

MONITORING HEALTH TECHNOLOGY ASSESSMENT AGENCIES

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Abstract: The increased use of “regulatory science” in decision and policy making is an important component in the governance of modern states. However, contrary to what one would be tempted to assume, the use of knowledge from advisory bodies is not straightforward. Health Technology Assessment (HTA) agencies are currently preoccupied with their impact on the health care system and the examination of more active dissemination strategies. This article suggests that their influence depends on how HTA users and other actors react to an assessment, agree with or contest its content, and negotiate solutions. A continuous monitoring system is presented that could be implemented by such agencies for documenting actors’ views and actions. This framework combines attributes both of self-assessment approaches and of impact assessment models.

Résumé: L’usage croissant de la science en tant que source de régulation dans la prise de décision et dans la formulation des politiques représente une composante importante de la gouverne des états modernes. Toutefois, le processus par lequel les savoirs produits par des organismes consultatifs sont utilisés n’est pas évident. Par exemple, les agences d’évaluation des technologies de la santé (HTA) se préoccupent actuellement de leur impact sur le système de santé et examinent quelles stratégies de diffusion seraient plus adéquates. Dans cet article, nous suggérons que l’influence de ces agences dépend de la façon dont les utilisateurs et d’autres acteurs réagissent aux évaluations, endossent ou contestent leur contenu, et négocient des solutions. Un système de suivi continu est présenté que ces agences pourraient implanter afin de documenter les points de vue des acteurs con-

cernés par des dossiers d'évaluation et les actions qu'ils posent. Ce système associe une démarche d'auto-évaluation avec des mesures d'impact.

EXAMINING THE INFLUENCE OF ADVISORY BODIES

As Jasanoff (1990) pinpointed, the increased use of “regulatory science” in decision and policy making is an important component in the governance of modern states. Several specialized advisory bodies were created to inform diverse sectors of public policies and social affairs, such as education, health care, technological innovation, or international development (Cozzens & Woodhouse, 1995). Contrary to what one would be tempted to assume, the use of knowledge from advisory bodies is not necessarily straightforward because they hold a governmental mandate. In this article, we examine the processes by which knowledge produced by a specific type of advisory body — Health Technology Assessment (HTA) agencies — is used by decision makers and other actors.

HTA agencies are at present preoccupied with their impact on the health care system and with the examination and testing of dissemination strategies which would enhance their contribution to decision and policy making (Battista, Banta, Jonsson, Hodge, & Gelbland, 1994; Bero, Grilli, Grimshaw, Harvey, Oxman, & Thomson, 1998; Durieux, Viens-Bitker, Jolly, & Blum-Boisgard, 1988; Hailey, Cowley, & Dankiw, 1990; Hailey & Crowe, 1993). These agencies were established over the course of the last two decades in several industrialized countries and are gaining increasing popularity in Eastern European and developing countries (Banta & Perry, 1997). Such agencies are of particular interest because of the complex institutional context within which they operate (multiple actors with conflicting goals) and because their “normative” function largely depends on co-ordinated interventions by other regulatory bodies (third-party payers, College of Physicians, Medical device and drug authorities). HTA agencies are generally mandated by the Health Minister to produce information on efficacy, safety, and costs of health technology and to examine their social, ethical, and legal aspects. The potential topics of assessment range from prostate cancer screening, prenatal genetic diagnosis of Down’s syndrome, and cardiac transplants to the use of lasers to correct vision malfunctions. Controversies arise regularly as competing claims are made regarding the “true” value of a given technology (Lehoux & Blume, in press). Thus, the impact of HTA is intimately linked to how “us-

ers” and other actors react to an assessment, make sense of or contest its content, negotiate solutions, or defend the status quo.

This article focusses on the processes by which information generated by advisory bodies such as HTA agencies can shape decisions, policies, and practices. A better understanding of the institutional environment in which HTA agencies operate is required, and a continuous monitoring of their influence on the health care system could enhance their organizational performance, as well as their overall impact. A sociopolitical perspective toward the multiple actors involved in HTA is adopted and monitoring tools that agencies could implement to clarify the mechanisms underlying the influence of their reports and dissemination activities are suggested. Drawing on various models of research information, utilization developed either in the field of HTA (Battista, Feeny, & Hodge, 1995; Hailey et al., 1990) or knowledge utilization (Huberman, 1989; Oh & Rich, 1996; Rich, 1997). The monitoring system presented combines attributes of self-assessment approaches (Lusthaus, Anderson, & Adrien, 1997) and impact assessment models (Battista, Lance, Lehoux, & Régnier, 1999; Buxton & Hanney, 1996; Jacob & McGregor, 1997) in order to provide agencies with tools to reinforce organizational learning.

COMBINING SELF-ASSESSMENT AND EXTERNAL IMPACT ASSESSMENT MODELS: A REFLEXIVE MONITORING OF ADVISORY BODIES

Recently, Rich (1997) pointed out that a rationalist bias has dominated the literature on utilization of knowledge. Researchers assume that the use of information in decision making is rational (and to do otherwise, irrational) and that better decisions result from high levels of information input. This bias has led to the neglect of important issues. First, information may be collected for a variety of purposes (March & Simon, 1958, cited in Rich, 1997). Second, negative and unintended consequences may arise from the use of information (Dunn, 1983, cited in Rich, 1997). Third, ignoring available information may be fully rational (Calvert, 1985, cited in Rich, 1997). To avoid this type of bias, our framework defines knowledge as an entity that may be ambiguous, that is gradually constructed through the interaction of competing knowledge claims, and that evolves according to the maturation process of the issues at stake, often through negotiation between stakeholders. Huberman (1989, p. 7) used the term “transactional” (or constructivist or conflict-theoretic) for a simi-

lar perspective in which knowledge is individually, collectively, and strategically reconstructed in ways not necessarily faithful to its original form. In accordance with this definition, advisory bodies have much to learn from examining how the knowledge they provide is assimilated or contested by “users,” and how it is combined with other kinds of information and integrated into a change process. Even though advisory bodies may be ready to examine their influence, “relatively little work has been done in supporting institutions in their quest to better understand themselves and their performance” (Lusthaus et al., 1997, p. 84). Our idea is therefore to extend a self-assessment process, as defined by Lusthaus et al. (1997), to a continuous monitoring process of the changes knowledge producers may trigger in their environment. We explain below why this avenue seems justified.

