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# Current Snapshots on Stroke Prevention and Control and More Proactive National Strategies Against It in China

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## Abstract

**Background and Purpose:** Stroke has become a major public health problem. This paper aims to briefly review the current epidemiological characteristics, preliminary achievements, and national action strategies related to stroke prevention and control in China.

**Methods:** English and Chinese literature were searched on stroke epidemiological characteristics and more proactive strategies for its prevention and control in China. Potential papers related to this topic were identified from PubMed, Medline, Embase, Cochrane Library, Wanfang Database, SINOMED, and China National Knowledge Infrastructure databases, as well as the annual reports and websites of the People's Daily, the State Council, and the National Health Commission of the People's Republic of China.

**Results:** Stroke has been ranked among the top three causes of death in China, and has become a public health problem endangering people's health. High rates of incidence, mortality, and disability bring a heavy burden to stroke patients, families, and society. With China's economic development, urbanization, and population aging, the prevalence and incidence of stroke are still rising. Although some progress has been made in specialized stroke prevention and treatment in China, there is still much room for improvement. Curbing increasing stroke due to increased prevalence and suboptimal control of risk factors and unhealthy lifestyles is no longer just the efforts of medical service institutions. It still requires a more proactive national strategy and general mobilization of the whole people. Increased prevalence of stroke, survivors' unfavorable outcomes, and suboptimal rehabilitation also need specialized stroke care and the perfect Hierarchical Medical System within the regional medical consortium in China.

**Conclusions:** The current situation of stroke prevention and treatment is still very serious in China. In the future, the stroke prevention and treatment model will change from passive stroke treatment and risk factor control to a more proactive prevention model of health factor management.

## Plain Language Summary

Stroke prevention and treatment in China is a critical public health priority due to the high prevalence, incidence, mortality, and disability rates associated with strokes. Strokes are a leading cause of death and long-term impairment, placing a significant burden on individuals and the healthcare system. To address this issue, China has made strides in improving stroke care through the establishment of specialized stroke centers, the integration of traditional non-drug Chinese medicine into treatment plans, and efforts to shorten emergency response times for acute cases. Despite these advancements, challenges remain. Rural areas often lack access to high-quality healthcare services, leading to disparities in stroke care between urban and rural regions. Additionally, hypertension, a major risk factor for strokes, is not always well managed across the population. Preventing strokes through lifestyle changes and health education remains a key focus, as does raising public awareness about the risks and signs of strokes. The Chinese government has implemented national strategies to promote "Healthy China," including initiatives aimed at reducing disabilities caused by strokes by 2025. These efforts emphasize improving healthcare

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systems, expanding access to specialized care, and fostering community involvement in stroke prevention and early intervention. Looking ahead, advancements in medical treatments, better resource allocation, and increased public education are expected to improve outcomes for stroke patients. However, addressing rural-urban disparities and ensuring consistent management of risk factors like hypertension will be crucial for long-term success. Overall, a multifaceted approach—combining medical innovation with community engagement—is essential to reducing the impact of strokes in China.

**Keywords**
stroke, epidemiology, primary prevention, secondary prevention, management, treatment, rehabilitation, organized stroke care, stroke prevention and control system, national prevention and control strategy, China

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## Introduction

In recent decades, stroke has been ranked among the top three causes of death in China, and has become a public health problem endangering people's health.[1,2] In 2019, there were 28.76 million (95% uncertainty interval 25.60-32.21) prevalent cases of stroke, 3.94 million (3.43-4.58) new stroke cases and 2.19 million (1.89-2.51) deaths from stroke in China, respectively.[1] Among the prevalent cases of stroke in 2019, 24.18 million (20.80-27.87) were ischaemic stroke, 4.36 million (3.69-5.05) were intracerebral haemorrhage, and 1.58 million (1.32-1.91) were subarachnoid haemorrhage.[1] Its high incidence, mortality, and disability rates bring a heavy burden to stroke patients, families, and society. With China's economic development, urbanization, and population aging, the prevalence and incidence of stroke are still increasing due to environmental and lifestyle changes. Taking the people's health and interests as the starting point, the Communist Party of China (CPC) Central Committee and the State Council of China have prospectively made a series of important deploys at the national level for the long-term goal of "building a healthy China" in 2035. This paper briefly reviews the current epidemiological characteristics, preliminary achievements, and national action strategies related to stroke prevention and control in China.

