Prevalence of Stroke in China, 2013–2019: a population-based study
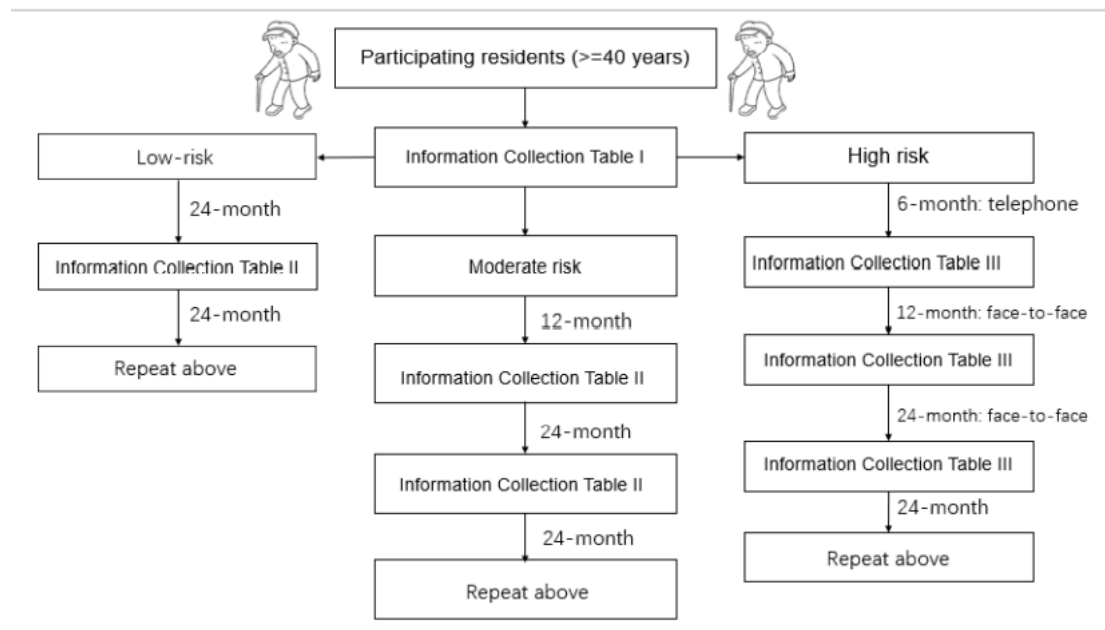
Supplementary materials

Supplemental Methods

Supplemental Chinese version of the abstract

Tables S1-S5

Supplementary methods

High-risk population screening and intervention program proposals

Screened people were divided into three groups (high risk, caution and low risk) according to the National Stroke Association's Stroke Risk Scorecard (https://www.neurologystroke.com/pdfs/Stroke-Risk-Assessment Scorecard.pdf), which including hypertension, hyperlipidemia, diabetes, obesity, smoking, atrial fibrillation, lack of exercise, and family history of stroke. Participants had greater than or equal to three above factors or transient ischemic attack or history of stroke are defined as high risk, while had one of the following medical histories: hypertension, diabetes, and atrial fibrillation are defined as moderate risk.

Definition criteria of risk factors

Smoking status was divided into three categories: current smoking (was defined as continuous or cumulative smoking for >6 months), former smoking (was defined as continuous smoking for >6 months but no smoking at the time of the survey), and passive smoking (was defined as exposure to smoke from smokers for at least 15 minutes per day and >1 day per week among non-smokers).

Alcohol consumption was divided into three categories: heavy alcohol consumption (was defined as the intake of alcoholic beverages ≥3 times per week and ≥100 mL per drinking episode), light to moderate alcohol consumption (was defined as the intake of alcoholic beverages <3 times per week or <100 mL per drinking episode), and none.

Vegetable and fruit consumption were classified according to the following frequency tertiles (days per week): ≤2, 3 to 4, and ≥5.

Physical inactivity was defined according to WHO recommendations standard (at least 150 min of moderate-intensity, or 75 min of vigorous-intensity physical activity per week, or any equivalent combination of the two) [1].

Body mass index (BMI) was calculated as body weight (kg) divided by the square of height (m). Overweight (BMI of 24.0–27.9 kg/m2) and obesity (BMI ≥28 kg/m2) were defined according to the guidelines established for Chinese adults [2}.

Hypertension was defined as systolic blood pressure ≥140 mm Hg, diastolic blood pressure ≥90 mm Hg, self-reported hypertension, or the use of antihypertension medications. Blood pressure measurement needs to be measured at least 3 times on a different day. The standard for diagnosing hypertension by ambulatory blood pressure is the 24-hour average blood pressure≥130/80mmHg, average blood pressure during the day ≥135/85 mmHg, or average blood pressure at night pressure ≥120/70mmHg.

Diabetes mellitus was defined as fasting plasma glucose level ≥7.0 mmol/L or oral glucose tolerance test ≥11.1 mmol/L, self-reported diabetes mellitus (was determined previously by a healthcare professional), the use of oral hypoglycemic agents, or insulin injections.

Dyslipidemia was defined on the basis of ≥1 of the following criteria: triglycerides ≥2.26 mmol/L, total cholesterol≥6.22 mmol/L, high-density lipoprotein cholesterol<1.04

mmol/L, low-density lipoprotein cholesterol ≥4.14 mmol/L, self-reported dyslipidemia, or the use of anti-dyslipidemia medications [3].

AF was defined as self-reported history of persistent AF or ECG results. AF was divided into three categories: paroxysmal AF (atrial fibrillation occurs for less than 7 days, often less than 24 days, and can be converted on its own sinus rhythm), persistent AF (atrial fibrillation occurs more than 7 days, more electrocon version or drug conversion is required), and permanent AF (cannot be converted to sinus heart rhythm).

