

## CHINA CDC WEEKLY



Vol. 4 No. 36 Sep. 9, 2022

中国疾病预防控制中心周报



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ISSN 2096-7071



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## Proactive Health: An Imperative to Achieve the Goal of Healthy China

Jue Liu<sup>1</sup>; Weidong Li<sup>2</sup>; Hongyan Yao<sup>3</sup>; Jianjun Liu<sup>3,\*</sup>

### ABSTRACT

Proactive Health has become a new service model to improve human health. Although the concept of Proactive Health has been proposed by the *Outline of the Healthy China 2030 Plan and the Healthy China Initiative*, the lack of a unified definition of Proactive Health in China's academic community is still the most fundamental and critical deficiency. Therefore, based on the concepts of Proactive Health, this study analyzed and described the natural characteristics and implications of Proactive Health to establish an exact definition.

### BACKGROUND

With the application of transformative technologies and rapid socioeconomic development, health demands are increasingly becoming an important core driver of future economic growth. "Proactive Health" has become a new service model to improve human health (1). The concept of Proactive Health has been fully embodied in the *Outline of the Healthy China 2030 Plan* and the *Healthy China Initiative*. To effectively improve the national health level, the *State Council's Opinions on Implementation of the Healthy China Initiative* clearly pointed out in 2019 that we should accelerate the shift from a focus on treatment of disease to improving people's health and motivate the whole of society to implement prevention-oriented principles (2–3).

Although the concept of Proactive Health has been proposed before, there continues to be a lack of well-developed interdisciplinary systems and independent applications of key technologies. A most fundamental and critical deficiency is that there is no unified definition of Proactive Health in China's academic community. Therefore, based on the concepts of Proactive Health, we analyzed and described the natural characteristics and implications of Proactive Health to establish an exact definition of Proactive Health.

### FROM "PASSIVE HEALTH" TO "PROACTIVE HEALTH"

Proactive health has four important transformations from passive health. First, the service philosophy is changed from disease-centered to health-centered. Second, the service objects are changed from patient-centered to people-centered, reflecting the entire life cycle of health. Third, entities that integrate multiple services, such as health, sports, elderly care, and education, become the new service providers. Fourth, service content changes from single disease diagnosis and treatment to a whole-health service chain that covers disease prevention, diagnosis, treatment, rehabilitation, nursing, and health maintenance.

### NATURAL CHARACTERISTICS OF PROACTIVE HEALTH

Based on the above transformations, there are six shared, natural characteristics of the Proactive Health services model: Preventive, Precision, Personalized, Proactive, Co-construction and sharing, and Self-rule and self-discipline. "Proactive" is a core element of all natural characteristics, which means that individuals, industries, and society should give full play to initiatives promoting public health. "Preventive" refers to reduction of disease occurrences through a combination of health promotion measures and reduction of adverse prognoses through timely diagnosis and treatment, and rehabilitation after disease onset by taking active and passive measures. Different from Preventive, "Proactive" means that the public takes the initiative to prevent disease. "Precision" implies a combination of modern technology and traditional medical methods to comprehensively assess exposure to various risk factors and the health status of individuals to maximize health benefits for both individuals and society through efficient, safe, and economical health services.

“Personalized” refers to the provision of diverse, multi-level, targeted health services that are tailored to individuals’ health demands. “Co-construction and sharing” implies integration of individual, industry, and social forces to promote health in all fields. “Self-rule and self-discipline” gives full play to individual initiative and motivation, improving self-health literacy and health status of all.

## IMPLICATIONS OF PROACTIVE HEALTH

Proactive Health profoundly reflects people-oriented principal concepts in its natural characteristics. With improvement of people’s health awareness, health literacy, and healthcare consumerism, medical demand is no longer the primary demand. What will benefit people the most is a new type of integrated medical and health service that is oriented to the entire population, throughout the life and health cycles, integrating interventions of healthy diet, exercise, physics, psychology, environment, and culture that incorporates the complete health service chain of prevention, diagnosis, treatment, rehabilitation, and nursing and health care.

Thus, Proactive Health is the sum of all social activities that focus on health and prevention, that are based on the whole population and the whole life cycle, and that integrate health goals into all policies. The aim is to promote all people to actively pursue health; reduce occurrence of disease; strengthen early diagnosis, early treatment, and early rehabilitation; and enable everyone to receive comprehensive, equitable, accessible, qualified, and efficient health services. Proactive Health provides important fundamental support for a sound public security prevention and control system and is a major initiative to address the overall situation, serve the people, and serve national strategies and national security (Figure 1).

## DEFINITION OF PROACTIVE HEALTH

Based on a synthesis of the concept, natural characteristics, implications, and scope of Proactive Health, we propose the following definition. Proactive Health is the sum of all social activities of human beings that revolve around health, including controlling health risk factors at the source, creating health values in the process, and actively responding to population security crises in all social activities.

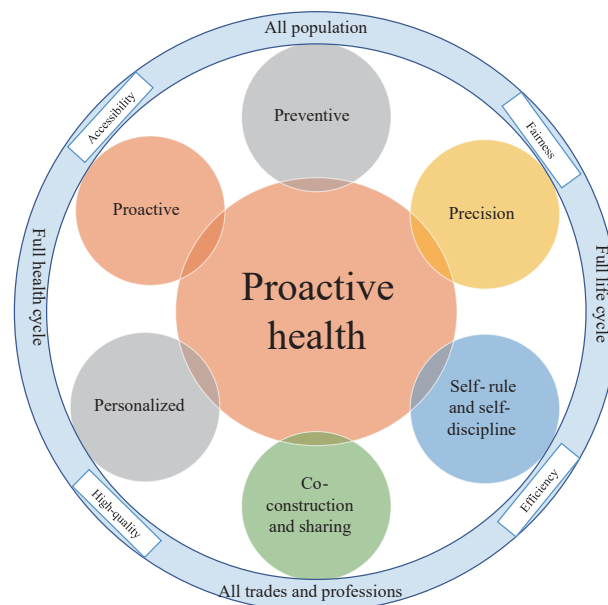


FIGURE 1. The “4PCS” theoretical framework of proactive health.

## PROSPECTIVE

In 2021, China released the *Outline of the 14th Five-Year Plan and the Vision 2035 of the National Economic and Social Development of the People’s Republic of China*, which clearly laid out Proactive Health intervention technologies. Health management has become an essential, fundamental, core area for national security and development. Proactive Health will become a new pillar of great power for the whole population throughout the life cycle. Many scholars have explored disease management models, public health system construction, and medicine-body integrative services from a theoretical perspective of active health (4–6). Concerted efforts should be made by all parties to transform research into strategies and plans of action, to mobilize the whole people to act together, and to implement comprehensive measures to truly improve health literacy and fitness levels for Chinese residents. With in-depth development of theoretical research and practical application, it is believed that Proactive Health will gradually form a perfect disciplinary system with mature key technologies that will best serve the construction of Healthy China.

