APACMed
The voice of MedTech

Medical Technologies in Out-of-hospital Care of China

-Value, Opportunities and Development Path

(2022)

In 2022, the Asia Pacific Medical Technology Association (APACMed) launched the out-of-hospital medical service project in China, conducted research with Tsinghua University to on the topic of out-of-hospital medical care about concept, scenario, application technology and policy development background. APACMed aims to put forward targeted opinions for the continuous improvement of medical service system in China, and supports Tsinghua University to release the project report: Research on the Value, Opportunities and Development Path of Medical Technology on out-of-hospital Medical Services. The summary of this report is presented below.

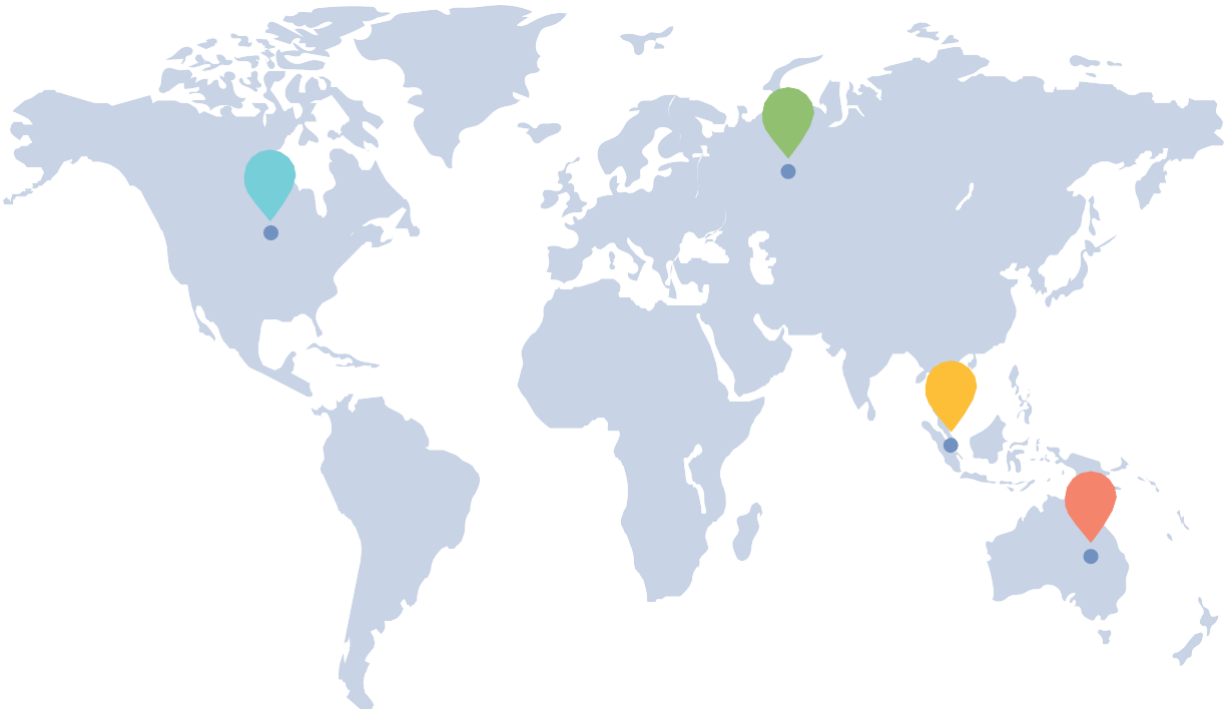
International experience: Main models of out-of-hospital medical services in different countries

Europe:

Out-of-hospital care includes home-based care, ambulatory care and day care. Home-based care includes technical care and non-technical care. Ambulatory care refers to all medical care received outside a hospital, including services from a general practitioner or specialist, scans or ultrasounds, and management of serious illnesses such as cancer or diabetes, etc. The functions of ambulatory care include health care, diagnosis, treatment, rehabilitation, and telemedicine. Day care patients are admitted and discharged on the same day, with a stay of less than 24 hours, mostly for day surgery.