BEYOND INFORMATION TRANSFER: COMMUNICATION

The influence of advisory bodies can be likened to three metaphorical views pervading the literature on communication technology, as identified by Sfez (1992). First, like a *machine*, communication can be understood as a mechanical phenomenon. The sender produces a clear message, makes it go through the right channels of communication, and the receiver passively assimilates it. Second, like a *living organism*, communication can be situated within a system of interdependencies in which the senders’ and receivers’ reactions and actions gradually shape both the message and the rationale behind the communication. Actors are aware of the interdependence between the sender and the receiver and tend to adapt their messages and interpretations according to their understanding of the other parties involved. Third, as in the narcissistic story of *Frankenstein* where a man creates his double, communication sometimes becomes meaningless because messages are no longer sent to be shared or debated, but solely for the sake of creating messages. Communication thus loses its aim and becomes strictly self-referential.

Instructive parallels can be drawn between these metaphors and approaches to measuring the influence of advisory bodies. Some studies have assumed that the implementation of the conclusions of a scientific report depends on effective information transfer. Following the machine metaphor, a report has a linear, non-temporal impact on an isolated target. This image reflects the conceptual model most often used when assessing the impact of a specific form of HTA, such as consensus conferences (Ferguson, 1993; Kaluzny, 1990;

Kanouse et al., 1989; Lomas, 1991; Wortman, 1988). Typically, a consensus statement is analyzed as a well-defined message moving along relatively direct paths to the intended decision makers (i.e., physicians). The impact assessment then attempts to determine the percentage of targets the message reached and its assimilation. Furthermore, the recommendations stemming from such studies are also moulded by the projectile metaphor. If the message is not received by the right recipients or by a sufficient number of recipients, it implies that the communication channels need to be either increased in number or more accurately targeted. And if the message is not received clearly or is received at the wrong time, it implies that accompanying “noise” needs to be reduced and timing of transmission better identified. For instance, Kanouse et al. (1989) suggest writing concise recommendations adapted for clinical practice and giving broader media coverage to consensus conferences for a longer period of time.

Such recommendations are not superfluous, but neither are they empirically satisfying.¹ They do not clarify the action and communication mechanisms conditioning the impact of consensus conferences (Weill, 1990). Their primary aim is to identify the information physicians consider relevant, as well as their information-gathering routines, in order to “send the right information through the right channels.” Nonetheless, the observed minimal impact of clinical practice guidelines (another specific form of HTA) revealed the limitations of the targeted projectile model. As described by several authors (Deber, 1989; Greer, 1986; McKinlay, 1981; Setbon, 1993; Weill, 1990), processes of decision and policy making and professional practices are complex, and change requires more than a mere transfer of rational information.

Communication (e.g., sharing each other’s views) rather than simple information transfer better depicts how actors’ perceptions and positions condition the utilization of scientific advice and knowledge. Accordingly, the organism metaphor provides a starting point to clarify the complexity of communication about claims of scientific knowledge. Following this metaphor, the influence of knowledge producers is conceptualized as a flow of interactions through learning loops (De Carlo, 1996). A single learning loop characterizes a system observing its own historical evolution and regulating its behaviour to achieve specific objectives (i.e., a homeostatic process). A double loop characterizes a system capable of questioning its objectives, modifying its organization, setting new goals, and creating

new means of problem solving. For example, with a double learning loop, an advisory body could gather information explaining the lack of impact of its reports and use this new understanding of the situation to modify its structure, document additional dimensions of the problem, and suggest the creation of a politically legitimate steering committee.

Lastly, the Frankenstein metaphor offers a caveat for measuring the influence of advisory bodies, especially to HTA practitioners wishing to assess the impact of their own HTA agency. Searching for impact runs the risk of going in circles, blindly pursuing narrowly defined, short-term impact objectives. Pressure for such impact could lead an agency to avoid initiating assessments of topics seen as too controversial to be “positively influenced” (i.e., medically assisted suicide) or, on the contrary, lacking adequate visibility (i.e., rare and under-studied diseases). Following the Frankenstein metaphor, care must be taken to avoid evaluation solely relying on superficial impact indicators and easily measurable objectives (dollars saved, hospital admissions prevented, reduction of working days lost due to hospitalization, etc.). Such an impact evaluation would lose sight of its aim: to enhance organizational performance of advisory bodies by identifying, developing, and testing new methods and approaches to knowledge production and dissemination.

Accordingly, the development of a monitoring system for advisory bodies that goes beyond a self-assessment process by integrating attributes of an external impact assessment approach seems justified for two reasons. First, evaluating the influence of HTA reports and products requires reflexivity, for example, the ability to examine oneself critically (Hammersley & Atkinson, 1983). The term “reflexivity” emphasizes the contrast between a lenient self-evaluation and an introspective learning process motivated by a willingness to bring substantial changes to one’s organization (double learning loop). A monitoring system would establish a critical structure for advisory bodies to appraise their role within their institutional environment, and consequently define desirable changes in their structure and processes.

Second, HTA influence relies on the translation of normative scientific conclusions by sociopolitical means (Cabatoff, 1996). These normative conclusions typically define (explicitly or implicitly) what “ought” to be done through standards, practice guidelines, or quality benchmarks (Lehoux, 1995c). Actual change, however, is socio-

political. It requires an understanding of the mechanisms that endow some decision makers with the authority to decide what should be changed and how, and the dynamics by which various actors lose or gain prestige, financial resources, cognitive authority, and professional autonomy as a result of change (Lehoux & Blume, in press; Lomas, 1993b). These sociopolitical dimensions of HTA have generally been avoided or negatively perceived by evaluators (Banta & Andreasen, 1990; Gutzwiller & Chrzanowski, 1986; Kanouse et al., 1989), perhaps due to the scientific rationalism that dominates the field of HTA coupled with the predominantly epidemiological training of many evaluators. Nonetheless, the effective implementation of HTA's normative recommendations depends heavily on both how decision makers interpret and act on the results of assessments and how they react to pressures from other actors (Hailey, 1993; Hailey & Crowe, 1993; Weiss, 1991). A monitoring system would offer an entry point into identifying and understanding these sociopolitical processes (Dahl, 1989; Vincent, 1992).

