Summary and Review of Management Experience of Emerging Health Technologies in Various Countries

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Abstract

The rapid development of emerging health technologies throughout the world not only promotes the progress of health undertakings, but also brings about a lot of management problems. The management of emerging health technologies is an administrative means to guarantee medical safety and standardize medical treatment. In this paper, the management experience of foreign emerging health technologies is reviewed, to provide a reference for Chinese medical institutions and health administrations to strengthen standardized management of emerging health technologies.

Keywords

Summary and Review; Management Experience; Emerging Health Technologies.

1. Introduction

The predominant way that science and technology contribute to human health is through the development of health technology. With increasingly higher contribution rate of science and technology in the development of medical and health undertakings, health technology has become an important channel that medical institutions improve medical service level and core competitiveness, as well as an important driver for the scientific development of health undertakings. But on the other hand, ever-growing emerging health technologies also result in higher and higher health costs. Therefore, how to manage burgeoning health technologies, control health costs and achieve better cost-effectiveness is an important research direction in the current health undertakings in various countries. In recent years, many countries have established emerging health technology assessment organizations and formed a relatively perfect emerging health technology assessment system, which is of referential significance for the management of emerging health technologies in China.

2. Definition of emerging health technologies

The concrete definition and development stage of emerging health technologies (also known as new health technologies) differ slightly. Based on the definition of the International Information Network on New and Emerging Health Technologies (EUROSCAN)[1], emerging technologies are divided into new health technologies and emerging health technologies. The former refers to technologies that have been adopted shortly after clinical use, usually during marketing or in the early stage after marketing, while the latter refers to technologies that haven't been adopted by the health system, for example, drugs in Phases n or m in clinical trial or drugs before marketing. For medical devices, emerging technologies come out before marketing or within 6 months after marketing, or although marketed, the sales is less than 10% or the devices are only used in some medical centers.

Compared with mature health technologies, emerging health technologies have the following characteristics [1]: (1) they have just been put into use or on trial clinically and have a high degree of uncertainty in effect; (2) they continue to develop after clinical use and are in dynamic change;(3) decision-makers can't acquire plenty of assessment information, due to the lag of information.

3. Development of Management of Emerging Health Technologies

Health technology assessment originated in the 1970s, when health care costs rose sharply in some countries and the impact on health policy was significant. Especially in the United States, due to the rapid development of new technologies, all kinds of expensive new and high technologies had been frequently used. To control these costs, the country was bound to manage the development, appraisal, implementation and application of these new technologies. For this end, the United States has established a national health care technology center (abolished after) and come up with the concept of health technology assessment (HTA) for the first time, which laid a foundation for management of emerging health technologies. Subsequently, research in this field was developed in the United States and Europe and gradually spread to the rest of the world [2].

However, early HTA agencies may need to spend 3-4 years to complete full reports. Too long assessment cycle disables decision-makers from taking it as the basis of decision-making. With the development of HTA around the world, demands for early and timely assessment of emerging technologies came out. People gradually realized the importance of timely assessment for decision-making in the health industry. Before the marketing and implementation of technologies, it is critical to provide early and timely assessment. Early assessment allows decision-makers to plenty of time to develop application methods a new technology [3, 4].

In 1980, Banta and Gelijns [5] proposed developing a systemic method for the identification and early assessment of an emerging health technology, so as to provide suggestions on this technology for decision-makers in advance. After that, the world's first health technology early warning system was founded in the Netherlands (also known as horizon scanning system). In 1999, emerging health technology early warning systems in several countries joined hands and built the International Information Network on New and Emerging Health Technologies, i.e., EuroScan, which heralded the birth of an international alliance of emerging health technology early monitoring cooperation network. EuroScan grew fast and became an international organizational network in this field with the most relevant member agencies. Now this network has attracted more than 20 organizations from more than 10 countries, including Canada, Denmark, Norway, Sweden, Australia, New Zealand, the Netherlands, UK, Israel, Spain, France and Switzerland, etc. [6]. Apart from EuroScan and its member states, organizations in many other countries, for example, the United States, also set up a horizon scanning system.

4. Early Warning System (Horizon Scanning System)

4.1 Definition of Early Warning System

Early warning system (EWS), also known as horizon scanning system (HSS), is a system to identify, screen, set priorities for and assess an emerging health technology, help improve the decision-making process and provide timely, useful, sufficient and reasonable information for whether health decision-makers should adopt this technology [7], manage the assessment of emerging health technologies effectively and make assessment activities more rational. In the 21st Century, evidence-based medicine and evidence-based policy have received more and more attention. Relevant interest groups need to draw support from faster, more authoritative and more targeted decision-making information [8]. With limited health technology assessment resources, to prevent total health expenses from growing too fast, at present it is undoubtedly the best choice to adopt an early warning system for technology assessment.

In 1999, emerging health technology early warning systems in several countries joined hands and built the International Information Network on New and Emerging Health Technologies (EuroScan) [9]. It was an international cooperation network used to share early identification and assessment method information on emerging health technologies and provide timely information on emerging technologies for decision-makers in various countries. This organization was committed to promoting research on early warning and monitoring methodologies of emerging health technologies, building a shared and authoritative database for early monitoring and assessment of international

emerging health technologies, drawing on the wisdom of organizational members and facilitating information exchange and sharing.

