International Journal of Technology Assessment in Health Care, 28:3 (2012), 220–227.

doi:10.1017/S0266462312000438

HEALTH TECHNOLOGY REASSESSMENT OF NON-DRUG TECHNOLOGIES: CURRENT PRACTICES

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Objectives: Obsolescence is a natural phase of the lifecycle of health technologies. Given increasing cost of health expenditures worldwide, health organizations have little choice but to engage in health technology reassessment (HTR); a structured, evidence-based assessment of the medical, social, ethical, and economic effects of a technology, currently used within the healthcare system, to inform optimal use of that technology in comparison to its alternatives. This research was completed to identify and summarize international HTR initiatives for non-drug technologies.
Methods: A systematic review was performed using the terms disinvestment, obsolescence, obsolete technology, ineffective, reassessment, reinvestment, reallocation, program budgeting, and marginal analysis to search PubMED, MEDLINE, EMBASE, and CINAHL until November 2011. Websites of organizations listed as members of INAHTA and HTAi were hand-searched for gray literature. Documents were excluded if they were unavailable in English, if the title/abstract was irrelevant to HTR, and/or if the document made no mention of current practices. All citations were screened in duplicate with disagreements resolved by consensus.
Results: Sixty full-text documents were reviewed and forty were included. One model for reassessment was identified; however, it has never been put into practice. Eight countries have some evidence of past or current work related to reassessment; seven have shown evidence of continued work in HTR. There is negligible focus on monitoring and implementation.
Conclusions: HTR is in its infancy. Although health technology reassessments are being conducted, there is no standardized approach. Future work should focus on developing and piloting a comprehensive methodology for completing HTR.

Keywords: Technology assessment, Biomedical, Health services research, Biomedical technology, Health planning

Obsolescence is a natural part of the lifecycle and use of all health technologies. With limited resources, health organizations are noting the value of reassessing potentially ineffective, wasteful, and obsolete health technologies with the possibility of redirecting funds to technologies which could provide greater clinical effectiveness, better quality of care, and improved public health.

The term "disinvestment" has been used to describe the removal of funding based on ineffectiveness (Table 1). This term assumes that the result of the process will be the removal of funding. The goal of health technology reassessment (HTR) is a transparent and reasoned process preceding an evidence-informed decision. An optimal HTR process would ensure that technologies used in clinical practice are based on the best available research and have been critically and fairly evaluated. The outcome of HTR may be a change in scope-of-use, removal from practice, or no change in use. Ideally, funds saved will be reinvested in the system. This reinvestment could be used to motivate change in the clinical community.

This work was supported by a grant from Alberta Health and Wellness. The content herein does not reflect the views or opinions of Alberta Health and Wellness.

Currently, no systematic review of international HTR initiatives is available in the literature. There are, however, several nonsystematic reports summarizing various international initiatives including mainly Australia, England, and Spain (13;27;41). The most extensive work completed in 2009 by the Center for Health Economics Research and Evaluation in Australia reports the HTR activities in England, Denmark, Scotland, Spain, and Australia (6). Notably, this work does not include the United States, Canada, Sweden, or many other European countries with known current HTR activity. The purpose of this study is to systematically review the current and past international HTR initiatives for non-drug technologies.

METHODS

A systematic review was conducted of literature published until November 2011. The terms *disinvestment, obsolescence, ineffective, reassessment, reallocation, program budgeting* and *abandoned* were searched in CINAHL, EMBASE, PubMED, MEDLINE, and the Health Technology Database (Appendix 1). MeSH headings were used where applicable. References from included studies were hand-searched to identify further literature for consideration.

Table 1. Definitions

Health Technology Disinvestment: The complete or partial removal of a health technology based on evidence that it is clinically ineffective and/or financially inefficient
Health Technology Reassessment: A structured, evidence-based assessment of the clinical, social, ethical & economic effects of a technology currently used in the health care system, to inform optimal use of that technology in comparison to its alternatives.