In summary, a monitoring system and a self-assessment model share the belief that advisory bodies should use and develop their "internal knowledge" of the context and constraints in which they operate. And, like an external impact assessment model, the monitoring system probes the value-added contribution that such bodies bring to the governance of society.

INCEPTION OF HTA AGENCIES AND WHY BOTHER ABOUT THEIR IMPACT

The establishment of the Office of Technology Assessment (OTA) by the Congress of the United States at the beginning of the 1970s is the often-cited event marking the inception of the field of HTA. Even though OTA closed in 1995,² the field has pursued its expansion in other industrialized countries. During the last 10 years, the impact of HTA agencies has been a topic of growing interest (Battista et al., 1994, Bos et. al, 1996; Hailey, 1996; Jacob & Battista, 1993; Jacob & McGregor, 1997). For example, in a report prepared by the Coverage Subgroup of the EUR-ASSESS Project, the following observations were made with regard to the diffusion of invasive cardiology therapy (ICT) in five European countries: "There is no uniform system, and no single source of information, for the establishment of ICT coverage policy decisions. The information provided by HTA studies represents just one tool in a group of interacting forces" (Bos et al., 1996, p. 39). Such interest in impact stems from striking

changes in HTA institutional environments since the early 1980s. First, the governments of many industrialized and developing countries have substantially increased their support of HTA. Second, the number of institutions and people involved in HTA has grown markedly³ (Banta & Perry, 1997). Third, a strong international network has emerged in the field of HTA⁴ (INAHTA, 1997).

Thus, while marked by some resistance and questioning, a wide process of institutionalization of HTA seems to be taking place. As HTA has moved into positions of increasing prominence, it has had to interact more frequently with other policy streams and perspectives. In the context of budget cuts that characterize the late 1990s, HTA agencies, like other government bodies, are increasingly confronted with questions of accountability, cost-effectiveness and “real world” value added (Albaek, 1996).

In this article, although we are concerned with helping agencies “perform better,” our view is that impact is not automatically positive (i.e., rationing health care is problematic), that multiple effects can ensue from the adoption of an HTA report’s findings, and that measurement of impact should be accompanied by a thorough reflection on what the influence of regulatory science means for the governance of society (Cozzens & Woodhouse, 1995). Because HTA agencies can play a crucial role in shaping public policies in health care and in developing knowledge about several under-studied dimensions of technology, their contribution should be examined.

A FRAMEWORK FOR CLARIFYING HTA PATHWAYS OF INFLUENCE

We follow two steps to develop our monitoring system. First, in the following pages, we describe a framework synthesizing important organizational and environmental factors that facilitate or impede the influence of HTA. Second, we expose a monitoring strategy informed by this framework which focuses on actors’ views and socio-political changes surrounding the dissemination of HTA reports (in the second part of the article).

With very little cross-fertilization between fields of research, the literature on HTA impact has made similar observations to those stressed by scholars in the field of knowledge utilization. From the latter, Rich (1997) summarized seven observations from diverse empirical studies that emphasized the assumptions behind the in-

put/output model to measuring knowledge utilization. In Table 1, grouped under seven attributes of knowledge use, we list both the observations summarized by Rich and the statements found in HTA literature explaining why HTA does not influence decision and policy making in a straightforward manner.

These two overlapping sets of observations help to define a framework which aims to chart the cascade or interplay of actions and decisions between an HTA agency and its institutional environment with the ultimate effect of altering (or not altering) current practices (see Figure 1). As mentioned earlier, the primary mandate of HTA agencies is to provide information and knowledge on specific health technologies, often upon formal requests from the minister in charge (generally the health minister or, as in Quebec, the minister of science, research and technology) or representatives of regulatory and professional bodies. Figure 1 shows that an HTA agency generally

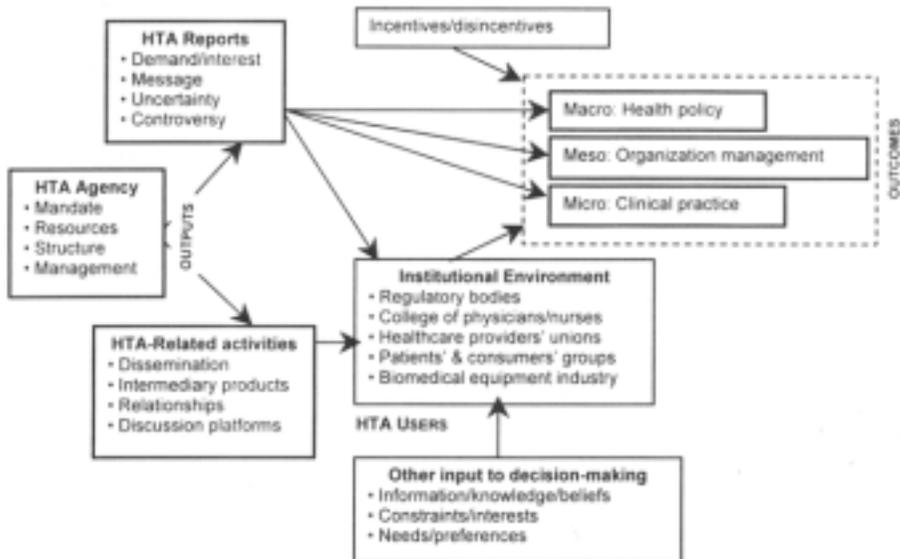
Table 1
Partly Overlapping Observations on Knowledge Use