Family history of stroke was defined as the occurrence of stroke in ≥1 of the participant's parents or siblings.

The following information in stroke patients needs to be collected: the time of first and last onset, the main symptoms at the time of onset, the treatment method (inpatient [the name and level of the medical institution], emergency, outpatient, family ward); the main classification (cerebral infarction, cerebral hemorrhage, subarachnoid hemorrhage), imaging examination, intracranial and extracranial vessels assess, the severity of symptoms, clinical treatment (internal medicine, intervention, surgery), rehabilitation treatment in hospital; rehabilitation after discharge (such as rehabilitation refers to community rehabilitation or homework under the guidance of regular rehabilitation physicians treatment and physical therapy), outcome and whether regular secondary prevention etc.

Sample weights

Across all National Stroke High-Risk Population Screening program, we developed sample weights to account for multi-stage sampling design and post-stratification. For an individual in the sample, his/her sample weights were developed as follows.

1. Base weights for multi-stage design (Wdesign)

1.1 Stratifications: East/ Central /West * Urban/Rural = 6 stratum

1.2 A1=Number of districts/counties in different stratum in the sample

1.3 B1=Number of districts/counties -level administrative districts in each stratum

1.4 Wdesign=B1/A1, assign the weight Wdesign of each stratum to the corresponding case of each stratum

2. Non-response weights (Wnr) from 2013 to 2019

Wnr = the number of eligible adults in the household where the individual was from divided by the number of participating adults in the household

3. Post-stratification weights (Wps)

3.1 Stratifications: gender (2 levels) * geographic region (6 levels: North China, Northeast China, East China, Central South, Southwest, Northwest) *age group (9 levels: 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80+) =108 stratum

3.2 A2=The sum of the case weights Wdesign of each stratum of the sample

3.3 B2=Number of people by stratum in the 2010 Sixth census

3.4 Wps=B2/A2, assign the weight Wps of each stratum to the corresponding case of each stratum

Supplemental Chinese version of the abstract

中国 2013 年到 2019 年卒中患病率：一项基于中国卒中高危人群筛查项目的研究

涂文军，巢宝华，华杨，闫峰，卞何涛，杨弋，楼敏，康德智，何俐，楚兰，曾进胜，武剑，陈会生，韩建峰，马林，曹雷和王陇德

研究研究背景：中国的卒中负担在过去 40 年持续增加。本研究通过中国卒中高危人群筛查项目旨在确定 2013 年至 2019 年中国卒中患病率趋势以及按社会人口学特征（包括性别、年龄、居住地、种族和省份）分层的患病率趋势。

方法：我们利用了中国卒中高危人群筛查和干预计划中 2013 年 1 月至 2019 年 12 月期间生成的数据，这是一个正在持续进行的基于人群的筛查项目，每年在中国大陆 31 个省招募约 80 万名 40 岁以上的社区居民。本项目采用现场调查的方式收集信息。所有在入组时具有卒中病史的活着的受试者都被认为患有卒中。根据年龄和性别估计卒中的患病率。粗略和年龄标准化的流行率与其 95% 置信区间(CI) 同时计算。

结果：研究期间最终纳入来自 31 个省 227 个城市的 4229616 名 40 岁以上的中国成年人。 入组率从 47.8%（2013 年）到 65.4%（2019 年）不等。从 2013 到 2019 年卒中加权患病 率逐年增加，2013 年为 2.28%（95% CI：2.28%-2.28%），2014 年为 2.34%（2.34%-2.35%），2015 年为 2.43%(2.43%-2.43%)，2016 年为 2.48%（2.48%–2.48%），2017 年 2.52%(2.52%– 2.52%)，2018 年为 2.55% (2.55%–2.55%)，2019 年为 2.58%（2.58%-2.58%）（趋势 p 20%）。卒中患病率受到年龄、性别、城乡、民族和省份的影响。男性、老年人、满族和蒙古族以及居住在农村和东北地区的居民卒中患病率较高。

研究结论：在过去的 7 年（2013-2019 年）中，中国和大多数省份的卒中患病率持续上升，需要在全国范围内制定广泛的战略以改善预防，加大筛查力度并提供更广泛有效且负担得起的干预措施。特别是对于脑卒中高发的省份，例如黑龙江，内蒙古和河南，现有数据将有助于省卫生健康委制定有针对性的脑卒中预防规划和医疗资源配置。

Table S1

The national major public health service project -- the screening and intervention project for the high-risk population of stroke

Survey of risk factors of Cardiovascular and Cerebrovascular Disease Risk Factors 2019

(For community,township,high-risk stroke population at 6months,12months of follow-up and 12months of middle-risk population follow-up)

Informed consent:I have read the informed consent and volunteered to participate in this screening and intervention project.I agree to use the data for the managementof the national health administration

Signature:_____

Name of screening institution _____	Screening date day : _____ month:_____ year : _____
On-site QC: _____ Contactnumber: _____	

I.BASIC INFORMATION

1.1 Demographic information

Name _____	Sex: male female	Ethnicity _____	ID number:_____

Marital status: unmarried   married   widowed   divorced   others

Living conditions   living alone   living with spouse   living with children   living with spouse and children
living with others (other relatives or care givers)   nursing home   others

Education level :   primary school and below   junior high   technical school/high school   junior college /Bachelor's degree   master's degree or above

Retired   Yes   No
Occupation(pre-retirementoccupation)   Person in charge of state organs, party-mass organizations, enterprises and institutions   Professional and technical personnel   Clerical and related personnel   Business and service personnel   Producers in agriculture, forestry, animal husbandry, fishing and water conservation   Production, transportation equipment operators and related personnel   Soldiers   Others

Average annual income   Under 5K   5K-10K   10K-20K   Above 20K

Main medical payment methods   Basic medical insurance for urban workers   New basic medical insurance for urban residents   The new rural cooperative medical insurance   Commercial health insurance   All public   Self-paying   Other Social Insurance   poverty relief   others