United States:

Since the outbreak of the Corona-virus disease 2019 (COVID-19) pandemic, the Centers for Medicare and Medicaid Services (CMS) of the United States has allowed beneficiaries of Medicare to choose the family hospital model. In 2022, CMS implemented the Acute Hospital Care at Home program, laying a foundation for Medicare coverage for hospital-at-home model. As of July 2021, Family hospital services provided by more than 140 hospitals under 66 health systems were approved by CMS.



Australia:

Out-of-hospital medical services in Australia mainly include medical services represented by the application of home monitoring equipment or technology, and family hospitals. Family hospitals' advantages include lower risk of surgical infection and higher flexibility of the environment. For doctors, a highly optimized clinical pathway can improve the ability to provide services for patients, which contribute to reducing the length of hospital stay, the risk of falls, surgical infection, and accelerating postoperative recovery.

Singapore:

Singapore's DR Screening Project (SiDRP) is a DR screening program based on national tele-ophthalmology medical treatment. It has combined telemedicine, AI and medical technology in the field of diabetic retinopathy out-of-hospital medical care. Nineteen community hospitals across the country are able to screen 120,000-150,000 diabetic patients (50%). In addition, the Singapore Ministry of Health is also actively promoting family hospital pilots.

2 Current practice in China:

2.1 The macro policy background of medical service development in China during recent years

In recent years, several important policies have promoted the continuous improvement of medical service system in China. They are shown as follows:

Build a telemedicine system	In 2014, the Opinions on Promoting Telemedicine Services in Medical Institutions was released, which clarified the service content of telemedicine and emphasized relevant management regulations, marking the rapid development of telemedicine in China. In 2016, China launched the 13th Five-Year Plan. After that, China incorporated telemedicine into a series of major information planning projects, formulated telemedicine industry standards and Healthy China 2030 plan.	The Objective is to alleviate the uneven distribution of medical resources. By 2030, telemedicine will cover four levels of medical and health institutions across provinces, cities, counties and townships.
Encourage non-government hospitals	Since 2009, the government has successively launched documents including Opinions on Deepening the Reform of the Medical and Health System, Notice on Promoting the Development of Social Medical Sustained Health Standards, and Regulations on Amending the Implementation Rules of the Administration of Medical Institutions to clarify the management regulations of third-party medical institutions and mobilize the enthusiasm of social capital to organize third-party medical institutions.	The objective is to alleviate current problem that it can be difficult and expensive to get medical treatment through a flexible and efficient way.

 Encourage the use of artificial intelligence in healthcare system	Since 2016, the government has issued Guidelines on Promoting and Regulating the Development of Health and Medical Data Applications, The 13th Five-Year Special Plan for Health and Health Science and Technology Innovation, and Guidelines for the Construction of the New National Generation Artificial Intelligence Standard System to support medical related research and application of AI technology.	The objective is to apply digital scenes
 Monitor and manage chronic diseases	In October 2016, the State Council issued the Healthy China 2030 Planning Outline, proposing to strengthen the integration of sports and medicine and non-medical health interventions, and achieve whole-population, whole-life chronic disease health management by 2030. In 2017, the State Council released China's Medium and Long-Term Plan for the Prevention and Treatment of Chronic Diseases from 2017 to 2025, which plans to achieve effective control of chronic disease risk factors by 2025, reduce premature mortality, and effectively control the burden of chronic diseases. In 2019, the National Medical Insurance Bureau issued Guiding Opinions on Improving Outpatient Medication Security Mechanisms for Urban and Rural Residents with Hypertension and Diabetes, and included outpatient medications within the scope of the national basic medical insurance drug catalog for insured patients with hypertension and diabetes, in which the reimbursement ratio increased to over 50%. In 2020, the National Development and Reform Commission issued Recent Work Plan to Expand Domestic Demand Promotion Expenses, which includes the cost of Internet follow-up visits for chronic diseases into the scope of medical insurance payment under the premise of medical safety and quality. In 2021, the National Health and Medical Commission issued Notice on the Current Management of Long-term Drug Prescriptions for Chronic Diseases, proposing to strengthen daily medical service management and formulate long-term prescription management policies for patients with chronic diseases. In addition, the Notice on the work of Basic Public Health Service Projects in 2021 was released, which aims to provide targeted services for patients with chronic diseases. In 2022, the State Council launched the Notice on Printing and Distributing the 14th Five-Year National Health Plan to implement a comprehensive strategy for the prevention and control of chronic diseases.	The objective is to prepare for the medium and long-term pressure of aging and the healthy China strategy