Attributes	Knowledge utilization field (Adapted from Rich, 1997)	HTA field
Prediction	It is almost impossible to predict the effects of knowledge on a particular policy or decision.	An HTA report has to carry a discernible "message" (Jacob & McGregor, 1997).
Usability	Users have to be able to abstract utilization processes from overall problem-solving processes.	Knowledge about health technology can be ambiguous, while decision and policy makers prefer clear-cut answers (Deber, 1989; Hailey, 1993, 1996).
Role	Problem solving is affected by many variables other than information (ideology, work environment, demographics).	HTA is not the only input to decision and policy making (Bos et al., 1996; Deber et al., 1994, 1995; Lomas, 1991, 1993b).
Processes	A decision does not represent a single event; decisions are inscribed in a series of events that lead up to them.	Dissemination strategies are as important as HTA results themselves (Bero et al., 1998; Lomas, 1991, 1993b).
Attribution	It is impossible to attribute an action to the dissemination and application of specific pieces of information.	Incentives or the removal of disincentives are often required for HTA to have an impact (Battista et al., in press; Lomas, 1991).
Outputs	Knowledge produces effects, not a single effect.	Multiple effects may arise (Lehoux, 1997).
Traceability	Use is not always tied to a particular action or choice.	It may take years before a report shows a measurable impact (Buxton & Hanney, 1996; Jacob & McGregor, 1997).

disseminates full technology assessment reports, technical briefs, and updates on prior reports. These scientific products may reduce uncertainty regarding the merits of medical interventions or clarify the benefits and costs of implementing state-wide public health programs. An agency's staff may also engage in HTA-related activities such as attending scientific meetings (also seminars, peer-reviewed publications), supporting the production of clinical guidelines, organizing consensus conferences or expert panels, and communicating findings and expertise to the general public (press conference, media communication) (Battista et al., 1995). Thus, in our framework, "intermediary products" refers to entities that do not strictly correspond to a scientific output, but rather to a knowledge-based product that can easily be appropriated by potential HTA users for accomplishing their tasks or delivering services (clinical guidelines, methodological rules of thumb, ethical standards, etc.).

Within this framework, HTA reports and related activities aim to shape an institutional environment consisting of a large number of actors (manufacturers, planners, health care professionals, administrators, decision makers, patients) engaged in a variety of interactions (commercial activity, medical practice, health care

Figure 1
Pathways of Influence of an HTA Agency



management, health behaviours) and motivated by different interests (Lehoux, 1997). These actors may be generally considered potential HTA users, if “contesting” is defined as a certain kind of use (i.e., biomedical equipment manufacturers may challenge a formal assessment of a new technology). Obviously, their decisions are not only shaped by HTA reports, their preferences, needs, constraints, beliefs, and other sources of information will contribute to the decision- and policy-making processes (Blanpain, 1986; Durieux et al., 1988; Weiss, 1991). Health care providers and health administrators certainly have the most direct influence on health technology adoption, use, and diffusion. However, specific interest groups, including patients’ and women’s health groups and professional bodies, often influence decision makers and health care professionals (Setbon, 1993). In addition, such groups communicate their messages (which may directly oppose HTA findings) through various media outlets, further enhancing their influence. For instance, media coverage of “waiting lists” has been a powerful factor in accelerating decision making with regard to coronary artery bypass grafting (CABG) in Canada, the Netherlands, and Sweden (Battista et al., 1994, p. 408). As underscored by Gelijns (1991), the biomedical equipment industry also greatly influences clinical practice and decisions to adopt technology. Although evaluators are not usually concerned with R&D or marketing processes, they have powerful effects on the conditions affecting the acceptability of assessments, particularly to health care practitioners (Budrys, 1986; Deber et al., 1994, 1995; McKinlay, 1981). In fact, “many decisions concerning the use of a technology involve more than one decider and are often the result of the interaction between two or more” (Jacob & McGregor, 1997, p. 69). This is why it is warranted to include as “users” individuals and groups that are likely to reject, reformulate, or counterargue HTA report conclusions.

Lastly, studies that measured the *outputs* and outcomes of technology assessment have focused on three decision-making levels regarding technology use: 1) *micro*: medical practice (Gutzwiller & Chrzanowski, 1986; Lomas, 1991, 1993a); 2) *meso*: hospital/organization management (Durieux et al., 1988; Jacob & McGregor, 1997); and 3) *macro*: health policies (Battista et al., 1994; Hailey, Cowley, & Dankiw, 1990; Hailey & Crowe, 1993). For any given technology, its cost and the setting where it is used determine which of these levels is the most crucial for intervening in technology use (Battista et al., 1999; Greer, 1986). For instance, the use of routine chest x-rays is more amenable to clinical guidelines (micro), whereas the acquisi-

tion of costly medical imaging equipment (i.e., positron emission tomography) can be largely controlled by the government (macro). Indeed, single-payer systems (Canada, Sweden, and UK) offer an easily identifiable “client” for HTA compared with multiple-payer systems (Battista et al., 1994). At each level, however, technology adoption and use is influenced by many other factors, such as financial, administrative, legal and political *incentives* or *disincentives* (Battista et al., 1999; Lomas, 1990).

Thus, in this framework, the contribution of an agency is subdivided into two categories: 1) *outputs* correspond to the production of HTA reports and HTA-related activities; and 2) *outcomes* are associated with the influence of outputs on three decision-making levels. We also assume that, globally, efforts by the agency to promote an evaluation culture through HTA-related activities are likely to facilitate receptiveness of actors to future assessments.

The second step in the development of a monitoring system is described in the next section. We expose a monitoring strategy informed by the framework of the pathways of influence and illustrate the ways in which it could help improve the organizational performance of HTA agencies.

TOWARD A CONTINUOUS MONITORING SYSTEM

In October 1991, Quebec’s Ministry of Health and Social Services requested an external evaluation (Price Waterhouse, 1991) of the mandate and publications of the Quebec Health Technology Assessment Council (Conseil d’évaluation des technologies de la santé [CETS]). The scope, quality, and usefulness of the assessment reports were, in most cases, noted to be highly satisfactory by a sample of Quebec health care system decision makers. In addition, the overall financial and health-related benefits were believed to confirm the cost-effectiveness of maintaining such a governmental agency (Jacob & Battista, 1993; Jacob & McGregor, 1997). The CETS experience is typical of the general tone of evaluations of HTA agencies (Battista et al., 1995; P.A. Research Consultants, 1993). Unless clearly unfavourable, the conclusion of this type of evaluation of HTA is to “continue doing what you are already doing.”

