Strategies and Analysis for Chinese Biomedical Journals Applying for Inclusion in International Databases: A Case Study of China Oncology

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Abstract

Objective: To analyze the current status and key inclusion criteria of major international biomedical databases indexing Chinese biomedical journals, aiming to provide reference for domestic medical journals applying for international database inclusion and enhancing their international impact.

Methods: Statistically analyze the current status of international databases (Scopus, Embase, DOAJ, MEDLINE, PMC, WoS, etc.) indexing Chinese medical scientific journals, conduct in-depth analysis of inclusion criteria, and using the specific practices of *China Oncology* journal' s application for international database indexing as a case study, summarize existing problems in the application process and propose solutions.

Results: The inclusion of Chinese biomedical journals varies among databases; overall, the number of Chinese journals indexed is limited. In recent years, Scopus, DOAJ, and PMC have developed rapidly, indexing both Chinese and English journals; SCIE primarily indexes English journals, while ESCI has begun indexing Chinese journals; the inclusion standards of MEDLINE and PMC are increasingly stringent. Improving journal content quality is essential. Additionally, journals should strengthen their Chinese-English bilingual website construction, establish and implement various policies, and advocate for extended English abstract strategies to enhance journal visibility.

Conclusion: In recent years, the number of Chinese biomedical journals indexed by international databases has shown overall continuous growth, yet there remains room for improvement. The indexing of Chinese biomedical journals in international databases facilitates institutional development and the construction of world-class journal websites, helps improve content quality, and enables rapid dissemination of academic achievements, thereby enhancing the visibility and international impact of Chinese biomedical journals.

Full Text

Strategies and Analysis for Chinese Biomedical Journals Applying for International Database Indexing: A Case Study of *China Oncology*

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Abstract

[**Objective**] This study analyzes the current status and key inclusion criteria of major international biomedical databases for Chinese biomedical journals, aiming to provide references for domestic medical journals seeking international database indexing and enhanced global influence.

[**Methods**] We examined the indexing status of Chinese medical journals in international databases (Scopus, Embase, DOAJ, MEDLINE, PMC, and WoS) and analyzed their inclusion criteria. Using *China Oncology*' s application experiences as a case study, we summarized common challenges and proposed solutions.

[**Results**] Database inclusion of Chinese biomedical journals varies significantly, with overall limited representation. Recently, Scopus, DOAJ, and PMC have developed rapidly, indexing both Chinese and English journals; SCIE primarily indexes English journals, while ESCI has begun indexing Chinese journals; MEDLINE and PMC have increasingly stringent standards. Improving content quality is essential. Journals should strengthen bilingual website construction, implement comprehensive policies, and adopt long English abstract strategies to enhance visibility.

[**Conclusion**] The number of Chinese biomedical journals indexed in international databases has grown annually but remains insufficient. International indexing promotes institutional development, world-class website construction, content quality improvement, and rapid academic dissemination, thereby enhancing the visibility and global impact of Chinese biomedical journals.

Keywords: International database; Biomedical journal; Indexing; Influence

Author Contributions: Author 1: Database retrieval, data analysis, material compilation, and manuscript writing; Author 2: Data analysis, literature retrieval, and manuscript proofreading; Author 3: Database retrieval, data analysis, literature retrieval, and manuscript review.

In recent years, Chinese scientific journals have actively responded to the national "going global" initiative, transitioning from "borrowing a ship to sail" to "building a ship to sail."Through proactive promotion and international database indexing, these journals have expanded their global influence. Biomedical journals constitute a significant component of scientific publications. International database indexing facilitates academic content dissemination and is crucial for journal development and influence enhancement. First, it improves international visibility. Second, database requirements promote institutional development. Third, the application process encourages construction of world-class Chinese and English journal websites. Furthermore, indexing motivates editorial offices to strengthen manuscript solicitation, thereby improving content quality.

Previous studies have reported that authoritative international journal databases include the Science Citation Index (SCI), Engineering Index (EI), Chemical Abstracts (CA), Science Abstracts (SA), Current Bibliography on Science and Technology (CBST), and ( ). While these databases index biomedical journals, their development levels have become uneven, with some declining in influence. Currently, important international biomedical databases include Scopus, Embase, DOAJ (Directory of Open Access Journals), MEDLINE, PMC (PubMed Central), and WoS (Web of Science). Although some Chinese biomedical journals have been indexed, many editorial offices remain unfamiliar with these databases' influence, indexing strategies, and application procedures. Previous studies have reported on international database indexing of Chinese journals but were mostly limited to single-database analyses, lacked comprehensive reports on biomedical journals, and some are outdated as indexing requirements have changed significantly.