## Methods

### *Search Strategy and Inclusion Criteria*

English and Chinese literature were searched on stroke epidemiological characteristics and more proactive strategies for its prevention and control in China. Potential papers related to this topic were identified from PubMed, Medline, Embase, Cochrane Library, Wanfang Database, SINOMED, and China National Knowledge Infrastructure databases. The reference lists of all relevant studies and reviews were also checked to identify any pertinent information. Our search strategy consisted of MeSH terms and the following keywords: Stroke, Epidemiology, primary prevention, Secondary prevention, Management, Treatment, Rehabilitation, Organized stroke care, Stroke prevention and control system, National prevention and control strategy, China. Additionally, we browsed the annual reports and websites of the People's Daily, the State Council, and the National Health Commission of the People's Republic of China. The final reference list was generated according to relevance and quality.

## Results and Discussion

### *Current Snapshots and Preliminary Achievements of Stroke Prevention and Control in China*

*1 Stroke Burden and Trend.* According to data from the National Mortality Surveillance and the GBD study 2019, stroke was the third highest cause of death in China and the leading cause of disability-adjusted life-year (DALY) in China in 2019.[2] The age-standardised prevalence, incidence, and mortality rates of stroke in 2019 were 1468.9/100 000, 200.8/100 000 and 127.2/100 000, respectively. The age-standardised prevalence and incidence rates of stroke increased by 13.2% and 34.7% from 1990 to 2019, respectively, although the age-standardised mortality rate of stroke and the age-standardised prevalence and incidence rates of intracerebral haemorrhage (ICH) and subarachnoid hemorrhage (SAH) decreased.[2]

According to the National Epidemiological Survey of Stroke, the weighted prevalence, incidence, and mortality rates of stroke in adults over 20 years of age in 2013 were 1114.8/100 000, 246.8/100 000, and 114.8/100 000, respectively. Compared with the comparable results 30 years ago, the prevalence rate of stroke increased by 155% in rural areas and 18.2% in urban areas in China in 2013, and the incidence rate of stroke increased by 31.6% in rural areas.[3] The results of stroke surveillance in rural areas of Tianjin over the past 22 years confirmed that the incidence rate of stroke in China's rural areas was increasing rapidly with an average annual growth rate of 6.3%.[4]

*2 Pediatric Stroke.* In the Hong Kong Special Administrative Region, China, the estimated incidence of pediatric stroke between 1998 and 2001 was 2.1 cases per 100 000 children per year.[5] In Taiwan, China, the incidence of pediatric stroke in 2011 was 6.4 cases per 100 000 children per year; 2.3 per 100 000 children per year for ischaemic strokes (IS), and 3.2 per 100 000 children per year for hamorrhagic strokes (HS), whereas The 2-year-period prevalence of pediatric stroke is 14.2 cases per 100 000 children; 5.2 per 100 000 children per year for IS and 6.2 per 100 000 children per year for HS.[6] According to the point prevalence of 4.82 (95% CI: 1.31-12.34) per 100 000 children and the annual incidence of 2.34 (95% CI: 0.28-8.45) per 100 000 children estimated from a nationally representative cross-sectional survey in China, there are 10 668 (95% CI: 2899-27311), 12 213 (95% CI: 3319-31268) prevalent childhood strokes in total and 5179 (95% CI: 620-18702), 5929 (95%

CI: 709-21411) new childhood strokes annually in China, respectively in 2013 and 2020. Chinese children may have more prevalent cases of HS than arterial IS. (Unpublished data) Furthermore, a retrospective case-series study confirmed that cerebral arteriopathy is a major risk factor for both arterial IS and HS in children living in China.[7] The leading cause of childhood arterial IS was cerebrovascular diseases including moyamoya (68.6%), while that for HS was arteriovenous malformation (51.43%).[7]

