HOW CAN HEALTH SYSTEMS PREPARE FOR NEW AND EMERGING HEALTH TECHNOLOGIES? THE ROLE OF HORIZON SCANNING REVISITED

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Objectives: For many years, several health technology assessment (HTA) agencies scanned the horizon to identify health technologies that were safe, effective and offer value for money. However, there is limited evidence regarding its impact. The role of horizon scanning in preparing health systems for the uptake of new and emerging health technologies was discussed during the 2018 HTA International (HTAi) Global Policy Forum Meeting.
Methods: Reflection of the discussion between seventy-two senior representatives from for-profit, not-for-profit organizations, and HTAi leadership. It was informed by a background paper, and presentations from four invited experts and seventeen Policy Forum members.
Results: Current horizon scanning systems (HSS) mainly identify health technologies in the late stage of development, aiming to inform topic selection for HTA. Areas for improvement included the need for a clearer definition of the end user(s), purpose, scope, and focus of HSS, the long-term full health system effects, including all relevant stakeholders as early as possible, and considering smart data systems and international collaboration to improve HSS's efficiency. The way in which HSS could be further optimized and better shaped to prepare health systems was also discussed and good practice examples were presented.
Conclusions: HSS have not yet reached their full potential in preparing health systems. To improve the current situation, the HTA community could act as convenors, bringing together all relevant stakeholders and providing the information that decision makers need. This would require a new, more integrative approach to define and use HSS and HTA, and requires new skills.

Keywords: Horizon scanning, Emerging health technology, Health technology assessment, Health systems

Decision makers around the globe are challenged to balance universal access to high quality and innovative care against issues of financial sustainability and equity. With the emergence of highly effective new and emerging health technologies, such as 3D printing, cell therapies, and regenerative medicine, pro-active planning is needed to enhance access to these technologies (1). Horizon scanning can inform this process as it aims to systematically assess the safety, effectiveness, economic and other impact of new and emerging health technologies to anticipate access to, and provision of, health services, as well as the development of health policy (2). For almost 20 years, several—but not all—health technology assessment (HTA) agencies around the globe scanned the horizon to identify health technologies. Most of these horizon scanning systems (HSS; synonyms of HSS include early warning system [EWS] and early awareness and alert system [EAAS]) would be at least 50 percent publicly funded (3).

Current HSS often have not published on their effectiveness (4). Due to an increased attention in horizon scanning, mainly related to access to medicines (5), the role of current HSS in supporting health systems in the uptake of new and emerging health technologies was the central theme during the 2018 HTA International (HTAi) Global Policy Forum (GPF) Meeting, entitled 'Facing the dynamics of future innovation: The role of HTA, industry and health system in scanning the horizon. The HTAi GPF consists of HTA leaders from public and private sector organizations (6). Specific issues related to the theme include: (i) How can HSS more efficiently identify health technologies? (ii) What time horizon should be considered when identifying new health technologies?

(iii) What are the challenges in addressing different types of health technologies? (iv) Which stakeholders need to be involved, when and how? and (v) What can be done at an international, regional and/or local level?

This study provides a reflection of the discussion of these issues during the 2018 GPF meeting.

METHODS

Horizon scanning was briefly discussed during previous meetings (7;8) of the HTAi GPF. In response to the increased attention to this issue, the Policy Forum Committee (PFC) selected horizon scanning as topic for the 2018 meeting. For this purpose, seventy-two representatives from HTA agencies, industry, the HTAi Board, including four invited speakers, met in January 2018.

To inform discussions during this meeting, a background paper (9) and presentations were prepared. The background paper was based on desk research, input from the PFC, GPF members and the wider HTAi community. Keynote presentations were provided by invited speakers (representative of a HSS, a senior policy officer from a Ministry of Health, a clinician, and a patient representative), while case studies were presented by GPF members under two strands: optimizing current HSS and the role of HSS in preparing health systems for taking up new and emerging health technologies (Supplementary Table 1). All this information provided input for group discussions, and plenary discussions shared insights from across these group discussions. At the end of the meeting, the attendees were asked to formulate key messages for further debate.

The meeting was conducted under the Chatham House Rule, which states: 'participants are free to use the information received, but neither the identity nor the affiliation of the speaker(s), nor that of any other participant, may be revealed' (10). This study presents solely the authors' view and is not a consensus statement and, therefore, cannot be taken to represent the views of any of the individuals attending the meeting or of the organization for whom they work.