We believe that it is possible and highly desirable to push the reflection on the contribution of advisory bodies to public policies and practices further by giving them the resources to implement a sys-

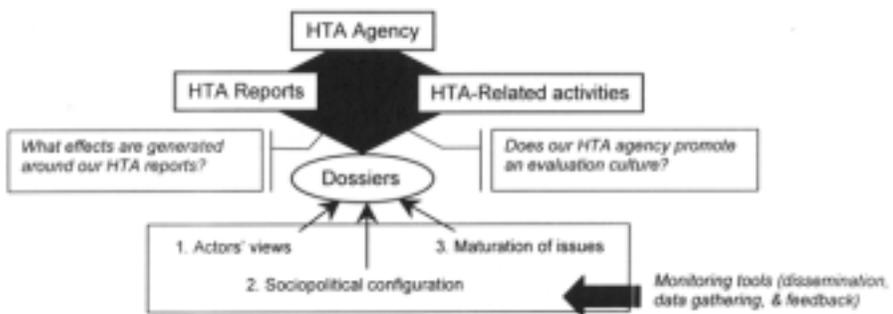
tem of continuous monitoring of their influence on their environment. The goals of such a process would be to better understand: first, how an assessment report generates “effects” and on which actors; and, second, how an assessment agency grows as an institutional agent, instilling an evaluation culture in its environment. Therefore, a monitoring system would document: 1) the actors’ views on the value of a given technology; 2) the sociopolitical configuration in which a report is disseminated; and 3) the maturation process of the issues at stake (Lehoux, 1997).

Overall Strategy for a Continuous Monitoring System

Actors’ Views

The influence of HTA agencies is tightly linked to a persuasive “process of imitation” (see Figure 2), a process by which decision makers from regulatory bodies, hospitals, community health centres, and private clinics understand and agree with the message (Jacob & McGregor, 1997) conveyed by the content of HTA reports and adapt their policies or practice to such a message. It also implies that disincentives or barriers to change have been removed and that other (less powerful, vocal, or visible) actors agree and comply with the change (Lomas, 1993a). An assessment may spark conflicts among actors if the definition of the problem and the proposed solutions differ from what they consider desirable. An HTA report and its related dissemination products will often compete (or be congruent) with other claims made by promoters, manufacturers, physician

Figure 2
Monitoring System



users, or patients about the value of the technology (Melkers & Roessner, 1997). These claims may generate fears, cognitive dissent, conflict of interest, or value clashes. Thus, documenting the evolution of actors' views would help the agency to identify points of disagreement and potential areas of negotiation more clearly.

Sociopolitical Configuration

Because of the variety of actors and the objective of an assessment being to shape their decisions and behaviours, the actors can be seen as part of a sociopolitical configuration. Before an assessment is completed, the technology is often already a structuring part of actors' relationships (Cabatoff, 1996; Weiss, 1991). It is a resource, promoted and used by certain groups of actors, that shapes particular relations between them (commercial partnerships, leading market position, clinical innovation, patient dependence). Hence, any evaluation exercise should not only focus on HTA reports but also explore the complex dynamics of the broader entity that we call a "dossier." A dossier includes the initial definition of the problem associated with a technology, the actors' network where this technology is promoted and used, previous knowledge about the technology and alternative procedures, the HTA report itself, and other assessments (Lehoux, 1995a; 1995b). In this respect, a monitoring system should consider the configuration in which the assessment report, the assessed technology, and the actors reside. It should address questions such as: Who has gained or lost? Approved or disapproved? Wielded authority? And felt deprived or threatened? The objective of documenting such configuration is to identify (and try to anticipate) the dynamics that cause a given assessment to gain or lose credibility in a sociopolitically structured environment.

Maturation of Issues

The concept of dossier takes into account the time-related dimensions of the influence of HTA; a dossier matures as knowledge evolves and political settings change (Melkers & Roessner, 1997). The technology being assessed also evolves, competing solutions may emerge, and the new range of alternatives will often affect the initial parameters of assessment (i.e., numbers of potential patients, costs, clinical indications of use, etc.). Over time, the content of scientific reports is confronted or combined with knowledge and arguments referring to other dimensions (social, ethical, legal) of the technol-

ogy (Greer, 1986). Therefore, both actors' views and sociopolitical configuration should be seen as subject to change in a partly-shared process of reappraisal of the situation. An agency would learn a great deal by following over time, and documenting explicitly, how issues are negotiated and settled among actors.

Thus, our continuous monitoring system focuses on the above three characteristics of the environment in which the findings of HTA reports are disseminated. In addition, since a monitoring system should help an agency improve its organizational performance, we suggest it serves three functions: 1) information dissemination, 2) data collection, and 3) feedback (see Table 2). The three functions could be performed simultaneously or in parallel, repeated over time when necessary, and targeted at more than one dossier. Table 2 shows

Table 2
Examples of Monitoring Tools

Dissemination of agency reports & activities	Data gathering on anticipated/actual influence and actor views & satisfaction	Feedback on both influence & lack of influence
Web site*	"Dossier diary"	information
Executive summaries	Initial plan for disseminating/ monitoring a dossier at the onset of an assessment	
Press conference		
Regular meetings with key organizations*	Collecting the views of the experts involved in the peer-review process on the potential influence of the report	
Coordination/steering committee	Mail questionnaire on the contribution of a prior report	
Local clinical champions	Practice survey (including competing technology)	
Update on a prior report*	Phone interviews with decision and policy makers (including patient associations, manufacturers)	
Letter to the editor*		
Announcing future assessments	Popular and specialized press reviews	
Annual Report*	Reader satisfaction, needs, constraints	
News Bulletin*	Topics prioritizing	
	Citation index	
Educational activities to build recipient capacity*	Keeping track of user profiles, & sources of	

(**Could be part of dissemination tools marked with *)

that a flexible monitoring system could use a variety of instruments including mail questionnaires, practice surveys, interviews with key actors, patient satisfaction instruments, focus groups, citation indexes, and press reviews. In the case of assessments involving a major change in clinical behaviour, using more proactive tools such as a Steering Committee chaired by a clinical opinion-leader would be relevant (Lomas, 1993a). Effective monitoring likely requires that several tools be used in conjunction. Since some assessments may target practitioners or other decision makers who have received previous reports, when disseminating a new report the agency can include a questionnaire to determine how a previous report was received. Or again, when sending a follow-up questionnaire on a recently published assessment, an update of a previous report can also be included. Finally, giving feedback to clinicians and policy makers (news bulletin, seminars, letters to the editor) about the influence of an assessment can be extremely helpful for building partnership and trust (Bero & Jada, 1997).

