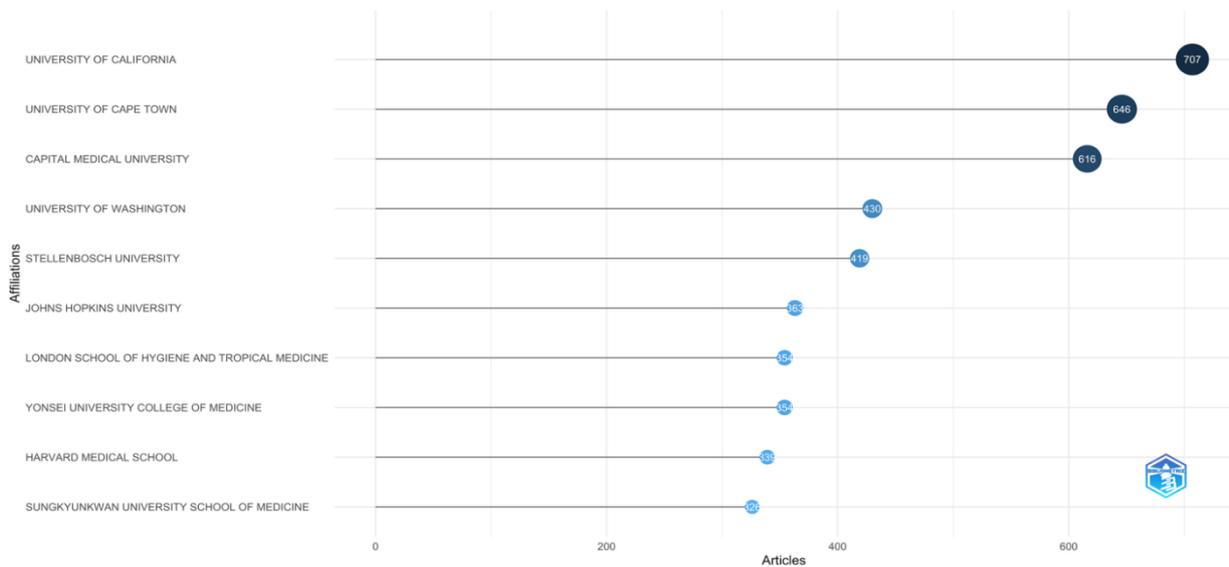


Source: Primary Data, 2025

Figure 4. Most Influential Authors

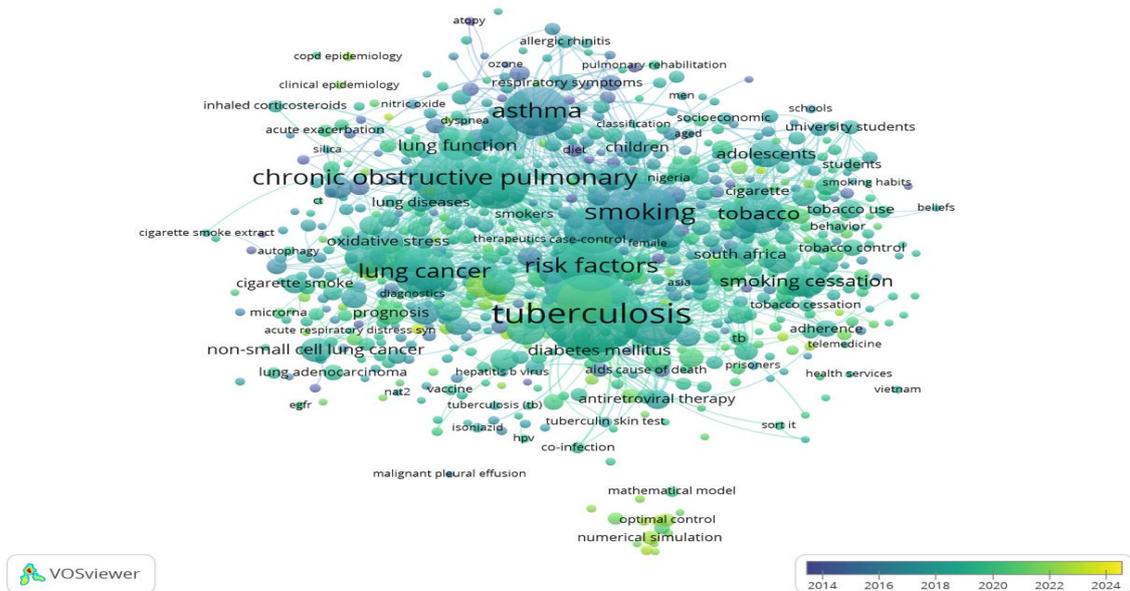
The top 10 most cited publications are given in Table 1. The article titled “Global cancer statistics, 2012” from CA Cancer Journal for Clinicians has the most cited publication. The color legend shows the evolution of the research focus over time (Figure 6): New-er/Emerging Research (Yellow-Green to Yellow, 2020-2024). The terms mathematical model, optimal control, and numerical simulation are new (bright yellow), indicating the increasing use of computational and modelling approaches in respiratory disease research (e.g., to predict the spread

