Priority Setting within Regional Funding Envelopes: The Use of Program Budgeting and Marginal Analysis

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Key Implications for Decision Makers

- Because of limited resources, decision makers must examine how best to allocate health system resources.

- Health region personnel do not necessarily have the skills to set priorities and make choices about how best to allocate resources. Managers and clinicians want an evidence-based process that is explicit, formal, and systematic.

- The program budgeting and marginal analysis (PBMA) framework is pragmatic and evidence-based, providing options for efficient service delivery and for directing resources to obtain maximum benefit.

- The framework also helps to ensure accountability and transparency.

- The framework has been successfully used in three Alberta health regions to set priorities and make resource allocation decisions. It should continue to be used in Alberta.

- Managers in health organizations, within and external to Canada, should consider using the same framework.

- There are organizational and managerial barriers to adopting the framework. When conducting framework exercises and adopting the framework, several factors are important for success, including:
  - stability (low staff turnover), especially in strategic planning divisions
  - strong leadership
  - a high level champion for the framework
  - training in relevant economic principles
  - a stronger relationship between physicians and health regions
Executive Summary

Context

Because of scarcity in health services, decision makers must make choices among competing claims on limited resources. It has only recently been documented that health care managers do not necessarily have adequate skills to set priorities. Program budgeting and marginal analysis (PBMA) is an economic framework for priority setting that has been used in health authorities internationally since the mid-1970s. Despite this long history of use, there has been limited formal evaluation of the framework, either at the individual case study level or more broadly across studies internationally. This study provides such an evaluation.

Implications

Key decision-makers interviewed from Alberta reported that, generally speaking, resources are allocated on a historical basis without using a formal priority-setting process. It is apparent that health region personnel do not necessarily have the skills to set priorities and make choices about allocating scarce resources. They want an evidence-based process that is explicit, formal, and systematic.

The PBMA framework could feasibly be implemented in health regions in Alberta and was viewed favorably by managers and clinicians who participated in the case studies. It is a pragmatic framework that gives decision makers ways to examine options for service delivery, directing resources for maximum benefit. The framework aids in helping managers identify more efficient ways to deliver services, and can help to make resource allocation fair. It also helps to ensure accountability and transparency. Numerous lessons were learned about the methodology of conducting priority setting exercises and successfully adopting the framework, including the importance of having stability (low staff turnover), strong leadership, and a high level champion for the framework.
Results

The results of this research project are summarized in the following table:

**Summary of project results**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Key Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>Authors Survey</em></td>
<td>- PBMA used at least 78 times in 59 health regions</td>
</tr>
<tr>
<td></td>
<td>- in 59% of cases, approach was viewed as having a positive impact</td>
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<td></td>
<td>- PBMA continues to be used in at least 52% of the health regions</td>
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<td>- barriers to success include personnel changes and lack of champions</td>
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<tr>
<td><em>Key Decision Makers Survey</em></td>
<td>- clear process of setting priorities in 3 Alberta health regions does not exist</td>
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<td></td>
<td>- allocation of resources is based on historical trends</td>
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<td></td>
<td>- 22% of managers believe that the priority setting process works well</td>
</tr>
<tr>
<td></td>
<td>- key concerns include lack of transparency of process, political influence, lack of meaningful physician involvement</td>
</tr>
<tr>
<td></td>
<td>- 92% of respondents believe that PBMA would be useful in their region</td>
</tr>
<tr>
<td><em>Case Studies</em></td>
<td>- 7 PBMA case studies at micro and meso levels in three health regions were conducted and evaluated against a diverse set of outputs</td>
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<tr>
<td></td>
<td>- challenges included, in some cases, difficulty adopting the framework and, in others, difficulty in following through on exercise recommendations</td>
</tr>
<tr>
<td><em>Follow-up Survey</em></td>
<td>- as a whole, managers and clinicians involved in PBMA case studies were positive about their experience and suggested future use of the framework</td>
</tr>
<tr>
<td></td>
<td>- respondents highlighted numerous important outcomes on which a PBMA exercise should be judged: the effect on patient benefit, evaluation of historical services, identification of re-design options, resource re-allocation</td>
</tr>
</tbody>
</table>