The monitoring system therefore relies on two assumptions: 1) the prevailing sociopolitical configuration, at a given point in time, shapes an HTA report's influence; and 2) an HTA agency's ability to educate and help organize its environment is an important vehicle for its overall influence. Accordingly, two types of influence can be monitored.

First, longitudinal monitoring tailored to each assessment should regularly gather information on policies, decision-making processes, actor views, and the status of competing technologies. This requires specific monitoring during dissemination and for some time thereafter. The relationship of an HTA report to its environment can be characterized as one of either turbulence or continuity (see Figure 3). Turbulence occurs when the conclusions of an assessment report and the positions of actors portend conflict. By contrast, continuity occurs with report conclusions easily compatible with current actor opinions. Both the conclusions of the HTA report and the position of actors could be dichotomized as "The present state of affairs must be changed" or "The present state of affairs must not be changed." Figure 2 assumes that turbulence would result from conflicting positions between HTA report recommendations and actor views, continuity from synergistic positions.

For an HTA report, "changing the present state of affairs" would mean calling attention to the insufficient availability of equipment, the possibility of achieving savings through a new practice, or iden-

tifying excessively large variations in current practice profiles. By contrast, an HTA report supporting “no need for change” would conclude that the equipment allocation is sufficient or a particular innovation should not be reimbursed by third-party payers because of great uncertainty or lack of demonstrable effectiveness in health outcome terms. With respect to actor positions, “changing the present state of affairs” might lead to the acquisition of new equipment or a commitment to reduce differences between practice profiles. For actors, “maintaining the present state of affairs” reflects adherence to current practices or reservations about new practices. Although actor views are rarely homogeneous, a dominant position generally emerges.

The influence of HTA is likely to be greater in the case of synergistic positions (either maintaining or changing the present state of affairs), e.g., continuity between actor views and HTA report conclusions, even though this implies that “no change” is an indicator of impact (an agreement not to change). Turbulence does not necessarily mean status quo or that changes cannot be made. Rather, it underscores a substantial disagreement between evaluation and actor positions that calls for further knowledge and discussion. HTA could show impact in a situation of turbulence, although this might require time, additional studies, and negotiation among actors. According to Figure 3, changes in the sociopolitical configuration during dissemination or after formal dissemination may result in turbulence yielding to continuity or continuity being overwhelmed by turbulence.

On the one hand, continuity implies that the actors have agreed on the statement of the problem addressed by the dossier and can act together to resolve it. Indicators, such as the number of procedures

Figure 3
Situations of Continuity and Turbulence

	HTA report conclusion	Actor views and actions
Turbulence	Change is required	No change is required
Issues require more definition	No change is required	Change is required
Continuity	Change is required	Change is required
Solutions are possible	No change is required	No change is required

invoiced or discrete decisions (purchases, reimbursements), used in combination with qualitative methods (policy analysis, case studies, interviews with key informants) describe the significance and extent of the influence (Jacob & McGregor, 1997). The monitoring system should, at the same time, be able to identify economic, health, organizational, market, social and political effects (described further), and shifts in the positions of actors.

On the other hand, in a situation of turbulence, certain actors may try to downplay or discredit the conclusions of an assessment report. Monitoring tools (follow-up committees, press conferences, surveys, interviews) must then endeavour to gather information about the sociopolitical situation that will help the agency restate the problem and move the debate forward. The impact of the assessment focusses on identifying a problem situation and framing further discussion and research. Significant influence would then include increased awareness of the problem and agency efforts to initiate, clarify, and guide the debate. Conditions hindering the implementation of the recommendations should be identified in order to “put the ball back in the court.” Turbulence definitely calls for political skills, and an agency must thus deepen its understanding of the environment and its ability to forge and maintain a legitimate position despite conflicts between the stakeholders (Chelimsky, 1997).

Second, HTA agencies have a global influence in the health care system as knowledge producers and disseminators. The range of communication activities by which an assessment agency instills an evaluation culture in its environment should be reported in its annual report. Indicators reflecting different levels of influence and recognition (international, national, regional, local) include scientific papers, training seminars, and conferences. Semi-directed interviews with key informants (representatives of professional bodies and patient associations, policy makers, manufacturers) that focus on the need for assessments and constraints in using them would help prioritize assessment topics and enhance communication and educational activities. Keeping track of the list of individuals and organizations who requested reports and identifying how they were informed of the publication of these reports would help define the “audience” of the agency and how the interest for HTA evolves over time and issues.

These two types of monitoring activities should be integrated as much as possible into the flow of the agency’s routine (Lehoux, 1995a,

1995b). Additional resources would of course be useful. Actually, several Canadian funding agencies are aware of the need to increase dissemination activities, and resources are available to this end. In small- to medium-sized HTA agencies, an evaluator (or someone with a background in health research and specialized training in communication) could devote part of his/her time to monitoring the influence of agency dossiers. With the help of semi-structured forms, all evaluators could regularly note the activities in which they participate, those in which they are invited to speak, the audience reached, and the main observations made by key participants. In a “dossier diary,” evaluators may collect information over the course of the development of each assessment to help anticipate what dissemination activities prove successful, as well as a potential monitoring strategy. The potential influence of a given report could therefore be made more explicit right from the onset of the evaluation process. Finally, the results of most monitoring activities could be regularly shared with evaluators (in a brief bimonthly meeting) to keep them informed of the progress of dossiers with which they are less familiar.

To summarize, the monitoring system examines both the influence of assessments and the sociopolitical environment in which they evolve. By describing current practices and defining underlying uncertainties and conflicts more explicitly, monitoring encourages relevant actors to discuss and identify parts of the solutions.