*3 Primary Prevention of Stroke.* In China, stroke-related healthy lifestyles and health literacy are not optimistic. The smoking rates in 2018 were 26.6% among adults aged 15 and over and 50.5% among men in China, respectively.[8] The population proportion protected by the comprehensive smoke-free regulations was only 10%.[9] The 2010-2012 China National Nutrition and Health Survey (CNNHS) drinking rates were 30.5% in Chinese adults aged ≥18, 53.8% in men, and 12.2% in women, respectively.[10] With the improvement of people's living standards, the intake of meat and fatty food in China has increased rapidly, and the ratio of fat supply to energy has reached 32.9%, which exceeds the recommended upper limit of 30% of dietary guidelines; however, the average intake of fruits, beans, and milk has been insufficient for a long time.[11] The National Physical Fitness Surveillance data in 2014 showed that the proportion of regular physical activities was 33.9%.[9] The rate of reaching the recommended minimum of 150 min of moderate or 75 min of vigorous exercise per week among individuals aged 20-59 years was only 22.8%.[12] In the past decade from 2002 to 2012, the adult obesity rate (BMI ≥28) increased by 67.6%, with an average annual growth rate of 5.3%.[9] At present, only 12% of the residents can achieve the ten articles of mental health literacy issued by the National Health Commission of China.[9]

Similarly, the control of stroke-related "three high" risk factors is not optimistic yet. According to the latest survey data on hypertension in China from 2013 to 2014, the prevalence of hypertension in adults over 18 years old in China was 27.8%; compared with 2002, the national number of hypertension patients increased from 150 million in 2002 to 290 million in 2013-2014, up nearly 1 times.[13] Although the awareness, treatment, and control rates of hypertension improved compared with the previous surveys, the control rate of hypertension was still less than 20%, which was far lower than 55% in developed countries in Europe and America.[14] The prevalence of diabetes and dyslipidemia in China was as high as 10.9% and 34.0%, respectively, but its control rate was also not optimistic.[15,16]

*4 Pre-hospital and Emergency Care of Acute Stroke.* Among 544 stroke patients from a population stroke surveillance data in China, only a quarter of patients with stroke could reach the emergency or hospital within 2 h of onset, and only 16.9% of patients (or their family and friends) realized that the initial symptom was due to stroke, and only 18.8% of patients sought 120 or 999 emergency medical services. It is worth noting that up to a third stroke of patients who resorted to "120" or "999" emergency medical services were not identified by emergency physicians.[17]

Although organized stroke unit care is an accepted standard of care to improve post-stroke outcomes, a previous study showed that only a third of stroke patients in China received such care.[18] Previous hospital-based studies showed that about 90% of patients with ischemic stroke started antithrombotic therapy and statin therapy within 48 h of hospitalization; Only 10% ~ 20% of stroke patients arrived at the hospital within 3 h of onset, and less than 3% of patients with cerebral infarction received ultra-acute thrombolytic therapy. This data was significantly lower than the 20% of patients admitted in time, and the thrombolytic proportion of patients with ischemic stroke in high-income countries.[19-21] In stroke patients with atrial fibrillation, only less than 30% of patients received anticoagulant therapy.[19,20] The risk of bleeding after treatment is speculated to be probably related to the lack of standardised anticoagulant therapy in stroke patients with atrial fibrillation in China. In the stage of acute ICH, about two-thirds of patients with ICH in China received early antihypertensive treatment. Only 10% of patients received the surgical intervention of hematoma removal or intracranial pressure reduction.[19,22] According to the data from the Hospital Quality Monitoring System (HQMS) 2019 in China, the proportion of mechanical intracranial artery thrombectomy in IS patients was 3.0‰ (16 624/5 596 296).[2] The proportions of interventions (including intracranial aneurysm embolisation/intracranial aneurysm coil embolisation/ intracranial aneurysm embolisation/ middle cerebral aneurysm embolisation) and the clipping of aneurysms in SAH patients were 14.1% (20 780/146 913) and 3.9% (5699/146 913), respectively.[2] Among 2562 patients with nontraumatic spontaneous subarachnoid hemorrhage enrolled in a study, 81.4% were aneurysmal SAH and 18.6% were nonaneurysmal SAH. In addition, brain arteriovenous malformation (AVM, 7.5%), Moyamoya disease (7.3%), stenosis or sclerosis of the cerebral artery (2.7%), and dural arteriovenous fistula or carotid cavernous fistula (2.3%) were the major causes of nonaneurysmal SAH.[23] Therefore, standardised surgical treatment technology needs to be further popularized based on clinical indications.