**Conflicts of interest:** No conflicts of interest.

**Funding:** National Natural Science Foundation of China (72122001), National Key Research and Development Program of China (2021ZD0114101).

doi: 10.46234/ccdcw2022.156

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Submitted: July 31, 2022; Accepted: August 18, 2022

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## China's Actions to Achieve Universal Health Coverage for Children

Zhimin He<sup>1</sup>; Tao Xu<sup>1,†</sup>

### ABSTRACT

The United Nations General Assembly adopted the 2030 Sustainable Development Goals (SDGs) in September 2015. Through this, governments have also committed to universal health coverage (UHC) as a development sub-goal within the SDG health field (1-2). In its effort to fully safeguard universal child health, China has established a management system for child healthcare to provide all children with continuous healthcare services starting at birth. Since 1950, China has implemented a system of local physicians who take responsibility for child healthcare services within their areas. Under the three-tier management system at the county, township, and village levels, every newborn is included in the child health management system starting immediately after birth. The urban and rural community-based health facilities in the area provide unified, standardized, and systematic healthcare services. Moreover, since 2009, child health management has been included in the National Essential Public Health Service Program, which mandates that community-based primary health facilities provide free health management services for children 0–6 years old in their area. This has led to equitable and comprehensive coverage of health services for these children. When children enter school at the age of six, they receive an annual routine physical examination at school. In 2020, the national coverage for neonatal visits, the health management rate for children under 3 and the health management rate for children under 7 all surpassed 92%, while the prevalence of stunting among children under 5 continued to decline. In addition, urban-rural disparities in major child health indicators have also narrowed significantly. Moreover, the inoculation rate of children in National Immunization Programme Vaccines has remained over 99% since 2011 (3).

### BACKGROUND

When the People's Republic of China (PRC) was

founded in 1949, the country experienced a high incidence rate of acute and chronic infectious diseases in children, with frequent outbreaks of smallpox, cholera, kala-azar, schistosomiasis, and plague, among others. Thus, the top priority in child healthcare efforts was to prevent and reduce child deaths caused by infectious diseases (4). However, with socioeconomic development and changes in the disease spectrum of children, incidences of infectious diseases have been slashed significantly, while the impact of non-communicable diseases on children's health has gradually become prominent. In addition to common infectious diseases such as pneumonia, diarrhea, and nutritional diseases, emotional and behavioral developmental problems in children have also received increasing attention. While continuing to implement strategies to ensure survival, China has recognized that measures also need to be taken to promote comprehensive early childhood development, and that child healthcare services should be provided in a systematic and continuous way instead of fragmented and sporadic. Since the founding of the PRC, health authorities have put in place a hierarchical maternal and child health (MCH) system to improve children's health: providing continuous healthcare services for children from 0–6 years old (5).

### KEY CONTENT & TARGETS

The aim of establishing a child health management system was to improve the three-tier child healthcare service network at the county, township, and village levels; provide continuous health management services so that child development deviations can be detected at an early stage; and prevent and reduce diseases. These health targets have been included in the National Program of Action for Child Development (2021–2030), and require that every child receive equitable, accessible, comprehensive, and continuous healthcare services. By 2030, the goal is for the neonatal mortality rate, infant mortality rate, and under-5 mortality rate to be reduced to less than 3 per



1,000 live births, 5 per 1,000 live births, and 6 per 1,000 live births, respectively. Since the 1980s, China has established and implemented the National Maternal and Child Health Annual Report System and the National Maternal and Child Health Surveillance System. The former collects data on children's health and healthcare services, such as neonatal visits; the health management rate of children; and their growth and development status. The latter collects data on child deaths and birth defects, such as neonatal mortality; infant mortality; and the mortality rate of children under five years old. Data from these information systems show that, in 2020, the national coverage of neonatal visits, the health management rate for children under 3 years old, and the health management rate for children under 7 years old all surpassed 92% (6). The national under-5 mortality rate decreased by 81.1%, from 39.7 per 1,000 live births in 2000 to 7.5 per 1,000 live births in 2020 (7). Meanwhile, the rural under-5 mortality rate dropped from 3.3 to 2.0 times the urban rate, suggesting a significantly reduced urban-rural gap. The prevalence of stunting among children under the age of 5 continued to decline, from 33.1% in 1990 to 4.8% in 2015. Furthermore, rural areas saw a larger margin of decline than urban areas. The prevalence of stunting among children under 5 in urban areas fell by 69.2% — from 11.4% to 3.5% — while, in rural areas, the figure dropped by 85.6% — from 40.3% to 5.8% (8). (Figure 1)

## STRATEGIES & MEASURES

### Improving the Management Network of the Child Healthcare System

The management of the child healthcare system features local physicians taking responsibility for child healthcare services within their areas and tiered management underpinned by the MCH service network. Community-based health facilities (urban community health service centers, rural township health centers, and some remote village clinics) are tasked with basic health management and disease screening through unified and standardized personal health management records. Once high-risk children with growth and development deviations or disorders are detected, they are referred to higher-level health facilities for further diagnosis and treatment. MCH hospitals, general hospitals, and specialty hospitals within the areas accept referrals from community-based

health facilities and provide professional childcare services. The MCH hospitals at the county and district levels coordinate all MCH services in their areas, including general hospitals, specialty hospitals, and primary healthcare facilities (4). Furthermore, the National Health Commission (NHC) has issued working specifications for child healthcare, technical specifications on child healthcare, working specifications for healthcare services in kindergartens (along with other documents to regulate child healthcare services), and guidance for MCH hospitals at all levels to carry out continuous and standardized child healthcare services.

### Providing Continuous Child Healthcare Services

Before leaving the hospital, a newborn receives healthcare services from the obstetric facility. Afterward, the newborn will be included in the child healthcare management system in its area to receive follow-up services, including newborn disease screening, growth and development monitoring, feeding and nutritional guidance, emotional and behavioral development evaluation and guidance, vaccination, common disease prevention and treatment, and injury prevention and health promotion targeted at their parents. Children under the age of seven receive regular healthcare services, accompanied by their parents, at the child healthcare service department of urban and rural community-based health facilities (9). Such services include one neonatal home visit and one first-month neonatal health management visit, health checkups four times a year for infants under a year old, health checkups twice a year for children one to two years old, and annual doctor visits for children aged three to six. During each visit, relevant information will be recorded and included in the child's health file. High-risk and sick children requiring referrals and consultations will be promptly referred to higher-level health facilities and receive follow-up visits. (Figure 2)

### Including Child Healthcare Services in the National Essential Public Health Service Program

Child healthcare services have been part of the National Essential Public Health Service Program since 2009, giving all children access to free child healthcare services. Beyond that, the program provides free micronutrient sachets (*Ying Yang Bao*) for children