of disease or the effectiveness of interventions). “Telemedicine”: A relatively new term, perhaps its popularity is increasing due to the need for remote healthcare, especially post-pandemic. “Vaccine” (TB-related): Indicates a newer or ongoing research focus on vaccine development. “Acute Respiratory Distress Syndrome (ARDS)”: Seemingly newer, it may have received more attention after the COVID-19 pandemic, although COVID-19 itself did not emerge as the dominant node.



Source: Primary Data, 2025

Figure 5. Most Influential Institutional



Source: Primary Data, 2025

Figure 6. Overlay Visualization Analysis Year

Table 1. The Top 10 Cited Tuberculosis and Tobacco Use Articles in Scopus (1999-2024)

No	Author and Year Publication	Title	Journal	Global Citations
1	JEMAL A, 2011 ²⁵	Global cancer statistics, 2012	CA Cancer Journal for Clinicians	31691
2	LIM SS, 2012 ²⁶	A comparative risk assessment of burden of disease and injury attributable to 67 risk factors and risk factor clusters in 21 regions, 1990–2010: a systematic analysis for the Global Burden of Disease Study 2010	LANCET	9687
3	QUANJER PH, 2012 ²⁷	Multi-ethnic reference values for spirometry for the 3-95-yr age range: the global lung function 2012 equations	European Respiratory Journal	4536
4	LAMPRECHT B, 2011 ²⁸	COPD in never smokers: results from the population-based burden of obstructive lung disease study	CHEST Journal	458
5	JHA P, 2008 ²⁹	A nationally representative case-control study of smoking and death in India	NEW England Journal of Medicine	420
6	EISSENBERG T, 2009 ³⁰	Waterpipe tobacco and cigarette smoking: direct comparison of toxicant exposure	American of Journal Preventive Medicine	401
7	SMITH-SIMONE S, 2008 ³¹	Waterpipe tobacco smoking: knowledge, attitudes, beliefs, and behavior in two U.S. samples	Nicotine Tobacco Respiratory	295
8	FENG Y, 201 ³²	Exposure to Cigarette Smoke Inhibits the Pulmonary T-Cell Response to Influenza Virus and Mycobacterium tuberculosis	Infection And Immunity	130
9	LEUNG CC, 2015 ³³	Smoking adversely affects treatment response, outcome and relapse in tuberculosis	European Respiratory Journal	127
10	JEE SH, 2009 ³⁴	Smoking and Risk of Tuberculosis Incidence, Mortality, and Recurrence in South Korean Men and Women	American Journal of Epidemiology	93

Source: Primary Data, 2025

The network map presented illustrates the various thematic clusters and relationships between keywords in the literature on Tuberculosis (TB) and tobacco use from 1999 to 2024 (Figure 7). The size of each node (circle) reflects the frequency of keyword occurrence in the dataset. The distance between nodes and the thickness of the connecting lines (edges) indicate the strength of their co-occurrence, showing how often keywords appear together. Different colors represent distinct thematic clusters (Table 2).