An empirical model of the priority-setting process in health organizations was derived from this project. This model describes the prerequisites for conducting a framework exercise, as well as lists possible results. It also outlines key barriers to acceptance and use of the framework, and provides recommendations to help overcome those barriers. This model should be empirically validated in other jurisdictions and could be used as a tool for evaluating future PBMA framework case studies.
Approach

First, an exhaustive literature review on the framework was done. This was also used to identify principal authors of papers, who provided details on the specific PBMA exercise in question, including the short- and long-term impact in the specified health region. Key decision makers in three health regions in Southern Alberta were then identified and interviewed. They were asked to describe the current process of setting priorities and allocating resources, to provide specific feedback on how the processes could be improved, and to examine the potential for using the framework in their regions. Next, seven distinct priority setting case studies were done in the same three health regions in Alberta. Finally, structured follow-up surveys with all PBMA case study participants were conducted.

Additional Resources

Numerous peer-reviewed papers based on this research project have been done or are currently under review. Seminars on priority setting in health organizations have been given in Alberta, British Columbia, and Saskatchewan. The primary audience for these seminars has been health region personnel and clinicians. Specific presentation materials and copies of papers can be obtained from the principal investigator.

Further Research

Primary areas for future research that arose directly from this project include:

- Continued use of the framework at the micro and macro levels in health regions, with the intention of evaluating it with the model derived from this project.
- Exploration of priority setting at an organizational level, across portfolios within a health region. This would attempt to put in place an approach to priority setting that is systematically applied, is fair, and is based on economic principles of opportunity cost and the margin. (Development of a priority-setting “toolkit” for managers and clinicians, to serve as a guide for their own explicit, evidence-based priority setting activity.)
Full Summary

1.0 Context

1.1 Background to this project

In society, there are not enough resources to meet all potential claims on the available resources (10). Similarly, it is held that such scarcity exists in the health system, requiring decisions to be made about which claims will receive limited public funding and which will not (1). If this premise of scarcity is accepted, there is an inevitable need to make choices about which claims to meet and to what extent, and conversely, which claims not to meet. Thus, it could be argued that decision-makers in the newly formed health regions in Canada require a framework to aid in choosing amongst competing claims on their limited resources. This project examined the priority setting process in three health regions in Alberta, and examined the use of an economic framework for priority setting and resource allocation, designed for the regionalized health care context. The framework itself involves explicit consideration of both benefits and costs of services, with the goal of maximizing the needs met for a given population from the limited resources available.

In all but one of Canada’s ten provinces, health services decision-making has been devolved to the regional level (7). These health regions are responsible for setting priorities and allocating resources within broadly defined provincial mandates. In particular, health regions were given the mandate to meet the needs of local populations with a limited amount of resources. A recent survey, however, reported that decision-makers in these regions do not necessarily possess adequate skills to set priorities (8). While research on resource allocation in Canada has occurred at the provincial level (6), and on priority setting at the hospital level (16), there has been no previously reported work in this area in health regions in Canada.

One priority setting framework that has been used in health care over the last 25 years in the UK, Australia and New Zealand, is program budgeting and marginal analysis (PBMA) (3, 4, 11, 13, 15). This economic framework aims to assist managers in making decisions about the competing claims on the limited resources available. However, despite the long history that PBMA has endured in health care, there has been little
formal evaluation of this framework, either at the individual case study level or more broadly across studies internationally.

1.2 Relevance of this project

In health care settings where decision-makers are required to consider how best to spend limited resources, a priority setting framework would likely be of considerable use (9). In Canada, as the majority of provinces have regionalized health care, providing an environment where precisely such allocation decisions must be made, the need for piloting a framework to aid decision-makers in the process of setting priorities and allocating resources is indicated. As mentioned, one framework that enables this process is PBMA. Although the transition to an explicit framework for setting priorities based on both the benefits and costs of services can be difficult (2), the end result, in principle, is one where the benefits to the population can potentially be maximized for a given set of resources (4).

