
Malaria is a major parasitic disease, which imposes serious threat to people’s health and safety and affects social and economic development in China. Since the founding of new China, governments of all levels have attached high importance to the issue of malaria. Hence some achievements have been obtained on the prevention and control. The incidence of malaria has been reduced to tens of thousands by the end of 1990s from 24 million at the beginning of 1970s. The epidemic area has been significantly narrowed to Yunnan and Hainan. Falciparum malaria has been eliminated from other areas. After year 2000, epidemic situations of some areas in China slightly deteriorated. However, along with the implementation of National Malaria Prevention and Control Plan, 2006-2015, both central and local governments have put more supports and inputs for the prevention and control of malaria and local epidemics were effectively contained. At present, 95% of counties (cities and districts) of all total 24 malaria epidemic provinces have reduced the incident rate under 1/10,000 and the incident rates are over 1/10,000 at only 87 counties (cities and districts).

In order to protect the public health, to promote harmonious economic and social development and to respond to global malaria elimination initiative proposed on UN Millennium Development Goals High-Level Meetings, Chinese government decided to launch comprehensive measures for malaria elimination. By 2015, malaria should be eliminated from most areas and by 2020, malaria should be basically eliminated nationwide. Development of this action plan is to identify tasks and measures and to clearly assign duties of different departments.

1. Guiding Ideology
The guideline is to focus on the implementation of scientific prevention and control measures. Local conditions must be considered and instructions must be categorised. Co-operations must be established between different departments and levels. Working mechanism should include the whole society. International co-operation and exchange should be strengthened to continuously improve the technical skills and to fully utilise all possible resources both domestic and overseas. Each objective must be achieved as planned.

2. Category of Malaria Epidemic Areas
Based on the malaria epidemic report of 2006 – 2008, counties in China are categorised into four classes:
County Class A: local infections are detected in 3 consecutive years and the incident rate equals or higher than 1/10,000.
County Class B: local infections are detected in 3 consecutive years, and the incident rate is lower than 1/10,000 at least in one of those 3 years.
County Class C: no local infections reported in 3 years.
County Class D: Non-malaria-epidemic-area.

3. Goal
a) Overall Objective
By 2015, local transmission of malaria should be eliminated except for partial border areas in Yunnan. By 2020, malaria elimination should be achieved nationally.
b) Objective of Each Phase
i.
By 2015, malaria should be eliminated in all Class C counties.

ii.
By 2015, local transmitted malaria should be eliminated in all Class B counties and Class A counties, except for border areas in Yunnan. By 2018, malaria should be eliminated in general.

iii.
By 2015, incident rate of malaria of Class A counties at border areas of Yunnan should be reduced to less than 1/10,000; by 2017, local transmitted malaria should be eliminated and by 2020, malaria elimination should be realised.

c) Indicators
The following indicators should be realised by 2012:

i.
Technical Trainings
i) 95% or high more staff members of provincial, municipal and prefectural disease prevention and control institutes and towns and village clinics of Class A, B and C counties must have received trainings on malaria prevention skills and elimination.

ii) More than 95% clinicians of provincial, municipal and prefectural medical institutes and of town clinics of Class A and B counties should have received trainings on malaria diagnosis and treatment; more than 95% lab staff should have receive trainings on plasmodium microscopic examination of blood smears.

iii) More than 95% clinicians of medical institutes of village levels at Class A and B counties and of town levels at Class C counties should have been trained on basic knowledge of malaria prevention and treatment.

iv) More than 95% of the health quarantine workers should have received trainings on knowledge and skills of malaria prevention and treatment.

ii.
Febrile patients’ blood test for plasmodium
i) 100% provincial and local general hospitals and disease prevention and control institutes should be able to conduct plasmodium blood tests. 100% general hospitals and disease prevention and control institutes of Class A, B and C counties should be able to conduct plasmodium blood tests. 90% Class A and B counties medical facilities at town level should be able to conduct plasmodium blood test.