This network map depicts countries collaborating on scientific publications in the field of Tuberculosis and Tobacco Use (Figure 8). Green Cluster (Dominance of the United States and Africa/Southeast Asia), Red/Orange Cluster (European Collaboration Network), Red/Orange Cluster (European Collaboration Network), and Blue Cluster (Middle East and Asia Collaboration Network).

DISCUSSION

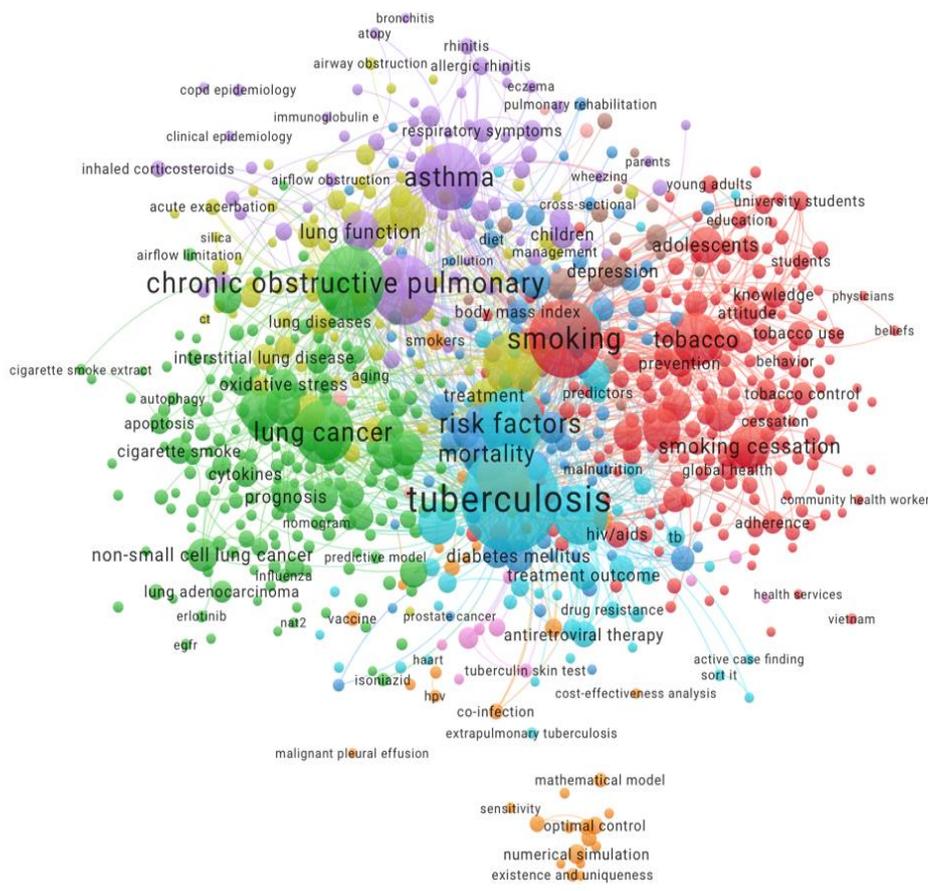
This study provides a comprehensive overview of the research development related to the relationship between Tuberculosis (TB) and tobacco consumption from 1998 to 2024. Our key findings point to a significant increase in the volume of publications, illustrating a growing awareness of the dual impact of TB and tobacco consumption as a global health problem. The analysis is enriched by a network visualization of the co-emergence of keywords and co-authorship of countries, which provides in-depth insights into the thematic structure and patterns of global collaboration.

