UNIVERSITY OF CALGARY | FACULTY OF MEDICINE

Health Technology Reassessment and Reinvestment: A Systematic Review of Current Practices

Leggett, L., Zarrabi, M., Sutherland, L., Noseworthy, T., Clement, F.

UNIVERSITY OF CALGARY | FACULTY OF MEDICINE

Contents

DEFINITIONS

HTR – Health Technology Reassessment – A structured evidence-based assessment of the medical, social, ethical and economic effects of a technology currently used within the healthcare system, on the healthcare system, individuals and society, to inform optimal use of the technology in comparison to its alternatives.

Reinvestment – The process of investing savings resulting from changes in practices or scope of use elsewhere within the healthcare system

Disinvestment – "...the process of (partially or completely) withdrawing health resources from any existing health care practices, procedures, technologies or pharmaceuticals that are deemed to deliver little or no health gain for their cost, and thus are not efficient health resource allocations."[8]

Obsolescence – "The end point in the life cycle of a health technology (occurs when a new technology supersedes the old)."[13]

HTA (Health Technology Assessment) – "The systematic evaluation of properties, effects or other impacts of health technology (the purpose of health technology assessment is to inform policy-making for technology in health care)."[13]

Health Technology – "A drug, device, medical procedure or surgical procedure and the administrative supportive system in which health care is delivered."[13]

Potentially Obsolete Technology - "Any technology identified in any one of a number of ways which appears to have been superseded by other available alternatives and whose possible obsolescence should be rigorously assessed."[11]

ORGANIZATION ABBREVIATIONS

Table 1: Organizational Abbreviations

Abbreviation	Full Name	Country
AHS	Alberta Health Services	Canada
ASTUTE	Assessing Service and Technology Use to Enhance Health	Australia
Avalia-t	Acronym used for the Galician Agency for HTA	Spain
CADTH	Canadian Agency for Drugs and Technologies	Canada
CCE	Center for Clinical Effectiveness	Australia
DACEHTA	Danish Centre for Evaluation and Health Technology Assessment	Denmark
HealthPACT	Health Policy Advisory Committee for Technology	Australia
HTAi	Health Technology Assessment International	Based in Canada
INAHTA	Network of Agencies for Health Technology Assessment	Based in Sweden
MaCSWise	Making Choices, Spending Wisely	Scotland
MSAC	Medical Services Advisory	Australia
NC	Norwegian Council for Quality Improvement and Priority Setting in Health Care	Norway
NCHCT	National Center for Health Care Technology	United States
NHMRC	National Health and Medical Research Council	Australia
NHS	National Health Service	UK, Scotland, Wales
NICE	National Institute for Health and	UK

	Clinical Excellence	
NOMA	Norwegian Medicines Agency	Norway
OSTEBA	Acronym used for the Basque Office for HTA	Spain
PBAC	Pharmaceutical Benefits Advisory Committee	Australia
QPACT	Queensland Policy Advisory Committee on New Technologies	Australia
SBU	Swedish Council on Technology Assessment in Health Care	Sweden
SHARE	Sustainability in Healthcare by Allocating Resources Effectively	Australia
SHTG	Scottish Health Technologies Group	Scotland
VPACT	Victorian Policy Advisory Committee on Clinical Practice and Technology	Australia
WAPACT	Western Australian Policy Advisory Committee on Clinical Practice and Technology	Australia

1.0 BACKGROUND

On a global scale, there is growing interest in Health Technology reassessment. All health technologies are susceptible to aging, and often become obsolete merely due to the passage of time. This obsolescence may stem from factors such as clinical ineffectiveness, safety concerns, poor benefit-for-value and/or the availability of a better option. The Canadian Agency for Drugs and Technologies in Health (CADTH) defines obsolescence as "The end point in the life cycle of a health technology (occurs when a new technology supersedes the old)."[13]

Health Technology Reassessment:

A structured evidence-based assessment of the medical, social, ethical and economic effects of a technology currently used within the healthcare system, on the healthcare system, individuals and society, to inform optimal use of the technology in comparison to its alternatives.

Once technologies become obsolete, they often fall into disuse passively. However, with limited resources, health organizations are beginning to note the value of actively removing ineffective health technologies in order to redirect those funds towards solutions that will promote optimal safety, clinical effectiveness, quality of care and public health. This is one organizational approach to optimize resources.

Health technologies often go into the system through a one-way door; funding is approved but rarely removed (except in situations where safety concerns arise). Although new technologies are funded as replacements of existing ones, there are few ways of removing an existing technology on the basis of inefficiency.

The term 'disinvestment' has traditionally been used to describe the removal of funding based on inefficiency. As Elshaug notes, disinvestment is 'The process of withdrawing health care practices, procedures, technologies or pharmaceuticals that are deemed to deliver little or no health gain for their cost…'[8] This term implies that at the onset of the process, the aim is to remove funding. Terms such as 'reallocation,' 'reassessment' and 'decommissioning' have also been used to describe disinvestment processes.

Rather than looking at disinvestment, this document focuses on Health Technology Reassessment and Reinvestment (HTRR). Unlike 'disinvestment,' HTRR does not assume that the end result of the process will be the removal of funding; the goal of HTRR is a transparent and reasoned process preceding an evidence-informed decision. The term, HTRR, highlights the importance of appropriate reinvestment as an essential element of the process. HTR is a structured evidence-based assessment of the medical, social, ethical and economic effects of a technology currently used within the healthcare system, on the healthcare system, individuals and society, to inform optimal use of the technology in comparison to its alternatives. In this context, reinvestment can be defined as the process of investing savings resulting from changes in practices or scope of use elsewhere within the healthcare system.

The outcome of HTRR may be a change in scope-of-use, the removal from practice or indeed, no change in use.

Technology reassessment processes have often come into focus during times of raising health care costs and sustainability concerns. The identification and reduction of health technology misuse or scope-of-use creep is one tool that can be used for achieving optimal functioning of a health care system. HTRR is a method of increasing the value provided by the health care system without increasing costs.

"[HTRR]…is a growing area of priority setting in health care that requires national and international perspectives, debate and collaboration'
-Elshaug[8]

HTRR is a multidisciplinary field. A multitude of factors must be taken into account when determining whether a health technology has reached the end of its lifespan. Clinical effectiveness, safety, redundancy, ethicality, and cost-effectiveness are a few facets that influence the overall efficacy of a health technology. These elements must also be considered in a HTRR evaluation.

The more mature field of Health Technology Assessment (HTA) is inexorably linked to the notion of HTRR, however, the distinction is important to highlight. HTA, a "...form of research that examines the clinical, financial and social consequences…from the use of any given technology"[11] focuses on the evaluation of new and emerging technologies, whereas HTRR is focused on the reassessment of technologies currently in use. Many Health Organizations have

associated HTA units; however, as of yet, there are very few groups showing explicit interest in HTRR, and even fewer have an active HTRR program.

2.0 POTENTIAL BENEFITS OF HTRR

An optimal HTRR process would ensure that technologies used in clinical practice are backed by up-to-date research and have been critically and fairly evaluated. For patients, this would mean that they are receiving the best available care given the resources available. For health care professionals, having concise, evidence-based information on health technologies should support evidence-informed decision-making. HTRR has the potential to make these improvements, while improving health care sustainability.

HTRR is about doing "…the right thing at the right moment in the right place."
-Basque Office for HTA[2]

A document produced as a follow-up to an Australian work-shop in 2007 outlines the following additional benefits that may arise from the HTRR process[14]:

- Increased patient safety
- Higher quality of care
- Optimization of available resources
- Increased accessibility of timely care
- Increased efficiency

- Potential savings from inappropriate health interventions
- Reduction of unnecessary referrals
- Ensuring only proven, clinically effective health interventions are in practice

3.0 OBJECTIVES

This review was performed to identify and summarize HTRR initiatives which are taking place, or have been undertaken in the past, and to synthesize current theoretical knowledge in the field.