Table 2. Inclusion and Exclusion Criteria

Inclusion criteria:
- The document must be published in English
- Title or abstract must make mention of some aspect of health technology reassessment and/or reinvestment
- The document must contain information relevant to either current practices or theoretical knowledge in health technology reassessment and/or reinvestment *of non-drug technologies*
- The document must have become available between January 2000 and April of 2011

Exclusion criteria:
- The document is only available in a language other than English
- Duplicate publications
- Title or abstract not relevant to health technology reassessment and/or reinvestment
- Material exclusively focused on program budgeting and marginal analysis (PBMA) or economic analysis without placement of such methods in the context of reassessment and/or reinvestment
- Case study documents reporting on a single reassessment without context within a model, framework or program
- Material centered on reallocation without emphasizing identification or prioritization or cost-ineffective technologies

In addition, a gray literature search was completed. Websites of organizations listed as members of International Network of Agencies for Health Technology Assessment (INAHTA) and Health Technology Assessment International (HTAi) were searched for presentations, working papers, or other gray literature. The terms used to search the published literature were also used to search these Websites. Only information published in English or with an English translation option was included.

During abstract review, documents were excluded if they were non-English, solely focused on economic approaches to reassessment, focused exclusively on reassessment of pharmaceuticals, or if the title/abstract was irrelevant to HTR. During full-text review, any form of literature (including but not limited to Powerpoint presentations, working papers, peer-reviewed literature, poster presentations, and memos) meeting the inclusion criteria (Table 2) were included. This review does not look at clinical guidelines or HTA reviews which may have resulted in the change of scope or removal of funding of a technology in use.

All documents were selected and reviewed in duplicate (L.L., F.C.) based on inclusion criteria (Table 2), and any discrepancies were resolved through discussion and consensus. A kappa statistic for inter-rater agreement was calculated for full-text review of the published literature. Data were extracted from documents using a standardized data extraction form. The identified frameworks and practices are each summarized in a narrative.

RESULTS

The published literature search identified 482 abstracts (Figure 1). Of these, 435 were excluded and 47 proceeded to full-text review. Four additional articles were identified through hand-searching. After full-text review, sixteen were excluded because they were deemed irrelevant to this review; eight had a sole focus on the economic processes of reassessment and, therefore, were excluded; one was a case study but had no mention of a model or current practices; one was duplicate data; and four were excluded because they exclusively focused on health technology assessment. Seventeen published articles were found to be relevant and were included in this systematic review (3;11;12;14;17;18;20;22;23;25–28;32;39;42;51). The kappa for inter-rater agreement was 0.72.

Thirty gray literature documents were reviewed in full-text. Of these, eleven were found to be irrelevant to this review and were excluded. There were nineteen documents from the gray literature (including power point presentations, seminar reports, memos, and working papers) that were included in this systematic review (4–10;13;19;21;24;29;31;33;38;41;43–45).

Current Practices

Eight countries were identified as having an active HTR program (Table 3). Of those, seven indicated an ongoing interest in HTR activities. Currently, there is only one incomplete model to guide the reassessment process. The programs in each country are summarized below.

Australia. There are multiple organizations involved in HTR in Australia. A coordinated approach to HTR is absent; some of the organizations involved in HTR activities in collaboration with other initiatives while others seem to be doing work in isolation. Although several groups have HTR within their mandate, there is often little knowledge transfer about what progress is being made.

National Level. Although both the infrastructure and need exist for reassessment in Australia at the federal level, HTR activities appear to be infrequent. There are three main groups involved in HTR: the Pharmaceutical Benefits Advisory Committee (PBAC), the Medical Services Advisory Committee (MSAC), and Health Policy Advisory Committee

https://doi.org/10.1017/S0266462312000438 Published online by Cambridge University Press