Following this line of thought, PBMA provides information that can be used to identify means of providing services in a more efficient manner, and further can help to ensure that the allocation of resources is also fair (12). As well, the information can aid accountability by allowing the monitoring of whether resource allocation patterns match stated intentions from planning documents, and also can facilitate benchmarking processes (10). As a result, if fully integrated, PBMA can positively impact how resources are allocated in health regions and should further enable both current and future strategic planning activities in a transparent, and thus accountable, way. A more detailed description of PBMA, including a number of questions that ‘operationalize’ the framework, is found in Section 3.2, below.

Drawing on the international body of experience in the field of priority setting, this work provided a timely and insightful response to concerns being expressed in health regions regarding the setting of priorities. After five years of regionalization in Canada, managers are beginning to think more proactively about activities such as priority setting and resource allocation. That the skills to perform these activities are often lacking speaks directly to the need for addressing this important issue through an applied research
Further, while a primary goal of this work was to aid Canadian managers in the priority setting process — through a comprehensive evaluation of an economic framework that has been used widely in practice internationally but which has undergone little rigorous evaluation to date — this project also contributed to a much broader body of knowledge.

1.3 Contributions of this project

Based on this rationale, a four-phased research project was undertaken in Alberta. The basic outline of the project was to first conduct a review of previous PBMA exercises, in order to identify the impact of the framework on priority setting and strategic planning within health regions internationally. Such information had not previously been collated in one study. Information required for the development of PBMA in a Canadian context was then obtained through a survey of health region decision-makers, in the first attempt in Canada to determine specifically how priorities are set and how relevant information can best be structured to facilitate efficient and equitable priority setting decisions. The next step, again as a first in Canada, was in the piloting of PBMA through a series of case studies in three health regions, with the intent of testing the feasibility of using the framework in Canada and examining numerous unresolved issues from the PBMA literature. Finally, similar to unrelated work ongoing in Australia, a formal follow-up survey was conducted to gauge the impact of PBMA in the specific case studies in which the framework was piloted. Taken individually, each phase of this research project provides a significant contribution either to the Canadian or international priority setting literature. Further, through describing the first comprehensive evaluation of PBMA to date and providing suggestions regarding key areas for future research, this project as a whole makes a substantial contribution to current knowledge in this field.
2.0 Implications

2.1 Overall Conclusions

This work began by identifying, through an international survey of authors, some of the key determinants for the short and long-term success of PBMA on decision-making within health regions. Such compilation, categorization and analysis of PBMA activity had not previously been reported on internationally, and as such provides a significant base of information upon which, and from which, further study can be conducted. It was found that PBMA has been used in a diverse set of programs in almost 60 health regions internationally. Further, building on the lessons learned from this survey of authors, potential future use of PBMA can be appropriately tailored to organizational issues such as having the support of high level personnel when embarking on such priority setting activity. The key next step for further research arising from this phase of the project is in moving towards further analysis at the individual exercise level in terms of evaluation. In fact, it is recommended that all future PBMA studies should contain a specific evaluatory or monitoring component. Not only will this help to improve further priority setting endeavors in the given health region, but as well will contribute to the overall body of knowledge in terms of the uptake and use of evidence in the priority setting process. In addition, explicit comparison of the use of PBMA with a like control group using an alternative practice (e.g., ad hoc decision-making or cost-effectiveness analysis) would provide valuable information as to whether managerial time is best spent on a PBMA exercise. In essence, while the survey of authors provided insight into the overall state of PBMA, what is now critically needed is a more concerted effort on evaluation of specific exercises to provide further insight into whether, and how best, PBMA is to be used in the future.

With respect to the survey of key decision makers conducted in three health regions in Alberta, three key points can be made. First, the regionalized system in Canada does allow for priorities to be set, and does enable resources to be allocated. This is important to recognize because, as one respondent put it, the system ‘does work’, suggesting that not all is bad with the current system of delivery of health care. Second, health region personnel would clearly prefer to have a more explicit, evidence-based process in place.
on which priority setting and resource allocation could be based. As health regions in
Canada move from infancy to adolescence, it is perhaps time that a more mature
approach to planning is undertaken. As for other countries, where regionalization has
been in place for many years, historical and/or political decision-making is still
widespread and should surely be viewed as outdated. That the decision-makers
themselves appear to be seeking an actual framework for priority setting supports the
need for applied research to respond to this call. Finally, PBMA would appear to be a
viable option for priority setting, and certainly an improvement on the status quo. The
role of academics is to present the options and offer guidance to health regions as
requested; ultimately, the uptake and continued use of an evidence-based, systematic
process for setting priorities and allocating scarce resources lies in the hands of the health
region personnel. In sum, the second phase of this Alberta-based research project
provided valuable insight into the decision-making processes of health regions in Canada,
which had not previously been reported on, and, further, provided direct support for
conducting the piloting of PBMA in these three regions.