1.2 Communication and contact information

Address:	province:	city:	District /county:	Streets /towns:	Residential(village) committees:	Zip Code(optional):
Current address	province:	city:	District/ county:	Streets /towns:	Residential(village) committees:	Zip Code(optional):
Mobile phone:	Telephone	Wechat optional				Email address (optional) :
Person to contact:	Relationship parent couple children Brothers & Sisters others					Contact phone:

1.3 Status of this survey

Investigation: face to face   telephone

   Was the survey conducted by the respondents themselves: yes

      no   Relationship between the informer and the respondent: parent   spouse   child   brother and sisiter   others

Whether lost to follow-up   no

      yes   reason: lost contact   refused to participate in the investigation   other:_____

Dead or not: no

      yes,Time of death: before 31 December 2018

         Between 1 January 2019 and 31 December 2019

         O After January 1st, 2020:   month:_____day:_____

         The cause of death:(Register for 2019 only)

         stroke   Hemorrhagic stroke   Ischemic stroke   Unknown)
         Coronary heart disease (CHD)   malignant tumor   Respiratory disease   Liver and kidney disease - non - tumor   Accident

1/ 7GN-2020F0002   Screening table for cardiovascular and cerebrovascular disease risk factors incommunity and township population
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Of those who died of stroke,Death location   In the hospital   Outside the hospital

Whether in the hospital   _____   hospital level   Provincial hospital   Prefecture-level hospital   County-level
Yes,hospital:_____hospitals   District or township health institutions

Main Diagnosis at Admission   Cerebral infarction   hemorrhage   SAH   TIA

O no

Medical record material   provide   not provided

*In 2019, death registration, medical records and other supporting materials should be provided at least 85%

Screening officer: _____

2. Lifestyle

Screening officer :_____

2.1 Smoking

O No
O Yes, If you are , smoke for_____years _____cigarettes a day

   If you have quit smoking, how long you have quit smoking: _____years

2.2 Drinking

O no drinking
O A small amount of alcohol
O Frequent heavy drinking (liquor ≥3 times/week, ≥100ml each time)

2.3 Sports habits

O Regular exercise (moderate intensity exercise equivalent to brisk walking, and ≥3 times per week, each time ≥30 minutes, including moderate and heavy manual labor) O Lack of physical activity (those who do not meet the above criteria for regular exercise)

2.4 Dietary habits

Taste: O salty O weak salt taste O moderate
Mix meat quality: O meat O vegetarian O equilibrium
Vegetables (eat 300g vegetables a day): O ≥5 d /w O 3-4 d /w O≤2 d /w
Fruit (200g per day): O≥5 d /w O 3-4 d /w O ≤2 d /w

3、Family history

Screening officer :_____

3.1 Stroke

O None
O Yes，Relationship：□farther □ mother □ brothers and sisiters :(How many people are sick?____)
O Unknown

3.2 Coronary heart disease

O None
O Yes，Relationship：□farther □ mother □ brothers and sisiters :(How many people are sick?____)
O Unknown

3.3 Hypertension

O None
O Yes，Relationship：□farther □ mother □ brothers and sisiters :(How many people are sick?____)
O Unknown

3.4 Diabetes

None
Yes Relationship   farther   mother   brothers and sisiters : (How many people are sick?_____)
Unknown

4.*M ain medical history and control during this survey

(The survey period refers to the period from 2018 survey t
o this survey, the same below)

Screening officer   _____

4.1 History of cerebrovascular disease

Cerebrovascular history at the time of last screening/intervention: ○ no

Yes   Type of cerebrovascular disease   infarction   hemorrhage   SAH   TIA

Time of first symptoms:_____

During this investigation, there is no new incident of cerebrovascular disease: ○ No

○ yes ， How many episodes _____

Time of first symptoms:_____

Hospital Level   Provincial hospital   Prefecture-level hospital   County-level hospitals   Community or township health hospitals
Main diagnosis   infarction   hemorrhage   SAH   TIA

Whether to receive rehabilitation treatment during hospitalization   no   yes
Whether to receive rehabilitation treatment after hospitalization   no   yes

Medical record material   provide   not provided

Time of last symptoms:_____

Hospital Level   Provincial hospital   Prefecture-level hospital   County-level hospitals   Community or township health hospitals

Main diagnosis   infarction   hemorrhage   SAH   TIA
Whether to receive rehabilitation treatment during hospitalization   no   yes
Whether to receive rehabilitation treatment after hospitalization   no   yes
Medical record material   provide   not provided

(Note: The interval between two outbreaks should be more than 28 days. If there are three or more outbreaks, please record them separately.)

* For cerebrovascular diseases diagnosed in 2019, the most recent diagnosis and hospitalization records should be provided at least 85% of the time

MRS score: Cerebrovascular disease patients

Evaluation of time   day____month _____year_____ The evaluator   ____

Options (single option)	score
No symptoms at all	0
Despite symptoms, she has no significant dysfunction and is able to complete all routine tasks and daily life	1
Slightly disabled, unable to complete all pre-illness activities, but able to take care of daily life without assistance	2
Moderately disabled, with partial assistance, but able to walk independently	3
Severe disability, unable to walk independently, unable to meet their daily needs without other people's help	4
Severe disability, persistent bedridden, incontinence, continuous care and attention, and complete dependence on other people	5

4.2 History of the heart

History of heart disease at last screening/intervention: no
yes   Type of heart disease: 0 coronary heart disease 0 atrial fibrillation 0 valvular heart disease 0 other 0 unknown

Was therea new heart attack duringt he survey○无

Type of heart disease: coronary heart disease   coronary heart disease(angina, myocardial infarction, asymptomatic coronary stenosis)