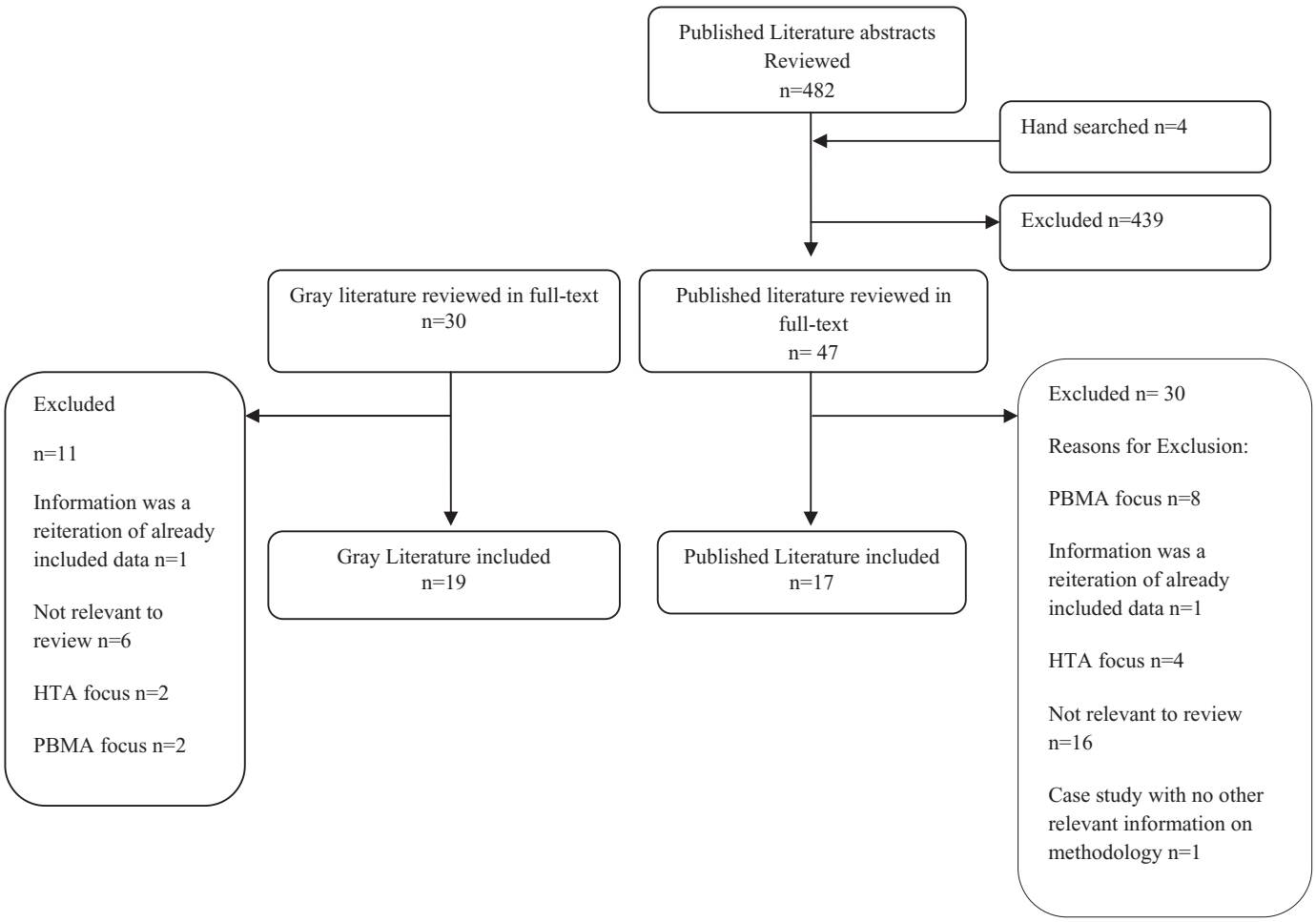

Figure 1. Inclusion flow chart.

Table 3. Overview of Current Practices

Country	Level of activity	Most recently documented activity	Evidence suggesting that HTR will be a focus in the near future?	Proposed model?
Australia	National and regional	2011	Yes	No
Denmark	National	2005	No	No
Norway	National	2010	Yes	No
Scotland	National	2011	Yes	No
Spain	Regional	2011	Yes	Yes
Sweden	National	2011	Yes	No
England	National	2011	Yes	No
United States	Private organizations	2011	Yes	No

for Technology (HealthPACT). However, only MSAC and HealthPACT will be discussed here as PBAC focuses solely on pharmaceuticals.

MSAC was established in 1998 to "...improve health outcomes for patients by ensuring that new and existing medical procedures attracting funding under the Medicare Benefits Schedule are supported by evidence of their safety, clinical effectiveness, and cost-effectiveness" (30). Although this organization's mandate is more in line with HTA, some of their activities involve reassessment and reinvestment (6). MSAC has no formal strategies for carrying out HTR.