ii) At class A and B counties, in each town, 3 kinds of febrile patients (clinically diagnosed malaria case, suspected malaria case and unknown-caused febrile patient) should have plasmodium blood tests, such tests should be conducted higher than 2% and 1% of populations of the administrative areas respectively. At Class C counties, more than 2‰ of the population of the administrative
areas should conduct plasmodium blood tests. During malaria epidemic season, such proportion should be higher than 80% of total annual blood tests.

iii) Lab testing rate of malaria should reach 100% and rate of lab confirmation should reach 75%.

iv) Screening rate of imported febrile patients by entry and exit inspection and quarantine facilities should reach 100%.

iii. Case report, treatment and case investigation
100% cases should be reported within 24 hours after diagnosed. 100% malaria cases must be treated regularly. Epidemiological investigation rate should reach 100%.

iv. Epidemic site treatment
Treatment rate of Class A county epidemic site should reach 50%, such of Class B county epidemic site should be reach 70% and 100% at Class C county.

v. Media control
During malaria epidemic seasons, 80% households of Class A and B counties should have prevention measures, such as mosquito net, net soaking and screen doors and windows.

vi. Health education

i) Malaria prevention and treatment knowledge should be learnt by 70% residents of Class A and B counties. 75% middle school and primary school students should know about malaria prevention and treatment. 90% workers at ports and health quarantine facilities should know about malaria prevention and treatment knowledge.

ii) Malaria prevention and treatment material should be placed at 90% ports of entry and exit and international travelling health care centres.

Indicators below should be met by 2015:

i. Technical trainings

i) 100% staff members of provincial, municipal and prefectural disease prevention and control facilities and town and village clinics of Class A, B and C counties should receive trainings on malaria prevention and treatment knowledge and on malaria elimination.

ii) 100% Clinicians of provincial, municipal and prefectural medical facilities and medical facilities of Class A and B counties should receive trainings on malaria diagnosis and treatment. 100% laboratory workers should receive technical trainings on plasmodium microscopic examinations of blood smears.
iii) 100% relevant clinicians of village clinics at Class A and B counties and medical facilities of town level at Class C counties should receive trainings on malaria prevention and treatment.

iv) 100% health quarantine workers should receive malaria prevention and treatment knowledge and technical trainings.

ii. Febrile patients’ blood tests for plasmodium

i) 100% general hospitals and disease prevention and control facilities at provincial and prefectural levels should be able to conduct blood tests for plasmodium. 100% general hospitals and disease prevention and control facilities of Class A, B and C counties should be able to conduct blood tests for plasmodium. 100% medical facilities at town level at Class A and B counties should be able to conduct blood tests for plasmodium.

ii) 3 types of febrile patients at towns of Class A and B counties should receive blood tests for plasmodium and such rate should not be lower than 1% and 2‰ respectively of the total population of each administrative area of Class A and B counties. And the rate should not be lower than 2‰ of the total population of each administrative area at Class C counties. More than 80% blood tests for plasmodium should be conducted during malaria epidemic seasons.

iii) 100% malaria cases should be laboratory confirmed.

iv) Screening rate of imported febrile patients by entry and exit inspection and quarantine facilities should reach 100%.

iii. Case report, treatment and case investigation

100% cases should be reported within 24 hours after diagnosed. 100% malaria cases must be treated regularly. Epidemiological investigation rate should reach 100%.

iv. Epidemic site treatment

Epidemic site treatment rate reaches 100%.

v. Media control

During malaria epidemic seasons, 90% households of Class A and B counties should have prevention measures, such as mosquito net, net soaking and screen doors and windows.

vi. Health education

i) Malaria prevention and treatment knowledge should be learnt by 80% residents of Class A and B counties. 85% middle school and primary school students should know about malaria prevention and treatment. 100% workers at ports and health quarantine facilities should know about malaria prevention and treatment knowledge.
Malaria prevention and treatment material should be placed at 100% ports of entry and exit and international travelling health care centres. By 2020, indicators below should be realised:

- Examination and certification of elimination
  - 100% malaria epidemic counties complete malaria elimination examination and certification

- Laboratory diagnosis of suspected malaria cases
  - Medical facilities and disease prevention and control facilities above county level at former epidemic counties should be equipped with plasmodium testing devices and be able to conduct tests.