*5 Secondary Prevention of Stroke and Recurrence.* The recurrent risk of stroke patients mainly depends on their stroke-related risk factors and their control. According to the NESS-China study in 2013, among the 7672 patients with stroke in seven major regions of China, the prevalence rates of hypertension, diabetes, dyslipidemia, atrial fibrillation, and coronary heart disease were 74.0%~88.7%, 9.8%~18.0%, 12.0%~27.5%, 1.5%~4.4%, and 3.5%~25.9%, respectively; whereas the smoking and drinking rates were 42.9%~56.6% and 35.1%~52.2%, respectively.[3] Data from the HQMS 2019 in China, also showed that the leading risk factor for stroke was hypertension, which was present in 52.3% (2 927 562/5 596 296) of IS patients,66.9% (549 990/822 403) of ICH patients and 42.9% (63 009/146 913) of SAH patients.[2] However, the control of stroke-related risk factors is not optimistic yet. The hypertension control rate among stroke patients was only 8% in the NESS-China study in 2013. Another multicenter registration study involving 56 hospitals in 16 provinces or

autonomous regions in China showed that the control rate of low-density lipoprotein cholesterol (LDL-C) (LDL-C <1.8 mmol/L) in IS patients was only 27.4%.[24] The detection rate of atrial fibrillation in stroke patients in China was generally low both in the population and in hospitals. The rates of stroke survivors with atrial fibrillation were 1.5%~4.4% in the NESS-China study and 2.6%~4.5% in the HQMS 2019, respectively. The data were significantly lower than that in the developed countries (17.8%~24.6%).[2,3,25] Although 90% of patients with ischemic stroke started antithrombotic drug and statin therapy within 48 h after hospitalization, a population-based study found that patients' compliance with treatment after discharge was worrying.[26] An observational study of stroke showed that 92% of patients with large atherosclerosis, 91% of patients with small vessel blockage, and 72% of patients with cardiogenic stroke received antiplatelet therapy in the hospital. However, less than half of the patients insisted on antiplatelet treatment one year later.[27] In stroke patients with atrial fibrillation, only 10% insisted on taking anticoagulants after 1 year.[28]

A meta-analysis found that the cumulative risk of recurrence at 3 months, 1 year, and 12 years after stroke was 7.7%, 10.4%, and 39.7% respectively.[29] The stroke recurrent rate in acute TIA patients was higher, and the cumulative stroke risk at 90 days was as high as 17%.[30] A study from three urban communities in China found that the cumulative recurrent rate of first-ever stroke was 20.8% within 3 years.[31] The weighted stroke risk of TIA patients after 2, 30, and 90 days in China is 9.7% (6.5%~14.3%), 11.1% (7.5%~16.1%), and 12.3% (8.4%~17.7%) respectively.[32] The CKB study found that 41% (41%-42%) of first-ever stroke survivors at 28 days developed recurrent stroke within 5 years; further, whereas the recurrent rates of ischemic stroke, intracerebral hemorrhage, subarachnoid hemorrhage and unspecified stroke subtypes were 41% (41%-42%), 44% (42%-46%), 22% (18%-27%) and 40% (35%-44%), respectively.[33] It is worth noting that 91% of recurrent stroke was still ischemic stroke in first-ever IS patients, while 56% of recurrent stroke was still intracerebral hemorrhage in first-ever ICH patients, but 41% of recurrent stroke was ischemic stroke.[33] Previous studies in China showed that the mortality of ischemic stroke at 1 month, 3 months, and 1 year were 5%, 10%, and 15% respectively.[34] The outcome and prognosis of patients with haemorrhagic stroke were worse, and the mortality at 1 month, 3 months, and 1 year were 10%, 25%, and 30% respectively.[34] The high recurrence and case-fatality suggest that there is a problem of insufficient treatment compliance in the long-term management of risk factors and antithrombotic treatment of stroke patients.