Time of first diagnosis(date) _____

atrial fibrillation (Paroxysmal   Persistent   Unknown)
□Valvular heart disease

□ other (_____)

□ unknown

Hospital Level   Provincial hospital   Prefecture-level hospital   County-level hospitals   Community or township health hospitals

If you have atrial fibrillation (including previous and newly discovered patients with atrial fibrillation during this survey) :

Whether or not to take antithrombotic drugs   no   yes

Drug varieties   warfarin   New anticoagulant   aspirin   clopidogrel   others

Duration of use   date : _____   Antithrombotic drugs   regular   irregular

4.3 Hypertension

Hypertension at last screening/intervention: O no O yes

Time of first diagnosis of hypertension   time :_____

Frequency of blood pressure measurement during this survey: Never measured   Often measured (at least once a week)   Occasionally measured   **Whether home self - blood pressure test?:**

no   occasionally measurement   often measured _____measurement frequency _____

Have you ever been diagnosed with hypertension   no   yes, confirmed time (date):_____

Are you taking blood pressure medication   no   yes

Type of drug use   diuretics   calcium antagonist   -blocker   -blocker   -blockers,   ACEI   ARB   others

Duration of use(date):_____   Drug use   Regularity   Irregularity

Blood pressure control: Standard   Not clear

4.4 Abnormal blood lipid

History of dyslipidemia at the time of last screening/intervention   O none O   yes

First diagnosis time of dyslipidemia   date _____

Frequency of blood lipid measurement: Never tested.   Regular tests.   occasionally tested (less than 1 times a date)Is there any new dyslipidemia found during this investigation: no

yes   Confirmed date _____

Types of dyslipidemia: high cholesterol   high triglyceride   high LDL-C   low HDL-C   unknown

If there are patients with dyslipidemia (including patients with previous dyslipidemia and patients with new dyslipidemia found during this survey),

Whether to take lipid-regulating drugs   no;

yes   Statins   Beta   Others

4.5 diabetes

History of diabetes at the time of last screening/intervention: ○ no ○ yes

First diagnosis time of diabetes(date):_____

Frequency of blood glucose measurement during the survey period :　 Never tested.　 Regular tests.　 occasionally tested (less than 1 times a year)

Is there any newly found diabetes during this investigation?　 No　　Yes, the date of diagnosis:_____

If patients with diabetes (including previous and newly discovered diabetes patients during this survey)

　　Whether to use hypoglycemic agents :　　 no
　　　　　　　　　　　　　　　　　　　　　　yes　 Take hypoglycemic drugs　 insulin　 others

　　Blood glucose control:　 basically standard,　 not standard,　 unclear

5. Physical examination

5.1 General signs　screening officer: _____

　Inspection time: month:_____;day:_____ year_____

　Height: ___cm Weight: ___kg BMI (automatically generated by the system) : ____(kg/m2) Waist circumference:_____

5.2 Blood pressure is now measured (on the same side, two times)　　screening officer : _____

Time of measurement: month :_____ day:_____year: _____

First, systolic blood pressure SBP: _____ mmhg Diastolic pressure DBP: _____ mmhg pulse: _____ times/min

secondly, systolic blood pressure SBP: _____ mmhg Diastolic pressure DBP: _____ mmhg pulse: _____ times/min

5.3 Cardiac auscultation　screening officer:

　Inspection time: month:_____;day:_____ year_____

Heart murmur: ○ none ○Have a heart rhythm: ○in order ○ out of order

6　Electrocardiogram　(Cardiac auscultation patients with arrhythmia must do the project)

Inspection time: month:_____;day:_____ year_____　**screening officer**: _____

inspection: ○ normal

　　　　　　　○ abnormal;　　　abnormal type:○ atrial fibrillation　○ others

7、Laboratory examination

7.1 Blood glucose

Inspection time: month:_____;day:_____ year_____　Fasting blood glucose: _____ mmol/L

Inspection time: month:_____;day:_____ year_____　Blood glucose 2 hours postprandial (recommended) : _____ mmol/L

Inspection time: month:_____;day:_____ year____　　Hemoglobin:_____%

7.2 Blood lipids

　Inspection time: month:_____;day:_____ year_____

Triglyceride: _____mmol/L, Cholesterol:_____mmol/L

Low density lipoprotein cholesterol: _____ mmol/L High density lipoprotein cholesterol : _____ mmol/L

7.3 Homocysteine

　Inspection time: month:_____;day:_____ year_____　Homocysteine:_____μmol/L

8. Risk rating for cardiovascular and cerebrovascular diseases

1	**High blood pressure:** ○ yes ○ no
2	**dyslipidemia:** ○ yes ○ no

5/ 7GN-2020F0002　Screening table for cardiovascular and cerebrovascular disease risk factors incommunity and township population

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3	Diabetes：○ yes ○ no
4	Atrial fibrillation or valvular heart disease：○ yes ○ no
5	History of smoking：○ yes ○ no
6	**Obvious overweight or obesity**：○ yes ○ no
7	Lack of movement : ○ yes ○ no
8	Family history of stroke:○ yes ○ no
I	Past stroke：○ yes ○ no
II	Previous transient ischemic attack (TIA) : ○ yes ○ no

Risk classification	○ stroke	○TIA	○n≥3 high risk	○ critical	○ low risk
Hazard marking	🟥🟥🟥🟥🟥🟥🟥			🟨	🟩
Management classification	Enhanced management			Standardized management	Health management

9.*Cervical vascular ultrasound

*Note:Required projects for high-risk groups

Inspection time: month: _____; day: _____ year : _____   Screening officer: _____   Name of Inspection _____