HealthPACT works in collaboration with MSAC and has HTR activities within their mandate (49). This body's role is to use horizon scanning as a means of assessing the safety, financial implications, and clinical benefits of both new and existing technologies (49). There is little evidence in the literature that HealthPACT is carrying out HTR-related activities.

Regional Level. Three states have shown evidence of HTR development; Victoria, Western Australia, and Queensland (48). The Victorian Policy Advisory Committee on Clinical Practice and Technology (VPACT) was formed as an advisory organization in 2004 by the Victorian Department of Human Services (1). As a part of the New Technology Program, VPACT was developed to conduct new and existing health technology assessments (1).

https://doi.org/10.1017/S0266462312000438 Published online by Cambridge University Press

VPACT's role ideally augments the national initiatives being taken by HealthPACT, by looking at the national issues with a local lens (50). VPACT has been criticized for not taking on a larger role in HTR (1).

The SHARE project was established in 2009 in response to a workshop lead by VPACT and the Victorian Department of Health (2007) (5). It is being led by a group from the Center for Clinical Effectiveness (5). Their areas of focus include developing processes and structures for decision making, improving information dissemination, and piloting the HTR process (5). An Evidence Dissemination Service is available through this project, however, no HTR model has been produced (47).

The group in Western Australia responsible for HTR-related work (the Western Australian Policy Advisory Committee on Clinical Practice and Technology) was established in 2006 (48). Their role is to assess both new and existing technologies in terms of financial and clinical effectiveness, to monitor the use of health technologies currently in practice, and to disseminate this information to stakeholders (48). There is little information on how this organization is fulfilling their mandate.

While Queensland does not have an HTR program, a 2010–2011 work-plan from the Queensland Policy Advisory Committee on New Technology (QPACT) proposes the development of a new coordinated body for HTR in Australia (40). The steps QPACT has outlined for implementing this program include the following: conducting stakeholder meetings to understand significant HTR barriers, identifying potentially obsolete technologies, prioritization of identified technologies, and ultimately, the creation of the Australasian Registry of Obsolete Health Technologies Evaluated for Disinvestment (40).

Denmark. In 2005, a conference abstract outlined a pilot project undertaken by the Danish Center for Evaluation and Health Technology Assessment (DACEHTA) on the improper use of imaging technologies (15). Beyond this abstract, there appears to be little evidence of HTR interest in Denmark.

Norway. The responsibility for completing HTR is not clearly defined in Norway and there is little evidence that a unified plan for HTR development exists. Several organizations are involved in the reassessment of potentially obsolete technologies (32). The Norwegian Council for Quality Improvement and Priority Setting in Health Care was established in 2007 and is a key player in the Norwegian reassessment process (37). They do not have regulatory power but are prominent in the discussion of HTR within Norway (33).

Scotland. The Scottish Health Technologies Group (SHTG) is responsible for reassessment and reinvestment initiatives (46). The SHTG provides advice to the fourteen National Health Service (NHS) Health Boards in Scotland and operates as a division of Healthcare Improvement Scotland (46). Historically, the SHTG has focused on assessing emerging health technologies through horizon scanning, with reassessment and reinvestment being a secondary function (46). However, recently, the STHG has shown increasing focus in reassessment and reinvestment (45).

A 2010 seminar led by the SHTG, entitled "The Disinvestment Challenge" shed light on several potential future directions for Scottish reassessment/reinvestment. Throughout the seminar, reassessment, and reinvestment were regarded as viable methods for ". . .minimizing waste, inefficiency, harms, and variation across Scotland" (45). HTR was seen as a necessary initiative for maintaining quality and sustainability in NHS.

A short-term disinvestment steering group, MaCSWise, was established in April 2011 (44). With the tagline "Making Choices, Spending Wisely," the intent of this steering group is to move SHTG and NHS forward in terms of reassessment and reinvestment (44).

Spain. Health care in Spain is delivered on a regional basis. As a result, there are seven HTA agencies in Spain, two of which have shown a commitment to the development of health technology reassessment and reinvestment: the Basque Office for HTA (OSTEBA) and the Galician Agency for HTA (Avalia-t) (25). Both of these agencies have been recently involved in the development of the HTR process. As outlined by Ravina et al., there are legal structures in place within Spain which aid in the promotion the HTR such as the Royal Decree 1030 which outlines that HTR should be undertaken when one of the follow take place: there is evidence of a lack of efficacy, effectiveness, or efficiency or unfavorable risk-benefit; the technology has lost healthcare interest due to a technological or scientific development or the technology no longer meets current legislation (41).