RESULTS

The Current Situation of HSS

Horizon scanning consists of the following related steps: identification and filtration of new health and emerging technologies, prioritization of health technologies to be assessed, assessment of the potential impact on health and health care, dissemination of findings to clearly identified end-users, and monitoring the information provided, including feedback from stakeholders and updates (11). In 1999, EuroScan, an international network of publicly funded HSS, was set up to exchange information and expertise in the field of horizon scanning. This was mainly centered on safety and efficacy of new and emerging health technologies (12). The purposes of these HSS differ (Figure 1) (10), although most often horizon scanning is used for topic selection or workload planning of HTA agencies (13).

HSS also differ in the types of technologies that they scan: medical devices, diagnostics, interventional procedures, health programs and/or pharmaceuticals (13;14). Furthermore, HSS take different time horizons, that is, the time before expected market authorization or market entry, in which the health technologies are identified and information is collected regarding filtration, priority setting and assessment (15). Most often HSS take a 2 to 3 years' time horizon (1). Finally, there is limited evidence regarding the impact of current HSS on preparing health systems for the uptake of new and emerging health technologies (1). These findings fueled the discussion on what needs to be done to optimize current HSS and/or how to better prepare health systems.
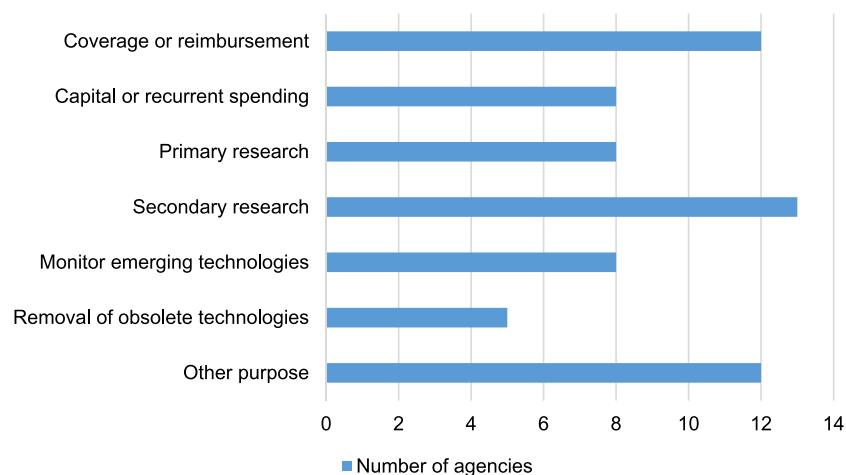

Figure 1. Purposes of horizon scanning - EuroScan member agencies. Source: Based on Joppi (2017) (19).

Table 1. Main Issues to (Further) Optimize and Better Shape HSS to Inform Future Healthcare

- The end user(s), their needs, the time horizon, purpose, and scope of HSS need to be more clearly defined
- HSS need to identify unmet needs in order to drive innovation
- HSS should focus on disease area and/or care pathways
- HSS need to include all relevant stakeholders at an early stage
- Use of smart data systems and international collaboration can improve the efficiency of current HSS

HSS, horizon scanning systems.

Optimizing Current HSS

During the meeting, several issues were identified regarding how current HSS could be (further) optimized and better shaped to inform future healthcare. The main issues discussed are listed in Table 1.

One key element discussed by attendees of the meeting was whether the time horizon that most HSS take should be considered horizon scanning or merely financial planning. Taking a longer time horizon (e.g., more than 3 years before launch) would allow HSS to retrieve information about where the pipelines are potentially going to hit, and enable scenario planning about the uptake in the health system. Obviously, a longer time horizon will need to be balanced with the uncertainty of the information regarding clinical and financial impact.

It was also apparent that horizon scanning could mean different things to different stakeholders and that it is often not clear what kind of information is needed, and for what purpose. Therefore, it was discussed that there is a need to clearly define what information the end user (e.g., national/regional governments, health professionals, purchasers of health services, HTA research commissioners, and healthcare providers) request and when they need this information (14).

The needs of the end user(s) will determine the purpose and scope, as well as the timeline of a HSS and related responsibilities. For example, a HSS can focus on: (i) Managed introduction of new technologies: assessing the impact on the health system, taking into account rearrangements of care delivery, linkage to managed entry agreements and reassessment of data. This should start 12–18 months before launch; (ii) Stimulating innovation, development of emerging technology. To enable this, horizon scanning should start at least 36 months ahead of launch, where HTA is part of the design of data generation. It also includes informing decision-makers for the purpose of system change and implementation plans involving a broader array of stakeholders to engage on changes in the care pathway; (iii) Informing (HTA) research. In this case, horizon scanning could be used to address gaps anticipated during HTA; the high-level trends in terms of R&D and public health priority setting; the shape of the

health policies and unlock R&D public funding as a complement to industry investment in research.

