

## Study on the Impact of ICD-11' s Inclusion of Traditional Medicine Codes on Disease Burden Measurement (Postprint)

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### Abstract

Disease burden estimation based on International Classification of Diseases (ICD) codes has been widely applied globally; however, current research in this area predominantly relies on Western medicine disease codes. With the increasing internationalization of traditional Chinese medicine (TCM), the inclusion of traditional medicine codes in ICD-11 facilitates the improvement of TCM disease diagnosis, enables the calculation of prevalence rates, survival rates, medication usage, and treatment levels, allows for further evaluation of disease burden for TCM disease categories, promotes clinical decision-making and rational allocation of health resources, and thereby further advances the internationalization of TCM. However, the incompleteness of traditional medicine codes in ICD-11 and insufficient mapping between these codes and both Western medicine disease codes and China' s national TCM standards pose new challenges for TCM disease burden estimation. This paper, grounded in the coding system for disease burden estimation, analyzes the deficiencies in current TCM disease burden estimation research, examines the impact of ICD-11' s inclusion of traditional medicine codes on TCM disease burden estimation, and provides a preliminary comparison between traditional medicine codes in ICD-11 and Western medicine disease codes as well as China' s new national standards, offering references for the future improvement of coding systems for TCM disease burden estimation. It proposes that future efforts may leverage big data technologies to facilitate mapping between standardized TCM terminology and ICD-11 traditional medicine codes, as well as between ICD-11 traditional medicine codes and Western medicine disease codes, thereby advancing research on TCM disease burden.

## Full Text

### Impact of ICD-11 Inclusion of TCM Codes on the Global Burden of Disease

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#### Abstract

Burden of disease measurement based on International Statistical Classification of Diseases and Related Health Problems (ICD) codes has been widely applied worldwide, yet most current studies rely exclusively on Western medical codes. As Traditional Chinese Medicine (TCM) gains international recognition, the inclusion of TCM codes in ICD-11 will facilitate improvements in TCM disease diagnosis and enable calculation of prevalence, survival rates, medication use, and treatment levels for TCM conditions. This advancement will further enable evaluation of disease burden for TCM-specific conditions, promote clinical decision-making, and support rational allocation of health resources, thereby advancing TCM internationalization. However, imperfections in TCM codes within ICD-11 and inadequate mapping between these codes and both Western medical codes and Chinese national standards pose new challenges for measuring TCM disease burden. This paper examines the coding systems used in disease burden estimation, analyzes current deficiencies in TCM disease burden research, assesses the impact of ICD-11's inclusion of TCM codes, and provides a preliminary comparison among TCM codes in ICD-11, Western medical codes, and China's new national standards to inform future improvements in TCM disease burden calculation and coding. We propose that big data technologies be leveraged to facilitate mapping between standardized TCM terminology and ICD-11 TCM codes, as well as between ICD-11 TCM codes and Western medical codes, thereby advancing research on TCM disease burden.

**Keywords:** Global Burden of Disease; Traditional Chinese Medicine; ICD-11; Medical Coding

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## Introduction

The burden of disease measures the health and economic impacts that diseases, injuries, and premature death impose on society and nations, encompassing health and life loss, economic losses, and other damages [1]. Since the 1990s, the

Global Burden of Disease (GBD) study has made substantial progress [2]. Current evaluation metrics primarily include Disability-Adjusted Life Years (DALY) and Health-Adjusted Life Expectancy (HALE) [2]. The research methodology employs Meta-regression analysis of heterogeneous health data based on the International Statistical Classification of Diseases and Related Health Problems (ICD) to calculate disease burden for various conditions globally and across different regions and countries [2]. GBD research methods have gained increasing recognition across disease systems, playing a crucial role in helping nations understand population health status and formulate health policies [3-5].

However, current GBD studies base disease classification on ICD-9 and ICD-10, which have not yet incorporated traditional medicine codes. TCM, characterized by its simplicity, convenience, affordability, and effectiveness, is widely used in China and offers unique advantages in prolonging survival and improving quality of life. With ICD-11' s inclusion of traditional medicine codes [6-7], TCM' s international influence has grown, prompting scholars to begin investigating TCM disease burden. This paper examines the coding systems used in international disease burden estimation, analyzes the current state of TCM disease burden research, compares existing disease coding systems, and identifies opportunities and challenges in TCM disease burden calculation to inform future improvements in coding for TCM disease burden estimation.