The exponential increase in the number of publications since 2015, especially in 2022, indicates not only a growing awareness of the dual impacts of TB and tobacco, but also is influenced by external factors such as the COVID-19 pandemic that may increase attention

to global respiratory health issues. In line with a study about analysis of tobacco and smokeless tobacco research from 2014 to 2024 also noted an annual increase of 7.3% in publications, with peaks likely caused by the COVID-19 pandemic.³⁵ Similarly, studies on herbal research in tuberculosis showed a marked increase in scientific output from the mid-2000s, with a sharp increase after 2015.³⁶ The convergence of these trends demonstrates the growing recognition of the dual burden of TB and tobacco as a global public health problem, as well as the urgency of research in related areas. This increased volume of research is critical as it demonstrates a grow-

ing evidence base to inform integrated prevention, diagnosis, and treatment strategies.

The network map of keyword co-occurrence (Figure 7) clearly illustrates the different thematic clusters and the evolution of the research focus. This is consistent with previous findings that show a shift in tobacco research from traditional health impacts to newer areas such as e-cigarettes and social determinants of health.³⁵ Tobacco control efforts, as evaluated in the annual report, also underscore the importance of policies and interventions to reduce tobacco use.³⁷



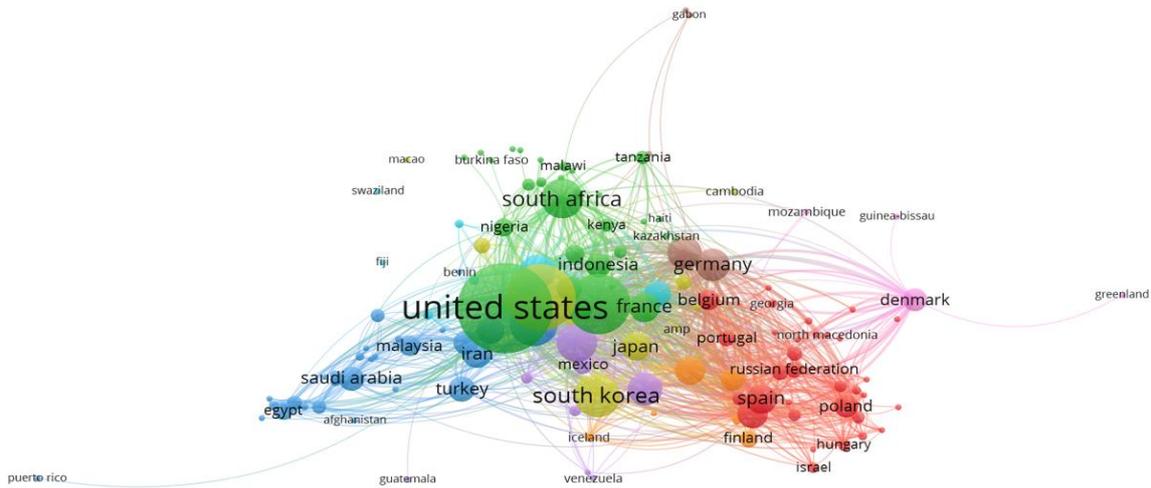
Source: Primary Data, 2025

Figure 7. Keyword Co-occurrence Network Map Analysis

Table 2. Thematic Clusters and Relationships Between Keywords in Article on Tuberculosis (TB) And Tobacco Use From 1999 To 2024

Cluster Color	Cluster Focus	Key Topics/Keywords	Description
Blue	Tuberculosis and Comorbidities/Treatment	Tuberculosis, risk factors, diabetes mellitus, antiretroviral therapy, HIV, co-infection, tuberculin skin test	This cluster focuses on TB as the primary subject, examining risk factors (e.g., HIV, diabetes), treatment options (e.g., antiretroviral therapy), and TB diagnosis methods.
Red	Tobacco Use, Behavior, and Control	Smoking, tobacco use, cigarettes, adolescents, students, smoking habits, tobacco control, smoking cessation, nicotine addiction	This cluster emphasizes tobacco use behavior, affected demographics (e.g., adolescents), tobacco control efforts, and the challenges of nicotine addiction.
Green	Respiratory and Pathophysiological Consequences	Lung cancer, Chronic Obstructive Pulmonary Disease (COPD), lung function, cigarette smoke extract, oxidative stress, non-small cell lung cancer, acute respiratory distress syndrome	This cluster focuses on the respiratory consequences of tobacco use, such as lung cancer and COPD, along with their pathophysiological mechanisms and clinical outcomes.
Purple	Other Respiratory Conditions and Vulnerable Populations	Asthma, respiratory symptoms, allergic rhinitis, pulmonary rehabilitation, children, adolescents	This cluster highlights research on other respiratory conditions worsened by tobacco exposure, particularly among younger populations, and emphasizes respiratory rehabilitation.