Inspection results :   All normal   Abnormal in any part

Abnormal	Abnormal project	Location of the offending lesion (Note: fill in the corresponding number " " in this section)									
		Left					**Right**				
		CCA	Carotid sinus	**IC**	subclavian Arterial SA	**VA**	**CCA**	subclavian Arterial SA	**IC**	subclavian Arterial SA	**VA**
Intima-Media Thickness IMT	Thickening (IMT 1.0 mm) (0=no,1=yes) Thickness: _____ mm	☐					☐				
Plaque	**Number**	○ no ○ single ○ multiple									
	Morphology (1= irregular, 0= regular)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Ulcer (1= Yes,0= No)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Echo (1= strong echo,2= medium echo, 3= low echo,4= mixed echo)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Narrow or block	Stenosis rate (0= no stenosis, 1=1-49%, 2=50-69 %, 3=70-99%, 4= occlusion)	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

10. Surgical or interventional treatment of vascular lesions

Screening officer:_____

10.1 The carotid artery	
Carotid artery stenting （CAS）	no yes left right bilateral Operation time(date):_____ Name of institution performing CAS:_____ Postoperative review: no yes, Time of review: 3 months after surgery, 6 months after surgery, one year after surgery, two years or more after surgery, Examination method: ultrasound, CTA, MRI, DSA Postoperative restenosis: No Yes Another intervention: No. The treatment method: CEA CAS Conservative treatment

Endometriectomy (CEA)	no yes left right bilateral Operation time(date):_____ Name of institution performing CAS:_____ **Postoperative review:** no yes, **Time of review:** 3 months after surgery, 6 months after surgery, one year after surgery, two years or more after surgery, **Examination method:** ultrasound, CTA, MRI, DSA Postoperative restenosis: No Yes Another intervention: No. The treatment method: CEA CAS Conservative treatment
Intracranial and extracranial vessel bypass graft	no yes The operation time(date) _____

10.2 Coronary arteries

percutaneous coronary intervention PCI	no yes The operation time(date) _____
coronary artery bypass grafting(CABG)	no yes The operation time(date) _____

10.3 Surgical treatment of hemorrhagic stroke

Have you ever received surgical treatment for hemorrhagic stroke: _____   No   Yes, The time of treatment (date): _____

The national major public health service project -- the screening and intervention project for the high-risk population of stroke

Risk factors for cardiovascular and cerebrovascular diseases in 2019
Follow-up table of community and township population

(For community,township,high-risk stroke population at 6months,12months of follow-up and 12months of middle-risk population follow-up)

Informed consent:I have read the informed consent and volunteered to participate in this screening and intervention project.I agree to use the data for the managementof the national health administration

Signature: _____

Name of screening institution _____	Screening date day : _____ month:_____ year : _____
Follow-up personnel ____ Contactnumber:_____	

I. BASICINFORMATION

1.1Demographic information		
Name _____ ID number: _____	Follow-up rounds (distance from filing time) :	6month 12month

1.2 Status of this survey

Method of investigation : ○ face to face

○ phone (Medium-risk group and high-risk group were followed up for 6 months)

Is this survey conducted by the respondents themselves?   yes

○ no , **the relationship between the informer and the respondent:**   Parents,   Spouses,   Children   Brothers and sisters,   Others:

Lost to visit: No

Yes, **the reason for the loss of visit:**   Lost contact   Refused to participate in the investigation   Other:____

Dead or not : ○ no

○ yes,death time ,Date : _____ Time: _____

Cause of death: Stroke (Hemorrhagic Stroke   Ischemic Stroke   Unknown)

○ coronary heart disease

○ malignant tumor

○ disease of respiratory system

○ damage and poisoning

○ others:_____

○ unknown

2. Life style during follow-up

Sports habits   Regular exercise (moderate intensity exercise equivalent to brisk walking, and   3 times per week, each time   30 minutes, including moderate and heavy manual labor)   Lack of physical activity (those who do not meet the above criteria for regular exercise)

Smoking: No   Yes

Drinking: non-drinking   small amount drinking   regular heavy drinking(Liquor   3 times/week,   100ml each time)

Taste: salty   Weak salty   moderate   **Balance portion of vegetables and meat** :   Partial meat diet   Partial vegetarian diet   equilibrium Eat vegetables (eat 300g vegetables a day) :   5 days/week   3-4 days/week   2 days/week

Eat fruit (eat 200g fruits a day) :   5 days/week   3-4 days/week   2 days/week

3.Main medical history and control during follow-up

3.1 Cerebrovascular disease

There were no new cerebrovascular disease events during the follow-up: ◯ no ◯ yes : How many episodes _____times

Time of first symptoms follow-up _____

Hospital Level   Provincial hospital   Prefecture-level hospital   County-level hospitals   Community or township health hospitals

Main diagnosis   infarction   hemorrhage   SAH   TIA
Whether to receive rehabilitation treatment during hospitalization   no   yes
Whether to receive rehabilitation treatment after hospitalization   no   yes

(Note: The interval between two attacks should be more than 28 days. If there are two or more attacks, please record them separately.)

MRS score: Cerebrovascular disease patients

Evaluation of time   day____month ____year_____ The evaluator _____

Options (single option)	Score
No symptoms at all	0
Despite symptoms, she has no significant dysfunction and is able to complete all routine tasks and daily life	1
Slightly disabled, unable to complete all pre-illness activities, but able to take care of daily life without assistance	2
Moderately disabled, with partial assistance, but able to walk independently	3
Severe disability, unable to walk independently, unable to meet their daily needs without other people's help	4
Severe disability, persistent bedridden, incontinence, continuous care and attention, and complete dependence on other people	5

4.2 History of the heart

Heart history   no

yes   Time of first diagnosis(date) _____

Type of heart disease   coronary heart diseas(angina   myocardial   asymptomatic coronary stenosis)

Atrial fibrillation   Paroxysmal   Persistent   Unknown
Valvular heart disease
Others:
unknown

Hospital Level   Provincial hospital   Prefecture-level hospital   County-level hospitals   Community or township