## 1 Overview of the Relationship Between ICD and the Traditional Medicine Chapter

The history of international disease classification dates back to 16th-century England, when the London Bills of Mortality published weekly counts of medieval disease-related deaths. In the late 19th century, Florence Nightingale advocated for collecting disease and cause-of-death statistics, while French statistician Jacques Bertillon promoted the Bertillon Classification of Causes of Death, which was adopted by several countries. In the 1940s, the World Health Organization inherited and expanded Bertillon' s system to include injury and disease statistics, establishing the first edition of the International Statistical Classification of Diseases, Injuries, and Causes of Death (ICD) [8]. ICD forms the foundation of health statistics, mapping human conditions from birth to death and coding injuries, diseases, and any circumstances that may cause death. It is central to depicting disease occurrence, trends, and prevalence—critical indicators of population health that inform health service planning and resource allocation.

The WHO released its Traditional Medicine Strategy (2014-2023) as early as 2013 [9], recognizing TCM' s important role in global primary healthcare and clarifying its function in disease coding. In May 2019, WHO released ICD-11, which incorporates a traditional medicine chapter [10]. This chapter classifies diseases and syndromes originating in ancient China and currently used in China, Japan, Korea, and other countries, comprising 150 disease entries and 196 syndrome entries (excluding unspecified conditions) [10]. ICD-11 provides optional

dual coding for TCM diseases and syndromes but does not endorse any specific treatment [8]. WHO notes that including a traditional medicine chapter enables recording epidemiological data on diseases described in classical Chinese medicine and statistics on TCM treatment outcomes, allowing more effective evaluation of TCM diagnosis and treatment safety and efficacy. For the first time, this enables statistical tracking of TCM service utilization and treatment patterns, measuring their forms, frequency, effectiveness, safety, quality, outcomes, and costs for comparison with Western medicine and research, thereby supporting the global expansion of TCM theory and clinical practice and providing support for TCM evaluation and decision-making.

Coinciding with ICD-11's release, China's State Council issued the "Opinions on Promoting 'Internet Plus Medical Health' Development" (State Office [2018] No. 26) [11], proposing to establish a unified, standardized medical data standard system, further standardizing disease classification management in medical institutions, and requiring health commissions at all levels to recognize the importance of unified disease classification and codes, actively promote comprehensive use of the Chinese version of ICD-11, and strengthen its application management and supervision. This demonstrates national commitment to ICD-11 and traditional medicine codes. However, due to the complexity of TCM classification systems for diseases, syndromes, and treatment methods, TCM data statistics remain weak, preventing precise comparison with Western medicine and urgently requiring integration of traditional medicine into ICD with proper mapping to China's traditional medicine disease codes.

## 2 Deficiencies in TCM Disease Burden Research

Disease burden refers to the health and economic impacts on society and nations caused by disease, disability, and premature death [12], encompassing health and life loss, economic losses, and other damages [1]. Current evaluation methods primarily include DALY and HALE metrics [2]. In the era of big data, a key challenge in public health is how to utilize heterogeneous health data for disease burden research. Professor Christopher Murray's team at the Institute for Health Metrics and Evaluation (IHME) developed a Meta-regression-based disease burden estimation method, extracting data from disease and mortality databases across 204 countries and regions for GBD studies, which has gained widespread global application [2,4,13-14]. GBD categorizes deaths from each cause using a tree structure into three groups: infectious diseases, maternal/perinatal/nutritional conditions, and non-communicable diseases, plus injuries. Current cause-of-death coding uses ICD-9 and ICD-10 [15-16], covering most diseases. However, the global disease burden research coding system has not yet incorporated traditional medicine disease codes, with mainstream research focusing on Western medical diagnoses and coding. Additionally, disease burden studies often contain "garbage codes" representing symptoms, signs, or ill-defined conditions, which affect the completeness and accuracy of results [15-16].