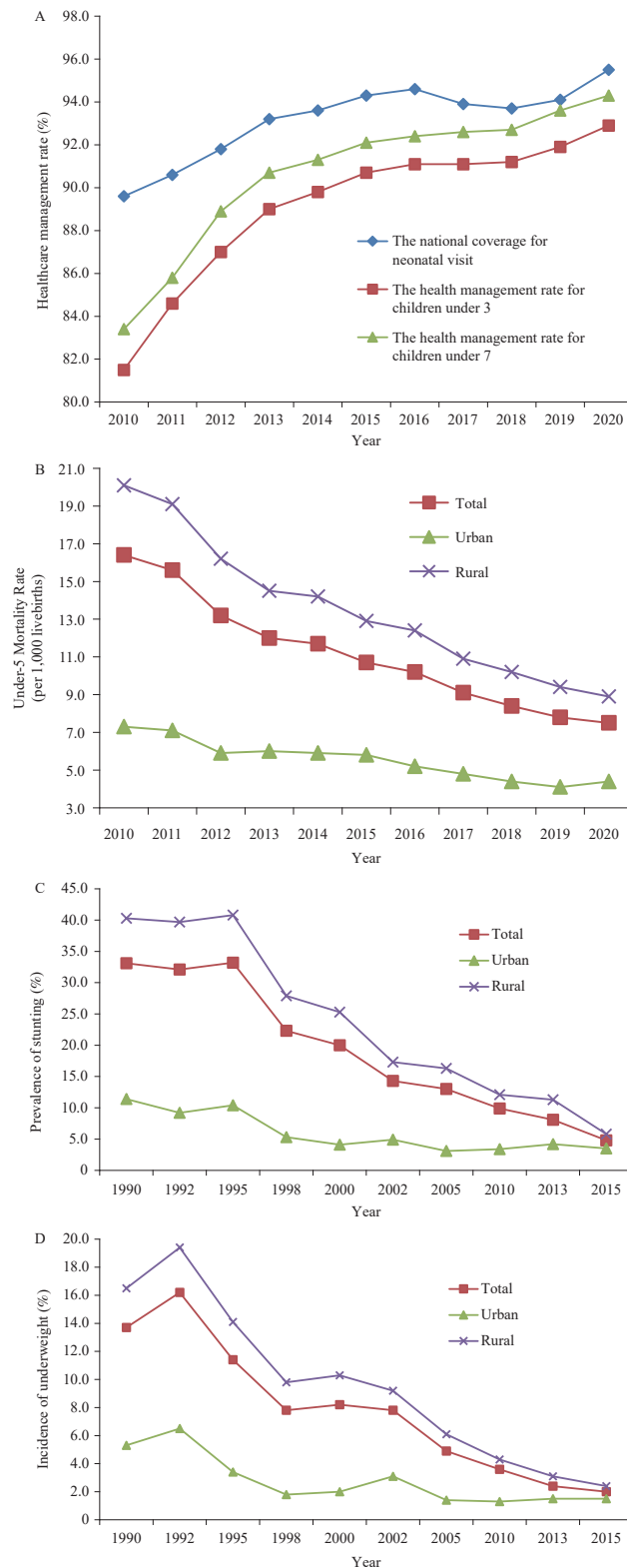


FIGURE 1. Trends of children's health indicators in China from 1990 to 2020. (A) Trends in the health management rate of children under 5. (B) Trends in the under-5 mortality rate. (C) Trends in the prevalence of stunting among children under 5. (D) Trends in the incidence of underweight among children under 5.

Note: Data from 2010 to 2020 in (A)&(B) were obtained from the Maternal and Child Health Annual Report and China Health Statistical Yearbook. The data of 1992, 2002, 2013, and 2015 in (C)&(D) were obtained from the nutrition and health status monitoring of Chinese residents, and the rest were obtained from the food and nutrition monitoring system of China.



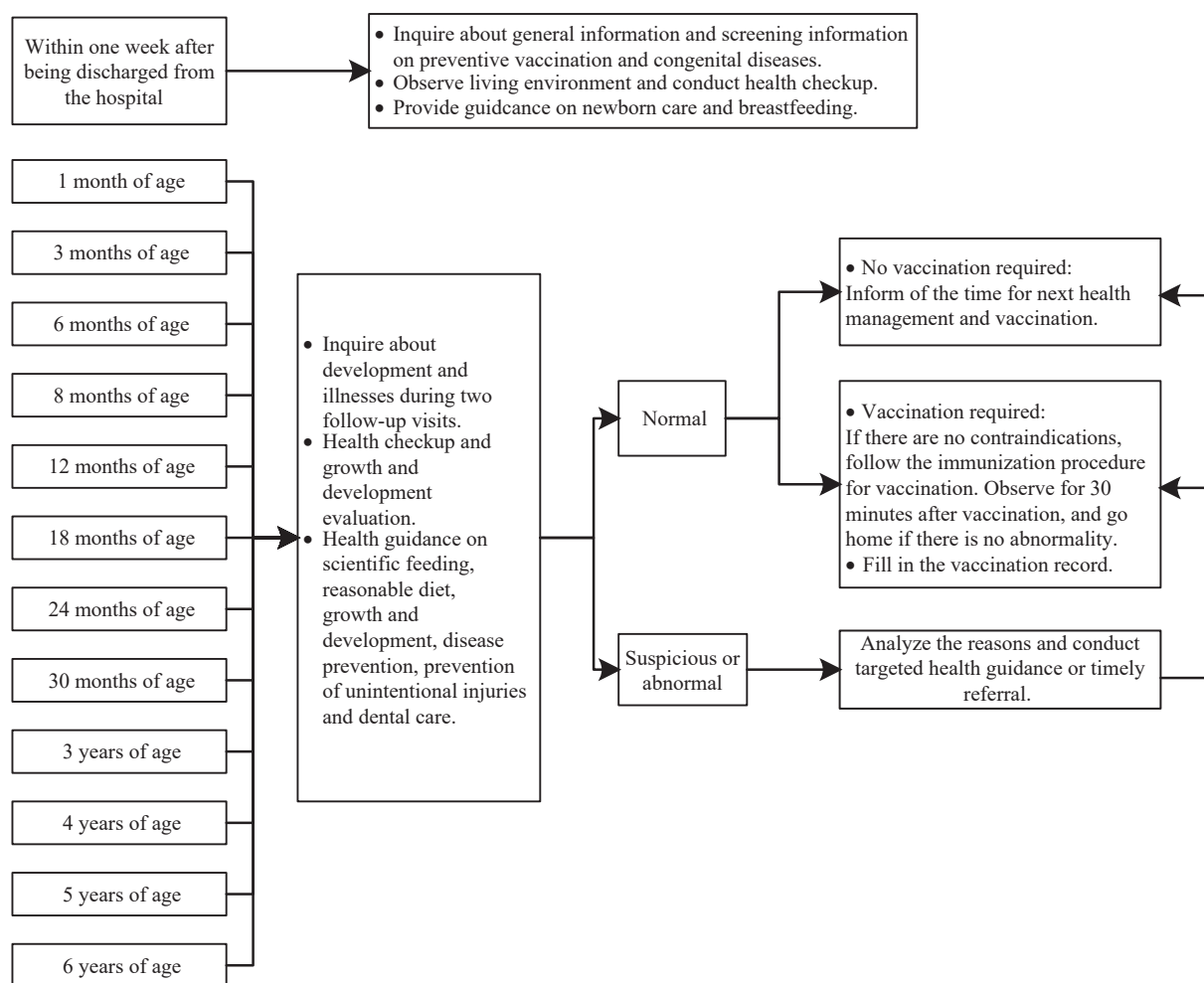


FIGURE 2. Child Health Care Services in China.

aged 6–24 months in poor rural areas, and Traditional Chinese Medicine health management services for children aged 0–36 months. Since 2017, the NHC has been promoting the use of a unified MCH handbook across the country, as recommended by the World Health Organization, for home-based records for the care of pregnant women, mothers, newborns, and children. The goal is to improve care-seeking behaviors, maternal and child home care practices, infant and child feeding, and communication between health providers and caregivers (10). All handbook service items are provided by the government free of charge, serving as a commitment from the Chinese government to safeguard maternal and child health.