If you have atrial fibrillation (including previous and newly discovered patients with atrial fibrillation during the current follow-up) :

Whether or not to take antithrombotic drugs   no   yes
yes **Drug varieties**   warfarin   New anticoagulant   aspirin   clopidogrel   others
Drug usage :   regular   irregular

3.3 Hypertension

New hypertension was found during the follow-up: No   Yes , Time of diagnosis(date):_____

If there is hypertension (including previous hypertension and newly discovered hypertension during the current follow-up period), **Whether to take antihypertensive drugs**

Type of drug use   diuretics   calcium antagonist   -blocker   -blocker   -blockers,   ACEI   ARB   others

Drug use   Regularity   Irregularity

Blood pressure control: Standard   Not standard   not clear

3.4 Abnormal blood lipid

Whether new dyslipidemia was found during the follow-up period : ○ no

○ yes , Time of diagnosis(date):_____

Types of dyslipidemia: high cholesterol   high triglyceride   high LDL-C   low HDL-C   unknown

If there is dyslipidemia (including patients with previous dyslipidemia and patients with new dyslipidemia found during the current follow-up),

Whether to take lipid-regulating drugs   no; yes   Statins   Beta   Others

3.5 Diabetes

Whether there is newly found diabetes during the follow-up: No   Yes,
the time of diagnosis (date): _____**If the patients with diabetes** (including the previous and the newly found diabetes during the follow-up).

Whether to use hypoglycemic agents: no
yes   Take hypoglycemic drugs   insulin   others

Blood glucose control: Basically up to standard   Not clear

4. Surgical or interventional treatment of vascular lesions during the follow-up period

4.1 The carotid artery

Carotid artery stenting CAS	○ no ○ yes , ○ left ○ right ○ Bilateral operation time(date): _____
Endometriectomy (CEA)	○ no ○ yes , ○ left ○ right ○ Bilateral operation time(date): _____
Intracranial and extracranial vessel bypass graft	no yes operation time(date): _____

4.2 Coronary arteries

percutaneous coronary intervention PCI	no yes operation time(date): _____
coronary artery bypass grafting(CABG)	no yes operation time(date): _____

4.3 Surgical treatment of hemorrhagic stroke

Have you ever received surgical intervention for hemorrhagic stroke:___   No   Yes, Treatment: _____ time of therapy(date):_____

5. Physical examination
(must be done in the 12-month follow-up of high-risk groups)

5.1 General signs

Inspection time: month:_____;day:_____ year: _____
Height: ___cm Weight: ___kg BMI (automatically generated by the system) : ____(kg/m2) Waist circumference:_____

5.2 Blood pressure   on the same side, two times

Time of measurement: month :_____ day:_____year: _____
First, systolic blood pressure SBP: _____ mmhg Diastolic pressure DBP: _____ mmhg pulse: _____ times/min
secondly, systolic blood pressure SBP: _____ mmhg Diastolic pressure DBP: _____ mmhg pulse: _____ times/min

5.3 Cardiac auscultation

Inspection time: month:_____;day:_____ year_____ Heart murmur   none   have a heart rhythm   in order   out of order

6. Laboratory examination
(must be done in the 12-month follow-up of high-risk groups)

6.1 Blood glucose
Inspection time: month:_____;day:_____ year_____Fasting blood glucose: _____ mmol/L
6.2 Blood lipids
Inspection time: month:_____;day:_____ year_____ Triglyceride: _____ mmol/L, Cholesterol: _____ mmol/L Low density lipoprotein cholesterol: _____ mmol/L High density lipoprotein cholesterol : _____ mmol/L

Table S3: Information on the cities participating in the screening project

Year	Cities	Hospitals	Village or community	Included peoples‡	Screened peoples	Enrollment rate (%)
2013	162	181	315	723,571	1,070,590	67.8
2014	164	184	342	670,603	1,026,016	65.4
2015	180	209	376	699,459	1,155,872	60.5
2016	178	206	366	513,147	802,255	64.0
2017	189	223	416	533,243	906,921	58.8
2018	186	227	401	550,975	865,367	63.7
2019	183	220	405	539,418	845,463	63.8
Total	223	260	1161	4,229,616	6,672,484	63.4

‡The data cleaning process consists of two parts: screening points and participating individuals.

(1) Screening points that meet the following criteria will be eliminated as a whole:

① The sample size is less than 400;

② Prevalence of stroke is 0;

③ The male to female ratio is greater than 1.5 or less than 0.4.

(2) Participating individuals that meet the following criteria will be eliminated:

① Lack of informed consent;

② Lack of main information, including gender, age, body mass index, blood pressure and risk factors (stroke, hypertension, diabetes, hyperlipidemia, smoking, atrial fibrillation, lack of exercise, family history of stroke and transient Ischemic Attack);

③ Lack of laboratory test results;

④ The reported data is obviously abnormal: age less than 40 years old or greater than 110; height less than 100cm or greater than 220cm; weight less than 40kg or greater than 150kg; systolic blood pressure greater than 250 mmHg or less than 90 mmHg; diastolic blood pressure greater than 200 mmHg or less 60 mmHg; laboratory test results are 0;