The differences between horizon scanning for medical technologies and pharmaceutical products was also debated. It was mentioned that medical technology often goes along with rapid evolution, there is a potential direct-to-consumer route to market and products, and especially products developed by small and medium enterprises might not be captured in current HSS. Furthermore, MedTechScan in the United Kingdom (UK) was presented as an example that aligns with government and payer policy and will augment existing clinical and financial planning. It was believed that such an approach would stimulate innovation in the areas of unmet need as well as to prepare an appropriate uptake in the health system. MedTechScan and other examples, including the Innovative Medicines Initiative, a public-private partnership in the European Union, are described in the background paper (9).

It was further emphasized that it would be beneficial for health systems if HSS would focus on disease area (e.g., Alzheimer) and/or care pathways, and not solely target a single technology for a specific disease. This could be further optimized by linking early HTA, horizon scanning and early dialogue, involving all relevant stakeholders and by providing necessary conditions (e.g., confidentiality agreements to share data). It was, however, mentioned that currently certain stakeholders, such as patients, are hardly involved in the identification of health technologies. Patients can be an important source as they are on top of all new developments in their respective disease area and often share this information through social media/online platforms. Stakeholder involvement, however, goes along with challenges that need to be clearly addressed. This includes how to balance all relevant perspectives, which methods to use (e.g., focus groups, deliberation), and how to deal with confidentiality of certain data (e.g., from industry).

Finally, several discussions during the meeting centered on how to improve the accuracy and efficiency of current HSS as (a) there is little evidence on the effectiveness of current HSS (4), and (b) current methods for identification and filtering appear to be very labor intensive. With regard to improving accuracy of HSS, the work of, and reports produced by, capital investors and financial backers were mentioned as specific sources of relatively accurate estimates of the impact or commercial success of new and emerging health technologies. In addition, the skills that these specialists use for handling the number of health technologies coming to market could be potentially beneficial to learn and improve the predictive accuracy of current HSS.

To avoid information overload while capturing all necessary sources (at times scattered), new approaches are needed. For example, the data systems developed by the NIHR Innovation Observatory in the United Kingdom involve the application of natural language processing with standardized ontologies and dictionaries to allow searching across multiple

data sources, from (all) clinical trials and adverse events registries to PubMed and device approvals (9). Adopting such systems would also require new skills. It was, however, noted that it might be difficult to attract skilled professionals as big data analytics is also extensively used in other competitive sectors. Furthermore, a cross-national database was believed to be beneficial for reaching efficiency, to identify technologies, collect and share information, and as such enhance earlier patient access to new and emerging health technologies. However, it was also made clear that an international database is not tailored to national needs and that filtration and prioritization of identified health technologies need to remain local.

Preparing Health Systems for the Uptake of New and Emerging Health Technologies

The current situation shows that, in preparing health systems for the uptake of new and emerging health technologies, some actions are needed in addition to the existing HSS. To better prepare health systems, some inspiring examples were presented at the meeting, including the following.

Use of Forecasting as Part of the Swedish HSS. The use of forecasting in horizon scanning: the case of Sweden (16). Initiatives to establish a system for the identification and assessment of emerging health technologies in Sweden dates back to the 1980s. The system started on regional (county) level and gradually became a national level activity. In 2010, the Stockholm County Council developed a forecasting model for estimating the adoption and budget impact of new medicines. Predicted trends for the upcoming two years are adjusted for likely changes, including patent expiration among key therapeutic areas, changes in the organization of care, new guidelines, reimbursement decisions and/or the introduction of new medicines or new indications. Using horizon scanning for forecasting potential budget impact requires an earlier time horizon, that is, 3 to 5 years is most often used in prediction models. An important feature of the Swedish system today is its complete integration into the national process for managed introduction and follow-up of new medicines as well as the strong collaboration with experts from the Regional Drug and Therapeutic Committees (DTCs). The system will continue to evolve as a response both to the changing landscape of health innovations and to new policy initiatives at the regional, national and international level.

This approach has been used with regard to the introduction of pharmaceutical products for treating hepatitis C in Sweden. The collaboration between the different stakeholder involved in the process (regulatory agency, patients, clinicians, drug agency, and payers) was well perceived.