China Oncology has been indexed in several domestic databases including the Chinese Core Journals Catalog (2020 Edition), Chinese Science Citation Database (CSCD), Chinese Scientific and Technical Papers Statistics Source Journals, Chinese Medical Current Content (CMCC), China Biology Medicine (CBM), and the World Journal Clout Index (WJCI) Report (2021 Edition). In 2020, the editorial board decided to pursue international database indexing to enhance global influence. After investigating major international biomedical databases and completing preparations, *China Oncology* was successively indexed by Scopus, Embase, and DOAJ starting December 2020. This study analyzes the latest developments in indexing Chinese biomedical journals in key international databases (Scopus, Embase, DOAJ, MEDLINE, PMC, and WoS), summarizes inclusion criteria, and discusses challenges and solutions using *China Oncology* as a case study to provide references for Chinese biomedical journals.

1.1 Database Indexing Analysis

This study examined Scopus, Embase, DOAJ, MEDLINE, PMC, and WoS, analyzing their indexing of Chinese biomedical journals. Information was retrieved from each database' s website using keyword or category searches based on database characteristics, with data compiled in Excel. MEDLINE used keyword search strategies, while DOAJ used category searches.

MEDLINE Chinese journal search strategy: China[Country of Publication] AND Chinese[Language] AND (currently indexed[All]) Sort by: PubDate Filters: Journals currently indexed in MEDLINE. English journal search strategy: China[Country of Publication] AND English[Language] AND (currently indexed[All]) Sort by: PubDate Filters: Journals currently indexed in MEDLINE. Data were merged with duplicate bilingual journals removed.

DOAJ search strategy used category retrieval with various parameter options: Journal country: China; Language: English AND/OR Chinese; Subject: Medicine AND Biology; Other parameters such as indexing year and open access type.

1.2 Indexing Criteria and Strategy Analysis

Applications to Scopus, Embase, DOAJ, MEDLINE, PMC, and WoS are submitted online. This study analyzed application form contents, summarized indexing strategies, and compiled *China Oncology*' s application strategies to provide references for Chinese biomedical journals.

2.1.1 Scopus and Embase

Scopus is currently the world' s largest abstract and citation database, indexing over 25,000 journals globally as of December 2022. From 2019 to 2022, Scopus indexed 399 Chinese scientific journals, including 127 biomedical journals. In 2022 alone, Scopus indexed 142 Chinese journals (102 independently published, 40 co-published), reaching a historical high. Recent trends show significant increases in Chinese scientific and biomedical journals indexed by Scopus. In 2022, total indexed scientific journals increased by nearly 24.6% compared to 2021. Although the number of indexed Chinese biomedical journals was similar between 2021 and 2022, they accounted for over one-third of total indexed journals. Table 1 shows Scopus indexing of Chinese scientific and biomedical journals from 2019 to 2022.

As of end-2022, Embase indexed over 8,000 medical journals from more than 95 countries, with approximately 35 million articles. Embase currently indexes only 87 medical journals from China. As Scopus indexing of Chinese biomedical journals increases annually, Embase' s indexing is expected to grow correspondingly.

2.1.2 DOAJ

DOAJ is the world' s largest open access database. Created by Lund University, Sweden in May 2003, DOAJ initially served as an open access journal directory and has evolved into a full-text database where readers can freely search and access full texts of indexed journals. Since 2021, DOAJ has intensified indexing and promotion efforts to enhance journal visibility within its system. In China, the DOAJ team actively promotes indexing through presentations, WeChat official accounts, and WeChat working groups.

As of December 31, 2022, DOAJ indexed 18,725 open access journals, including 12,680 journals charging no article processing fees, with approximately 8.49 million articles from over 130 countries and regions, covering 80 languages. Recent years have seen significant growth in Chinese journals indexed by DOAJ, though their proportion remains low. By end-2022, DOAJ indexed 264 Chinese journals, including 248 scientific journals and 68 biomedical journals. Table 2 shows DOAJ indexing of Chinese scientific and biomedical journals from 2018 to 2022. Results indicate 逐年增长 but low overall proportion, possibly due to: DOAJ' s Chinese journal indexing being in early stages; Non-open access limiting applications; Limited awareness of DOAJ among many journals.

2.1.3 MEDLINE and PMC

MEDLINE, established by the U.S. National Library of Medicine (NLM) in 1966, is a crucial biomedical journal abstract database. English titles, abstracts, and figures/tables are fundamental requirements for Chinese biomedical journals applying to MEDLINE. As of end-2022, MEDLINE indexed 91 Chinese biomedical journals, including 48 Chinese-language, 8 Chinese-English bilingual, 34 English-language, and 1 English-German bilingual journal. Trend analysis shows rapid growth in Chinese-language journal indexing from 1996-2010, but stagnation in recent years, particularly zero growth in the past five years. English-language journal indexing has continued to increase but in limited numbers (Figure 1 [Figure 1: see original paper]).