The evidence from the PBMA case studies in Alberta would suggest that further use of
this framework in the priority setting process of health regions in Canada is warranted.
As has been found previously, a strength of PBMA is that it is pragmatic; it is a
framework that provides decision-makers with a forum to explicitly examine options for
service delivery. While further research is required to explore how such a framework
might impact patient health outcomes, in the interim PBMA has shown qualified merit
for continued use in the health regions discussed here and for expansion to other health
regions in Canada. Not only did the case studies and follow-up survey demonstrate that
PBMA exercises can feasibly be conducted in Canadian regionalized contexts, but also
that other important outcomes, as outlined by the expert panel members themselves, did
result. Noting the alternative of historical allocation based on little evidence and almost
no systematic rigor, PBMA will likely be an important find for Canadian decision-
makers. As well, the follow-up survey can be viewed as a support tool for future
evaluation of PBMA exercises, which, while requiring piloting in other settings, can
provide detailed information to aid in the assessment of the case studies in this project.
As evaluation of PBMA has been almost totally lacking despite its lengthy history in
health care, the empirical framework derived from this research, based largely on the case studies and follow-up survey, and supported with information obtained through the two surveys, provides a significant first step in working towards the goal of evaluating PBMA, and more broadly priority setting, activity in the future.

Overall, PBMA has fared well internationally, providing the primary impetus to examine the potential use of the framework in Canada. In reviewing this literature, however, there was a clear lack of evaluation of PBMA, leaving it open to criticism through views that it really has not been used very much, or that the framework does not fit with managerial processes. These views were addressed through the survey of authors. The survey of key decision makers not only described the existing process of priority setting, but was able to elicit specific responses from the managers themselves on ways to improve the process. The most predominant message here was that the decision-makers wanted an explicit, evidence-based priority setting framework that was applied systematically across the given health regions. Importantly, even when such a framework is applied, organizational and managerial barriers can lead to a lack of re-allocation. Despite this, that the managers also felt that there are numerous other important potential outcomes with priority setting exercises was a novel finding. Too often, it has been claimed that the goal of priority setting is to maximize benefit for the given resources. This study has shown that outputs to a priority setting process such as historical evaluation of services are also meaningful to managers and thus deserve greater attention in future studies.

Finally, it was observed through this study that PBMA can feasibly be implemented in a Canadian regionalized context, and, indeed, that it has been used many times over internationally. The next steps are to examine explicitly whether managerial time spent working with a framework like PBMA is worthwhile, and to take priority setting to an organizational level, where coordinated, systematic efforts across programs can occur. More fully considering facilitators and barriers to the process of priority setting will go a long way in realizing the full potential of PBMA, and other evidence-based strategies, in the health sector.
2.2 Generalizability

From a Canadian perspective, the most important generalizable finding is that PBMA was feasibly applied in the regionalized context in Alberta, and, as long as other regions are interested in setting priorities with the constraint of limited resources, the framework could likely be appropriately applied in other provinces. Of course, the impact of each particular application of PBMA will have to be assessed, but in principle the framework should be able to be used in health regions elsewhere in Canada. Further, the insights gained through both the survey of key decision makers and the case studies, with respect to organizational and managerial barriers to an explicit, evidence-based process of priority setting, will likely be generalizable to other settings where there is a regionalized structure, although this is an area for further research, as discussed below. In addition, the need for follow-up of PBMA exercises is clearly a finding that is generalizable to other contexts. In an age of evidence-based medicine, it is not justifiable to use a framework for priority setting that itself has not been evaluated against expected outcomes. The inclusion of the follow-up survey in this project has started this process in the PBMA literature, and can certainly be used elsewhere. Finally, the identification of determinants of successful implementation of PBMA through the authors survey did have an impact on the development of PBMA in Alberta, and should, coupled with the aspects of the key decision makers survey, case studies and follow-up survey, provide valuable insight in other health regions considering to use, or re-use, the PBMA framework.