2.2 The definition and content of Chinese out-of-hospital medical care in this study

In the context of China's unique situation, out-of-hospital medical care can include the following types of services: various types of medical or paramedical services, including active treatment, symptomatic treatment, palliative care, rehabilitation and health care, provided by professionals or certified patient self-providers in various settings outside of traditional hospitals, including community health centers, senior living facilities, professional rehabilitation facilities, homes, etc.

3 Industry perspective

3.1 Cases of existing technologies and products at home and abroad

Service category	Product Profile	Enterprise
Screening and diagnosis	The digital diagnostic product AegisPOC makes the laboratory the hub of the whole system. It integrates POC devices with laboratory information systems (LIS), health information systems (HIS), electronic medical records (EMR), quality management, user management and other systems.	Abbott
	AI projects such as heart-lung screening in Shukun Technology have begun to be deployed in hundreds of physical examination stores across the country. Customers can use the products to find their disease risks early.	数坤科技 SHUKUN
Intervention and treatment	ResMed focuses on out-of-hospital/home treatment programs for obstructive sleep apnea (OSA), chronic obstructive pulmonary disease (COPD) and other chronic respiratory diseases, including home positive airway pressure non-invasive ventilator (CPAP) and related remote digital medical services (AirView cloud platform).	ResMed
	Fresenius Medical Care innovatively uses NxStage System One to realize home hemodialysis, which is easy to use, helps patients better return to their families and society , and improves their quality of life.	FRESENIUS MEDICAL CARE THE RENAL COMPANY
	The main business of Wego Blood Purification Industry Group covers the whole industry chain of hemodialysis. In 2011, it undertook the pilot task of the independent hemodialysis center of the Ministry of Health.	WEGO 威高

 Monitoring and management	Roche Diagnostics' CoaguChek is a medical device that provides coagulation monitoring and management for patients using warfarin, which can increase the anti-coagulation monitoring compliance rate (TTR) by 27.5%, thereby reducing the occurrence of complications such as thromboembolism and severe bleeding.	Roche
	The latest generation of MiniMed™ 670G is regarded as the first choice for T1 diabetes treatment by American Diabetes Association (ADA) and European Association for the Study of Diabetes (EASD). The Smart Guard technology embedded in the system can help measure blood sugar level every five minutes, and provide insulin or suspend insulin injection according to real-time personalized needs.	Medtronic Further,Together
	Abbott's instantaneous scanning glucose monitoring system changes the traditional way of measuring glucose and realizes blood glucose measurement without pricking fingers, and starts a new era of digital management by measuring blood glucose with a scan of a mobile phone.	Abbott
 Telemedicine	In 1996, Henan Province Telemedicine Center (HTCC) began to develop its platform and operation. In January 2018, HTCC was regarded as the national telemedicine center, taking the lead in developing and applying the country–province–county–township–village in the six-level telemedicine network.	

3.2 Access path-evaluation method and medical insurance payment

3.2.1 Health technology assessment level

The out-of-hospital medical technology assessment is still within the scope of health technology assessment, and the principles should be basically consistent with it. At the same time, relevant guiding principles should be added according to the characteristics of the subject, application scenario and service object including the dimensions of safety, effectiveness, economy, ethics, law, and data security. Key dimensions of guiding principles such as evaluation process, evaluation criteria, resources, impact, and technology should also be considered[123].

1 EU AdHopHTA Project Team, Hospital Health Technology Assessment: Handbook and Toolkit 2017, Shanghai: Shanghai Jiaotong University Press.