4.0 METHODS

The literature search was conducted in collaboration with the Health Technology Assessment and Innovation Group at Alberta Health Services (AHS). AHS completed a literature search of published literature from January 2000 to April 2011 using the search terms *disinvestment, obsolete technology, ineffective, reassessment, reallocation, program budgeting* and *marginal analysis (PBMA)* on both PubMed and Medline. The University of Calgary Health Technology Assessment Unit completed a grey literature search. In this search, 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 grey literature. The same keywords were used in this search as those used by Alberta Health Services. Only information sources produced in English were searched.

All material found was reviewed and selected in duplicate (FC, LL) with any discrepancy being resolved through discussion and consensus. A kappa statistic for agreement was calculated.

The following exclusion criteria were used for both searches (grey and published):

- Unavailable in English
- Involving animals
- Title or abstract not reporting on reassessment and/or reinvestment
- Material exclusively focused on 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

5.0 LIMITATIONS

A lack of published information was a limitation in conducting this review. Most of the documents used were in the form of grey literature such as PowerPoint slides. Gleaning information from these types of sources is limiting because the verbal commentary is missed.

Similarly, data for each country was pieced together from a variety of sources. Due to the lack of available literature, corroborating information across numerous sources was often not possible. When possible, information was double-checked to ensure accuracy, however, often only one source would report on a particular aspect of a countries HTRR program development. This limitation will be addressed by an environmental scan of HTA agencies and a series of key informant interviews which will be conducted in the following months.

6.0 RESULTS

The published literature search identified 2,500 abstracts. Supplemented by the grey literature search, 60 documents were selected for full-text review, of which 20 were excluded. Forty documents were included in the final review.

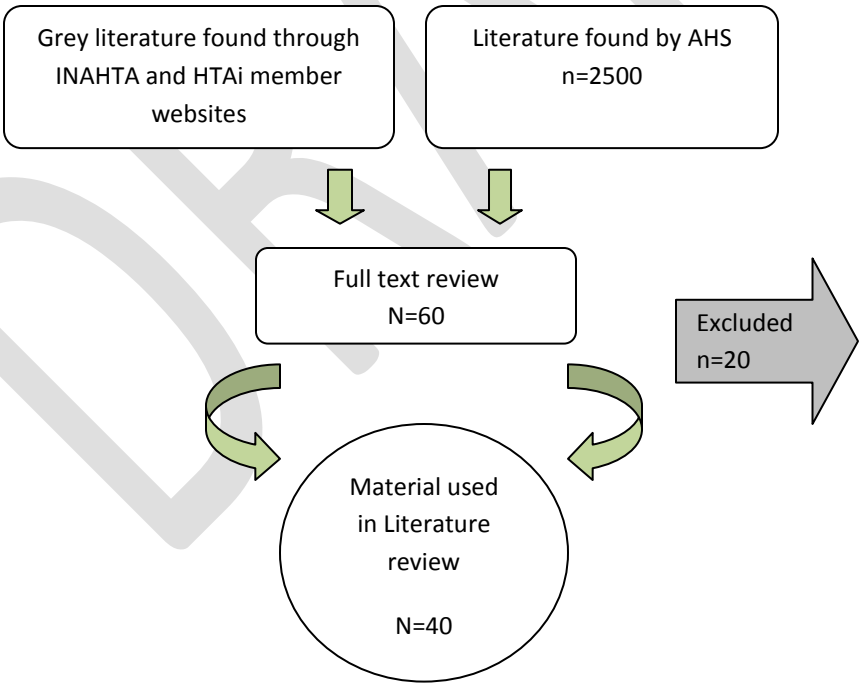


Figure 1: Flow Chart of Exclusions/Inclusions

Nine of the articles that were excluded based on full-text review were heavily focused on PBMA rather than the overall HTRR process. One was excluded because it was published before 2000, and therefore its applicability to current HTRR model development was debated. Two were excluded because the information they presented was a reiteration of information available in other documents that were already included. Two were excluded because they focused on HTA and had limited information on HTRR. And the remaining six were excluded because although their titles suggested relevance, the information they contained was not aligned with the goals of this document.

6.1 Theory

6.1.1 Overview

As the field of HTRR is relatively young, much of the knowledge is currently in the academic sphere and yet to be translated into practice. Among theoretically focused documents, there are a few significant pieces of research, and a multitude of thought-pieces. Available literature would suggest that a consensus is developing on the foundational phases of the HTRR process. Frequently discussed topics include: the identification of potentially obsolete technologies, prioritization of which technologies to assess, implementation and community uptake. The following will briefly outline what theoretical knowledge and research currently exist in disinvestment literature.

6.1.2 Identification of Potentially Obsolete Technologies

The starting point of the HTRR process is the identification of technologies which may be reassessment candidates. Given the number of technologies in use, this process can be complex. In their paper *Identifying Existing Health Care Services that do not Provide Value for Money*, Elshaug et al. identify twelve "Criteria for identifying existing, potentially non-cost-effective practices as candidates for [re]assessment"[15]:

1. New evidence
2. Geographic variations in care
3. Provider variations in care
4. Variation in volume over time
5. Technology development
6. Public interest or controversy
7. Because of consultation with health care practitioners
8. Individual nomination of a candidate technology
9. Funding of a replacement
10. Leakage (overuse)
11. Legacy items which have never been assessed
12. Conflict with current clinical guidelines

It is necessary to have a framework for identifying technologies, and similarly important to have sources from which to draw information for identification. An OSTEBA document outlines four sources that may be used for identifying health technologies for reassessment: biomedical literature, HTA reports, new and emerging technology databases and communication with clinicians.[11] They note that the first is the least useful given the immaturity of the field and therefore the lack of information commonly available in sources such as biomedical literature.

OSTEBA proposes the following process for using these sources to identify potentially obsolete technologies:[11]

1. Start with the oldest technologies
2. Seek the most recent standard treatment
3. Conduct a brief literature search to seek current information on the potentially obsolete technology
4. Corroborate the situation of these technologies in the service portfolio
5. Seek clinical expertise.

With so many health technologies in medical practice, this first step has the potential to be a time consuming one. As can be seen, there are proposals for how to identify potentially obsolete technologies yet there is no standardized method. Despite this, one thing commonly agreed upon is that when making reassessment and reinvestment decisions, it is imperative to have a transparent, structured and defensible process.

> *"Detection of potentially obsolete health technologies is a complex procedure which should be ongoing and conducted in a programmed, systematic manner."*
> *-Ravina et al.*[11]

6.1.3 Prioritization

Prioritizing which health technologies should be reassessed, is also a topic of debate in HTRR literature. Elshaug et al. touches on this subject, noting that technologies should be differently prioritized based on cost, available alternatives, disease burden, evidence-base, evidence development and clinical benefit.[6] Additionally, Mørland notes that the "…appraisals should be

based on the same criteria that are used for the introduction of new measures" in order to create a better flow of technology.[3]

Raviña et al reached out to a number of groups to understand their perspectives on the prioritization process of HTRR. By speaking with a technical team, a working group and a panel of experts, 10 prioritization criteria were divided into three larger umbrella topics[11]:

Population/end-user domain of prioritization	Risk/benefit domain of prioritization	Costs domain, organization and other implications
1. Disease frequency	1. Efficacy/Effectiveness/Validity	1. Efficiency
2. Disease Burden	2. Adverse effects	2. Maintenance costs
3. Frequency of use of Technology	3. Risks	3. Other implications
4. Patient Preferences		

Although there are criteria for HTRR prioritization available, it may not be ideal to use a framework that was developed for use in a different health care system.[7] It has been suggested that it might be better to develop these criteria and processes on a local level to ensure relevant contextual information is taken into account.[7] Demographic differences, health system structure and population values are a few such elements that may impact HTRR prioritization criteria.

In both the prioritization and identification phases of the HTRR process, difficult questions will be asked and crucial decisions must be made. As prioritization and identification are foundational to the HTRR process, it is important to have discussions on the decision-making framework used in these stages in order to ensure the process is well-based. It is also important to have a structured, transparent system for both.