2.3 Recommendations for Practice

Based on this research project, a number of key recommendations for the future application of priority setting in health care can be put forth for consideration by health care decision-makers, in conjunction with health researchers, in Canada and elsewhere. First, PBMA should continue to be applied in the three Alberta health regions in which it has been used to date, and it should be piloted in other regionalized Canadian jurisdictions. Regions may choose to start such activity within individual programs, following the guidelines laid out in Table 2 (pg. 14), and if momentum builds, to consider broader priority setting activity between programs and even across portfolios within the health region, depending on the organizational state of service delivery integration. Any
application must also be considered within the context of the organization, specifically with respect to the barriers and facilitators to using an evidence-based priority setting framework and to implementing change as a result of a given exercise. Managers and researchers must also take due caution when deriving program budgets, to ensure that individually identifiable information is removed from all presented material, so that patient confidentiality is maintained. The lowest aggregate level of information to be presented would be of a particular disease group, or as discussed above, a locality in the health region based on postal codes. Second, with respect to further application of PBMA internationally, decision-makers must spend more time thinking about the organizational context, the history of change and priority setting activity, and the likelihood of change in practice or service delivery resulting from a priority setting exercise. This is a critical step, even in health regions that have applied PBMA previously. Third, and likely as a predecessor to the rolling out of PBMA in regions in Canada or elsewhere that have not used this framework previously, such regions are urged, in conjunction with health researchers, to undertake a key decision-makers survey, in order to identify where the given region is at with respect to priority setting and resource allocation, before moving forward with the application of a priority setting framework. This survey allows for a region to identify the current process and to get feedback on that process, before implementing a framework that may in fact turn out not to be needed or warranted. Finally, decision-makers must embrace more fully the notion of scarcity, and begin to change the system from within, from a culture of ever-expanding services (and thus resources) to one in which re-allocation is genuinely supported. This overarching recommendation carries with it several sub-objectives, including continued improvement in the relationship between physicians and administrators, working through the mis-alignment of incentives between physicians and health regions, and changing the disincentive managers have to over spend their given budgets. While the challenges are large, they are certainly not insurmountable. In moving towards using a more explicit, evidence-based priority setting framework, it is held that the challenges related to this recommendation of changing the system from within, in particular, will necessarily be addressed.
3.0 Approach

3.1 Overview of methods

There were four primary objectives of this applied research project:

- To conduct a survey of PBMA authors to determine the use of the framework internationally and to identify determinants of the short and long term effects of PBMA in health authorities that have used the framework.
- To conduct a survey of key decision makers in three Alberta health regions to describe the priority setting process, identify how the process might be improved, and to determine the feasibility for the application of PBMA in Alberta.
- To conduct a series of PBMA case studies in three health regions in Alberta based on previous exercises conducted internationally and the information obtained in the key decision makers survey.
- To conduct a follow-up survey with health region personnel in Alberta who have used the PBMA framework, in order to determine the impact of PBMA on the decision making process and ways the framework could be improved for future exercises.

In relation to the first objective, an exhaustive literature review on PBMA was conducted and used to identify the principal authors for the semi-structured mail-out survey. Participants were asked to highlight further papers or projects not initially identified and to provide details on the specific PBMA exercise in question including the short and long term impact in the specified health region. The primary rationale for this phase of the project was that the impact of PBMA in practice had not previously been addressed in the literature, nor had there been a systematic assessment of use of the PBMA approach.

In order to address the second objective, key decision makers in three health regions in Southern Alberta were identified and approached for participation in the survey. Participants were asked through a structured interview to describe the current process of setting priorities and allocating resources, to provide specific feedback on how the processes could be improved, and to examine the potential for use of PBMA in the given
region. This phase of the project rested on the rationale that the precise nature of the priority setting process in regional health authorities in Canada had not been reported. Even internationally, where the broader priority setting literature is more advanced, little work has been done to examine how priorities are set in a regionalized context, and how this process might be improved.