2 Lampe, K., et al., The HTA core model: a novel method for producing and reporting health technology assessments. Int J Technol Assess Health Care, 2009. 25 Suppl 2: p. 9-20.

3 Petcharapiruch S, W.C.,How to carry out health technology assessment (HTA) for medical devices and in vitro diagnostic products - A review of the development trends and value assessment framework in the Asia Pacific region 2020, APACMed, IQVIA.

Table 2 Key dimensions and guiding principles of out-of-hospital medical technology evaluation

Dimension	Guiding Principle	Explanation
Assessment process	Clear assessment objectives	Set clear objectives before conducting the assessment, and ensure that all assessment processes and standards revolve around the objectives.
	Independent and open evaluation process	The evaluator should be independent of policy makers and stakeholders, and keep the evaluation process open.
	Clear assessment methods and submission guidelines	Develop transparent HTA guidelines and update regularly, so that technology suppliers participating in the evaluation can clearly understand what needs to be evaluated.
	Short evaluation cycle	The evaluation cycle should be as short as possible to match the pace of technology upgrading, since out-of-hospital medical technology is closely combined with the internet and digital technology, and the iteration speed is fast,
	Multiple public opinions	At each stage during the evaluation, consider the opinions from patients, manufacturers and clinical experts.
Evaluation criteria	Clear evaluation criteria	Determine which technologies need to be evaluated with clear, transparent and open standards.
	Multi angle standard	The evaluation criteria fully reflect the clinical effectiveness, economy, safety etc.
	Verifiable quality	Relevant standards have evidence to follow.
	Multidimensional evidence	Evidence from clinical trials and real world research.

Resources	Multi-disciplinary human resources	Ensure objectivity and comprehensiveness of decision-making.
	Adequate financial resources	Payment of operating costs.
Influences	Short and medium-term impact measurement	Intermediate indicators (e.g. patient satisfaction, manufacturer's cost or profit, etc.)
	Long-term impact measurement	End point indicators (health and social impact)
Technology	Technical maturity	Time to market, product life cycle, test times and results.
	Economy	Resource utilization, measurement and estimation of results, verification of costs and results, uncertainty analysis, heterogeneity analysis, patient burden.
	Effectiveness	Accuracy, health-related quality of life, quality of life, patient satisfaction, balance of advantages and disadvantages, amount of effect (impact on patients), quality of evidence.
	Ethics and Law	Beneficial or non-injurious principle, autonomy, respect, justice and fairness, compliance with the law.
	Data security	Privacy protection, data use, data sharing, user control.

Health technology assessment mostly follows a similar process, and the evaluation of out of hospital medical services is not exceptional[4]. The following figure shows the basic process of the whole health technology evaluation of out of hospital medical services from the beginning to the completion, application and update of HTA report.

4. Velasco, M., et al., Best practice in undertaking and reporting health technology assessments. Working group 4 report. Int J Technol Assess Health Care, 2002. 18(2): p. 361-422.