4.2 HSSs in Different Countries and Regions

Among countries and regions with HSSs, due to different general situations, economic strengths, health care systems and health system structures, etc., the implementation level, affiliation and service object of their HSSs also vary greatly (see Table 1).

Table 1

HSS	Country	Nationwide or Regional	Affiliation	Service Object
Basque Office for Health Technology Assessment (SorTek)	Spain	Regional	HTA agency	Regional ministry of health
Andalusian Agency for Health Technology Assessment (DETECTA)	Spain	Regional	HTA agency	Regional ministry of health
Agency of the Evaluation of Sanitary Technology (SINTESIS)	Spain	Regional	HTA agency	Network of sanitary professionals
Health Council of the Netherlands (Gr)	Netherlands	Nationwide	Government consulting agency	Ministry of health
The Committee for Evaluation and Dissemination of Innovative Technologies (CEDIT)	France	Regional	HTA agency	Paris group of public hospitals
Nationwide Horizon Scanning Center (NHSC)	England and Wales	Nationwide	Department of Public Health, Epidemiology & Biostatistics , University of Birmingham	English and Welsh ministry of health
Swiss Federal Office of Public Health (SFOPH)	Switzerland	Nationwide	Federal office of public health	Ministry of health
Norwegian Knowledge Centre for the Health Services (NOKC)	Norway	Nationwide	Nationwide knowledge center for the health services	-
Swedish Council on Technology Assessment in Health Care (SBU-ALERT)	Sweden	Nationwide	HTA agency	-
Danish Centre for Evaluation and Health Technology Assessment (DACEHTA)	Denmark	Nationwide	HTA agency	-
Canadian Emerging Technology Assessment Program (CETAP)	Canada	Nationwide	HTA agency	-
Division of Medical Technology Policy (DMTP)	Israel	Nationwide	Ministry of Health	Ministry of Health
Australia and New Zealand Horizon Scanning Network (ANZHSN)	Australia and New Zealand	Nationwide	HTA agency and Surgical Director, Australian Safety and Efficacy Register of New Interventional Procedures – Surgical (ASERNIP-S)	Heads of ministry of health in various states

Table 1 Horizon scanning organizations in various countries, as well as their implementation level, affiliation and service object [10]

Most of the HSSs shown in Table l are part of national or regional HTA agencies. Although these HSSs share common goals, they differ a lot in scale, resources, operation level, authority and organizational structure. So the specific process when assessment differs, too. In some countries,

HSSs have a clear service object, while in others, they don't. For example, in Britain, the National Horizon Scanning Center (NHSC) provides information for the national ministry of health. While in countries like Norway, HSSs don't have a clear service object.

4.3 Early warning system procedures [1, 7]

Typically, organizations that identify and assess emerging health technologies early include the following five tasks: identification and screening, priority setting, assessment, assessment result monitoring and assessment result dissemination. However, not every organization will finish all of these five steps in their early warning system. The details depend on national and regional conditions. Here, we only present an overview.

4.3.1 Identification and screening: Emerging health technologies develop too fast. Inevitably, they may be of varying quality. To avoid unnecessary health technology assessment costs, first of all, emerging health technologies are identified and screened, to filter out useless or less cost-effective emerging technologies. In the process of identification and screening, we need to collect data related to the emerging technology preliminarily to assist decision-makers in their judgement.

4.3.2 Priority setting: due to limited health technology assessment resources, it is necessary to set priorities for emerging health technologies, to confirm which technologies are worth further assessment and which need further improvement. Most of the HSSs use a priority criterion to judge priority. The priority criteria that EuroScan member agencies commonly use include: cost, health benefit or uncertainty in health benefit, organizational change, dissemination speed, ethical, legal and social concerns, number of patients, innovation, cost-effectiveness, severity of disease and relationship with national policies, etc.

4.3.3 Assessment and monitoring: after priority setting, we assess the emerging technology early. This step requires collecting plenty of information related to the emerging health technology, to evaluate the clinical effect, cost and cost-effectiveness, etc. of this technology. Meanwhile, monitoring is also an integral part of early assessment. Since the emerging health technology has a high degree of uncertainty and is in dynamic change, we monitor it dynamically, to facilitate repeated assessment and provide the best evidence for decision-making in each stage.

4.3.4 Dissemination and use: The assessment results are timely and flexibly, sometimes commercially sensitive. We need to limit their dissemination. Some HSSs will publish their assessment reports online (e.g., CEDIT NHSC). Some assessment results will also be published on the website of Euroscan. Through these open information channels, we may offer help to target groups that need such information.

5. Conclusion

To sum up, foreign countries have formed a relatively perfect set of management methods for emerging health technologies. Most foreign countries have horizon scanning organizations. In Europe, an alliance of emerging health technology information networks has been set up. However, when retrieving domestic literature, we didn't find a perfect system that can carry out preliminary assessment on emerging health technologies. Current emerging health technologies in China are also in a stage of high-speed development. The existing HTA is far from satisfying decision-makers who have to make decisions in a short time using limited resources. Nevertheless, it is also undesirable to introduce HSS organizations blindly. We need to further analyze and discuss how to improve the management mode of emerging health technologies in China and whether foreign experience is fit for the current development of health in China.

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