*6 Stroke Rehabilitation.* Seventy to eighty percent of patients after stroke cannot live independently due to disability.[25] Stroke survivors often have a few complex sequelae and complications. Sleep apnea is a common symptom in stroke survivors. A meta-analysis of 29 studies on sleep apnea including 2343 stroke and TIA patients found that stroke patients with apnea hypopnea index >5 and >20 accounted for 72% and 38% respectively.[35] And 7% of sleep apnea was mainly due to central apnea.[36] A survey from Beijing and Shanghai communities showed that the overall prevalence of cognitive impairment and dementia after stroke was as high as 80.97%.[36] Among them, the prevalence of cognitive impairment after stroke without dementia was 48.91%, and the prevalence of dementia after stroke was 32.05%.[36]

At present, it is estimated that 30%~60% of stroke patients do not receive rehabilitation treatment in the hospital.[19-21,34] Among the patients receiving rehabilitation treatment, most received acupuncture treatment, massage, or simple motor function rehabilitation, and less than 10% received physical therapy, occupational therapy, language therapy, or psychotherapy.[34] It is estimated that about 20% of stroke patients further received rehabilitation treatment after discharge.[34] Because the complications after stroke are relatively complex, there is a lack of standardised therapy and treatment.

*7 Preliminary Achievements of Stroke Prevention and Control in China.* Since the economic reform and open-door policy that took place in 1978, Chronic Non-Communicable Diseases (CNCD) such as cardio-cerebrovascular diseases have been increasing all the time, which endangers people's health. To keep sustainable social development, the Chinese government has successively established relevant prevention and control institutions for stroke and launched a series of epidemiological investigations and research on appropriate techniques or projects for the prevention and control of stroke in the population.[37] At the same time, with the deepening of the continuous reform of the medical and health system (especially the new round of health systems reform since 2009),[38] the basic medical and health service system in China has been strengthened, and the prevention and treatment of stroke in the population has also achieved preliminary results as follows:

*7.1 Age-standardised stroke mortality showed a phased decline.* Although the crude mortality of stroke from the National Mortality Surveillance System still increased between 2013 and 2018 probably due to population aging in China, the age-standardised stroke mortality showed a downward trend throughout 1994-2013. Compared with data in 1994, the age-standardised mortality of stroke in males and females decreased by 18.9% and 24.9%, respectively.[39] The findings from the NESS-China in 2013 also showed that stroke mortality in rural and urban areas of China decreased by 11.4%, and 31.0% respectively, compared with data 30 years ago.[3] The phased decline of age-standardised stroke mortality was presumably closely related to the universal health insurance covering the whole people,[38] continuous health education and promotion activities in the population, and the improvement of clinical diagnosis and treatment technology.

*7.2 The increasing trend of stroke incidence in urban and project areas has been curbed.* Although the incidence of stroke increased by 31.6% in rural areas, the incidence of stroke in urban areas decreased by 18.1% according to data from the NESS-China in 2013, compared with data 30 years ago.[3] As is inseparable from the continuous deepening reform of the medical and health system and the vigorous

development of urban community health services over the four decades. Since 2006, the series of policies, including the guiding opinions on the development of urban community health services ([2006] No. 10, issued by General Office of the State Council of China), the guiding opinions on strengthening the construction of urban community health talent team ([2006] No. 69, issued by the Ministry of Personnel of China), and the opinions of the CPC Central Committee and the State Council on deepening the reform of medical and health system ( [2009] No. 6, issued by General Office of the CPC Central Committee), had been issued.[36] China has made active exploration and practice throughout accelerating the development of urban community health services, establishing a general practitioner system, and deepening the medical and health system reform. In contrast, primary health care services that had effectively responded to infectious diseases before 1978 were difficult to cope with the rapid growth of chronic noncommunicable diseases with economic development and unhealthy lifestyles in rural areas.

In 2016, the former National Health and Family Planning Commission issued the comprehensive stroke prevention and control plan, in which the Chinese government at all levels in the project-implemented areas required to strengthen the construction of stroke prevention and control system, take comprehensive stroke prevention and control strategies and measures, carry out screening and intervention for stroke high-risk individuals, and promote the shift from passive disease treatment to proactive health management. According to data from the China National Stroke Screening Survey (CNSSS), the standardised incidence of first-ever stroke in 40- to 70-year-olds in China increased by an average of 8.3% annually from 2002 to 2013. It was anticipated that the increase of stroke incidence would be controlled to less than 5% annually in the project-implemented areas by 2020, and the mortality of cardiocerebrovascular diseases would be reduced by 10%.[40]