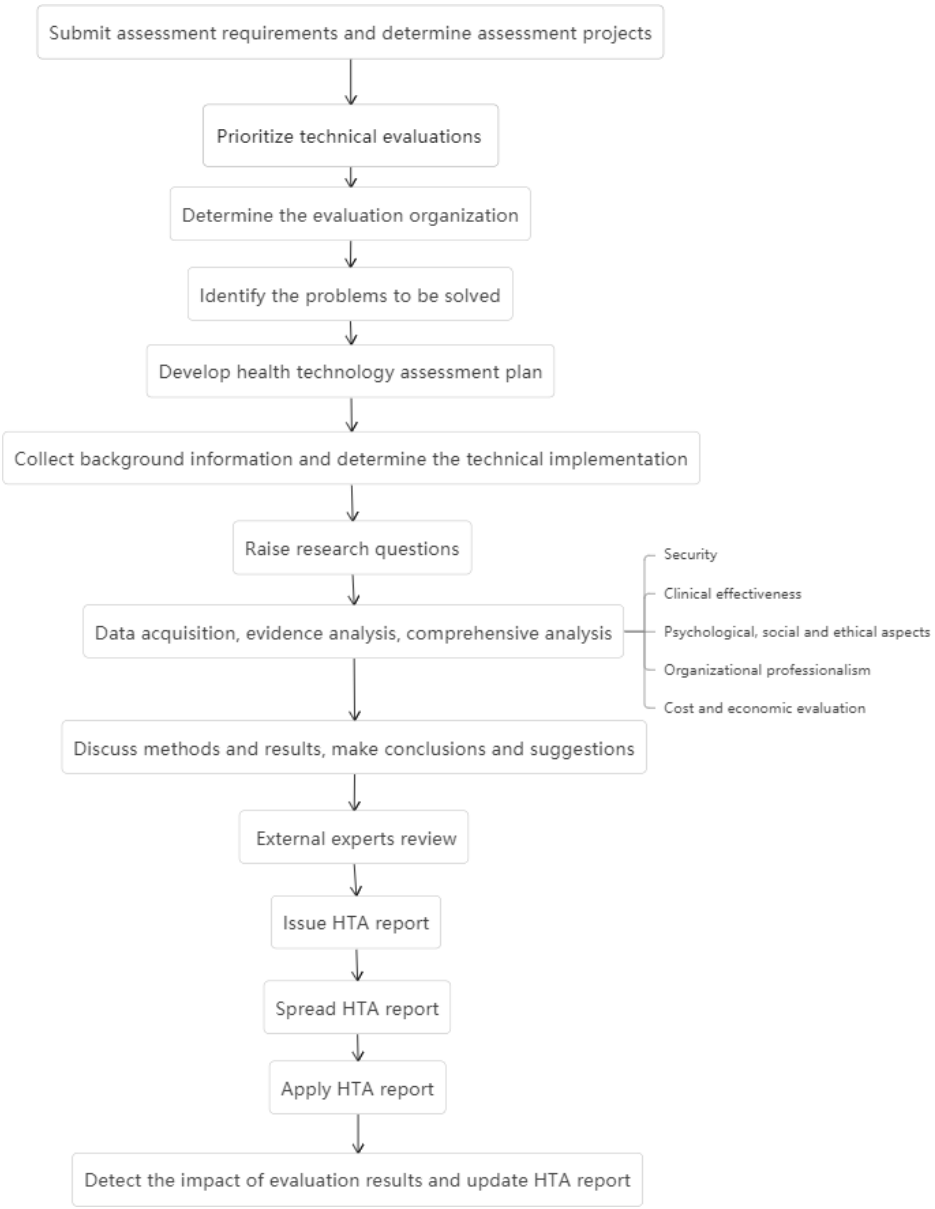


Figure 1 Technical Evaluation Roadmap of Out-of-hospital Medical Services

At the same time, the particularity of out of hospital medical services must be considered in the evaluation process. On the one hand, in the use of monitoring and testing out-of-hospital medical service technologies, a large amount of user information needs to be collected. Some technologies use artificial intelligence, big data analysis and other technologies. Therefore, the protection of user information and the protection of privacy become important issues in the application of such technologies. On the other hand, many out of hospital medical service technologies rely on the patients themselves or their families to operate, so higher requirements are put forward for the safety, operability, and professionalism of supporting training and guidance of technology or equipment.

3.2.2 Payment guarantee mechanism

Since the establishment of national basic medical insurance system in China, project-based payment has been mainly implemented. Project payment is simple and straightforward, and is adapted to the characteristics of the initial construction period of the system. However, due to its extensive management, it is prone to excessive medical treatment and some other shortcomings, resulting in low performance in the use of the medical insurance fund, affecting the sense of access of the masses, so it requires urgent reform.

Since the establishment of the National Medical Insurance Bureau in 2018, the DRG/DIP reform has been comprehensively promoted. The first round of three-year trials has been completed, and 101 national pilot areas have all entered the payment stage, which is a preliminary indication of strengthened internal management of medical institutions, new operating mechanism, convenience of medical treatment for the masses, lower cost burden, and more satisfaction. However, from the perspective of health, DRG payment is not suitable for rehabilitation medicine, nursing and health management. DRG payment is suitable for acute inpatient cases, not for rehabilitation cases, psychiatric diseases, or cases requiring long-term hospitalization.