> *"To ensure a maximally productive approach, any process for selecting health care practices with a view to evaluating them for displacement should follow a protocol with prespecified, transparent selection criteria"*
> *-Elshaug*[6]

6.1.4 Stakeholder Engagement

Although the HTRR process does not necessarily result in altered use of a health technology, that is one potential outcome. There is often hesitancy when faced with change, and as such, change management and uptake are topics of frequent discussion in HTRR literature. Without the acceptance of those involved, the HTRR process would be unproductive; stakeholder involvement is required to translate policy into practice. It is therefore necessary for health organizations to help facilitate the adjustment process.

Based on research findings, the GuNFT document proposes three actions take place in order to promote collaboration in the HTRR process:[16]

1. Provide patients with sufficient information regarding the reasons underpinning the decision
2. Provide health professionals who use the technology with the reasons underpinning the decision

3. Involve health professionals in the process of identifying and assessing whether a technology may be a suitable candidate for HTRR

HTRR will "…need broad public support at both the national and local level, with large-scale public engagement over the aims and means of health care" -Robinson[12]

There is a breadth of people that could potentially be impacted by the outcome of an HTRR process. These stakeholders include patients, industry, insurers, administrative staff, physicians, other health care professionals and society. Public involvement in decision-making presents a number of challenges unto itself; however this engagement is imperative to the success of HTRR. NHS Scotland adeptly summarized this by saying that "A cohesive, rational approach to [HTRR] will only be possible if all relevant stakeholders are engaged from the onset. Communication must be clear, honest and without jargon. The evidence supporting a decision…should be made widely available to foster understanding and acceptance."[4]

In a post-workshop survey, a question was posed to individuals who had previous experience with a reassessment project. They were asked what factors contributed to the success of the project. All four factors identified were based on stakeholder uptake and collaboration: generating consumer support, early engagement of staff, consulting specifically with staff known to resist change and gaining organizational/clinical support.[7] These responses provide evidence for the necessity of ongoing community collaboration during the HTRR process.[7]

Current literature highlights the importance of engaging stakeholders early and continuously throughout the process.[4;7;16] Elements of HTRR will inherently need to be driven from the top-down, but in order to be successful there must also be a focus on stakeholder engagement.

6.1.5 Implementation

Not only are the methods of decision-making still vague, so is the implementation process. Once a decision is made to remove a health technology from practice, or to change its scope of use, there are a number of implementation methods. Implementation methods are discussed further in the exploration of current practices (section 6.2). As HTA units have varying degrees of regulatory power, the methods of successful implementation vary. Some groups may have the regulatory power to ensure their reassessment findings are translated into policy. Others work on an advisory bases, so do not have that method of influence. This has often resulted in varying degrees of success and uptake.

Once a decision has been made regarding a particular health technology, the responsibility of HTRR implementation may lie in the hands of any number of individuals including, policymakers, stakeholders or health care professionals. Countries approach the implementation process very differently, and as such, there is no standard for who should be responsible for the implementation role. This has also resulted in varying degrees of success.

6.1.6 Monitoring

Surprisingly, although monitoring HTRR outcomes seems central to the process, there has been little documentation on this topic. The key reason for monitoring a process such as HTRR implementation would be to evaluate process and/or outcome success. However, the term

success has yet to be defined with respect to HTRR; there is no information in current literature about what criteria could be used to measure success in HTRR.

A report from the 2009 Australian SHARE workshop is one of the few documents to mention the monitoring of HTRR outcomes. They propose that four methods that could be used to assess HTRR success include:[7]

1. Budget impact
2. Staff satisfaction
3. Patient satisfaction and outcomes (rates of adverse effects ect)
4. Cross-campus comparison

6.2 Current Practices

6.2.1 Overview

Despite developing interest, there are few organizations actively involved in HTRR. Most of the organizations who explicitly state an interest in HTRR are groups which have been developed for the primary purpose of HTA.

Currently, there is only one formal model available to help guide the reassessment/reinvestment process (developed by the Spanish HTA group OSTEBA). However, the model proposed in Spain notably excludes major key considerations such as HTRR methodology, feasibility, implementation, and monitoring. The HTRR process has been carried

out in a number of countries including Sweden, Australia and the United States but formal models have not been developed as a result of these processes.

A significant gap exists in current HTRR documents, models and research; current HTRR research has targeted reassessment, with minimal focus on the reinvestment process. HTRR documents often emphasize the process for determining which existing health technologies are candidates for reassessment, but there is scant information on how to carry out the reinvestment decision-making process. This is an area where further research is warranted.

There is also a lack of information on the later steps of HTRR. As was seen in the theoretical literature, the steps leading up to action such as prioritization, identification and decision-making have been explored and reported upon in greater depth than those following implementation (such as monitoring).

Current Practices by Country

6.2.6 Australia

National Level

On a national level, there are two groups involved in HTA and HTRR in Australia – the Pharmaceutical Benefits Advisory Committee (PBAC) and the Medical Services Advisory Committee (MSAC).[5] Although all funding decisions are made by the Australian Minister of Health and Aging, these two independent bodies provide evidence-based guidance on what technologies are cost-effective, safe and clinically useful.[5]

> "…many currently implemented healthcare interventions diffused before well-defined standards of cost-effectiveness became a criterion for reimbursement and there are no systematic processes in place for disinvestment."
> -Elshaug[10]

PBAC

PBAC was established in 1954 under the Australian National Health Act to "…make recommendations and give advice to the Minister about which drugs and medicinal preparations should be made available as pharmaceutical benefits".[17] PBAC works with both new medications and existing pharmaceuticals. PBAC has the ability to assess and propose the withdrawal of funding from medications listed under the Pharmaceutical Benefits Scheme (PBS); a process similar to HTRR.[5] This group has developed the following criteria for removing a pharmaceutical from the PBS:[5]

1. The medication is not readily available
2. It has less benefit-for-cost compared to alternative medications available
3. It is not clinically effective
4. A better alternative becomes available
5. The medication is not meeting expectations in terms of efficacy

Although the above criteria are specifically targeted towards pharmaceuticals, the list could be adapted for use with technologies.

MSAC

Like PBAC, MSAC is a national-level organization. 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."[18] Although this organization's mandate is more in line with HTA, some of their activities involve reassessment and reinvestment. When a health technology is granted temporary approval by the Minister of Health and Aging, the MSAC has the ability upon reassessment, to advise against continued funding, thereby removing it from the health care system.[5] MSAC has stated no formal strategies for carrying out HTRR.

Although this formal body has been established to carry-out HTA and HTRR activities, only 3% of the items listed on the Medicare Benefits Schedule (MBS) have had evidence-based assessments.[19] Evidence-based assessment of items on MBS appears to be a priority for the Australian government who allocated $9.3 million toward putting in "…place a new evidence-based framework for reviewing services listed on the Medicare Benefits Schedule" in 2010.[5]

HealthPACT

HealthPACT (Health Policy Advisory Committee for Technology), a group working in collaboration with both MSAC and the Health Minister's Advisory Council, also has HTRR activities within their mandate.[20] Established in 2003, this national body's role is to "…assist the

introduction of new and emerging technologies…through horizon scanning.'[20] Their function involves assessing safety concerns, financial implications and clinical benefits.[20] In their evaluations, HealthPACT prioritizes technology assessments based on: clinical need, rate and pattern of diffusion, clinical impact, cost impact, efficacy and safety, ethical controversy and cultural issues.[21] Although HTRR falls within their scope, there is little evidence in literature that HealthPACT is currently involved in carrying out this type of work. HealthPACT lists one of their key challenges as maintaining ongoing reassessments of existing health technologies.[21]

Although Australia has the basic infrastructure in place to perform HTRR on a national-level, these organizations currently place most of their effort on HTA. Elshaug points out that a challenge for the Australian Health System is that "…many currently implemented healthcare interventions diffused before well-defined standards of cost-effectiveness became a criterion for reimbursement and there are no systematic processes in place for disinvestment."[10] There seems to be hesitancy (particularly within MSAC) to advise active reassessment and reinvestment; rather, technologies tend to fall passively into obsolescence. Although both the infrastructure and need exist for reassessment and reinvestment in Australia, HTRR has been infrequent.