Table S4: Information on the cities participating in the screening project

Province/Municipality	City	2013	2014	2015	2016	2017	2018	2019
Beijing	Changping district	v	v	v		v		
	Chaoyang district	v	v	v	v	v	v	
	Dongcheng district	v	v	v	v	v	v	
	Fangshan district	v	v					
	Fengtai district	v	v	v	v	v	v	v
	Haidian district,	v	v	v	v	v	v	v
	Huairou district	v	v					
	Tongzhou district		v					
	Xicheng district	v	v	v	v	v		
Tianjin	Beichen district	v	v	v	v	v		v
	Dongli district		v		v			
	Heping district		v		v		v	
	Hebei district	v	v		v		v	
	Hexi district					v		v
	Hongqiao district	v	v		v			
	Jinnan district		v		v		v	
	Binhai New Area			v	v	v	v	v
	Nankai district	v	v	v	v	v	v	v
	Xiqing district	v		v		v		v
Hebei	Baoding city	v	v	v	v	v	v	v
	Cangzhou city	v			v	v	v	v
	Chengde city		v	v	v	v	v	v
	Handan city	v	v	v	v	v	v	v
	Hengshui city	v	v	v	v	v	v	v
	Qinhuangdao					v	v	v
	Shijiazhuang city	v	v	v	v	v	v	v
	Tangshan	v		v	v	v	v	
	Xingtai					v	v	v
Shanxi	Datong	v	v	v	v	v	v	v
	Jinzhong city	v				v	v	v
	Linfen			v			v	v
	Luliang city	v	v	v	v	v	v	v
	Taiyuan city	v	v	v	v	v	v	v
	Yangquan city	v	v	v	v	v	v	v
	Yuncheng	v	v	v	v	v	v	v
	Changzhi city	v	v	v	v	v	v	v
Inner Mongolia	Baotou city	v	v	v	v	v	v	v
	Chifeng city	v	v	v	v	v	v	v
	Ordos city	v	v	v	v	v	v	v
	Hohhot		v	v	v	v	v	v
	Hulun buir	v	v	v	v	v	v	v
	Autonomous region			v				
	Tongliao	v		v		v	v	v
	Xingan league	v						
Liaoning	Benxi							v
	Chaoyang	v	v	v	v	v	v	
	Dalian	v	v	v	v	v	v	v
	Dandong				v	v	v	v
	Huludao	v		v	v	v	v	
	Jinzhou	v	v	v	v	v	v	v
	Liaoyang		v		v	v	v	v

	Shenyang	v	v	v	v	v	v	v
	Yingkou	v	v	v	v	v	v	v
Jilin	Jilin	v	v	v	v	v	v	v
	Siping	v	v	v	v	v	v	v
	Songyuan	v	v	v	v	v	v	v
	Tonghua	v	v	v	v	v	v	v
	Yanbian		v	v	v	v	v	v
	Changchun	v	v	v	v	v	v	v
Heilongjiang	Daqin	v	v	v	v	v	v	v
	Harbin	v	v	v	v	v	v	v
	Jiamusi	v	v	v	v	v	v	v
	Mudanjiang	v	v	v	v	v	v	v
	Qiqihaer	v	v	v	v	v	v	v
	Suihua						v	
Shanghai	Pudong new area	v	v	v	v	v	v	v
	Yangpu district					v	v	
Jiangsu	Changzhou	v	v	v	v	v	v	v
	Lianyungang	v	v		v	v	v	v
	Nanjing	v	v	v	v	v	v	v
	Nantong	v	v	v	v	v	v	v
	Suzhou	v	v	v	v	v	v	v
	Wuxi	v	v	v	v	v	v	v
	Xuzhou	v	v	v	v	v	v	v
	Yancheng	v	v	v	v	v	v	v
	Yangzhou	v	v	v	v	v	v	v
Zhejiang	Hangzhou	v	v	v	v	v	v	v
	Huzhou	v	v	v	v	v	v	v
	Jiaxing						v	
	Lishui city	v		v	v	v	v	v
	Shaoxing			v	v	v	v	v
	Taizhou	v	v	v	v	v	v	
	Wenzhou	v	v	v	v		v	v
Ahhui	Anqing		v	v		v	v	v
	Fuyang		v	v	v	v	v	v
	Heifei	v	v	v	v	v	v	v
	Huainan		v	v	v	v		v
	Lu'an	v		v		v		v
	Maanshan	v	v	v	v	v	v	v
	Tongling			v	v	v	v	v
	Wuhu	v	v	v	v	v	v	v
	Suzhou	v	v	v	v	v	v	v
	Xuancheng		v		v		v	
Fujian	Fuzhou	v	v	v	v	v	v	v
	Longyan		v	v	v	v	v	
	Nanping			v	v	v		
	Ningde	v	v	v	v	v	v	v
	Quanzhou	v	v	v	v	v	v	v
	Sanming			v	v	v		v
	Xiamen	v		v	v	v	v	v
	Zhangzhou				v			
Jiangxi	Ganzhou			v	v	v	v	v
	Shangrao	v		v	v	v	v	v
	Jiujiang	v	v	v	v	v	v	v
	Nanchang	v	v	v	v	v	v	v