Use of Environmental Scanning by the Canadian Agency for Drugs and Technologies in Health. Environmental scan on the use of proton beam therapy in Canada (17). The Canadian Agency for Drugs and Technologies in Health (CADTH) conducts Environmental Scans of policy, practice, and research issues inside and outside of Canada. Environmental Scans inform decision-makers about the actual use of health technologies across jurisdictions, particularly with respect to practice variation and policy gaps. In 2017, CADTH performed an Environmental Scan on the use and funding of proton beam therapy (PBT) in Canada, the United Kingdom (UK), and Australia. This was due to recent technological advances and the fact that several Canadian provinces were considering purchasing the technology within 5 years. The potential impact of introducing new PBT machines to the Canadian health system was not captured by horizon scanning, as PBT is not considered to be a new or emerging technology.

PBT is an advanced radiation treatment technology with a lower radiation dose to surrounding healthy tissues compared with photon radiotherapy. This may lead to better patient outcomes, both short and long-term, and increased capacity to treat pediatric patients and those that are untreatable by photon therapy. Recent advancements of the technology resulted in a system that can be integrated in a single-room hospital setting instead of a football field-sized space and at much lower costs than the older multi-room systems (CAN \$25 million compared with CAN \$200 million). The CADTH Environmental Scan found that currently in Canada, patients are referred for out-of-country treatment. The criteria used for the selection of patients for out-of-country referrals has been investigated as well as the practice in the two other countries with similar, publicly funded, healthcare systems. All these countries have already started the construction of PBT facilities or are considering purchasing the technology within 5 years. Once the facilities are available, the number of patients that could benefit from PBT treatment could potentially increase compared with the current situation where only highest-priority cases are referred.

The lesson learned from the PBT case is, that if a HSS is not able to trace a health technology that might be disruptive to the health system (e.g., because it not a new or emerging health technology), other mechanisms are needed to quickly respond to health systems' needs.

Evaluating the Potential Impact of Emerging Technologies on the Health System in Australia. Impact of renewed National Cervical Screening Program on the pathology workforce in Australia (18). The introduction of a national human papillomavirus (HPV) screening program in Australia in 2017 made clear that it is important to think early about the changes that a new and emerging health technology will bring to the organization of care. As a result of the renewed National Cervical Screening Program, which replaced the 2-yearly Pap test with 5-yearly primary HPV tests, the annual cervical cytology workload is expected to decrease from the current level of 2.4 million conventional

Pap smears to approximately 340,000 liquid based cervical cytology cases. Current projections are that this workload reduction for cytologists could lead to a reduction in the cervical cytology-screening workforce across Australia of approximately 200 full time equivalent scientists, cytotechnologists, and cytopathologists.

Specialists who continue to work in cervical screening will be required to adjust the approach to the examination and reporting of cervical cytology cases from screening to diagnostic. The Royal College of Pathologists of Australasia has worked out a transition services and support program for the cytology workforce. This approach consists of three phases: (i) a needs assessment of the cytologists potentially affected by the new program; (ii) workshops focusing on building personal skills to cope with ambiguity and change and developing a personal value proposition; and (iii) workshops on preparing for job search (resume building and interview skills).

This case makes clear the benefit of taking a broader perspective, that is, not only focused on a specific health technology but looking at the clinical pathway and/or broader care process when assessing and planning the introduction of a new or emerging technology.

Moving Forward

It is clear that current HSS have not yet reached their full potential in preparing health systems for new and emerging health technologies. Horizon scanning, as part of HTA, should provide decision-makers with the best information supported by the available evidence on the (potential) impact of new and emerging health technologies and to help prepare health systems. This requires a life cycle approach in which the role and responsibility of HTA as well of other stakeholders (e.g., industry, regulators, health professionals, patients, and payers) throughout the process should be more clearly determined. We believe that HTA agencies, coordinating HSS, could act as convenors, bringing together all relevant stakeholders and providing them with the relevant and meaningful information. This requires, however, a broader, health system perspective that will need to result in a new, more integrative approach to define and use HSS and HTA.

It will also require new skills. However, we do not need to reinvent the wheel. We can learn from existing approaches already undertaken by HTA agencies in collaboration with other stakeholders, as presented in this study, as well as from other disciplines (e.g., financial backers). Another important initiative with regard to defining HTA that has just been launched is the joint task group of INAHTA, HTAi and regional HTA networks (RedETSA, HTAsiaLink, EUnetHTA) to update the definition of HTA. We believe this is a great opportunity to move forward with the results from the 2018 GPF meeting.

SUPPLEMENTARY MATERIAL

Supplementary Table 1:

https://doi.org/10.1017/S0266462318000363

CONFLICTS OF INTEREST

All authors received funding from HTAi for the work reported in this study.

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