PMC, established in 2000, is an open access full-text biomedical database with a separate application portal on the NLM website. DOAJ indexing facilitates PMC indexing. However, PMC lacks independent capacity to review Chinese journal full texts, relying on MEDLINE review results for Chinese journal applications. As of end-2022, PMC indexed 86 Chinese biomedical journals, with 22 also indexed in MEDLINE (including 9 Chinese, 1 Chinese-English, and 12 English journals). Although total numbers remain limited, PMC indexing of Chinese journals has increased steadily, primarily English journals (Figure 2 [Figure 2: see original paper]).

2.1.4 WoS

WoS is a citation database cluster including multiple databases for science, technology, and humanities. Biomedical journals are indexed in Science Citation Index Expanded (SCIE) and Emerging Sources Citation Index (ESCI). According to the 2022 Journal Citation Reports, SCIE indexed 273 Chinese journals in 2022, adding 21 new journals. Among these, 43 had impact factors above 10 (increasing by 23 from the previous year), and 108 had impact factors above 5 (increasing by 40). For Chinese biomedical journals, SCIE and ESCI indexed 93 journals total, with 66 in SCIE and 27 in ESCI. SCIE primarily indexes English journals, with only one Chinese-language journal. Established in 2015, ESCI indexes promising, impactful journals as candidates for the core collection. ESCI has begun indexing Chinese journals, providing opportunities for Chinese medical journals, with more expected to be SCI-indexed in the future.

2.2 Database Comparison and Correlation Analysis

International database indexing positively impacts Chinese biomedical journals' visibility and influence. Each database has distinct characteristics while maintaining certain interrelationships:

1. **Embase and Scopus**: Both are Elsevier abstract databases, but Embase indexing is based on Scopus. Embase' s online application system is currently incomplete, and Scopus' s application form asks whether applying journals consent to inclusion in other Elsevier databases like Embase. Therefore, Scopus indexing is a prerequisite for Embase indexing.

2. **Embase and MEDLINE**: Embase, MEDLINE, and Cochrane Library are premier evidence-based medicine databases. High-level meta-analyses, guidelines, and consensus articles must include searches of both Embase and MEDLINE. As Cochrane Library primarily indexes clinical trials, it was excluded from this study. Embase is also recommended by many international regulatory agencies for comprehensive disease, drug, and clinical safety monitoring.

3. **MEDLINE and PMC**: Both are NLM databases; the former is an abstract database, the latter an open access full-text database. Publication language constrains PMC applications—only MEDLINE has resources to review non-English journal applications, while PMC lacks an independent Chinese-review team. Thus, PMC indexing of Chinese journals relies on MEDLINE indexing decisions. Although PMC theoretically indexes Chinese journals, as an English full-text database, Chinese journal applications face significant challenges.

4. **PMC and DOAJ**: As an open access database, PMC references DOAJ indexing status. Chinese journals are advised to apply for DOAJ before PMC.

5. **MEDLINE/PMC and WoS**: Both emphasize article quality, requiring

substantial research article proportions, methodological and result accuracy, and high proportions of recent references (within two years). This reflects the importance of quality manuscript solicitation.

2.3 Challenges in International Database Application

Scopus, Embase, DOAJ, MEDLINE, PMC, and WoS index relatively few Chinese biomedical journals, presenting significant challenges for most applicants:

1. **Limited comprehensive database understanding**: Most editorial offices lack knowledge of important international databases or application procedures.
2. **Insufficient content quality**: Databases demand higher content quality, requiring persistent solicitation efforts, tracking research hotspots, and increasing research article proportions.
3. **Language barriers**: Chinese journals face language restrictions and must consider increasing English content to improve visibility.
4. **Non-open access limitations**: This restricts DOAJ and PMC applications and reduces full-text visibility.
5. **Institutional development**: International databases require comprehensive, transparent policies for review, editing, and publishing. Current policy disclosure among Chinese biomedical journals is incomplete.
6. **Lack of English websites**: Absence of platforms to present required content in English.

3.1 Understanding Databases and Application Processes

International database indexing enhances visibility and academic promotion for Chinese biomedical journals. Success requires thorough preparation: understanding each database' s specifics and application methods, deciding which databases to target based on journal characteristics, studying inclusion criteria, and making informed decisions about immediate versus delayed application. Journals should apply progressively from easier to more challenging databases to build influence incrementally.