### Strengthening Early Screening and Treatment of Common Childhood Diseases

Since 2013, the former National Health and Family

Planning Commission and the China Disabled Persons' Federation have jointly issued the Working Specifications for the Screening of Disabilities in Children Aged 0 to 6 Years (Trial). Guided by this document, community-based health facilities use the Screening Checklist for the Warning Signs of Child Development Issues to conduct the initial screening for the five major types of disabilities (visual, hearing, physical, intellectual, and autism spectrum). They should then refer children with positive initial screening signs to re-screening facilities, while those with positive re-screening signs should then be referred to diagnostic facilities. Upon the diagnosis of a disability, the diagnostic facilities will provide information and link the disabled child with the resources for their rehabilitation and medical needs in relevant facilities. MCH hospitals at all levels have gradually established a working mechanism for the early screening, treatment, and rehabilitation of children with disabilities. The proportion of

community health service centers and township hospitals carrying out the initial disability screening service for children 0–6 years old has increased year on year, reaching over 85% in 2018 (11). Through the implementation of this program, the prevention and treatment of common childhood diseases has been strengthened and children's health has been advanced in a comprehensive manner.

## CHALLENGES & PERSPECTIVES

China gives universal child healthcare coverage top priority and has established a hierarchical MCH management system to provide continuous child healthcare services. The equitable and universal coverage of child healthcare services has been achieved by capitalizing on China's unique administrative management system; the community-based MCH service network at the county, township, and village levels; and the National Essential Public Health Service Program. After decades of unrelenting efforts and practice, the health status of children has improved significantly. However, new issues such as obesity, myopia, and psychological problems have emerged. Moreover, in terms of comprehensive protection of children's health, there are still challenges such as the unbalanced development between east and west regions and inadequate services in rural areas, among others. Thus, China currently cannot fully meet the growing health needs of children. Therefore, while enriching and expanding child health services, the country will have to add more policy and intervention components and take into consideration socioeconomic development and the needs of the people in order to promote comprehensive early childhood development.

**Conflicts of Interest:** No conflicts of interest.

**Funding:** Supported by the World Bank Loan Project—China Economic Transformation and

Institutional Capacity Building Project (TCC6) Sub-project of Experience Communication Strategy of Women and Children Health in China under the Framework of the Belt and Road Initiative (8375-CN-A28-2019).

doi: 10.46234/ccdcw2022.167

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Submitted: May 26, 2022; Accepted: August 29, 2022

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# Reducing Neonatal Mortality with a Three-Stage Neonatal Resuscitation Training Programme — China, 2004–2021

Chenran Wang<sup>1</sup>; Qing Yue<sup>1</sup>; Tao Xu<sup>1,†</sup>

## ABSTRACT

Neonatal asphyxia is a leading cause of neonatal death that is largely preventable with neonatal resuscitation techniques. In July 2004, China launched a 15-year, three-stage Neonatal Resuscitation Programme (NRP) with stages in 2004–2009, 2011–2016, and 2017–2021 (1). The objective of China's NRP was to ensure the presence of at least one trained attendant proficient in neonatal resuscitation at every delivery. With consistent effort, both incidence and mortality from neonatal asphyxia decreased remarkably during 2003–2020: incidence decreased from 6.32% to 1.42% and mortality decreased from 0.76‰ to 0.19‰ (1–2). China's empirical experience shows that widespread promotion of high-quality neonatal resuscitation techniques can reduce preventable neonatal deaths and provide important insight into “ending preventable deaths in newborns by 2030,” as proposed in the United Nations Sustainable Development Goal's third target (3).

## BACKGROUND

In 2004, the mortality rate among children under five in China was 25 per 1,000 live births, with approximately 20% of the deaths attributable to birth asphyxia (4). Before 2004, neonatal resuscitation training had been conducted in few areas of China. Some medical universities, medical associations, and international non-governmental organizations developed small-scale training courses in a few provincial-level administrative divisions (PLADs) and donated neonatal resuscitation equipment to impoverished areas to promote neonatal resuscitation (5). However, due to the limited coverage and sustainability of professional training, neonatal resuscitation was not given adequate attention (6). In July 2004, the Maternal and Child Health (MCH) Department of the then Ministry of Health launched the Newborn Resuscitation Programme (NRP) nationwide to explore a multi-sectoral cooperation

mechanism for the promotion of neonatal resuscitation techniques. Over the past 15 years of implementation, neonatal resuscitation training in facilities providing midwifery has expanded. The first NRP stage was launched in 20 PLADs in western and central China between 2004 and 2009, and was subsequently expanded to all 31 PLADs and Xinjiang Production and Construction Corps (XPCC) of the mainland of China during the second and third phases during 2011–2016 and 2017–2021. The objective of the NRP was to ensure that at least one trained attendant proficient in neonatal resuscitation skills was present at every delivery, with the ultimate goal of reducing the incidence of neonatal asphyxia and the neonatal mortality rate (1). The programme also established a collaborative resuscitation system in hospitals with quality improvement training and supervision and project management (7).

## STRATEGIES AND KEY ACTIVITIES

### Multiple Parties Work in a Government-led Management Mechanism

With official government management, technical guidance of academic associations and specialized institutions, and financial support from social organizations, multiple parties worked together to expand NRP's coverage and ensure smooth implementation of related activities (7). The mechanism was characterized by well-defined departmental responsibilities, rational division of labor, and strong coordination and communication. National and provincial health administrative departments managed project implementation and provided policy support. Academic associations and specialized facilities organized expert teams for technical support based on domestic and foreign academic exchange platforms. Social organizations provided financial support and conducted publicity and promotional activities through various channels to raise public awareness and understanding of neonatal resuscitation.