A VARIETY OF EFFECTS TO TAKE INTO ACCOUNT

The description of the monitoring system has remained general so far. However, the choice of “impact indicators” is extremely important. In this section, with a few examples, we explain why it seems more instructive and perhaps less risky for HTA agencies to make use of a variety of measures of influence.

Interplay between Costs and Change in Clinical Practice

In the current context of public budget cuts, HTA agencies often conceive of their impact in terms of expense rationalization (Buxton & Hanney, 1996; Garber, 1994). In our opinion, the danger lies in measuring the impact of assessment solely in financial terms. For financial impact to be truly meaningful, a change (upwards or downwards) in resource allocation needs to be commensurate with the

appropriate use of the assessed technology (Blanpain, 1986). However, resource allocation alone is not an indicator of appropriate technology use, as increased allocation may be necessary, and reducing historically allocated resources is often difficult (Evans, 1984). Furthermore, by assessing the financial impact of adopting an assessment's recommendations, an agency may endorse a role for technology assessment as a control on health expenditures. Even though some HTA agencies may be given such a mandate, other aspects of technology use require a broader notion of HTA.

In addition, all medical technologies cannot be directly regulated by controlling resource allocation; intermediate linkages between the assessment and clinical practice are often at play. For instance, the CETS study of regional variations in the rates of various elective surgeries (CETS, 1996) concluded that concerted efforts among the specialists and the referring physicians were required to reduce variation and called for professional self-regulation mechanisms such as guidelines and peer reviews. Once the extent of these practice variations was described and discussed, both political mechanisms (committees, agenda setting, consensus, follow-up) and financial mechanisms had to be implemented before practices would be suitably modified.

In another example, practice guidelines on the use of contrast media in radiology were published by the College of Physicians of Quebec (CPMQ, 1991) based on CETS recommendations. Two reports by the CETS had quite clearly identified the large cost differential between the two types of contrast media and shed important light on ethical considerations associated with a total or partial substitution of the contrast media currently in use (CETS, 1990a, 1990b). In addition, the guidelines also clarified the legal conditions of selectively using high- and low-osmolarity contrast media. As a result, both radiologists and hospital administrators were willing to initiate policies establishing selective use — radiologists gave assurance that this practice was legally above reproach and hospital administrators were interested in optimizing available financial resources. The mechanisms involved were professional self-regulation (assisted, in this case, by an economic incentive in the form of hospital savings) and a linkage between actors, because change by one required the agreement or support of the other.

Lastly, initiating desired changes may require consideration of mechanisms other than regulatory interventions in the health care

sector. For example, the question of re-using biomedical devices (pacemakers, catheters) (CETS, 1991, 1997) can be dealt with by R&D mechanisms in the biomedical equipment industry. Should the design of devices be modified to make their re-utilization safer? Can prices of catheters be negotiated? Would a post-marketing monitoring process be implemented for gathering more information on device performance and shortcomings? (For detailed discussions of other examples see Bos et al., 1996; Buxton & Hanney, 1996; Hailey, 1996; Jacob & Battista, 1993; Jacob & McGregor, 1997.)

In short, in order to reflect the dynamics that influence technology use, it is important to view the impact of HTA through mechanisms other than the mere financial regulation of technologies. Simply emphasizing cost containment as a measure of impact fails on two counts: 1) it presumes that resources can be reduced/re-allocated without health or social consequences; and 2) it threatens the development of HTA, because manufacturers and health professionals are unlikely to give credence to assessments if HTA agencies pride themselves solely on decreasing manufacturer revenue or provider income.

What Effects? When Do They Occur?

We suggest that HTA reports bring about six types of effects through the individual and collective actions of various actors, including some not directly affected by the reports (see Table 3). As mentioned above, the *economic effects* attributable to implementing an assessment's recommendations translate into increased or decreased specific health care expenditures (Evans, 1984). An overall change in spending is sensitive to the unit cost of a technology, the substitution for or addition of other procedures, the number of interventions per person, and the population served. However, how resources will actually be used remains at the discretion of planners, administrators, and practitioners. In addition, various cost-benefit models can estimate the costs associated with expected or measured health gains from specific health care services.

Early detection and prevention of cancer, home care for individuals who are insufficiently autonomous, and prevented post-operative complications are all positive *health effects*. Conversely, the anxiety caused by false-positive screening tests is a negative health effect. *Organizational effects* arise from implementing new programs that are responsive to community needs, sharing expensive technologies,

coordinating health care organizations, and increasing or changing care delivery. *Market effects* are principally documented in the United States literature, where group purchasing, service contracts, equipment leasing, and technical support are among payer strategies for minimizing costs and increasing services offered by technology vendors (Barlett Foote, 1986). *Social effects* include changes in access to services for individuals in remote areas, maintaining policies that

Table 3
Types of Effects

Category of Effects	Examples
ECONOMIC	<p>Decrease/increase in direct and indirect costs Decrease/increase in opportunity costs Change in funding mechanisms Transfer of expenses (public to private)</p>
HEALTH	<p>Mortality and morbidity Quality of life Therapeutics indications Disease and trauma prevention</p>
ORGANIZATIONAL	<p>Centralization and enhancement of know-how and skills Institutional coordination and competition Intensity of care Patient-management process Creation of innovative programs Reinforcement of teaching and research</p>
MARKET	<p>Corporate profitability Professional income Negotiations for group purchasing After-sales service and technical support Warranties and standards Trade balance</p>
SOCIAL	<p>Accessibility to services Equity Victim blaming Public education and information</p>
POLITICAL	<p>Legislation Confidentiality of information Application of democratic principles Consultation Accountability Policy transparency</p>

minimize inequities, and educating the public about health (Charles & De Maio, 1993). Intensifying research and teaching and disseminating knowledge also belong to a set of “collective goods” that assessment can promote (Contandriopoulos, 1994). Finally, *political effects* are linked to resource allocation decisions, disclosure of private information, enhancement of ethical standards, and a greater emphasis on accountability for professional behaviour and the expenditure of public funds (Roy, Dicjens, & McGregor, 1992).