Source: Primary Data, 2025



Source: Primary Data, 2025

Figure 8. Country Co-Authorship Network Map Analysis

The identification of leading journals, such as PLOS ONE and BMC Public Health, underscores the interdisciplinary nature of these topics, which require expertise in pulmonology, infectious diseases, public health, and behavioral sciences. Although previous bibliometric studies may have focused on these areas separately, our findings confirm that these journals serve as primary platforms for the disseminating of research in these fields. The productivity of top authors and institutions indicates well-established centers of research excellence, often academic institutions and research organizations focused on global health.

The map of country co-authoring networks (Figure 8) provides important insights into the patterns of international collaboration. The cluster is dominated by the United States as the largest node, as also noted in previous tobacco bibliometric studies that identified the U.S. as the dominant contributor.³⁵ Demonstrating a significant contribution of publications and a central role in the collaborative network. It is closely connected to African countries, such as South Africa, Nigeria, Kenya, Malawi, and Tanzania. This demonstrates the strong collaboration between the United States and African countries, likely driven by global health initiatives, research funding, and the high burden of TB in the region.

These findings have important implications for policymakers, researchers, and public health practitioners. The increasing volume of research and thematic evolution suggests a strong evidence base to inform integrated programs that simultaneously address TB and tobacco use. Given that tobacco use is a modifiable risk factor for active TB and poor treatment outcomes, integrating smoking cessation interventions into TB control programs is essential. Future research priorities should include the evaluation of the impact of these integrated interventions, exploration of the biological mechanisms underlying TB-tobacco interactions, and investigation of the impact of emerging tobacco and nicotine products on the TB epidemic. Although this study used a comprehensive search strategy in the database to maximize recall, several limitations should be considered. First, bibliometric analysis is inherently quantitative and does not assess the methodological quality or internal validity of the included studies. Additionally, it is

limited in representing existing research, as not all articles are indexed in the Scopus database. Second, despite efforts to capture a broad range of terminology, some publications may have been missed because of language variations, inconsistent indexing, or publications outside the selected database. Third, reliance on keywords and abstracts may not fully capture the thematic nuances of the articles. Finally, even if duplicate removal is performed carefully, some duplicates that are difficult to identify may still exist in the data. Future research can expand on these studies by conducting a qualitative analysis of the content of key articles to gain deeper insights into the research methodologies, study populations, and key findings. Analysis of specific regional or country-specific trends can also provide a more nuanced understanding of how TB-tobacco interactions manifest and are researched in various epidemiological contexts. Future studies should explore the impact of research funding on publication trends and collaboration in this area.

CONCLUSION AND RECOMMENDATION

This bibliometric study provides a comprehensive mapping of the evolving research landscape at the intersection of Tuberculosis (TB) and tobacco over the past 25 years. We found a substantial increase in publication volume, which underscores the growing global recognition of the dual burden of these two inter-related public health conditions. Thematic analysis revealed a clear shift in the focus of research from basic epidemiology and clinical outcomes to public health interventions, smoking cessation strategies, and, most notably, the impact of emerging tobacco and nicotine products. In addition, the growing pattern of collaboration, especially international partnerships between high and low-middle-income countries, highlights the global nature of these challenges and the need for a collective effort.