## Cascading Neonatal Resuscitation Training

Based on a “Training of Trainers” approach, cascaded training was implemented in teams composed of international, national, provincial, and county instructors. China formulated its guidelines for neonatal resuscitation by introducing the training mechanism from the American Academy of Pediatrics NRP curriculum and adapting the technical processes of resuscitation based on local healthcare settings. Using the guidelines, international experts introduced neonatal resuscitation techniques in China and trained and assessed a national training team of 33 experts. Each instructor was assigned 8 trainees and used theoretical education combined with simulated demonstrations supported by related teaching equipment (8). From 2004 to 2018, the national experts trained experts from the 31 PLADs and XPCC of the mainland of China and established provincial-level training teams composed of more than 900 facilitators. Prefecture- and county-level training teams were established in a similar cascading approach. The programme developed an online training and assessment platform with the quality of technical training enhanced through regular supervision, refresher trainings, and quality control exercises. Activities like the neonatal resuscitation skills competition were used to promote technical training and its application (8).

## Supportive Policy Environment for Sustainable Implementation

To enhance collaboration among obstetrics, neonatology, anesthesiology, and other specialties, and strengthen hospital-based professional training in neonatal resuscitation techniques, in 2009, China formulated a plan to establish a Neonatal Resuscitation Leadership Group in Health Facilities, which was subsequently replicated in all county-level health facilities. In 2014, the then General Office of the National Health and Family Planning Commission issued the Management System for Newborn Safety in Health Facilities (Trial), requiring primary, secondary, and tertiary general hospitals and secondary and tertiary MCH institutions to ensure that “at least one health staff member equipped with neonatal resuscitation techniques was present at every delivery.” Delivery rooms had to have equipment and medicines for neonatal resuscitation and rescue. The management system listed coverage of resuscitation techniques as a

performance indicator for health facilities, laying a policy foundation for neonatal resuscitation technical training in various regions, thus successfully promoting neonatal resuscitation techniques. The National Health Commission emphasized the need to strengthen neonatal resuscitation technical assessment and provided relevant support with multiple documents, including the Maternal and Child Safety Action Plan, Guidelines for the Construction and Management of the Treatment Centers for Critically Ill Pregnant Women and Newborns, MCH facility review and performance appraisals, and establishment of neonatal care departments in MCH hospitals (7). These efforts provided an impetus to translate empirical experience into policy, making neonatal resuscitation training a policy requirement for health facilities.

## EFFECTIVENESS OF NRP IMPLEMENTATION

From 2008 to 2009, the National Center for Women and Children’s Health, Chinese Center for Disease Control and Prevention, surveyed 322 hospitals to evaluate the effectiveness of NRP implementation in the first stage (2004–2009) (1). Efficacy of NRP implementation in the second stage (2011–2016) was evaluated by mail survey of 347 hospitals from October to November 2016 (9). Detailed descriptions of sampling methods and results have been published (1,9). The 2016 NRP evaluation showed that more than 90% of health facilities in programme areas established an in-hospital neonatal resuscitation working group responsible for technical training and quality control. Neonatal resuscitation training was conducted in more than 95% of enrolled health facilities (9). During NRP implementation, the incidence of neonatal asphyxia (defined as Apgar score  $\leq 7$  at 1 minute) decreased by 77.5%, from 6.32% in 2003 to 1.42% in 2020, while neonatal mortality due to birth asphyxia in the delivery room decreased by 75%, from 0.76‰ in 2003 to 0.19‰ in 2020 (Table 1, Figure 1). As a result, neonatal resuscitation techniques have been substantiated to be lifesaving for newborns.

## LESSONS LEARNED AND FURTHER PERSPECTIVES

To reduce neonatal mortality, relevant health authorities, academic associations, and social welfare

TABLE 1. Trends in asphyxia incidence and mortality rate during 2003–2008, 2010–2014, and 2017–2020.

Year	Live births	Asphyxia incidence				Asphyxia death			
		Cases	Crude rate (%)	Z*	P	Cases	Crude rate (‰)	Z*	P
The first stage of NRP <sup>†</sup>									
2003	237,140	14,998	6.32	−77.671	<0.001	179	0.76	−7.782	<0.001
2004	295,567	16,395	5.55			169	0.57		
2005	317,069	14,254	5.50			166	0.52		
2006	344,147	15,304	4.45			157	0.46		
2007	408,247	13,933	3.41			168	0.41		
2008	428,261	12,594	2.94			146	0.34		
The second stage of NRP <sup>§</sup>									
2010	335,190	7,810	2.33	−20.162	<0.001	81	0.24	−2.686	0.007
2011	385,694	8,755	2.27			86	0.22		
2012	407,451	8,719	2.14			85	0.21		
2013	434,287	8,555	1.97			83	0.19		
2014	515,481	9,227	1.79			85	0.16		
Surveillance data from MCH institutions <sup>¶</sup>									
2017	2,694,010	43,032	1.60	−18.794	<0.001	1,273	0.47	−21.888	<0.001
2018	2,488,254	36,733	1.48			1,250	0.50		
2019	2,602,198	35,961	1.38			560	0.22		
2020	2,400,961	34,155	1.42			446	0.19		

Abbreviation: MCH=maternal and child health; NRP=neonatal resuscitation programme; PLADs=provincial-level administrative divisions.

\* Cochran-Armitage trend test. A negative value of Z implies a decreasing trend of asphyxia incidence and mortality rate. P value <0.05 is considered statistically significant.

<sup>†</sup> The first stage of NRP was launched in 20 PLADs of western and central China between 2004 and 2009, and the final effectiveness evaluation was conducted.

<sup>§</sup> The second stage of NRP was launched in 31 PLADs and Xinjiang Production and Construction Corps (XPCC) of the mainland of China between 2011 and 2016, and the final effectiveness evaluation was conducted by a random sample survey in 347 hospitals.

<sup>¶</sup> The third stage of NRP was launched in 31 PLADs and XPCC of the mainland of China between 2017 and 2021, and the effectiveness evaluation was based on surveillance data of all secondary and tertiary MCH institutions. The surveillance data were collected from the MCH institutions surveillance system of the National Center for Women and Children's Health, China CDC.

organizations have reached a consensus and provided human, material, and financial support to form a stable and efficient programme management mechanism. China developed local technical guidelines for neonatal resuscitation and strengthened health staff clinical operational skills through theoretical education combined with simulated demonstrations. By building training teams through cascaded training, neonatal resuscitation techniques were mastered in a relatively short period of time. Evidence has shown that neonatal resuscitation techniques mitigate early birth asphyxia-attributable disease burden and yield favorable economic benefits (8). One pooled study conducted in low- and middle-income countries suggested that standardized formal neonatal resuscitation training decreased early neonatal mortality [relative risk (RR): 0.85, 95% CI: 0.76–0.96] (10). Practical experience gained from NRP has been translated into national

policy, thus providing solid institutional support for sustainable application. Further implementation is warranted to promote well-being of neonates. However, potential challenges exist, such as the lack of available resuscitation equipment, adherence to resuscitation techniques for trainees, and periodic quality supervision of technical training. Specifically needed for improved neonatal survival are concerted efforts to promote practical skills in health facilities at the county level and below, establishment of an effective mechanism for monitoring and evaluation, and enhancement of coordination among multiple partners (8). In response to the goal to promote neonatal health in the 14th Five-Year Health Development Plan and Healthy China 2030, further implementation of neonatal resuscitation is necessary to put core principles into practice (11).