		1	2	3	4	5	6	7
	Pingxiang	v	v	v	v	v	v	v
	Xinyu			v		v	v	v
	Yichun	v	v	v	v	v	v	v
Shandong	Binzhou	v	v	v	v	v	v	v
	Dezhou	v	v	v	v	v	v	v
	Dongying	v	v	v	v	v	v	v
	Heze	v	v	v	v	v	v	v
	Jinan	v	v	v	v	v	v	v
	Jining	v	v	v	v	v	v	v
	Liaocheng	v	v	v	v	v	v	v
	Linyi	v	v	v	v	v	v	v
	Qingdao	v	v	v	v	v	v	v
	Tai'an	v	v	v	v	v	v	v
	Weihai	v	v	v	v	v	v	v
	Weifang	v	v	v	v	v	v	v
	Yantai	v	v	v	v	v	v	v
Henan	Anyang	v	v	v	v	v	v	v
	Hebi city			v		v	v	v
	Jiaozuo	v	v	v	v	v	v	v
	Kaifeng	v		v		v	v	v
	Luoyang	v	v	v	v	v	v	v
	Luohe	v	v	v	v	v		v
	Nanyang	v	v	v	v	v	v	v
	pingdingshan			v		v	v	v
	Puyang							v
	Sanmenxia							v
	Shangqiu	v	v	v	v	v	v	v
	Xinxiang	v	v	v	v	v	v	v
	Xinyang			v		v		
	Xuchang	v	v	v	v	v	v	v
	Zhengzhou	v	v	v	v	v	v	v
	Zhoukou					v	v	v
	Zhumadian	v		v	v	v	v	
Hubei	Huanggang	v	v	v	v	v	v	v
	Jingmen	v	v	v	v	v	v	v
	Jingzhou		v		v			
	Shiyan	v	v	v	v	v	v	v
	Wuhan	v	v	v	v	v	v	v
	Xiangyang	v		v			v	
	Xiaogan	v	v	v	v	v	v	
	Yichang	v	v	v	v	v	v	v
Hunan	Changde		v	v	v	v	v	v
	Chenzhou	v	v	v	v	v	v	v
	Hengyang		v	v	v	v	v	v
	Huaihua	v	v	v		v	v	v
	Shaoyang	v	v	v	v	v	v	v
	Xiangtan	v	v	v	v	v	v	v
	Yiyang		v		v		v	
	Yongzhou		v	v	v	v	v	v
	Yueyang	v	v	v	v	v	v	v
	Zhangjiajie			v		v		v
	Changsha	v	v	v	v	v	v	v
	Zhuzhou	v	v	v	v	v	v	v
Guangdong	Guangzhou		v					

	Huizhou	v						
	Qingyuan	v	v	v	v	v	v	v
	Shaoguan	v	v	v	v	v	v	v
	Shenzhen	v	v	v		v	v	v
	Zhanjiang		v		v	v	v	v
	Zhongshan	v				v		
	Zhuhai	v	v	v	v	v		v
Guangxi	Baise			v	v	v	v	v
	Laibin	v	v	v	v	v	v	v
	Guilin	v	v	v	v	v	v	v
	Liuzhou		v	v	v	v	v	v
	Nanning	v		v	v	v	v	v
	Qinzhou	v		v	v	v	v	v
	Wuzhou		v	v	v	v	v	v
	Yulin	v	v	v	v	v	v	v
Hainan	Haikou	v	v	v	v	v	v	v
	Sanya		v	v	v	v	v	v
	Qionghai	v	v	v	v	v	v	v
Chongqing	Jiulongpo district		v		v	v	v	v
	Qijiang	v		v				
	Wanzhou district	v	v	v	v	v	v	v
	Yubei District							v
	Yuzhong district	v	v	v	v	v	v	v
Sichuan	Chengdu	v	v	v	v	v	v	v
	Deyang	v	v	v	v	v	v	v
	Leshan						v	v
	Luzhou	v	v	v	v	v	v	v
	Mianyang	v	v	v	v	v	v	v
	Nanchong	v	v	v	v	v	v	v
	Suining	v	v	v	v	v	v	v
	Yibin						v	v
	Zigong	v	v	v	v	v	v	v
Guizhou	Guiyang	v	v	v	v	v	v	v
	Liupanshui	v						
	Zunyi	v	v	v	v	v	v	v
Yunnan	Chuxiong				v		v	
	Dali	v	v	v	v	v	v	v
	kunming	v	v	v	v	v	v	v
	Lijiang	v	v	v	v	v	v	v
	Qujing	v	v	v	v	v	v	v
	Yuxi	v	v	v	v	v	v	v
Tibet	Lhasa	v	v	v	v	v	v	v
Shaanxi	Ankang	v	v		v		v	
	Baoji	v	v	v	v	v	v	v
	Weinan			v		v		v
	Xi 'an	v	v	v	v	v	v	v
	Yan 'an	v	v	v	v	v	v	v
	Yulin	v	v	v	v	v	v	v
Gansu	Baiyin	v	v	v	v	v	v	v
	Dingxi	v						v
	Jiuquan	v	v	v	v	v	v	v
	Lanzhou	v	v	v	v	v	v	v
	Qingyang	v		v	v	v	v	v
	Tianshui	v	v	v	v	v	v	v

	Wuwei					v	v	v
Qinghai	Haidong			v				v
	Haixi		v		v	v	v	
	Xining	v	v	v	v	v	v	v
Ningxia	Yinchuan	v	v	v	v	v	v	v
Xinjiang	Bayingeleng			v		v		v
	Changji	v	v	v	v	v	v	v
	Kashgar	v	v	v	v	v	v	v
	Urumqi	v	v	v	v	v	v	v
	Autonomous			v	v	v		

Table S5: the enrollment rates by province in 2019

Provinces	Screened peoples	Included peoples	Enrollment rate (%)
Beijing	7013	4290	61.2
Tianjin	15708	6842	43.6
Hebei	43861	23871	54.4
Shanxi	33450	16899	50.5
Inner Mongolia	19930	10562	53.0
Liaoning	40988	26068	63.6
Jilin	28406	15761	55.5
Heilongjiang	34013	21703	63.8
Shanghai	8357	5387	64.5
Jiangsu	51145	43819	85.7
Zhejiang	29281	21311	72.8
Anhui	35825	18214	50.8
fujian	22487	10142	45.1
Jiangxi	30898	18789	60.8
Shandong	68104	52966	77.8
Henan	67014	44790	66.8
Hubei	28184	17563	62.3
Hunan	56188	29115	51.8
Guangdong	23712	18141	76.5
Guangxi	24432	17517	71.7
Hainan	6059	3793	62.6
Chongqing	20632	13255	64.2
Sichuan	46452	35967	77.4
Guizhou	22882	12426	54.3
Yunan	16903	10625	62.9
Tibet	2332	940	40.3
Shaanxi	23116	17504	75.7
Gansu	15265	8437	55.3
Qinghai	4701	2818	59.9
Ningxia	7795	4513	57.9
Xinjiang	10328	5390	52.2

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