*7.3 The framework and foundation of specialized stroke centers and regional medical consortiums took shape.* On the one hand, the General Office of Stroke Prevention and Treatment Project of the National Health Commission drew lessons from domestic and foreign experience, and organized experts to jointly formulate the construction plan and scheme for stroke centers in China in 2012. In 2015, the construction of a stroke center in China was officially carried out. By December 2019, 30 demonstration centers for advanced stroke centers, 436 advanced stroke centers, and 898 stroke prevention and treatment centers had been found and certified. Now specialized stroke centers cover 292 prefecture-level cities and 742 counties (districts) in 30 provinces (autonomous regions, municipalities directly under the central government or Xinjiang Production and Construction Corps), effectively promoting the in-depth development of stroke prevention and treatment in China.[41] From the perspective of more than a dozen key performance indicators of China Stroke Center Alliance in 2019, the medical quality of in-hospital treatment and rehabilitation of ischemic stroke, haemorrhagic stroke, and subarachnoid hemorrhage had been improved sustainably.[2]

On the other hand, the Chinese government issued the "Guiding Opinions of the General Office of the State Council on Pushing Forward the Building of the Hierarchical Medical System (HMS)" in September 2015, to alleviate the unbalanced distribution of medical resources and divert patient flow to primary care facilities.[42] According to the work objectives established in the guiding opinions of the general office of the State Council of the People's Republic of China on promoting the construction and development of a medical consortium in 2017, based on summarizing the pilot experience, China comprehensively promoted the construction of the medical consortium and form a relatively perfect policy system of the medical consortium by 2020. All government-run secondary hospitals and community health service centers or medical settings at the primary level participate in the medical consortium. A fair and effective division of labor and cooperation mechanism with clear objectives, clear rights and responsibilities, and a guiding mechanism with consistent responsibilities and rights are established among medical institutions at different levels and categories within the medical consortium, to make the medical consortium a community of services, responsibilities, interests and management. The medical consortium effectively shares medical resources within the region and further improves the service capacity of medical settings at the grass-roots level. The hierarchical medical system within the medical consortium includes first treatment at grass-roots community health service centers or medical settings at primary level, the dual orderly referral between community health service centers or medical settings at primary level and secondary or tertiary hospitals, separate treatment for acute and chronic conditions, linkage mutually between community health service centers or medical settings at primary level and secondary or tertiary hospitals. Finally, the hierarchical medical system within the medical consortium may be better realized in China nationwide.[43] The Sanming medical reform pilot was first launched in 22 public hospitals in Fujian in 2013, by simultaneously restructuring the hospital governance structure, altering the payment system to hospitals, and realigning physicians' incentives instead of former incentives through overtreatment and overprescription, has been testified to successively reduce medical costs significantly without measurably sacrificing clinical quality and productive efficiency.[44] The Sanming medical reform model is now being steadily implemented throughout the country to promote the shift from disease treatment to health focus. The model is characterized by a regional medical center covering stroke prevention and treatment, a close medical consortium, a hierarchical medical model, and the mutual interaction of reforms on medical care, medical insurance, and medical pharmaceutics.

## More Proactive National Strategies for Stroke Prevention and Control in China

*1 Healthy China Action With Wide Social Participation and National Mobilization Led by the Chinese Government has Been Initiated.* In 2016, the CPC Central Committee and the State Council issued and implemented the outline of the "Healthy China 2030" plan at the National Health Conference, the