**Conflicts of interest:** No conflicts of interest.



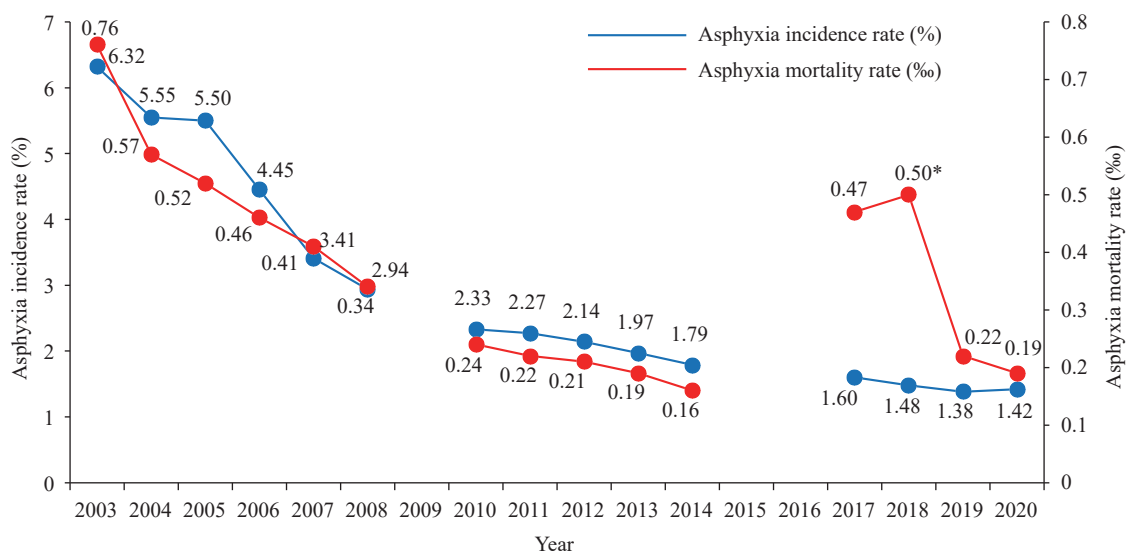


FIGURE 1. Trends of neonatal asphyxia incidence and mortality rate in China, 2003–2020.

Note: Data from 2003–2008, 2010–2014, and 2017–2020 were obtained from a random sample survey in 322 hospitals, a random sample survey in 347 hospitals, and the surveillance data of all secondary and tertiary MCH institutions, respectively.

Abbreviation: MCH=maternal and child health.

\* The abrupt increase in asphyxia mortality rate in 2017 and 2018 may be associated with the increased proportion of pregnant women of advanced maternal age (>35 years) after the implementation of the “universal two-child policy” released in October 2015.

**Funding:** Supported by the World Bank Loan Project–China Economic Transformation and Institutional Capacity Building Project (TCC6) Sub-project of Experience Communication Strategy of Women and Children Health in China under the Framework of the Belt and Road Initiative (8375-CN-A28-2019).

doi: 10.46234/ccdcw2022.168

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Submitted: June 08, 2022; Accepted: August 28, 2022

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## Policy Notes

# To Include Dyslipidemia Management into National Basic Public Health Service: from Project Practice to Policy

Yingjie Cao<sup>1</sup>; Zhuoqun Wang<sup>1</sup>; Yanfang Zhao<sup>1</sup>; Yuanli Liu<sup>1,\*</sup>

As cardiovascular diseases have been increasingly endangering the health and quality of life of Chinese residents, all relevant parties have been actively looking for policies and measures to effectively control the risk factors of the diseases. Hypertension and diabetes have been included in the National Basic Public Health Service Project since 2009; however, as one of the most crucial risk factors for cardio-cerebrovascular diseases, dyslipidemia has not yet been covered by the project due to various reasons. The prevalence of dyslipidemia in China increased rapidly from 18.6% in 2002 to 40.4% in 2012 (1), whereas the management of dyslipidemia has been lagging behind and become the “short board” in the prevention and control of cardio-cerebrovascular diseases.

The International Health Exchange and Cooperation Center (IHECC) of the National Health Commission (NHC) has integrated resources from various parties and has carried out the Pilot Project of Dyslipidemia Health Management Services in Chinese Adults since 2013 (2), aiming to explore a pathway to build a model of comprehensive prevention and control for cardio-cerebrovascular diseases at the community health center/township hospital level, as well as to make policy recommendations to include dyslipidemia into the National Basic Public Health Service Project and provide evidence for the national plan of non-communicable diseases (NCDs), ultimately to promote the equalization of basic public health services.

## BACKGROUND

A number of evidence-based clinical studies at home and abroad have confirmed that effective control of dyslipidemia can reduce the risk of cardiovascular events such as myocardial infarction, ischemic stroke or death from coronary heart disease. It is the cornerstone to preventing and controlling atherosclerotic cardiovascular diseases (3).

International experiences have also provided

reference and support to integrated prevention and control of risk factors for cardio-cerebrovascular diseases. The UK achieved the mortality target of circulatory diseases five years ahead of schedule in 2004, reducing the mortality rate by 40% from 1995–1997 baseline under the guidance of “National Service Framework for Coronary Heart Disease”. Finland, through the “North Karelia Project” and nationwide promotion, reduced the mortality rate of cardiovascular diseases among people aged 35–64 by 80% from 1972 to 2007 (4).

To actively establish a platform for exchange and cooperation, IHECC hosted an experience sharing and symposium on British cardio-cerebrovascular disease prevention and control in April 2013. Experts from the fields of policymaking, public health, clinical medicine, non-communicable disease management, primary health service, health economics and information management, as well as representatives from non-governmental organizations and related enterprises, attended. Consensus was reached to take the cardio-cerebrovascular diseases and other NCDs as the breakthrough point, and actions should be taken in comprehensive prevention and control; top-level design should be well conducted and experiences should be promptly summarized; most importantly, evidence-based and practice-demonstrated achievements should be transformed into the scientific basis for the support of policies and strategies.

## METHODS

A well-designed project was consequently launched in August 2013. The Pilot Project of Dyslipidemia Health Management Services in Chinese Adults (hereinafter referred to as “the project”) was implemented by the following: forming a joint steering committee under the guidance of the NHC and a transdisciplinary expert team; the two-way selecting and investigating of pilots; peer reviewing and expert evaluating of pilot proposals; and baseline study plans.