> Australian HTA Organizations are '…stuck with the old and overwhelmed by the new.'
> -Elshaug[8]

Regional Level

At the regional level, there are a number of organizations exploring the topic of HTRR within Australia – many of which are HTA groups. At this level, the Victorian, Queensland and Western states have shown evidence of HTRR development.[22] There are a number of HTRR programs within these states and multiple organizations showing an interest in HTRR. Although some of these organizations are collaborative in their HTRR interest (e.g. the Victorian Health Department, Victorian Policy Advisory Committee on Technology and the SHARE project), others seem to be doing work in duplicate. A coordinated approach to HTRR is absent. Similarly, although a number of groups have HTRR within their mandate or list it as a goal, there is often little information about what progress is being made.

<u>Victoria</u>

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.[23] As a part of the New Technology Program, VPACT was developed in order to fulfill the role of new and existing health technology assessment.[23] Included in this role is the "…identification, prioritization, introduction, evaluation and ongoing monitoring…" of health technologies.[24] VPACT's role augments the national initiatives being taken by HealthPACT by looking at the national issues brought forth by HealthPACT with a local lens.[24] This organization has been criticized for not taking on a larger role in HTRR.[23]

In collaboration with VPACT, the Victorian Department of Health organized a disinvestment workshop in 2007 entitled *Future Directions of Health Technology Uptake, Diffusion and*

Disinvestment in Victorian Public Health Services[14]. The Victorian Department also hosted a subsequent workshop in 2009 which was held as a part of the SHARE (Sustainability in Healthcare by Allocating Resources Effectively) project.[7] Throughout this workshop, a number of HTRR topics were discussed including prioritization, implementation, challenges and stakeholder involvement.[7]

The SHARE project, which was established in 2009 in response to the 2007 workshop, is being led by a group from the Centre for Clinical Effectiveness (CCE).[7] The Victorian Health Department has agreed to fund this project over a three year period.[7] Their three areas of focus include: developing processes and structures for decision-making, improving information dissemination and piloting the HTRR process.[7] A key development from this project was the 2010 initiation of an Evidence Dissemination Service.[25] The goal of this tool is to increase information dissemination by offering staff reliable information on health technologies.[25] No HTRR model has yet been produced through this project.

Western Australia

Established in 2006, the Western Australian Policy Advisory Committee on Clinical Practice and Technology (WAPACT) is the HTA body for Western Australia.[26] This organization is "…responsible for considering and making recommendations on the application of new and existing technologies and clinical practices in Western Australian public health services and hospitals."[26] It is their role to assess both new and old technologies in terms of financial and clinical effectiveness, to monitor the use of health technologies currently in practice and to disseminate this information to relevant stakeholders.[26] There is little information on how this

organization is fulfilling their mandate and on whether they have implemented a process for assessing existing technologies.

Queensland

Although currently Queensland does not have an HTRR 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 HTRR in Australia. This document notes that "…in order to address the lack of a clear coordinating mechanism for disinvestment in Australia, a proposal has been put forward to develop a national registry/clearinghouse for the identification and prioritization of disinvestment activities, entitled the Australasian Registry of Obsolete Health Technologies Evaluated for Disinvestment."[27] This is proposed as a collaborative effort between HealthPACT and Queensland.[27]

A number of steps for the progression of this proposal have been identified. The steps outlined include: conducting stakeholder meetings to understand significant HTRR barriers, identifying potentially obsolete technologies, prioritization of identified technologies, and ultimately, the creation of the Australasian Registry of Obsolete Health Technologies Evaluated for Disinvestment. [27]

National	Regional

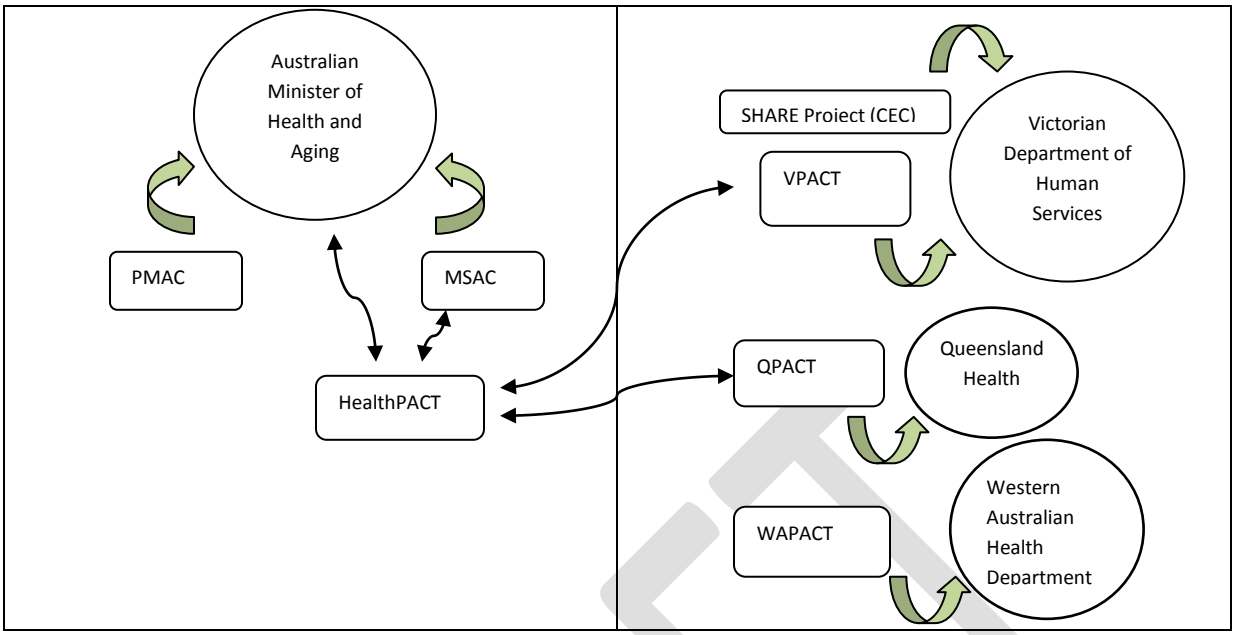


Figure 2: HTRR collaboration within Australia

ASTUTE

As a division of the Adelaide Health Technology Assessment group, the ASTUTE study (Assessing Service and Technology Use to Enhance Health) was initiated in 2009 under a grant from the National Health and Medical Research Council (NHMRC) of Australia.[5] ASTUTE is a three year study with HTRR as its primary focus.[5] The study "…aims to design, implement and evaluate a model to identify the social, ethical, political, economic and epidemiological factors that perpetuate the use of ineffective health care practices, and to test if practices can be disinvested."[28] By using case studies, this group aims to develop a functional model for HTRR within Australia.[28] The model has not yet been published.

Challenges to Overcome in the Australian System

In a 2007 paper entitled *Challenges in Australian Policy Processes for Disinvestment from Existing, Ineffective Health Care Practices*, Elshaug (2007) identified five deficiencies that may be inhibiting the progression of HTRR within Australia:[8]

1. Resources for HTRR
2. Lack of prioritization and identification mechanisms
3. Literature which provides evidence for HTRR
4. Funds for HTRR research
5. Few mechanisms for the removal of existing technologies combined with political, social and clinical barriers to removal

> *"While [HTRR] is a relatively new concept…there is already considerable knowledge and experience in Australia. Although significant work is being undertaken, it is usually in isolation. There are no standard methods, agreed approaches or shared understanding of what [HTRR] is and what it means…"*
>
> *-SHARE Workshop Report*[7]

6.2.3 Denmark

In 2005, a conference abstract by Frellsen and Kristensen was released outlining a pilot project undertaken by the Danish Centre for Evaluation and Health Technology Assessment (DACEHTA).[29] This project, conducted in 2004, had a particular emphasis on the improper use of imaging technologies and on the identification of potentially obsolete technologies. As part of the study, they used information collected from a literature review, and questionnaire results to determine how frequently chest x-rays were performed without indication.[29] Frellsen and Kristensen reported that 25% of internal medicine units performed chest x-rays when they

were not indicated.[29] They suggested that in an effort to "…prevent application of useless or maybe even harmful procedures, and at the same time optimize the utilization of the limited health resources," chest x-rays should only be performed when they are indicated.[29]

Beyond this abstract, there appears to be little evidence of HTRR interest in Denmark. Based on available literature, Denmark has shown little progression towards developing a significant HTRR program.