Based on these findings, we recommend that more rigorous research be conducted on the impact of new tobacco products, including electronic cigarettes and heated tobacco, on TB risk and treatment outcomes. Longitudinal studies examining the long-term effects of these products on TB morbidity and mortality are crucial. By addressing these recommendations, the scientific and public health communities can more

effectively reduce the dual burden of tuberculosis and tobacco use, ultimately contributing to improved global health outcomes.

ACKNOWLEDGMENTS

The authors express their appreciation to Gadjah Mada University for providing access to the database utilized in the literature search.

AUTHOR CONTRIBUTIONS

MY and E conceived the study, secured funding, and supervised the overall project; RI designed the methodology, conducted the formal analysis, collected the data, and performed data curation; and MY, E, and RI. wrote the original draft and M and SR critically reviewed and edited the manuscript. All authors have read and approved the final manuscript. MY = Meyi Yanti; E = Erwani; RI = Radian Ilmaskal; M = Masrizal; SR = Sohel Rana.

CONFLICTS OF INTEREST

The authors declare no financial or commercial conflicts of interest during the course of this study and that they have no competing interests with the funding sources.

REFERENCES

1. Aryanpur M, Hosseini M, Masjedi MR, et al. A Randomized Controlled Trial of Smoking Cessation Methods in Patients Newly-Diagnosed with Pulmonary Tuberculosis. *BMC Infectious Diseases*. 2016;16(369). <https://doi.org/10.1186/s12879-016-1727-4>
2. WHO. Tuberculosis. World Health Organization; 2025. <https://www.who.int/news-room/fact-sheets/detail/tuberculosis>
3. WHO. Global Tuberculosis Report 2024. World Health Organization; 2024. <https://iris.who.int/bitstream/handle/10665/379339/9789240101531-eng.pdf?sequence=1#page=5.00>
4. WHO. WHO Global Report on Trends in Prevalence of Tobacco Use 2000-2025, Third Edition. World Health Organization; 2019. <https://www.who.int/publications/i/item> [/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition](https://www.who.int/publications/i/item/who-global-report-on-trends-in-prevalence-of-tobacco-use-2000-2025-third-edition)
5. Chen Z, Wang T, Du J, et al. Decoding the WHO Global Tuberculosis Report 2024: A Critical Analysis of Global and Chinese Key Data. *Zoonoses*. 2025;5(1):1-16. <https://doi.org/10.15212/ZOONOSES-2024-0061>
6. Feldman C, Theron AJ, Cholo MC, Anderson R. Cigarette Smoking as a Risk Factor for Tuberculosis in Adults: Epidemiology and Aspects of Disease Pathogenesis. *Pathogens*. 2024;13(2):151. <https://doi.org/10.3390/pathogens13020151>
7. Chiang CY, Slama K, Enarson DA. Associations Between Tobacco and Tuberculosis. *The International Journal of Tuberculosis and Lung Disease*. 2007;11(3):258-262. <http://www.ncbi.nlm.nih.gov/pubmed/17352089>
8. Vidyasagaran AL, Readshaw A, Boeckmann M, et al. Is Tobacco Use Associated with Risk of Recurrence and Mortality Among People with TB?: A Systematic Review and Meta-Analysis. *Chest*. 2024;165(1):22-47. <https://doi.org/10.1016/j.chest.2023.08.021>
9. Gambhir HS, Kaushik RM, Kaushik R, Sindhwani G. Tobacco Smoking-Associated Risk for Tuberculosis: A Case-Control Study. *International Health*. 2010;2(3):216-222. <https://doi.org/10.1016/j.inhe.2010.07.001>
10. Perriot J, Nguyen LT, Peiffer G, Underner M. Determination of Tuberculosis and Tobacco Smoking, Smoking Cessation Care in TB Smokers. *Issues and Developments in Medicine and Medical Research*. 2022;2:78-86. <https://doi.org/10.9734/bpi/idmmr/v2/3123E>
11. Alkhawajah NM, Aljarallah S, Hussain-Alkhateeb L, Almohaini MO, Muayqil TA. Waterpipe Tobacco Smoking and Other Multiple Sclerosis Environmental Risk Factors. *Neuroepidemiology*. 2022;56(2):