By 2020, indicators below should be realised:

- Examination and certification of elimination
  - 100% malaria epidemic counties complete malaria elimination examination and certification

- Laboratory diagnosis of suspected malaria cases
  - Medical facilities and disease prevention and control facilities above county level at former epidemic counties should be equipped with plasmodium testing devices and be able to conduct tests.

All suspected malaria patients must receive laboratory blood tests for plasmodium.

If epidemiological investigation cannot identify sources of infections of malaria cases, identification of genetic source should be conducted at national labs.

Prevention and Control Strategy and Measures

Control of source of infections and media control measures should be strengthened at Class A counties to reduce malaria incidence. Sources of malaria infections should be eliminated at Class B counties to cut off local transmission of malaria. Surveillance and treatment of imported cases should be strengthened at Class C counties to prevent secondary transmission. Treatment of imported cases must be conducted properly at Class D counties. Each area should adjust their prevention and treatment strategies according to the changes of prevention and treatment process and epidemic situations.

a) Control and management of source of infections must be strengthened

i. Early detection of malaria cases. 3 types of febrile patients should have blood tests or rapid diagnosis tests (RDT) for plasmodium at medical facilities of all levels. Blood samples of RDT positive patients should be collected and preserved for examinations.

ii. Regular treatment of malaria cases. Medical facilities of all types and levels should treat malaria patients as required in Principles and Dosage of Anti-Malaria Drugs Administration. All malaria patients should be medicated under supervision in the whole process.

iii. Strengthened malaria epidemic situation report. Medical facilities of all types and levels must report detected malaria cases as required in Law on Infectious Disease Prevention and Control and Infectious Disease Information Report Regulations.
iv. Case verification. Malaria cases reported through the website must be verified immediately through blood tests for plasmodium by prefectural disease prevention and control facilities. Epidemiological investigation should be completed within 3 working days. Provincial disease prevention and control facilities should conduct laboratory pathological confirmation and genetic analysis for case detected in county, which the incident rate dropped to less than 1/100,000 in the previous year.

v. Treatment of epidemic sites. Prefectural disease prevention and control agencies should conduct case detection at villages or residential sites (epidemic site) where malaria case is detected and conditions are good for disease transmission. Blood samples should be collected from people with fever history in the recent two weeks for plasmodium tests or RDT. Meanwhile, relevant media control measures should be conducted at all households of the epidemic site. Malaria prevention and treatment material should be disseminated and consultation for malaria should be provided.

vi. Complete treatment during the rest period. Anti-relapse treatment should be given to tertian malaria cases of the previous year during the rest period of malaria transmission.

b) Media control must be intensified.

i. Prevention and eradication of mosquitoes. During the epidemic seasons, local areas should conduct environmental regulation and management along with patriotic health campaign and constructions of new villages to reduce breeding sites for mosquitoes and other insects and the density of mosquitoes. At epidemic sites, pesticides should be sprayed indoors and mosquito nets should be processed with pesticides, etc.

ii. Personal protection should be strengthened. During the epidemic seasons of malaria, residents at epidemic areas should apply repellent, mosquito burning incense, mosquito nets and screen doors and windows to reduce contact with mosquitoes.

c) Health education should be strengthened.

i. Education and promotion via mass media must be strengthened. Together with the “national Malaria Day” event, news media, including newspapers, broadcasting, TV and the internet, etc., should promote relevant prevention and treatment knowledge of malaria together with national policy on malaria elimination. The awareness of self-protection of the public should be improved and people should participate in malaria prevention and control and malaria elimination more proactively.
ii. Heath education should be reinforced on people entering and exiting borders. Institutes of border inspection and quarantine should set up billboards and other facilities at port of entries, and malaria prevention and control material should be placed at passenger channels. According to instructions given by department of health, travel agencies should organise trainings on malaria prevention and treatment for tour guides and passengers.