6.2.4 Norway

In the Norwegian health system, a number of organizations are involved in the identification and reassessment of potentially obsolete technologies.[3] The responsibility for completing HTRRs is not clearly defined and there is little evidence that a unified plan for HTRR development exists between organizations. As a result, the progression of HTRR in Norway appears fragmented.

> *"In Norway, we do not have general routines for determining which existing methods should be abandoned by the health service. Various players are involved in decisions to introduce and phase out methods …"*
> *-Mørland[3]*

Established in 2007 by the Norwegian Ministry of Health, the Norwegian Council for Quality Improvement and Priority Setting in Health Care (often referred to as NC) is a key player in the Norwegian reassessment and reinvestment process. NC's mission statement is to "…advise on decisions in health care concerning priority setting and quality improvement."[30] Although this organization does not have regulatory power, they are prominent in the discussion of HTRR within Norway. In a 2010

presentation, NC's reassessment of sleep apnea treatment highlights their interest in the HTRR field.[31]

In addition to the NC, the Norwegian Medicines Agency (NoMA) plays a key role in terms of pharmaceutical reassessment. This organization "…authorises and monitors pharmaceuticals, and contributes to the correct and economical use of pharmaceuticals.[32] This national-level organization deals with the monitoring of both new and existing pharmaceuticals.[32]

> "Disinvestment in NHSScotland has been patchy but current financial drivers and evidence accumulation now necessitates a more cohesive approach."
>
> -Feeley (2010)[4]

Another organization which is important to note is the Norwegian Knowledge Centre for Health Services. Although this group appears to primarily be interested in HTA's rather than HTRR, a number of individuals from within the organization have contributed to HTRR literature.

There is no evidence of a complete model for conducting HTRR in Norway at this time.

6.2.2 Scotland

Within Scotland, the Scottish Health Technologies Group (SHTG) is responsible for reassessment and reinvestment initiatives.[33] Working in an advisory capacity, the SHTG provides assistance to the 14 National Health Service (NHS) Health Boards in Scotland and operates as a division of the Healthcare Improvement Scotland organization.[33] Historically, the SHTG has focused on the assessment of emerging health technologies through horizon scanning, with reassessment and reinvestment being a secondary function.[33] However, recently, the STHG has shown increasing focus in reassessment and reinvestment.[4]

With the reassessment and reinvestment field being in its infancy in Scotland, there is no current evidence of an HTRR model being in place. However, the literature indicates that discussions on reassessment and reinvestment are taking place.

In a 2004 presentation, Scott identified four procedures routinely conducted in Scotland (tonsillectomy, dilation and curettage, varicose veins and grommet insertion) which, with successful HTRR, could result in the avoidance of 6,500 operations (17,000 operations were completed in 2003/2004).[34] Scott noted that the responsibility of HTRR in Scotland does not fall clearly to one organization, which creates a significant barrier in the development of a cohesive and useful HTRR program.[34] In response to this, the SHTG was identified as the agency to lead the Scottish HTRR agenda.

A 2010 seminar led by the SHTG, entitled 'The Disinvestment Challenge' shed light on a number of 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."[4] HTRR was seen as a necessary initiative for maintaining quality and sustainability in NHS.[4] Leadership and establishing clear direction were identified as major barriers in the development of a successful reassessment/reinvestment program.[4] To this end, it was agreed upon that "…clinicians should be able to generate initiatives locally with the knowledge that support will be given nationally."[4] Public misunderstanding of HTRR was also recognized as a potential barrier.[4] It was emphasized that transparency and communication will be an imperative piece of a successful HTRR program in

Scotland.[4] Trust and partnership between all stakeholders was emphasized as a key component to successful reassessment and reinvestment.[4]

As a result of this seminar, 'MaCSWise', a short-term disinvestment steering group was established in April 2011.[35] 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.[35]

6.2.8 Spain

Health care in Spain is delivered on a regional basis, and as such, it is divided into 17 autonomous systems. As a result, there are 7 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).[36] Both of these agencies have been substantively involved in the development of the HTRR process in recent years.

"…in Spain there is a statutory framework that envisages the possibility of obsolete health technologies existing and these being excluded from the service portfolio through withdrawal of funding."
-Ravina et al.[11]

Basque (OSTEBA)

Established in 1992, the Basque Office for Health Technology Assessment (referred to as OSTEBA), is one of the 7 HTA agencies in Spain.[2] This group reports to and is funded by the Spanish Department of Health. OSTEBA's mission is "To promote the appropriate use of health technologies in terms of safety,

effectiveness, accessibility, and equity, providing sufficient information for decision-making."[37] Although primarily focused on HTA, this group has taken a considerable role in moving HTRR literature and research forward. They also have within their remit, a goal to establish a framework for reinvestment and reallocation.

As outlined by Ravina et al., there are legal structures in place within Spain which aid in the promotion of HTRR. On a national level, the Royal Decree 1030 (2006) states that when any one of the following three cases occurs, HTRR should be considered:[11]

1. Evidence of a lack of efficacy, effectiveness or efficiency, or unfavorable risk-benefit
2. Loss of health-care interest as a consequence of technological and scientific development or failure to show its usefulness
3. No longer meets the requirements established by current legislation

In recent years, OSTEBA has firmly established itself as a global leader in the field of HTRR. Their work has evolved in four phases: identification process, prioritization and evaluation, use of a case study for testing purposes and ultimately the development of a hospital guide for HTRR.[5] Work is ongoing in all four of these phases.

In fulfillment of the last phase, OSTEBA has developed the first and only model currently available for the guiding the process of HTRR. The document outlining this model became available in May of 2010, and has become known as GuNFT (Guideline for Not Funding Technology).[16]

The GuNFT model divides the HTRR process into five key phases: identification, prioritization, assessment, decision making, and action plan, with a variety of sub-steps within each phase (Fig. 3).[16] Processes were developed for both regional/national level and local level HTRR. The GuNFT report includes a suggested application form to be used in the HTRR program, and a guideline that can be used to identify whether a technology is a candidate for removal from practice.[16] This guideline also includes suggestions for stakeholder involvement and information dissemination.[16] A free software program based on the GuNFT report has been developed to help health organizations facilitate the HTRR process.[36]

OSTEBA uses a number of means to disseminate the research they have conducted including literature, technical documents, newsletters, a website, press releases and educational opportunities.