The project was divided into two phases and lasted

six years. Phase I included several aspects. 1) Through systematic review and data analysis, the theoretical basis and international experiences of dyslipidemia management were sorted and analyzed; the impact of dyslipidemia on cardio-cerebrovascular diseases, as well as the prevalence status and disease burden in adults in China, were analyzed. 2) A technical guideline and service specification for community management of dyslipidemia and comprehensive management of cardio-cerebrovascular diseases were drafted by a multidisciplinary team; a service model at the community level, including a standardized process and operating mechanism, was explored. 3) A knowledge management system (KMS) for the prevention and control of dyslipidemia in Chinese adults was established to ensure that the most needed knowledge (including skills, tools, strategies, policies, best practices, etc.) will reach those most in need, especially for healthcare providers at the community level. 4) Dyslipidemia management and comprehensive management of risk factors of cardio-cerebrovascular diseases were conducted in 3 pilot cities (Beijing City, Hangzhou City, and Shenzhen City) where it was integrated as part of the hypertension and diabetes management. Capacity building was enhanced, and the mechanism of operation and sustainable development at the primary healthcare level was explored in the meanwhile. 5) Policy recommendations for comprehensive prevention and control of dyslipidemia and other cardio-cerebrovascular diseases in Chinese adults were put forward.

The practices in Phase I proved that it was feasible and effective to carry out comprehensive management of dyslipidemia and other cardio-cerebrovascular disease risk factors including hypertension and diabetes at community level, and the Chinese term of which was developed as “San Gao Gong Guan” (high blood pressure, high blood glucose, and high blood lipidemia). Therefore, in April 2016, Phase II of the project continued to be carried out by continuing to follow-up individuals managed in 3 pilot cities and accumulating scientific data and evidences, increasing 3 new pilots (Chengdu City, Qianjiang City in Hubei Province and Shaxian County in Fujian Province) in midwestern China and including rural areas in Phase II to further verify the experiences from the pilots in Phase I, continuing to improve the capacity building at the community/township level, as well as conducting health economics assessments to further provide evidence for the improvement of basic public health service projects.

## RATIONALE

Results of the baseline study of the project showed the following. 1) Evidence from studies at home and abroad showed that dyslipidemia management could effectively prevent and control cardio-cerebrovascular diseases. 2) The prevalence of dyslipidemia in Chinese adults significantly increased from 18.6% in 2002 to 40.4% in 2012 (1). As for the disease burden, in 2010, 281,000 people died of dyslipidemia-related NCDs in China, causing 5.268 million person-years of life lost, which was a marked rise since 1990 (5). 3) There was still a big gap between the current situation and the actual demands of dyslipidemia management. The awareness, treatment, and control rates were still not optimistic: only 11.0% of the individuals were aware of their dyslipidemia, compared with 8.5% in rural areas; 3.9% received dyslipidemia treatment; and only 3.5% were able to be controlled. 4) Lifestyle interventions plus drug therapy were important means of dyslipidemia management, not only having significant effects of lowering lipid levels, but also markedly reducing cardiovascular events. Diet intervention and lifestyle improvements were the basic measures for the management of dyslipidemia. 5) On the basis of the standardized management of risk factors of cardiovascular diseases such as hypertension and diabetes in the Basic Public Health Service Project, incorporating dyslipidemia into the integrated management will create a synergistic effect as “1+1+1>3” (2).

## FROM PROJECT PRACTICE TO POLICY

### Outputs and Results Achieved in the Pilot Cities and Towns Provided Practical Experiences for Policymaking

Implementation of each pilot was distinctive, had remarkable effects, and feasible measures. 1) By embedding the module of dyslipidemia management into the Community Healthcare Service System, Beijing has simplified the clinical pathway of dyslipidemia management through automatic assessment and regular reminders, and reduced repetitive management of community doctors by 68.5% and repetitive work by 40%. 2) Making full use of the advantages of information system, Hangzhou integrated the project into its intelligent community healthcare services, contracted family-doctor services, and promoted policy adjustments ultimately.

3) Through a wide range of publicity including television, newspapers, internet, radio and other media, Shenzhen carried out extensive nutrition education, as well as lifestyle intervention and drug therapy. The control rates of blood lipids, blood pressure, and blood glucose increased significantly. In 4 groups of patients (simple dyslipidemia, dyslipidemia complicated with hypertension, complicated with diabetes, and complicated with hypertension and diabetes), the levels of total cholesterol (TC), triglyceride (TG), and low density lipoprotein cholesterol (LDL-C) were decreased by 0.441–0.589 mmol/L, 0.278–0.418 mmol/L, 0.392–0.470 mmol/L respectively. 4) Three intervention strategies were implemented together in Chengdu, including health education of the general population, training of healthcare practitioners, as well as graded management of patients. The awareness rate increased from 8.0% to 33.7%, the management rate reached 93.80%, and the control rate of blood pressure and blood glucose increased as well. 5) Township hospital was selected as the pilot unit in Qianjiang. Health Information System (HIS) was improved and mobile management system was applied among doctors and patients. There was a significant increase from 2.7% to 30.77% in awareness rate and an average decrease of 0.84 mmol/L in TC, 0.12 mmol/L in TG and 0.72 mmol/L in LDL-C. 6) Capacity building among community/township healthcare practitioners was strengthened in Shaxian. After 6 months of systematic management and intervention, the TC decreased by 1.25 mmol/L and LDL-C by 1.09 mmol/L on average in high-risk groups.

Another output of the project lay in the field of health economics. The results of cost analysis in Qianjiang showed that the cost of integrating dyslipidemia management into non-communicable disease management was 20 CNY. The results in Shenzhen showed that the added cost of managing dyslipidemia in patients with hypertension and/or diabetes would be greatly reduced to 20–30 CNY.

### **Expert Consensus was Formed Through Exchanges and Publicity on Dyslipidemia Management**

Exchanges and publicity were carried out through multiple channels. 1) The influence of the project was expanded through various media promoting, experience sharing seminars, health education, on-site free clinic activities, and so on. 2) A series of scientific symposiums were held, and a proposed draft of service specification for dyslipidemia management was

submitted to the health administration departments. 3) Results and experiences from pilots on dyslipidemia management were introduced on the professional platform at the national level, such as China NCDs Management Conference, Annual Meetings of Chronic Disease Prevention and Control Society of Chinese Preventive Medical Association, and so on. 4) A series of articles on dyslipidemia management were published in the peer-reviewed journals of the Chinese Medical Association to disseminate results and experiences from the project. 5) Several rounds of expert seminars had been conducted to draft proposals of “Service Specification for Co-management of Hypertension, Diabetes, and Dyslipidemia”, as well as “Service Specifications for Comprehensive Management of Hypercholesterolemia”. The output was delivered to relevant officials for reference.

### **The Inclusion of Dyslipidemia Management in Local and National Policies Had Been Continuously Promoted**

**At the local level:** The project had been recognized by relevant parties. In 2014, “Free screening and management of dyslipidemia for residents aged 40 years and above in main urban areas” was ranked first in the top ten health projects in Hangzhou. By embedding the module of dyslipidemia management in the health information systems in communities and towns, the service efficiency had been improved in Beijing, Hangzhou, Chengdu, and Qianjiang. By integrating dyslipidemia management into the Family Doctor Contract Services and relevant incentive systems, the quality of health services had been improved at community/town level.