iii. Health education of primary and middle school students must be strengthened. Department of education should arrange primary and middle school students to receive health education. Disease prevention and control agencies should reinforce instructions of health education for primary and middle schools. For Class A and B counties, primary and middle schools should conduct relevant health classes or themed activities and to conduct malaria prevention and control education under local disease prevention and control agencies. Relevant knowledge should be passed on to their families through relevant activities.

iv. Community campaign and education should be strengthened. At Class A and B counties, the local disease prevention and control agencies should organise relevant units to set up billboards to promote knowledge of malaria prevention and control in waiting halls of hospitals, community health service centres, town clinics, village clinics and large construction sites, etc. The content should be updated regularly and the material should fits the features of local ethnic languages and cultures.

d) Malaria prevention and control must be strengthened among floating population.

i. Information report system must be established and improved. Departments of health and quality inspection should release domestic and international malaria epidemic information regularly. As required and arranged by department of health, travel agencies should release relevant malaria epidemic news regularly or irregularly. Information exchange must be conducted among different departments.

ii. People entering and exiting should be more cautious about malaria prevention and control. Entry and exit inspection and quarantine agency should promote malaria prevention and treatment knowledge and relevant consultations. Febrile patients entering the border must be screened and malaria case must be reported. Malaria case tracing must be conducted and relevant case information should be provided to relevant department. Travelling and commerce departments should co-operate with health department to conduct trainings on malaria prevention and treatment. Information of relevant people should be provided to facilitate
iii. Malaria prevention and control must be conducted properly on floating population. Large construction sites at malaria epidemic areas must provide construction workers with malaria protection equipment and be cooperative with local disease prevention and control institutes on malaria prevention and control. Malaria cases detected from floating population should be managed by relevant agencies of the detected areas. Information exchange must been conducted between disease prevention and control agencies of cases imported and exported areas. Department of public security and department of health should work closely on tracing of malaria cases among floating population, key population groups screening and communication on relevant information.

e) Malaria surveillance and testing network must be improved.
   i. The lab capacity for malaria confirmation must be strengthened. China CDC is responsible for the laboratory identification and tracking of malaria cases. Provincial CDCs are responsible for pathogenic confirmation and genetic testing for areas with incident rate less than 1/100,000 in the previous year. Prefectural CDCs are responsible for the review of all blood smears of malaria patients reported through the website and for random blood tests of at least 5% of febrile patients with malaria negative results. Regular skill examination and quality control should be conducted at laboratories of all levels for the smooth operations of laboratory network.
   ii. Surveillance at malaria eliminated areas. Relevant technical trainings about malaria diagnosis and treatment for medical workers should be continued at areas where the goal of malaria elimination have been achieved and non-epidemic provinces. Case surveillance for people from malaria epidemic areas should be stressed to prevent secondary cases.

5. Policy and Protections
   a) The leadership of the government should be strengthened and the management mechanism must be improved. Cross-sectors meeting system should be established. Ministry of Health should lead such meetings and relevant ministries (department) should participate for the work of malaria elimination, establishment of relevant policy and coordination in the implementation. Governments of all levels should include malaria elimination into the local social and economic development plan and use it as an indicator in the performance evaluation of the government. The responsibilities should be assigned clearly. The organisation and coordination should be strengthened. Policies and measures must be improved and major issues must be addressed. Major provinces (areas) should have malaria
elimination leading team established. The leadership should be strengthened. Plans should be developed and tasks must be assigned clearly. Other areas should plan according to the local situation and coordination mechanism should be established accordingly. Malaria elimination in the military should be organised in line with military management systems and implemented together with the work plan of the local government. Armed police, public security army should follow local government’s lead on malaria prevention and control.