China Oncology began international database applications in 2020, researching requirements and preparing accordingly. Application methods include:

1. **Email applications**: Databases like EBSCO and Ulrichsweb accept applications via email. Editorial offices should provide detailed journal introductions and relevant materials. These databases offer good starting points for expanding influence. EBSCO, the world' s largest multidisciplinary academic journal database, indexed 155 Chinese scientific journals (33 biomedical) by end-2022. *China Oncology* first applied to EBSCO via

email, introducing the journal and providing its website, and was successfully indexed.

2. **Online applications**: Scopus, DOAJ, MEDLINE, PMC, and WoS provide online application portals with subjective and objective questions. Database reviewers evaluate journal websites comprehensively, assessing information, policies, and published articles. Comprehensive institutional development and website transparency facilitate successful review. Journals should perfect relevant information before applying to maximize first-attempt success and avoid 1-2 year waiting periods after rejection.

Notably, MEDLINE' s online application process differs based on E-ISSN availability. Journals with E-ISSN undergo direct online review (2020-2021 applications required E-ISSN). Journals with only ISSN must submit print copies, combining online and offline review. Since DOAJ indexing is a prerequisite for PMC and MEDLINE indexing significantly increases PMC success probability, *China Oncology* pursued MEDLINE and PMC applications after DOAJ acceptance, submitting applications in 2022 currently under review. MEDLINE now requires only one print issue (previously, continuous submission until indexing was required).

Journal improvement and content quality enhancement are long-term processes. For example, Scopus requires fully English references for Chinese journals, necessitating English translations of Chinese references and six issues under the new policy before application. *China Oncology* applied to Scopus after implementing this standard for six issues (ensuring long-term compliance) and passed the review successfully.

3.2.1 Content Quality as a Key Indicator of World-Class Journals

MEDLINE, PMC, and WoS conduct comprehensive article evaluations, including column organization, research article proportions, writing standards, research content, methodology, statistics, and references. As databases evolve and standards become stricter, others may adopt similar quality evaluation criteria. Therefore, improving content quality is fundamental to internationalization. Journals can enhance quality through:

1. **Establishing academic influence** in the discipline through solicitation aligned with frontiers and hotspots. Editors can use cluster analysis to identify keywords for targeted solicitation and leverage editorial board members for manuscript organization.

2. **Emphasizing research article proportions** in each issue to reflect research activity. For MEDLINE applications, journals should maintain high research article proportions in the two years prior to application.

3. **Prioritizing recent references**, particularly from the past two years, given short biomedical literature half-lives. Reference evaluation reflects

article novelty.

China Oncology consistently emphasizes article quality through active solicitation. Its impact factor has ranked among the top three Chinese oncology core journals in recent years. The journal publicly displays its three-tier review system (initial review, expert peer review, and editorial board final review) and implements strict review to ensure quality. Specific measures include: maintaining research articles at over 50% per issue, limiting reviews to no more than two per issue; establishing a "Guidelines and Consensus" column with reference to AGREE-China and RIGHT statements; following ICMJE recommendations to improve writing quality; and leveraging editorial board members to produce annual progress reviews since 2022.

3.2.2 Strict Publication Schedule Adherence

Journals must publish on schedule, especially during application review periods, avoiding delays or suspensions. If delays occur during critical review periods, journals should publish articles online first, replacing them upon formal publication. *China Oncology* displays finalized articles on its website and publishes them online first in CNKI and other databases to ensure timely availability.

3.3.1 Increasing English Content and Promoting Long English Abstracts

While Chinese biomedical journals' international influence grows, Chinese-language journals typically provide only English titles, abstracts, figures/tables, and references. To reach broader audiences, improve visibility, and facilitate database indexing, Chinese journals should increase English content and adopt long English abstract strategies.

Since 2000, the Ministry of Science and Technology has organized four "China Excellent Scientific Journals" selection events to enhance quality and influence, accompanied by the "F5000"project providing long abstracts for selected articles. On May 18, 2021, the Central Propaganda Department, Ministry of Education, and Ministry of Science and Technology issued the "Opinions on Promoting Academic Journal Prosperity," encouraging Chinese journals to provide long English abstracts and strengthen foreign-language or bilingual websites.

Accordingly, *China Oncology* adopted Chinese-English long abstract strategies since 2020, requiring comprehensive abstracts with detailed methods, results, and data for research articles, and latest research progress summaries for reviews. This approach provides complete yet detailed overviews, enhancing international visibility and influence. While figures and tables were already in English, references were not fully English. Since 2020, *China Oncology* has provided English translations below Chinese references to meet international database standards.