**At the national level:** With continuous efforts and appeals from all relevant parties, the co-management of hypertension, diabetes, and dyslipidemia has been gradually incorporated into the national policies: 1) In 2017, the detection of blood lipid indicators was added for the elderly in the National Basic Public Health Service Project. 2) In the same year, the Mid- and Long-Term Plan for the Prevention and Control of NCDs (2017–2025) issued by the State Council clearly included the annual detection rate of blood lipid among residents aged 35 years and above as the main indicators in addition to those of hypertension and diabetes. Moreover, clear goals and plans for the comprehensive management of cardiovascular diseases were set in the plan (6). 3) In the Action of Prevention

and Control of Cardio-Cerebrovascular Diseases in “Healthy China Initiative (2019–2030)” issued by the State Council in 2019, to “promote the co-management of hypertension, diabetes, and dyslipidemia” was clearly proposed to indicate the pathway to realize the comprehensive management of risk factors of cardio-cerebrovascular diseases (7).

## COMMENTS

The project commenced in 2013, was innovative in many ways, and promoted the transformation from project practice to policymaking. It set a good example for this kind of projects for evidence-based policy advice.

**Innovation in design:** 1) The project started early in systematic reviews of the prevalence, disease burden, prevention and treatment, measures and policies of dyslipidemia, cardio-cerebrovascular diseases, and their risk factors from the perspectives of basic medicine, clinical medicine, population surveys, and intervention studies. 2) A set of evidence-based, practical and concise knowledge management system suitable for primary healthcare staff to carry out dyslipidemia management was formed based on medical standards and evidences.

**Innovation in management:** The project had been organized and implemented under the guidance of the logical framework from the beginning to the end. An overall plan was designed at the top level with mutual support given among multiple sub-projects and dynamic evaluation realized within the project. Management documents such as the constitution of the steering committee, project management manual, and pilot application templates had been formulated, thus standardized management was achieved. Several rounds of expert argumentation meetings, workshops, and field investigation and research had been organized, in which the expert team independently played their roles. A model for evidence-based policy-making projects was built and the process of which was accelerated.

**Innovation in publicity and evaluating:** Various media including traditional and new ones had been fully optimized, such as television and broadcasting stations, newspapers, subway TVs, mobile mass text-messaging, and applications (apps). Generating or selecting evidence using an evidence-based medicine method and sending timely and accurate information to people in need innovated the pathway of scientific evidence dissemination and publicity.

The health economics evaluation method was introduced to scientifically calculate the per capita cost of dyslipidemia management at community/township level for the first time, which provided an important basis to evaluate the replicability and generalizability of the project.

This project was subject to some limitations: 1) As the project was carried out in 6 pilots with a management period of 6 months to 1 year, due to the short intervention period, the long-term effect of dyslipidemia management on reducing the incidence and death of cardio-cerebrovascular diseases had not been observed yet. 2) The sampling methods of managed populations were not fully consistent as pilots were exploring local management modes and mechanisms based on their local conditions. Therefore, the overall effect of dyslipidemia management at the national level could not be evaluated comprehensively.

**Acknowledgements:** Steering committee members, the expert team, the leadership of IHECC, and the sponsor.

doi: 10.46234/ccdcw2022.169

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Submitted: April 29, 2022; Accepted: September 02, 2022

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## Notifiable Infectious Diseases Reports

### Reported Cases and Deaths of National Notifiable Infectious Diseases — China, June 2022

Diseases	Cases	Deaths
Plague	0	0
Cholera	6	0
SARS-CoV	0	0
Acquired immune deficiency syndrome*	5,626	1,647
Hepatitis	131,857	51
Hepatitis A	1,038	0
Hepatitis B	106,846	35
Hepatitis C	20,925	15
Hepatitis D	22	0
Hepatitis E	2,411	0
Other hepatitis	615	1
Poliomyelitis	0	0
Human infection with H5N1 virus	0	0
Measles	110	0
Epidemic hemorrhagic fever	566	6
Rabies	15	6
Japanese encephalitis	7	0
Dengue	1	0
Anthrax	29	0
Dysentery	4,708	0
Tuberculosis	67,901	345
Typhoid fever and paratyphoid fever	700	0
Meningococcal meningitis	6	1
Pertussis	4,213	0
Diphtheria	0	0
Neonatal tetanus	0	0
Scarlet fever	2,896	0
Brucellosis	9,943	0
Gonorrhea	8,988	0
Syphilis	48,507	4
Leptospirosis	12	0
Schistosomiasis	5	0
Malaria	62	0
Human infection with H7N9 virus	0	0
COVID-19†	1,541	0
Influenza	747,038	4
Mumps	11,945	0



Continued

Diseases	Cases	Deaths
Rubella	167	0
Acute hemorrhagic conjunctivitis	2,905	0
Leprosy	37	0
Typhus	124	0
Kala azar	20	0
Echinococcosis	250	0
Filariasis	0	0
Infectious diarrhea <sup>§</sup>	95,012	1
Hand, foot, and mouth disease	140,661	1
<b>Total</b>	<b>1,285,858</b>	<b>2,066</b>

\* The number of deaths of acquired immune deficiency syndrome (AIDS) is the number of all-cause deaths reported in the month by cumulative reported AIDS patients.

† The data were from the website of the National Health Commission of the People's Republic of China.

§ Infectious diarrhea excludes cholera, dysentery, typhoid fever and paratyphoid fever.

The number of cases and cause-specific deaths refer to data recorded in National Notifiable Disease Reporting System in China, which includes both clinically-diagnosed cases and laboratory-confirmed cases. Only reported cases of the 31 provincial-level administrative divisions in the mainland of China are included in the table, whereas data of Hong Kong Special Administrative Region, Macau Special Administrative Region, and Taiwan, China are not included. Monthly statistics are calculated without annual verification, which was usually conducted in February of the next year for de-duplication and verification of reported cases in annual statistics. Therefore, 12-month cases could not be added together directly to calculate the cumulative cases because the individual information might be verified via National Notifiable Disease Reporting System according to information verification or field investigations by local CDCs.

doi: 10.46234/ccdcw2022.157



Indexed by PubMed Central (PMC), Emerging Sources Citation Index (ESCI), Scopus, Chinese Scientific and Technical Papers and Citations, and Chinese Science Citation Database (CSCD)

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The inauguration of *China CDC Weekly* is in part supported by Project for Enhancing International Impact of China STM Journals Category D (PIIJ2-D-04-(2018)) of China Association for Science and Technology (CAST).



Vol. 4 No. 36 Sep. 9, 2022

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**Responsible Authority**

National Health Commission of the People's Republic of China

**Sponsor**

Chinese Center for Disease Control and Prevention

**Editing and Publishing**

China CDC Weekly Editorial Office  
No.155 Changbai Road, Changping District, Beijing, China  
Tel: 86-10-63150501, 63150701  
Email: weekly@chinacdc.cn

**CSSN**

ISSN 2096-7071  
CN 10-1629/R1