b) Responsibilities of departments should be clarified and implementation of measures must be reinforced. Departments should work closely and take their own responsibilities for malaria elimination. Under the unified leadership of the State Council, ministry of health should coordinate relevant department for the guideline, policy, planning and measures of malaria elimination and MoH is responsible for the comprehensive coordination. Ministry of Development and Reform and Ministry of Finance are responsible for listing malaria elimination related work to national economic and social development plans. Special fund must be assigned for malaria prevention and control and elimination and the fund must be under close monitoring. Department of entry and exit inspection and quarantine, public security, tourism and commerce should co-operate with department of health on health education of malaria for people entering and exit the border, on case surveillance and disease prevention and management at port of entry. Information must be communicated with Ministry of Health in a timely manner. Department of broadcasting and television should arrange various malaria prevention and treatment knowledge education. Department of health should conduct malaria prevention and treatment education at primary and middle schools. Department of Science and Technology should include scientific research projects of malaria prevention, treatment and elimination into national plan of science and technology. Department of industry and information technology are responsible for the organisation and deployment of the production and supply of anti-malaria drugs and reagents. Department of General Logistics are responsible for the implementation and supervision of malaria elimination in the army.

c) Malaria elimination should be conducted in line with legislation and regulations.
Legislations, regulations and relevant technical guidelines, such as, Law on Infectious Disease Prevention and Treatment of People’s Republic of China, Regulations of Public Health Emergency Response, Law on Border Health Quarantine of China, National Preparedness Plan on Public Health Emergency, Preparedness Plan for Malaria Outbreak Response and Public Health Emergency and Infectious Disease Epidemic Surveillance Information Report Management Measures, should be implemented strictly at all areas by all relevant department. Malaria elimination should be conducted legally and scientifically.
d) Team building must be strengthened and technical skills must be improved. Professional malaria prevention and treatment team should be built and improved at all provinces, cities and prefectures. At Class A and some Class B counties where the workload is heavy, the prefectural CDCs should set up special departments and arrange skilled personnel. Professionals should be specifically assigned on malaria prevention and treatment at town clinics. At other Class B Counties and Class C counties, prefectural CDCs should have enough professional malaria prevention and control personnel and people should be specially assigned for malaria prevention and treatment at town clinics. In order to ensure the training outcomes and to improve the skills of the personnel, professional skill trainings should be conducted at all levels, at different times.

e) Financial input should be increased and funds should be gathered in various ways. Based on the principle of responsibilities shared among all levels, local government should include the fund for malaria elimination in the financial budget. Financial support will be given to poor areas for malaria prevention and treatment by the central government. Meanwhile, extensive mobilisation or social financial and material support for malaria elimination should be conducted.

f) Scientific research should be conducted and technical protection should be provided. Research on key technical problems of malaria elimination could be supported by national plan of science and technology. Cross-disciplinary research should be organised for the transmission dynamics of malaria, surveillance of plasmodium resistance, full treatment of tertian malaria and development of novel, effective rapid diagnosis agent and pathogen tracing technology, etc.

g) International communication and cooperation must be strengthened. International communication and cooperation must be conducted proactively. Advanced and applicable technology should be introduced and applied. International financial support, such as global fund, should be fully utilised for the support of tertian malaria elimination actions. Cross-border cooperation mechanism should be established for malaria prevention and control. Malaria control at border areas and malaria elimination must be accelerated in China.

6. Monitoring and Evaluation

a) Regulations of targeted responsibility and accountability
Based on requirements of this action plan, all areas should establish local implementation plan in line with their local conditions. Objectives and tasks should be broken down at different levels and responsibilities should be documented. Relevant people should take their administrative responsibility if the objective is not achieved.

b)
Monitoring and inspection
Based on the principle of “scientific, quantitate and random”, all areas should establish specific plan for monitoring and inspection. Regular self-revision and random examination should be conducted to comprehensively evaluate their performances. Feedbacks of results should be given to the examined units. Together with relevant department, Ministry of Health will also examine action plans of random areas and give notify the local governments.

c) Evaluation
Evaluation should be conducted evaluation at prefectures (cities, districts) of all epidemic provinces (autonomous regions and municipalities) which objective of the stage is achieved. Verification of malaria elimination of each province should be completed by 2020.