Process to disinvest in existing health technologies at a regional or national level

Process to disinvest in existing health technologies at a local level

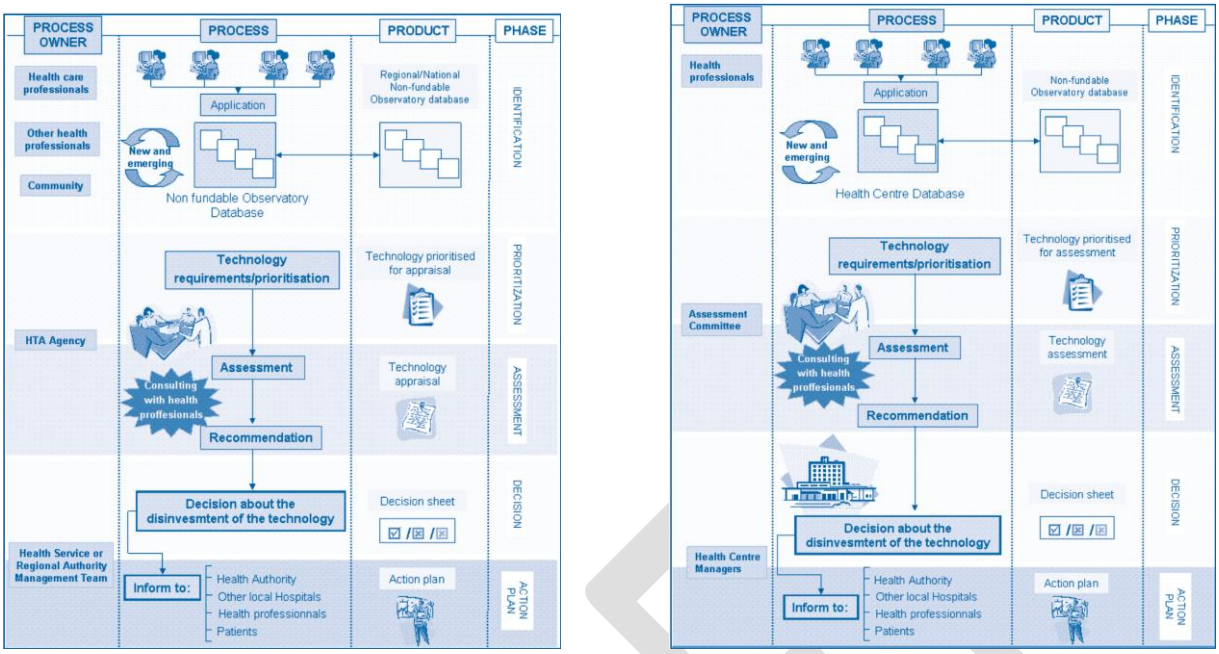


Figure 3: GuNFT Process (Reproduced with permission from the author)[16]

Galicia (Avalia-t)

The Galician Agency for Health Technology Assessment (Avalia-t) was established by the Galician Regional Government in 1999.[38] This group is a division of the Spanish Department of Health and one of the two HTA organizations involved in HTRR. One of Galicia's key contributions to the field of HTRR has been the development of the PriTec tool.[39] This free online tool allows for side-by-side assessment of up to 50 health technologies.[39] The technologies entered are scored in terms of population/users, benefit/risk, and costs/other implications - the criteria established in the OSTEBA/Avalia-t collaborative project.[39] There is no data available on the use of this tool.

Collaborative Efforts between Basque and Galicia

In collaboration with Avalia-t, a project on "The Identification, Prioritization and Evaluation of Potentially Obsolete Health Technologies" was launched by OSTEBA in 2008. A document of the

same name was published in 2009 which outlined the findings of the study.[11] This study was presented in three parts: Identification, prioritization and HTA of potentially obsolete technologies.[11] As a part of this study, knowledge was sought from a variety of groups including a working group (formed from a number of Spanish HTA Agencies), a panel of experts and a team of technical staff.[11] The goal of this research was to develop a guide for HTRR which could be applied to the Spanish Health Care system on a national level.[11]

The resulting documents outline the main sources for identifying potentially obsolete technologies, a method for prioritizing reassessment and a proposed structure for reporting reassessment results (Table 2).[11] It emphasizes the lack of information on HTRR, the complicated nature of prioritizing health technologies and outlines the necessity for concise and comprehensive reporting on reassessment efforts.[11]

1.	Information on potentially Obsolete technology
2.	Contextualization of potentially obsolete technology
3.	Consideration of technology as obsolete
4.	Level of scientific evidence
5.	Conclusions and recommendations
6.	Data sources and bibliography

Table 2: Summary of OSTEBA's propose structure for HTRR reports[11]

Challenges in Spain

In a 2008 presentation given by OSTEBA, a number of challenges were presented which might create barriers to the development of a successful HTRR system. Some of the challenges outlined include:[2]

- A lack of interest in collecting data on efficiency once technology is in practice
- Challenges associated with removing a technology based on ineffectiveness alone (rather than safety)
- Lack of understanding about obsolescence

6.2.5 Sweden

Within Sweden, HTRR primarily falls within the mandate of the Swedish Council on Technology Assessment in Health Care (SBU).[9] Established in 1987, this organization was launched by the Swedish Government primarily as a HTA assessment group due to the rising costs of health care.[9] Despite SBU's focus on HTA, one of the goals within their mandate is also "…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."[9] Rather than cost-containment, they have focused their efforts on a multidimensional understanding of the effectiveness or obsolescence of health technologies and consider reassessments from "…medical, economic, ethical and social standpoints," which is in line with the goals of HTRR.[40]

Although not necessarily using the term HTRR, this independent group has long been conducting assessments on the use and potential obsolescence of health technologies. A 1989 assessment conducted by SBU on routine preoperative testing of patients undergoing elective surgery identified that if tests on these patients were only conducted when there was indications for their use, there would be a cost savings of $30 million USD.[9] It was demonstrated that in the case of elective surgery patients, not only did these preoperative tests

provide no clinical benefit but they also had the potential to cause undue harm, in terms of false positive results.[9] A 2006 study by SBU examining the ineffectiveness of prescription calcium in the treatment of osteoporosis in female patients under 80 years old, allowed for a five million dollar reinvestment.[9]

Another focus area for SBU is information dissemination (for both their HTA and HTRR work).[9] To ensure the right information reaches the right individuals, some of the strategies this organization uses include: developing summaries directed to and circulated within the general community; striving to engage a diverse set of stakeholders; arranging educational programs on their findings and utilizing both the press and available forms of media (e.g. newsletter, website).[9]

> "For approximately 10 years, SBU annually evaluated its potential impact through large-scale surveys of policy makers, managers, and the medical profession. Considerable evidence shows the impact of specific SBU assessments, particularly their impact on [HTRR]."
>
> -Jonsson[9]

Although Sweden is infrequently mentioned in current HTRR literature, it is clear that they are well-versed in the topic of HTRR and have consistently been a forerunner in the field. Based on the organization's publications, SBU has primarily focused on the identification, assessment and prioritization of potentially obsolete technologies, and has not comprehensively explored the later end of the HTRR process such as implementation and mitigation. SBU does not propose a model for the completion of HTRR.

6.2.9 UK

The National Institute for Clinical Effectiveness (NICE) was launched in late 1999 with the goal of ensuring equitable health care delivery throughout England, Wales and Northern Ireland. This group is overseen by the National Health Service.[41] Although NICE has three divisions; The Center for Public Health Excellence, the Center for Clinical Practice and the Center for Health Technology Evaluation, it is the latter which has taken HTRR within its mandate.[42] NICE is one of the most noteworthy leaders in the field of HTRR. The launch of NICE's disinvestment program was spurred by a 2005 announcement of four national health agenda's: prevention, system inefficiencies, administrative waste and clinical waste, with HTRR falling into the last.[6]

NICE has developed three methods for supporting the HTRR process: technology appraisals, recommendation reminders and commissioning guidelines.[11] Technology appraisals for existing technologies are based on the process used for assessing those which are new or emerging. Recommendation reminders are released monthly and summarize any new recommendations for the use of an existing technology.[43] This is one way NICE disseminates the information found through their technology appraisals of existing practices. The third HTRR initiative, commissioning guides, are aimed at NHS commissioners. They are practical guidelines for helping commissioners use NICE recommendations.[44] Included in these guides are cost models which will allow commissioners to calculate savings and costs associated with a change in service.[44]

NICE's "Do not do" list is a compilation of all of the technologies they suggest are not used or used sparingly, based on their assessments since 2007.[45] This searchable list is available online through NICE's website. There are currently over 800 technologies on the "Do Not Do" list.[45] Based on the recommendations from this list, it has been estimated that NHS has incurred a savings of over £600 million.[46]

When a decision is reached on a new or emerging health technology, the NHS is obligated to fund accordingly. This system is unusual in that their recommendations are binding for new technologies. However, in terms of reassessment and reinvestment decisions, NICE guidance is not mandatory – it is advisory. This has resulted in variability of uptake as it is up to commissioners to decide to implement any changes recommended by NICE.