All in all, the problem is the structure of medical treatment and health in China. The medical treatment is divided into four parts, clinical treatment, prevention, health care and rehabilitation but the four aspects do not

seem to match in China.

Medical insurance payment must explore the payment methods covering the whole health cycle in the future. DRG (Diagnostic-Related Group) is mainly used for the payment of acute inpatient treatment. FRG (Function-Related Group) is suitable for early rehabilitation after treatment in acute stage. While PDPM (Patient-Driven Payment Model) is suitable for medium and long-term rehabilitation. In addition, Per Capita Fee and OOP (Out of Pocket) for future daily health management may adopt the tiered diagnosis and treatment model, general practitioners care and Per Capita Fee. Individual medical insurance accounts can also cover part of the health management treatment costs. Certainly, commercial insurance is also an important part of the diversified payment system.

4 Suggestions on the next step

4.1 Health-related departments should pay more attention to the health services beyond hospitals with community and family as the core unit.

4.2 Government policies should be made to give more attention to key chronic diseases such as diabetes, hypertension, kidney dialysis, and sleep health, as well as strengthen the spread of health concepts.

Review and approval system, regulations on application management, and service compensation mechanism for home hemodialysis products and technologies should be established.

4.3 Medical institutions should play a guiding role in health services beyond hospitals.

On the one hand, diagnosis and treatment standards should be established and expert consensus reached on kidney dialysis, diabetes, hypertension, chronic respiratory disease, etc. On the other hand, it is important to mobilize the enthusiasm of doctors, so as to provide guidance on more products that meet the needs of patients outside a hospital setting. In addition, they should accumulate authoritative data and evidence in clinical practice, creating conditions to extend patient management beyond hospitals .

4.4 Academic institutions and the media should strengthen the theoretical research and publicity of the concept about health services beyond hospitals, so as to share health knowledge with the public in a timely manner and support governments' decision-making.

APACMed China MedTech Health Service members

Alicia Chang, Lead for China, APACMed

Jiali Yin, Project assistant, APACMed China

Lingyi Fang, Project assistant, APACMed China

Jenny Jin, Senior director, Government Affairs, Fresenius Medical Care(Shanghai) Co.,Ltd

Hui He, Associate Director, Government Affairs, Fresenius Medical Care(Shanghai) Co.,Ltd

Anita Song, Director of Health Economics, Policy and Reimbursement Medtronic Greater China

Chen Luo, Director of market access for diabetes, Medtronic(Shanghai)

Jun Cao, Director of government affairs, ResMed China

Grace Chen, Market Access and External Engagement Director, Abbott(Shanghai)

Kelvin LU, Access Director of Strategy & Health Economics,Corporate Affairs & Market Access, Roche Diagnostics China

Fei Zhou, Director of Brand PR,Shukun (Beijing) Technology Co., Ltd.

Academic Advisor

Jun Jing, Professor of Sociology Department of Tsinghua University, Deputy Director of Global Medical and Health Research Center of Tsinghua University,

Naijun Hu, Associate professor of Public Policy and Management Department of UCAS, Deputy Secretary General of the Aging Finance Branch of the Chinese Association of Gerontology and Gerontology

Jun Zhang, Director of the Office of the Medical Sociology Research Center of Tsinghua University, Deputy Secretary General of Global Medical and Health Research Institute of Tsinghua University Global Industry Research Institute

You Wu, Assistant Professor of Hospital Management Research Department of Tsinghua University

About APACMed

The Asia Pacific Medical Technology Association (APACMed) represents manufacturers and suppliers of medical equipment, devices and in vitro diagnostics, industry associations, and other key stakeholders associated with the medical technology industry in the Asia Pacific region. APACMed's mission is to improve the standards of care for patients through innovative collaborations among stakeholders to jointly shape the future of healthcare in Asia-Pacific. In 2020, APACMed established a Digital Health Committee to support its members in addressing regional challenges in digital health.

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