ICD-11 further improves cause-of-death coding and incorporates a traditional medicine chapter, which will help reduce garbage codes in future disease burden studies [15], gradually improve cause-of-death statistics using TCM codes, and enhance the quality of cause-of-death reporting, thereby further improving disease burden research quality.

### 3 Current Status of Traditional Medicine Classification Research in China

Since standardizing TCM research, China has issued multiple national standards related to TCM. These primarily include: the National Standard for TCM Syndrome Classification “Classification and Codes of Diseases and Syndromes in Traditional Chinese Medicine” (Standard No. GB/T15657-1995), “Clinical Terminology of Traditional Chinese Medicine: Syndromes” (Standard No. GB/T16751.2-1997), the ICD-11 Chapter 26 Traditional Medicine Module, and revised versions including “Classification and Codes of Diseases and Syndromes in Traditional Chinese Medicine (Revised Edition),” “Clinical Terminology of Traditional Chinese Medicine Part 1: Diseases,” “Clinical Terminology of Traditional Chinese Medicine Part 2: Syndromes,” and “Clinical Terminology of Traditional Chinese Medicine Part 3: Treatment Methods” [17]. Beginning in April 2017, to better guide TCM clinical inheritance and innovation, consolidate China’s discourse power and leadership in international standard development, and resolve compatibility issues between national standards and the ICD-11 traditional medicine chapter, the National Administration of Traditional Chinese Medicine organized over 80 national TCM experts across disciplines to revise and review these four national standards. The revised national standards better align with international standard norms, conform more closely to TCM clinical diagnosis and thinking, and facilitate clinical use and academic exchange [18].

In May 2019, Shanghai experts from the ICD-11 project team selected all secondary-level and above TCM and integrated Chinese-Western medicine hospitals plus four Western medicine hospitals in Shanghai to compare and test the ICD-11 traditional medicine chapter disease-syndrome coding system against the TCM national standard code database. Within TCM hospitals, the disease classification matching rate was 90.18%, and the syndrome matching rate was 71.77%, providing data that substantiates the scientific validity and rationality of the disease-syndrome classification framework [19]. However, obstacles remain in mapping Chinese traditional medicine disease codes to international codes. As shown in Table 1, certain mapping relationships exist between ICD-11 traditional medicine codes and Chinese national standard codes, with some traditional medicine codes mapping directly to national standards. However, ICD-11 traditional medicine codes are relatively general in classification. For example, “Xiao Ke” (diabetes) has code SD71 in ICD-11 without sub-classifications, whereas the new national standard categorizes Xiao Ke into upper, middle, and lower Xiao Ke, plus Xiao Ke Jue (excluding gestational and neonatal diabetes) based on different syndrome types. Additionally, some traditional medicine

codes lack corresponding classifications in ICD-11, such as rheumatism. Overall, ICD-11 traditional medicine codes and Chinese national standard codes exhibit both similarities and differences, requiring deeper research to understand their relationships. Future work must further improve international codes and promote transformation from traditional medicine disease codes to international codes, continuously refining and expanding traditional medicine's international coding system [19].

## 5 Impact of ICD-11 Application on Disease Burden Research

ICD-11's incorporation of TCM represents a milestone in connecting TCM to the international mainstream medical classification system [20]. ICD-11 can advance TCM modernization and standardization research, such as developing expert consensus on TCM diagnosis and treatment protocols and digital disease management solutions. Due to TCM's characteristics of being simple, convenient, inexpensive, and effective, it is widely used in China and offers unique advantages in extending survival and improving quality of life. Therefore, TCM research aligns with two criteria proposed by the World Bank for priority development areas: high disease burden and good cost-effectiveness of interventions [1]. ICD-11's inclusion of a traditional medicine chapter holds significant importance for TCM disease burden research, with scholars beginning to address TCM disease burden measurement [18,21-22], though this research remains in its infancy. In preliminary studies, our team addressed the scarcity of TCM disease burden research by pioneering an approach based on ICD-11 traditional medicine chapter disease-syndrome classifications. Using GBD's comprehensive framework and incorporating TCM disease-syndrome classification characteristics, we screened TCM-advantaged disease types—including management-advantaged and clinical research-advantaged conditions—within a TCM standardization framework to calculate disease burden for TCM-advantaged diseases. Building on this, we further measured disease burden attributable to TCM constitution for these conditions [18], providing new approaches for comparing cost-effectiveness of different diagnosis and treatment protocols under international standards to promote rational health resource allocation [21]. Additionally, this offers new evidence for leveraging TCM constitution to enhance TCM's advantages in disease prevention, management, and treatment.