3.3.2 Open Access Strategy

Open access enhances visibility and promotes academic dissemination, and is required for DOAJ indexing. Open access implementation requires strict adherence to Creative Commons licenses. *China Oncology* adopts the CC BY-NC-ND 4.0 license, displayed on its website and specified in copyright transfer agreements, informing authors of usage rights under this license.

3.4 Strengthening World-Class Biomedical Journal Website Construction

Journals should develop and optimize English websites to improve online policy accessibility and enhance international visibility through bilingual academic platforms. English mirror sites help international database reviewers better understand Chinese journals and enable global readers to access Chinese publications. Since DOAJ indexes journals in multiple languages, it reviews consistency between Chinese and English websites—a critical consideration.

Currently, Chinese biomedical journals with English websites often have inconsistent bilingual content requiring improvement. *China Oncology* has gradually improved its bilingual website by completing basic information construction, publishing articles promptly online, displaying all policies, and ensuring Chinese-English consistency, thereby comprehensively presenting journal information and demonstrating editorial rigor.

3.4.1 Completing Basic Journal Website Information

Journal websites should display: country, ISSN, about journal, aims & scope, sponsor, publisher, editorial board, contact information, and subscription details. Editorial boards should list full English names and affiliations of all members, including chief and deputy editors, with designations for academicians of the Chinese Academy of Sciences or Chinese Academy of Engineering. Increasing international editorial board members enhances global influence.

3.4.2 Timely Online Publication

Published issues should be posted online promptly, with archives of past issues preserved. Articles should offer HTML display and PDF/XML downloads. Open access journals must display full texts; non-open access journals should freely provide titles, authors, abstracts, and figures/tables even if full-text downloads require payment.

3.5 Institutional Development and Display

International databases have explicit requirements for medical journal policy establishment and implementation. Policies must be both formally established and strictly enforced. *China Oncology* summarized institutional requirements

from medical international databases, referenced domestic and international medical journal websites, and established comprehensive policies implemented rigorously in editorial work.

3.5.1 Establishing and Implementing Policies

Existing policies such as peer review systems should be publicly displayed and strictly executed. *China Oncology* implements a three-tier review system: initial editorial review, expert peer review, and editorial board final review. Initial review assesses academic and writing quality; expert peer review by biomedical specialists comprehensively evaluates academic quality; editorial board final review makes publication decisions. This rigorous system ensures academic quality. *China Oncology* displays its review policy bilingually with detailed explanations.

Required policies not yet established should be promptly created, implemented, and displayed. These include plagiarism declarations and screening policies requiring authors to pledge no plagiarism and disclose conflicts of interest. Ethically, both clinical research and animal studies require ethics approval documentation, with multi-center studies needing approvals from all participating centers. Long-term strict implementation of these policies is essential for high-standard development. Some databases conduct post-indexing audits; DOAJ may delist journals failing to comply with these standards.

3.5.2 Online Policy Display

Online policies should include: peer-review policy, editorial policy, guide for authors, paper template, research ethics, publishing ethics, plagiarism policy, article screening policy, and copyright. Copyright ownership (typically the editorial office or sponsor) must be declared. Open access journals must also display open access statements. DOAJ requires clear publication fee information and any waiver policies, best placed in the guide for authors.

3.6 Monitoring Indexing Standard Updates

Database indexing standards are increasingly stringent and continuously evolving. Editorial offices should monitor these changes closely. Since preparation-to-application intervals can be lengthy, new requirements emerging during this period necessitate timely adjustments.

3.7 Post-Indexing Activities

After indexing, journals must maintain scheduled publication and website maintenance. The goal of indexing is enhanced visibility and influence, making post-indexing data submission crucial. Submission methods include: Editorial office submission: DOAJ, MEDLINE, and PMC require XML file uploads. *China Oncology* produces XML files and uploads them upon publication. Database

crawling: For open access journals, Scopus' s data center crawls journal websites; non-open access journals require separate negotiation on data provision. Post-indexing work must not be neglected.

International databases are evolving rapidly. Newer databases like Scopus, DOAJ, and PMC have developed swiftly into important biomedical resources, while established databases like MEDLINE and SCIE have increasingly strict selection criteria. This study uses *China Oncology*' s experiences to explore current status, challenges, and strategies for Chinese biomedical journals seeking international indexing, providing references for domestic journals. Limitations include not covering all biomedical databases, potential selection bias, and exclusion of interdisciplinary databases like EI for medical engineering journals, warranting future research.

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Note: Figure translations are in progress. See original paper for figures.