By paying attention to these six types of effects when assessing the influence of HTA agencies, different parts of the general HTA role in their environment can be delineated. Furthermore, when measuring such effects, three issues should be considered. First, HTA reports often exert influence in *conjunction* with the intervention of individual and institutional actors who support and promote the findings of assessment reports (Hailey & Crowe, 1993). Such interactions should be documented as explicitly as possible in the monitoring process. On the other hand, assessments that receive no support and are manifestly disputed by several actors can have *counter-effects*. As an illustration, an assessment supporting the re-use of hemodialyzers (CETS, 1991) could trigger the adoption of this practice by many hospitals. However, clinicians and administrators would have to discuss the local relevance and feasibility of re-use and develop organizational policies. In other hospitals, patients disputing the safety of re-use may have created an environment unfavourable to adopting this practice, which could even affect the practice of re-using other types of biomedical devices. Thus, a larger view on intended and unintended effects should be adopted (Rich, 1997). Third, effects occur in different *time frames*: immediately after the assessment is disseminated, after a period of maturation, or with recurrent incentives. Political activities or unforeseen events (death, fraud) may act as catalysts, accelerating or disrupting the adoption of an assessment's recommendations (Melkers & Roessner, 1997). A monitoring system should therefore accommodate the supervision of a dossier over a long period of time, despite the apparent stasis of the situation.

CONCLUSION

The growing interest in the use of scientific advice in policy making serves as the background for this article. Articulate observers such as Jasanoff (1990) underlined the perils associated with the increased use of regulatory science in the governance of modern states. Since

the 1960s, numerous advisory bodies have been effectively established — some have since been abolished while others have gained vigour. By producing knowledge on the efficacy, costs, safety, and ethical, social, and legal issues of health technologies, HTA agencies could play an important role in shaping public policies. They could also become instruments in the hands of the government (Faulkner, 1997). In this article, however, we suggest that their contribution to decision and policy making follows multiple pathways. An examination of their influence is not only challenging but necessary. HTA agencies, whose purpose is to promote the appropriate use of technology in health care systems, operate in a highly complex environment. Without a keen understanding of this environment, their ability to make a valuable social contribution is diminished. As Jacob and McGregor put it: “failure to make any attempt to assess the impact of HTA is clearly inconsistent with the concept that decisions should be evidence-based” (1997, p. 68).

This article’s primary claim is that the normative function of HTA and its impact on society and the health care system must be more closely examined. We have described a range of effects, measurement of which will enable agencies to better understand the implications of their normative function and to identify the complexity underlying the role of HTA. We have also described a monitoring system, emphasizing the usefulness of monitoring tailored to each assessment report and monitoring agency HTA-related activities. In situations of turbulence, the emphasis will be placed on agency efforts to define a resolvable problem and, in situations of continuity, on its participation in implementing effective solutions.

Developing a continuous monitoring system with information dissemination, data gathering, and feedback functions is certainly a demanding task. First, it suggests that HTA producers initiate research activities and use tools with which they are not familiar. Indeed, the proposed sociopolitical concepts and methods differ from the epidemiological arsenal, which emphasizes accurately identifying the causal relationships between medical interventions and health outcomes. Nonetheless, because the influence of HTA research findings occurs within a social world, tools from the social sciences are highly appropriate. Second, a monitoring system requires additional resources. In fact, a monitoring system should not preclude formal external assessments. We believe that such an investment will prove useful in the long run for the agencies themselves and for the health care system.

Because our monitoring system combines attributes of self-assessment and external impact assessment models, it could be adapted to monitor similar advisory bodies by following the two steps described. First, by replacing in the “framework of pathways of influence” the factors specific to the health care sector with appropriate institutional actors and regulatory bodies, one could chart the main links between an advisory body and the potential users of the knowledge it produces. Second, a specific monitoring system based on a modified framework would aim at: 1) making clearer how diverse interacting forces influence the dissemination of scientific reports and produce different types of effects in a given jurisdiction; 2) defining a range of monitoring activities that are useful for enhancing the organizational performance and dissemination strategies of the advisory body; and 3) carefully selecting impact indicators because of their significance for the future development of the advisory body. In sum, monitoring scientific knowledge utilization presents stimulating challenges and, when addressed from a broad sociopolitical perspective, may provide the seeds for continued growth and increased contribution of knowledge producers.

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NOTES

- 1 Huberman (1989, pp. 8–9) suggests that there are two dominant ways of defining and measuring knowledge utilization. First, the “instrumental” or “imperativist” perspective holds that “scientific knowledge is gradually transformed into more prescriptive forms as it enters the user’s setting.” One robust finding of this line of inquiry lies in the correlations between the “types or intensity of dissemination of research findings” and the measured “effects on targeted users.” Second, the “constructivist” or “transactional” or “conflict-theoretic” perspective stresses that knowledge is reconstructed individually and/or collectively in ways that do not automatically correspond to the knowledge-producers’ aims. According to Huberman, this second line of inquiry was able to more fully ex-

plain how “sustained interactivity” — a construct central to the imperativist perspective — was empirically effective in predicting the level of knowledge utilization. He therefore argues that “looking with both eyes,” e.g., using both models to explain knowledge utilization, by using a two-layered conceptual frame would capture a sharper picture of the phenomenon of knowledge utilization.

Similarly, we feel that the metaphors of the projectile and the organism could be used jointly to highlight complementary dimensions of the dissemination, assimilation, and appropriation of knowledge. The projectile shares affinities (type and intensity of dissemination means) with the “imperativist” perspective, whereas the organism reflects some dimensions (subjectivity, social interaction, intentionality) of the “transactional” perspective.

- 2 In 1981, only three years after its inception, the National Center for Health Care Technology (NCHCT) was similarly closed under pressure from the Health Industry Manufacturer’s Association and the American Medical Association (AMA) (Perry, 1982, p. 1098).
- 3 The International Society of Technology Assessment in Health Care (ISTAHC) held its first annual meeting in 1985 with 16 countries represented. Today, more than 1,100 (individuals, institutions and corporate) members are drawn from over 40 countries. The *International Journal of Technology Assessment in Health Care* was also first published in 1985.
- 4 An International Network of Agencies for Health Technology Assessment (INAHTA) was established in 1993. It now includes over 28 organizations from 16 countries and is aimed at the promotion of HTA (training, dissemination, organization) and the development of joint assessments on selected topics (INAHTA, 1997).

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