OSTEBA reports to and is funded by the Spanish Department of Health. Although primarily focused on HTA, this group has taken a considerable role in advancing HTR research and practice. In recent years, OSTEBA has firmly established itself as a global leader in the field of HTR.

OSTEBA has developed the first and only model currently available for the guiding the process of HTR. The document outlining this model became available in May of 2010, and has become known as GuNFT (Guideline for Not Funding Technology) (22). The GuNFT model divides HTR into five phases: identification, prioritization, assessment, decision making, and action plan, with a variety of sub-steps within each phase (22). The GuNFT report includes a suggested application form and a guideline that can be used to identify whether a technology is a candidate for removal from practice.

Avalia-t was established by the Galician Regional Government in 1999 (2). One of Avalia-t's key contributions to the field of HTR has been the development of the PriTec tool (2). This free online tool allows for side-by-side assessment of up to fifty health technologies; technologies are scored in terms of population/users, benefit/risk, and costs/other implications (2). No data are available on the use of this tool.

In 2008, Avalia-t and OSTEBA launched a project called "The Identification, Prioritization and Evaluation of Potentially Obsolete Health Technologies." As a part of this study, knowledge was sought from a variety of groups including a working group (formed from several Spanish HTA Agencies), a panel of experts and a team of technical staff (41). The goal of this research was to develop a guide for HTR which could be applied to the Spanish healthcare system on a national level (41).

Sweden. HTR primarily falls within the mandate of the Swedish Council on Technology Assessment in Health Care (SBU) (26). Established in 1987, this organization was launched by the Swedish Government in response to rising healthcare costs (26). Despite SBU's focus on HTA, one of the goals within their mandate is ". . .to obtain reliable scientific information on the value of established and new technology in medicine as a basis for potential disinvestment and priority setting in health care" (26). Although not using the term HTR, this independent group has long been conducting assessments on the use and potential obsolescence of health technologies (26). Based on their publications, SBU has primarily focused on the identification, assessment, and prioritization of potentially obsolete technologies. SBU does not propose a model for the completion of HTR.

England. The National Institute for Clinical Effectiveness (NICE) was launched in late 1999 with the goal of ensuring equitable healthcare delivery throughout England, Wales, and Northern Ireland (39). The launch of NICE's disinvestment program was spurred by a 2006 announcement of four national health agenda's: prevention, system inefficiencies, administrative waste, and clinical waste, with HTR falling into the last (13).

NICE has developed three methods for supporting the HTR process: technology appraisals, recommendation reminders, and commissioning guidelines (41). Recommendation reminders are released monthly and summarize any new recommendations for the use of an existing technology (7). The third HTR initiative, commissioning guides, are practical guidelines to help NHS commissioners carry-out NICE recommendations (35). Included in these guides are cost models which will allow commissioners to calculate savings and costs associated with a change in service (35).

NICE's "Do not do" list is a compilation of all of the technologies they suggest should not be used or should be used sparingly (36). There are currently over 800 technologies on the "Do Not Do" list (36). Based on the recommendations from this list, it has been estimated that NHS has incurred a savings of over £600 million (34).

NICE has a reputation for having transparent processes and engaging stakeholders (39). It is seen as a leader in the HTR field. However, NICE has been criticized for their bias toward new technology assessments and for poor uptake in the clinical community (7;13).

United States. HTR initiatives in the US began with an attempt to reassess and reinvest medical procedures through the 1976 Blue Cross/Blue Shield Medical Necessity Project in response to rising healthcare costs and resistance against escalating premiums (13). This collaborative project between the Blue Cross/Blue Shield and professional colleges resulted in seventy-six surgical and medical procedures being removed from coverage (13). There is no record of how/whether the money saved in this process was reinvested back into more efficient medical practices.

In a 2011 speech, President Barack Obama alluded to future work on HTR (16). He noted that the US ". . .will slow the growth of Medicare costs by strengthening an independent commission of doctors, nurses, medical experts, and consumers who will look at all the evidence and recommend the best ways to reduce unnecessary spending while protecting access to services. . ."(16).