However, a major challenge in current TCM disease burden research is that ICD-11 traditional medicine codes are not fully equivalent to Western medical codes. As shown in Table 2, certain similarities exist between ICD-11 traditional medicine codes and Western medical codes, but differences remain. First, some traditional medicine codes cannot map directly to any Western medical code. For example, FA20 and FA2Z describe rheumatoid arthritis and inflammatory arthritis applicable to all joints, whereas traditional medicine codes SC6Y describe other specified bone, joint, and muscle system diseases, and SC6Z describe unspecified bone, joint, and muscle system diseases applicable to all bones,

joints, and muscles. Additionally, SC61 indicates low back pain but lacks a corresponding Western medical code. Second, some disease classifications lack detail. For instance, SD71 describes Xiao Ke without sub-classifications, whereas Western medical codes provide detailed categorization for such diseases. Overall, ICD-11 traditional medicine codes and Western medical codes show some overlap and connection in disease description but also exhibit differences and deficiencies requiring further research and improvement to better study disease burden and compare cost-effectiveness of different diagnosis and treatment protocols. In previous research [18], we calculated the disease burden of Xiao Ke in Guangzhou based on ICD-11 traditional medicine code SD71 and, using national standards, calculated disease burden for four Xiao Ke types: upper, middle, lower Xiao Ke, and Xiao Ke Jue. However, direct comparison between TCM-advantaged disease burden and Western medical disease burden remains impossible due to mapping limitations between traditional medicine and Western medical codes.

We believe that because ICD-11 traditional medicine codes, Western medical codes, and Chinese national standard codes cannot be mapped one-to-one, research on TCM disease burden based on unified disease coding remains a formidable task. Future TCM disease burden research should first overcome this mapping dilemma to align TCM disease codes with international standards. Additionally, big data technologies such as natural language processing can be employed within a Meta-regression framework to facilitate mapping between standardized TCM terminology and ICD-11 traditional medicine codes, as well as between ICD-11 traditional medicine codes and Western medical codes, thereby advancing TCM disease burden research. Furthermore, since hospital HIS systems in China have not yet updated to ICD-11, challenges remain for death coding and disease burden research. Future efforts should utilize big data technologies to promote mapping between TCM standardized terminology and ICD-11 traditional medicine codes, and between ICD-11 traditional medicine codes and Western medical codes, thus facilitating TCM disease burden studies.

## 6 Summary and Outlook

Given the insufficient matching rates between Chinese TCM codes and ICD-11, and between traditional medicine and Western disease codes in ICD-11, issues with TCM disease coding in disease burden research require further investigation. Considering the difficulty in one-to-one mapping among ICD-11 traditional medicine codes, Western medical codes, and Chinese national standard codes, research on TCM disease burden based on unified coding remains a challenging long-term endeavor. Future TCM disease burden research must first overcome the mapping dilemma to promote alignment between TCM disease codes and international standards. Additionally, big data technologies can be employed within a Meta-regression framework to calculate disease burden for TCM-related diseases and syndromes (including DALY, HALE, and economic burden) and

compare these with disease burdens calculated using Western medical codes to identify optimal diagnosis and treatment protocols. Moreover, ICD-11's inclusion of traditional medicine codes can facilitate extraction of incidence and mortality data from China's valuable ancient medical literature, thereby improving early-stage TCM disease burden research. Disease burden estimation based on ICD-11 can further promote improvements in TCM disease diagnosis and advance TCM internationalization.

**Author Contributions:** ZHOU Jingjing conceptualized the study and drafted the manuscript; HE Kaiyue collected and compiled ICD-11 traditional medicine codes and Chinese national standard codes; LIU Ailing collected and compiled ICD-11 traditional medicine codes and Western medical codes; ZHAO Lanhui organized the literature; GAO Jing revised the manuscript; ZHOU Shangcheng provided quality control and final approval.

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