NICE is "…recognized as being a world leader in setting standards for high quality healthcare and are the most prolific producer of clinical guidelines in the world"

-NICE[1]

NICE uses the following criteria for prioritizing the reassessment of an existing technology:[41]

1. The cost of the technology has a significant overall budget impact
2. Effective alternative technologies exist which have demonstrated cost-effectiveness but are underused
3. Elimination of the technology may reduce risks to patient safety
4. The impact off disinvestment will not be borne largely by specific vulnerable populations such as the disabled, elderly or children
5. The ascribed benefit of the technology is small

The following is the general framework for the assessment or reassessment of a health technology that is used by NICE:[43]

- Topic Selection
- Scoping
- Guidance Development
- Evidence Gaps
- Budget Impact
- Implementation Support
- Guidance Review
- Guidance Uptake and Impact Assessment

> *"It is acknowledged that while identifying topics with [HTRR] potential remains a key strand of NICE's mandate, few disinvestment topics are actually referred to NICE, the rationale for referral is not explicitly stated…and there is resistance to withdrawing existing technologies."*
> *-Center for Health Economics*[5]

NICE has a reputation for engaging stakeholders, and ensuring result transparency.[41] Although NICE is seen as a leader in the HTRR field, they are not exempt from criticism. There have been a number of papers published outlining flaws in NICE's processes. As with many organizations who have a number of tasks within their mandate, NICE has been criticized for their bias towards new technology assessments.[43] Additionally, NICE has often been criticized for poor uptake in the clinical community.[6]

6.2.7 United States

There is a paucity of recent literature on what reassessment and reinvestment has occurred in the United States. In the 2009 paper *Policy Perspectives on the Obsolescence of Health Technologies in Canada,* Elshaug et al. briefly describes the relationship the US has had with HTRR, but beyond that there is little information available in current literature.[6]

In this paper, Elshaug et al. note that the US was involved in disinvestment from an early point – beginning with an attempt to reassess and reinvest medical procedures through the 1976 Blue Cross/Blue Shield Medical Necessity Project in response to rising health care costs and resistance against escalating premiums.[6] This collaborative project between the Blue Cross/Blue Shield and professional colleges resulted in 76 surgical and medical procedures being removed from coverage.[6] Removal of funding was the method of removing these health technologies from practice. Although coverage was removed for these 76 procedures, physicians were still able to offer them if they felt they were indicated, by providing written justification for reimbursement.[47]

This Necessity project focused on the first half of HTRR, reassessment, but there is no record of how/whether the money saved in this process was reinvested back into more efficient medical practices. During coverage decisions, the following questions were posed:[47]

- Is the procedure experimental?
- It is accepted?
- It is relatively safe?
- What does it cost?

- Is there another procedure which costs less but has equal benefit?
- Is it accessible?
- Is it clinically effective?

> *"The USA has a less unified health service and is striving to improve it."*
>
> *-Mørland*[3]

Elshaug et al. also outlines the lifespan of the US Department of Health and Human Services National Center for Health Care Technology (NCHCT), which was established in 1978. The function of this non-regulatory group was two-fold: multifaceted technology assessment and appraisal of value (whether the technology was medically necessary enough to warrant coverage).[6] This group was briefly in existence, and dispersed in 1982.[6]

In a 2011 speech, President Barack Obama alluded to future work on HTRR.[48] In this speech, focused on reducing the US fiscal deficit, 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…"[48]

7.0 CHALLENGES

Many benefits and opportunities are possible with the successful implementation of a HTRR process, however, there are also a number of challenges that must be overcome or mitigated. Since this field is in its infancy on a global scale, not all of the challenges of HTRR development may have been identified. Similarly, as no formal HTRR processes have been carried out in Canada, barriers may arise that are specific to the Canadian context. Although it is not possible

to foresee all of the difficulties that will arise in the development and implementation of an HTRR program in Canada, the barriers faced internationally may provide insight as to what may need to be overcome.

The first type of challenges that face Canada will be the difficulties that arise in the course of trying to develop a realistic, well-founded process. Simply developing a process for conducting HTRR is demanding because of the limited literature available, the lack of consensus on prioritization and identification methods or what constitutes low or no value health technology and often, a lack of resources to support the development process.

> *"Canada has an international reputation for its capacity and governance in HTA processes. It is well placed to tackle [HTRR] challenges head-on and forward this important agenda"*
> *-Elshaug*[6]

Once the process is developed, a host of other challenges present themselves. Barriers such as resistance to change, balancing clinical, consumer and political interests and preferences, sunk cost of human and financial capital, achieving consistent implementation, how to engage and obtain buy-in from stakeholders, and who should take leadership for the process have been experienced internationally.

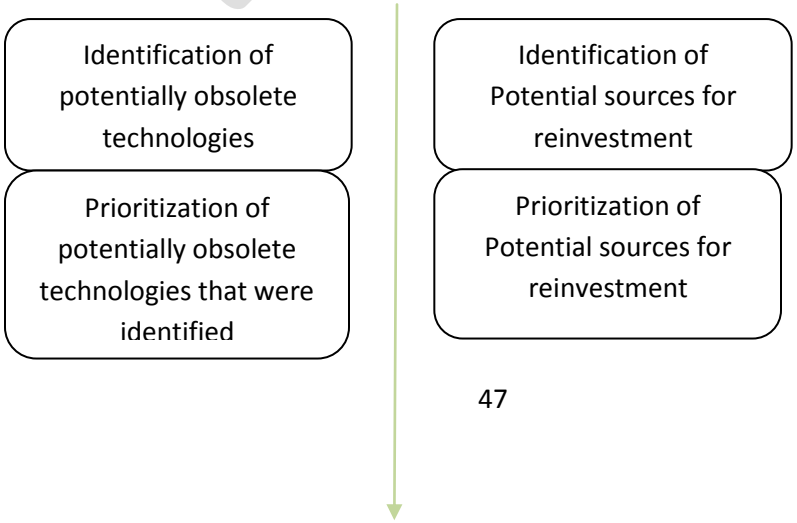
Although there are barriers to the development and application of an HTRR program, these challenges are not reason to shy away from the process. HTRR holds great potential to improve quality of care and health care sustainability. Challenges and barriers can be mitigated and overcome, and as more progression is made in the area of HTRR, these difficulties will lighten.

8.0 IMPLICATIONS FOR A CANADIAN HTRR MODEL

Although Canada is well-established in the HTA field, HTRR does not appear to be a current focus. A number of papers on HTRR have been published by Canadian authors, but rather than discussing an overall model or framework, the focus has been more specifically on the economic portion of the process; specifically program budgeting and marginal analysis (PBMA). Information on PBMA may be useful in informing the development of an HTRR model for use in Canada, however, more literature and research is needed on what the broader process might look like in a Canadian context.

Using information and processes developed internationally will be necessary in the development of a HTRR model. Additionally, due to the lack of published and grey literature, direct communication and collaboration with groups who are knowledgeable in the HTRR process will be imperative.

Based on the information available on models and processes developed for HTRR, a general guideline for what a model may look like in a Canadian context can be developed (Fig 4). This framework is based off of information gleaned from literature, and has been expanded upon to incorporate reinvestment. The processes of reassessment and reinvestment are equally important, and would optimally be undertaken at the same time for any given technology.