first medium-term to long-term strategic plan for the health sector since the founding of China in 1949.[45] A year later, the 19th National Congress of the Communist Party of China put forward the "implementation of the healthy China strategy" and incorporated it into the overall national strategic level for overall planning and deployment. In October 2020, the proposal of the CPC Central Committee on formulating the 14th 5-year plan (2021-2025) for national economic and social development and the long-term objectives through the year 2035 was officially adopted by the Fifth Plenary Session of the 19th Central Committee of the Community Party of China, further clarifying the strategic deployment of "comprehensively promoting the construction of healthy China".[46] Taking people's health as a developmental priority, Chinese government will further reform the disease prevention and control system, strengthen public health construction, promote the whole people to develop a civilized and healthy lifestyle, and improve the public service system of national fitness. All these measures will greatly facilitate the implementation of the prevention and control strategy of cardio-cerebrovascular diseases among the whole population. Prevention and treatment of cardio-cerebrovascular diseases have become an important component of China's Medium- and Long-term Plan for CNCD Prevention and Treatment (2017-2025) and one of 15 special campaigns in Healthy China Action (2019-2030).[9,47] Weight loss, tobacco control, increased physical activity, and prevention and treatment of hypertension have been listed as the government's medium- and long-term work objectives. Salt, oil, and sugar reduction, increased intake of fruits and vegetables, and regular measurements of blood pressure, blood lipid, and blood sugar have become public health behaviors advocated by the government. With the implementation of the plan, the medium- and long-term government work indicators and outcome goals for the special campaign of cardio-cerebrovascular diseases are being implemented item by item and can be expected in the future. It is estimated that by 2030, the mortality rate of cardio-cerebrovascular diseases will drop to 190.7/100 000 and below from 238.4/100 000 in 2015; The awareness rate of hypertension among residents aged 30 and above will not be less than 65%; The standardised management rate of patients with hypertension will not be less than 70%; The treatment and control rates of hypertension will continue to improve; Intravenous thrombolysis will be carried out in stroke centers of all secondary and above hospitals; The annual blood lipid detection rate of residents aged 35 and above will not be less than 35%; The proportion of township hospitals and community health service centers providing more than 6 types of traditional non-drug Chinese medicine therapy will reach 100%, and the proportion of village clinics providing more than 4 types of traditional non-drug Chinese medicine therapy will reach 80% respectively; Aid training of acute conditions on the public is encouraged, and the proportion of personnel with training certificates will increase to 3% or more.[9]

*2 The Level of Organized Stroke Care and Prevention Will be Greatly Improved in the Future.* Characterized by higher incidence, mortality, disability, and recurrence rates, Stroke seriously affects the health of the people in China. Solving the problems of stroke prevention and treatment is of great significance to improving people's health levels and reducing the burden on families and society. In June 2021, the National Health Commission jointly with other 9 government sectors decided to implement the project of strengthening stroke prevention and control and reducing millions of new disabilities, to further improve the prevention and treatment of stroke, the effect of diagnosis and treatment, and the reduction of disability caused by stroke.[48] It is guaranteed that the new comprehensive project of reducing millions of new disabilities will be implemented by a series of measures, including deepening interdepartmental cooperation, improving the system of diagnosis and treatment management, popularizing appropriate technologies for stroke prevention and control, as well as strengthening hypertension prevention and control management, improving the support capacity of comprehensive logistics and strengthening propaganda and guidance. The project requires nationwide governments at all levels to take the prevention and control of hypertension risk factors and the popularization of technologies appropriate for stroke prevention and control as major measures, by actively delivering favorable policies. Relevant administrative sectors at all levels will gradually optimize the operational performance supervision indicators of the medical institutions, formulate the charging standards of appropriate technologies for stroke prevention and control introduced in the scope of medical insurance reimbursement, and actively promote the purchase of drugs and consumables with a substantial amount. And it is expected to finally achieve the goal of reducing 1 million new disabilities by 2025. The prevention and treatment service capacity covering pre-hospital aid, rescue at emergency, in-hospital thrombolysis, thrombectomy, post-stroke recurrence prevention, and rehabilitation management in China will be greatly improved in the future, by integrating a system of stroke medical care and prevention and constructing specialized stroke centers with Chinese characteristics.

## Conclusion and Vision for the Future

In summary, the current situation of stroke prevention and treatment is still very serious. We must realize that the primary prevention of stroke is still the fundamental way out of stroke prevention and control. In line with the starting point of being highly responsible for the people's health, the Chinese government made national strategic plans for "comprehensively promoting the construction of healthy China". The construction and integration of specialized stroke centers and medical consortia in China are bound to create a new stroke prevention and control system with international standards and Chinese characteristics, and the accessibility and equalization of health services in stroke prevention and control can also be well-solved. The stroke prevention and treatment model will change from passive stroke treatment and risk factor control to a more proactive prevention model of health factor management. Each one will also become the first responsible person for stroke prevention and treatment and our health. With the participation of the whole society and the whole people under the

government leadership, increased stroke incidence and prevalence will be curbed, and the long-term goal of "building a healthy China" will be realized by 2035.

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**Bin Jiang:** Conceptualization, Data curation, Formal analysis, Funding acquisition, Investigation, Methodology, Resources, Software, Supervision, Validation, Visualization, Writing –original draft, Writing –review & editing.

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The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

## Data Availability Statement

Data sharing does not apply to this article as no new data were created or analyzed in this study.

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