- 97-103.
<https://doi.org/10.1159/000521223>
12. Freedman ND, Thun MJ, Phillips DH, Sauvaget C. Tobacco Products: Massive and Still Growing Causes of Cancer Worldwide. In: Wild CP, Weiderpass E, Stewart BW, Editors. *World Cancer Report: Cancer Research for Cancer Prevention*. Lyon (FR): International Agency for Research on Cancer; 2020.
<https://www.ncbi.nlm.nih.gov/books/NBK606465/>
 13. Winnall W, Bellew B, Greenhalgh EM, Winstanley MH. 3.9 Increased Susceptibility to Infection in Smokers. In: Greenhalgh, EM, Scollo, MM, Winstanley MH [Editors]. *Tobacco in Australia: Facts & Issues*. Melbourne: Cancer Council Victoria; 2025.
<https://www.tobaccoaustralia.org.au/chapter-3-health-effects/3-9-increased-susceptibility-to-infection-in-smoke>
 14. Basu S, Stuckler D, Bitton A, Glantz SA. Projected Effects of Tobacco Smoking on Worldwide Tuberculosis Control: Mathematical Modelling Analysis. *BMJ*. 2011;343:d5506.
<https://doi.org/10.1136/bmj.d5506>
 15. Ding S. Insights Into Bibliometric Analyses. *JBI Evidence Synthesis*. 2025;23(4):564-565.
<https://doi.org/10.11124/jbies-24-00522>
 16. Ganti L, Persaud NA, Stead TS. Bibliometric Analysis Methods for The Medical Literature. *Academic Medicine & Surgery*. 2025.
<https://doi.org/10.62186/001c.129134>
 17. Wang EY, Arrazola RA, Mathema B, Ahluwalia IB, Mase SR. The Impact of Smoking on Tuberculosis Treatment Outcomes: A Meta-Analysis. *The International Journal of Tuberculosis and Lung Disease*. 2020;24(2):170-175.
<https://doi.org/10.5588/ijtld.19.0002>
 18. Wang MG, Huang WW, Wang Y, et al. Association Between Tobacco Smoking and Drug-Resistant Tuberculosis. *Infection and Drug Resistance*. 2018;11:873-887.
<https://doi.org/10.2147/IDR.S164596>
 19. Jeyashree K, Kathirvel S, Shewade HD, Kaur H, Goel S. Smoking Cessation Interventions for Pulmonary Tuberculosis Treatment Outcomes. *Cochrane Database of Systematic Reviews*. 2016;2016(1).
<https://doi.org/10.1002/14651858.CD011125.pub2>
 20. Igwaran A, Edoamodu CE. Bibliometric Analysis on Tuberculosis and Tuberculosis-Related Research Trends in Africa: A Decade-Long Study. *Antibiotics*. 2021;10(4):423.
<https://doi.org/10.3390/antibiotics10040423>
 21. Nafade V, Nash M, Huddart S, et al. A Bibliometric Analysis of Tuberculosis Research, 2007–2016. *PLoS One*. 2018;13(6):e0199706.
<https://doi.org/10.1371/journal.pone.0199706>
 22. Ekenoglu Merdan Y, Etiz P. A Scopus-Based Bibliometric Analysis of Global Tuberculosis Publications: 1849-2020. *Turkish Thorac Journal*. 2022;23(3):246-256.
<https://doi.org/10.5152/TurkThoracJ.2022.21284>
 23. Xing J, Liu J, Han M, Jiang Y, Jiang J, Huang H. Bibliometric Analysis of Traditional Chinese Medicine for Smoking Cessation. *Tobacco Induced Diseases*. 2022;20(November):1-14.
<https://doi.org/10.18332/tid/154961>
 24. Montazeri A, Mohammadi S, M. Hesari P, Ghaemi M, Riazi H, Sheikhi-Mobarakeh Z. Preliminary Guideline for Reporting Bibliometric Reviews of The Biomedical Literature (BIBLIO): A Minimum Requirements. *Systematic Reviews*. 2023;12(239).
<https://doi.org/10.1186/s13643-023-02410-2>
 25. Jemal A, Bray F, Center MM, Ferlay J, Ward E, Forman D. Global Cancer Statistics. *CA: A Cancer Journal for Clinicians*. 2011;61(2):69-90.
<https://doi.org/10.3322/caac.20107>
 26. Lim SS, Vos T, Flaxman AD, et al. A Comparative Risk Assessment of Burden of Disease and Injury Attributable to 67 Risk