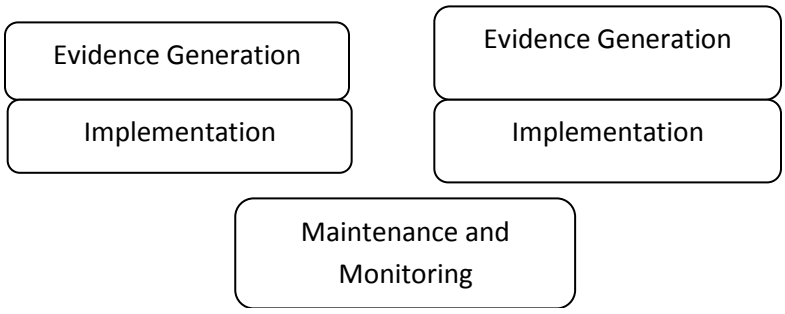


Fig 4. General Model for HTRR

9.0 CONCLUSION

Although there are many challenges associated with developing and implementing an HTRR process, the potential benefits are impressive. With little thorough research or documentation in the field, the knowledge foundation for developing an HTRR program is small. However, this field is worthy of research attention.

As is apparent from the country case studies, a number of countries have taken an interest in the field. However, none have developed a model and completed the process start to finish. The availability of a comprehensive model that has been used in practice, and documented throughout, would be a significant addition to the field of HTRR.

REFERENCE LIST

(1) National Institute for Health and Clinical Excellence. NICE: Who we are. 2010.
Ref Type: Online Source

(2) Basque Office for HTA. Managing Obsolete Technologies and Disinvestment in the Basque Country's Health System. 2008.
Ref Type: Slide

(3) Morland B. Methods of No Value Must be Abandoned. *The Journal of the Norwegian Medical Association* 2011;130:1256-1257.

(4) Final Report from Disinvestment Challenge Seminar: Making Choices, Spending Wisely. The Disinvestment Challenge Seminar; 2010.

(5) Center for Health Economics RaE. Reducing the Uses of Ineffectives Health Care Interventions. 2010.

(6) Elshaug A, Watt A, Moss J, Hiller J. Policy Perspectives on the Obsolescence of Health Technologies in Canada. 2009.
Ref Type: Report

(7) Center for Clinical Effectiveness. Health Technology Disinvestment: Tests, Drugs and Clinical Practice. Report on a National Disinvestment Workshop. 2011.
Ref Type: Report

(8) Elshaug A, Hiller J, Tunis S, Moss J. Challenges in Australian policy processes for disinvestment from existing, ineffective health care practices. *Australia and New Zealand Health Policy* 2007;4:23.

(9) Jonsson E. History of health technology assessment in Sweden. *International Journal of Technology Assessment in Health Care* 2009;25:42-52.

(10) Elshaug AG, Hiller JE, Moss JR. Exploring Policy-makers Perspectives on Disinvestment from Ineffective Healthcare Practices. *International Journal of Technology Assessment in Health Care* 2008;24:1-9.

(11) Ravina A, Gonzalez M, Lema L, Mota T, Roteta N, Ibarluzea I et al. Identification, Prioritisation and Assessment of Obsolete Health Technologies: A Methodological Guideline. 2009.

Ref Type: Report

(12) Robinson S, Dickinson H, Freeman T, Williams I. Disinvestment in Health: the Challenges Facing General Practitioner (GP) Commissioners. *Public Money & Management* 2011;31:145-148.

(13) Joshi N, Noseworthy T. Reassessment of Health Technologies: Obsolescence and Waste. 2009.

(14) Metropolitan Health and Aged Care Services Division. Future Directions for Health Technology Uptake, Diffusion and Disinvestment in Victorian Public Health Services: Department of Human Services Workshop Discussion Paper. 2007.
Ref Type: Report

(15) Elshaug A, Moss J, Karnon J, Merlin T, Hiller J. Identifying Existing Health Care Services that do not Provide Value for Money. *The Medical Journal of Australia (MJA)* 2009;190:269-273.

(16) Ibargoyen-Roteta N, Gutierrez-Ibarluzea I, Asua J. Report on the Development of GuNFT Guideline: Guideline for Not Funding Existing Health Technologies in Health Care Systems. 2009.
Ref Type: Report

(17) Pharmaceutical Benefits Advisory Committee. Pharmaceutical Benefits Advisory Committee. 2007.
Ref Type: Online Source

(18) Medical Services Advisory Committee. Medical Services Advisory Committee: About Us. 2011.
Ref Type: Online Source

(19) Elshaug A. Improving Allocation Efficiencies in Health Care: Australian Experience and Future Perspectives. 2011.
Ref Type: Slide

(20) Towler.Simon. Governments and Technology Vantage Points. 2008.
Ref Type: Slide

(21) The Health Policy Advisory Committee on Technology (HealthPACT). 2011.
Ref Type: Online Source

(22) The Allen Consulting Group. Description of Selected Health Technology Assessment Processes: Participation in national assessment activities. 2009.
Ref Type: Online Source

(23) Aspex Consulting. Victorian Department of Health Services: Review of the Victorian Policy Advisory Committee on Clinical Practice and Technology (VPACT). 2009.

(24) Victorian Policy Advisory Committee on Technology (VPACT): Terms of Reference for Role, Function and Governance. 2009.

(25) Southern Health. Southern Health: Evidence Dissemination Service. 2011.
Ref Type: Online Source

(26) The Allen Consulting Group. Description of Selected Health Technology Assessment Processes: Health Technology Assessment in Western Australia. 2009.
Ref Type: Online Source

(27) **Health Technology Assessment in Queensland**. 2010.
Ref Type: Online Source

(28) Adelaide Health Technology Assessment. ASTUTE Health Study Background. 2011.
Ref Type: Online Source

(29) Frellsen MB KF. Technologies that are claimed useless or applied in a useless way should undergo HTA and be discarded from daily practice if proven so. Case: routinely performed chest x-ray at admission [abstract]Frellsen MB KF. *Italian Journal of Public Health* 2005;2

(30) The Norwegian Council for Quality Improvement and Priority Setting in Health Care. 2010.
Ref Type: Online Source

(31) Morland B. Using HTAs to Support Disinvestment - the Case of Sleep Apnoea (OSAS) in Norway. 2010.
Ref Type: Slide

(32) Norwegian Medicines Agency. Norwegian Medicines Agency. 2009.
Ref Type: Online Source

(33) Scottish Health Technologies Group (Health Improvement Scotland). What is the Scottish Health Technologies Group. 2009.
Ref Type: Slide

(34) Scott S. Potential for Disinvestment in Procedures of Low Health Gain in Scotland. 2004.
Ref Type: Slide

(35) Scottish Health Technologies Group. Disinvestment - MaCSWise. 2011.

(36) Ibargoyen-Roteta N, Gutirrez-Ibarluzea I, Asua J. Guiding the Process of Health Technology Disinvestment. *Health Policy* 2010;98:218-226.

(37) Ibargoyen-Roteta N. Sources to Identify Potentially Obsolete Technologies. 2010.
Ref Type: Slide

(38) INAHTA. INAHTA Members List: AVALIA-T - Galician Agency for Health Technology Assessment. 2011.
Ref Type: Online Source

(39) Avalia-t. PriTec Tool for Obsolete Health Technologies. 2011.
Ref Type: Online Source

(40) SBU. 2011.
Ref Type: Online Source

(41) Pearson S, Littlejohns P. Reallocating Resources: How Should the National Institute for Health and Clinical Excellence Guide Disinvestment Efforts in the National Health Service? *Journal of Health Services Research & Policy* 2007;12:160-165.

(42) National Institute for Health and Clinical Excellence. NICE: What We Do. 2011.
Ref Type: Online Source

(43) Chalkidou K. The Challenge of Disinvestment. 2007.
Ref Type: Slide

(44) National Institute for Health and Clinical Excellence. How to use NICE guidance to commission high-quality services. 2010.
Ref Type: Online Source

(45) National Institute for Health and Clinical Excellence. NICE 'do not do' recommendations. 2011.
Ref Type: Online Source

(46) National Institute for Health and Clinical Excellence. How NICE guidance is helping the NHS through financial uncertainty. 2010.
Ref Type: Online Source

(47) Greenberg B, Derzon RA. Determining Health Insurance Coverage of Technology: Problems and Options. *Medical Care* 1981;19:967-978.

(48) Garance Franke-Ruta. Obama's Deficit Speech (Transcript). The Atlantic . 2011.
Ref Type: Online Source