A recently published article by Kale et al. reported on the findings of The Good Stewardship Group which identified health technologies which were common but provided little benefit (28). Technologies such as annual ECG's, imaging for back pain and routine bone density scans for younger patients were found to be unnecessary (28). They assessed the costs associated with these technologies and concluded that if the unnecessary use of the top five technologies was minimized, $5 billion could be saved (28).

Canada. Although Canada is well-established in the HTA field, there is no national approach to HTR. Several papers on HTR have been published by Canadian authors, but rather than discussing an overall model or framework, the focus has been on the economic aspects of the process; specifically program budgeting and marginal analysis (PBMA). Information on PBMA may be useful in informing the development of a Canadian HTR model, however, more literature and research is needed on what the broader process might look like in a Canadian context.

Currently, a HTR model is being developed for regional use in Alberta. This model will be available in 2012. It will be pilot-tested and subsequently used to reassess health technologies within Alberta.

DISCUSSION

The field of HTR is in its infancy. There is evidence in the published literature of eight countries engaged in active HTR. There is no complete model for reassessing health technologies and there is very little information on implementation and monitoring the resulting decision of a reassessment. Theoretical information is more prevalent in the literature than practical knowledge.

The first HTR challenge is to develop a realistic, evidence-informed process. In our opinion, the process must include at minimum five steps: identification, prioritization, evaluation, implementation and finally monitoring. For each step, a transparent process and methodology is required. The identification

of potential technologies could use a variety of already established tools such as horizon scanning, expert input and linking to current HTAs by adopting a "one-in-one-out" policy whereby for each new technology considered, the current technology is also considered. Prioritization of potential technologies could also draw upon exists tools for priority setting in healthcare resource allocation. Evaluation could mirror the process of a HTA adopting the lens of comparative effectiveness with expanded consideration of implementation, social, ethical, and legal barriers. Barriers such as resistance to change, balancing clinical, consumer, and political interests, sunk costs of human and financial resources, achieving consistent implementation and obtaining buy-in from stakeholders will become prominent once the implementation of an HTR model begins.

Countries have different methods of addressing issues such as stakeholder engagement, knowledge transfer, identification and prioritization of health technologies, and implementation. A standard, tested approach to HTR, developed through collaborations, would be an asset and may enable more countries to begin reassessing health technologies.

A common understanding of the goals of HTR is surprisingly absent. It must be made clear that HTR differs from disinvestment in that it does not assume the removal of funding and is not meant as a rationing tool. HTR must focus on more than obsolescence. Much of the literature focuses on removing obsolete technologies; however, this is only one focus for the HTR process. HTR should target optimal use of technology. This will include obsolete technologies in addition to technologies which are clinically ineffective or do not provide value for investment and effective but under-used technologies.

Our study design, as with all systematic reviews, is limited to the published and gray literature. While we have systematically extensively searched the published and gray literature, it is likely that activities in some countries may be missed. HTR may be ongoing in countries in nonacademic settings with no motivation to publish or release their on-going activities.

Our work, to our knowledge, is the most comprehensive and current synthesis of international initiatives in HTR. Others have published nonsystematic reviews of selected countries (5;13;27;41). Of note, our work includes the HTR activities in eight countries, three of which have never been reported before (Norway, Sweden, Scotland).

CONCLUSION

HTR holds great potential for improving the quality of patient care and healthcare sustainability. However, there are many challenges associated with HTR. This is not reason to avoid the process. Speaking to experts who are actively involved in this field would be a method of understanding the more practical aspects of HTR. Additionally, because the body of HTR literature is small, a focus on collaboration and communication between interested groups will be necessary to continue to build expertise and knowledge. The development of a comprehensive model that has been pilot-tested, monitored, and successfully implemented would be a significant addition to the field.

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CONFLICT OF INTEREST

Laura Leggett, Tom Noseworthy, Diane Lorenzetti, Lloyd Sutherland, and Fiona Clement report their institution has received a grant from Alberta Health and Wellness. Mahmood Zarrabi has no potential conflicts of interest.

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https://doi.org/10.1017/S0266462312000438 Published online by Cambridge University Press