- Factors and Risk Factor Clusters in 21 Regions, 1990–2010: A Systematic Analysis for The Global Burden of Disease Study 2010. *Lancet*. 2012;380(9859):2224-2260. [https://doi.org/10.1016/s0140-6736\(12\)61766-8](https://doi.org/10.1016/s0140-6736(12)61766-8)
27. Quanjer PH, Stanojevic S, Cole TJ, et al. Multi-ethnic Reference Values for Spirometry for The 3–95-yr Age Range: The Global Lung Function 2012 Equations. *European Respiratory Journal*. 2012;40(6):1324-1343. <https://doi.org/10.1183/09031936.00080312>
 28. Lamprecht B, McBurnie MA, Vollmer WM, et al. COPD in Never Smokers. *Chest*. 2011;139(4):752-763. <https://doi.org/10.1378/chest.10-1253>
 29. Jha P, Jacob B, Gajalakshmi V, et al. A Nationally Representative Case–Control Study of Smoking and Death in India. *New England Journal of Medicine*. 2008;358(11):1137-1147. <https://doi.org/10.1056/nejmsa0707719>
 30. Eissenberg T, Shihadeh A. Waterpipe Tobacco and Cigarette Smoking. *American Journal of Preventive Medicine*. 2009;37(6):518-523. <https://doi.org/10.1016/j.amepre.2009.07.014>
 31. Smith-Simone S, Maziak W, Ward K, Eissenberg T. Waterpipe Tobacco Smoking: Knowledge, Attitudes, Beliefs, and Behavior in Two U.S. Samples. *Nicotine & Tobacco Research*. 2008;10(2):393-398. <https://doi.org/10.1080/14622200701825023>
 32. Feng Y, Kong Y, Barnes PF, et al. Exposure to Cigarette Smoke Inhibits the Pulmonary T-Cell Response to Influenza Virus and Mycobacterium Tuberculosis. *Infection and Immunity*. 2011;79(1):229-237. <https://doi.org/10.1128/iai.00709-10>
 33. Leung CC, Yew WW, Chan CK, et al. Smoking Adversely Affects Treatment Response, Outcome and Relapse in Tuberculosis. *European Respiratory Journal*. 2015;45(3):738-745. <https://doi.org/10.1183/09031936.00114214>
 34. Jee SH, Golub JE, Jo J, Park IS, Ohrr H, Samet JM. Smoking and Risk of Tuberculosis Incidence, Mortality, and Recurrence in South Korean Men and Women. *American Journal of Epidemiology*. 2009;170(12):1478-1485. <https://doi.org/10.1093/aje/kwp308>
 35. Richa S, Praveen S, Albariqi AA, et al. Global Trends and Emerging Frontiers in Smoking and Smokeless Tobacco Research: A Bibliometric Analysis over the Past Decade. *Healthcare*. 2025;13(11):1224. <https://doi.org/10.3390/healthcare13111224>
 36. Nur AA, Stefani W, Putri DI, Pratiwi WD, Abidah S, Muhammad A. Herbal and tuberculosis in Indonesia: Bibliometric analysis. Yusuf M, Siswanto D, Nishizawa M, et al., eds. *Bio Web Conference*. 2025;154:03001. <https://doi.org/10.1051/bioconf/202515403001>
 37. American Lung Association. State of Tobacco Control 2025 Report. 2025. <https://www.lung.org/research/sotc/key-findings>