In addressing the third objective, seven distinct PBMA case studies were conducted in the same three health regions in Alberta where the key decision makers survey was conducted. These exercises are depicted in Table 1.

**Table 1: Application of PBMA in Alberta**

<table>
<thead>
<tr>
<th>Health Region</th>
<th>Program or Service Area</th>
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</thead>
<tbody>
<tr>
<td>Calgary Health Region</td>
<td>• Arthroplasty</td>
</tr>
<tr>
<td></td>
<td>• Infant Cranial Remodeling</td>
</tr>
<tr>
<td></td>
<td>• Neonatal and pediatric transport</td>
</tr>
<tr>
<td>Chinook Health Region</td>
<td>• Chronic disease management</td>
</tr>
<tr>
<td></td>
<td>• Inpatient to outpatient surgical shifts</td>
</tr>
<tr>
<td>Headwaters Health Authority</td>
<td>• Surgical services</td>
</tr>
<tr>
<td></td>
<td>• Long term care</td>
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</table>

While more details on PBMA itself are provided on the next page, the basic approach taken in these case studies was as follows: 1. Define a program budget to describe patterns of resource use and cost; 2. Compile information on activity and resource use in the form of a program budget; 3. Form an expert panel to discuss whether the current balance of resource use is 'correct' given the needs of the stated population; 4. Use information from different sources to estimate effects of any proposed changes on patterns of resource use and, where possible, likely effects on health; and 5. Make recommendations for potential changes to the provision of services, if overall benefit is thought to improve for the resources available.

Finally, structured follow-up surveys with all PBMA case study participants were conducted. The aims were to determine the strengths and weaknesses of the PBMA exercises conducted in the various health regions, to determine if the regional personnel
would recommend further use of PBMA within their health authority, and to identify parts of the PBMA framework, if any, that should be changed to better suit the specific regional context in which it was applied. A priori, a decision was made to rate a given exercise as a ‘success’ if resources were re-allocated following the pilot study. Based on the follow-up surveys, a broader set of post-hoc criteria was developed, as depicted in Figure 1 under ‘outputs’ (pg. 19).

3.2 Details on PBMA

The intent in using PBMA is to provide assistance to health authority managers in directing resources in order that the impact of health care on meeting the health needs of the local population is maximized (4). At the same time, PBMA allows for consideration of other health system objectives, such as equity (12). Its starting point is to examine how resources are currently spent before focusing on marginal health gains and costs of changes in that spend, through comparison across or within programs (4). Following the approach outlined in the previous section, the PBMA framework can be defined by asking five questions pertaining to the use of resources:

1. What resources are available in total?
2. In what ways are these resources currently spent?
3. What are the main candidates for more resources and what would be their effectiveness?
4. Are there any areas of care that could be provided to the same level of effectiveness but with fewer resources, so releasing those resources to fund candidates from #3?
5. Are there areas of care that, despite being effective, should receive fewer resources because a proposal from #3 is more effective (per dollar spent)?

The first two questions relate to program budgeting, while the latter three pertain to the marginal analysis. Program budgeting is a means for describing the pattern of spending within health authorities and its distribution between groups in the population. The program budget can classify expenditure by program (i.e. disease group), by service
inputs grouped by sector of care (i.e. primary care, acute care), or by other means such as population demographics. The second stage, marginal analysis, can be used to examine the historical provision of services in health care, through which options for improving the efficiency and equity of programs can be proposed (5). Although this technique is often used to analyze potential changes in service options within a particular program, marginal analyses can also be utilized within health authorities across programs of service (12). As such, based on the principal of opportunity cost, through marginal analysis, managers can suggest resource re-allocations from one patient group to another, if it is held that benefit to the population as a whole would improve, or other objectively stated criteria would be better met.

An application of PBMA would usually first require that the specific program area and objectives be defined. Following this, a program budget can be developed to map the relevant activity and cost data, informed through health authority information systems or prospective data collection if necessary. An expert panel, representing key stakeholders including administrators, clinicians, and possibly the public, can then be struck, with the mandate to identify areas for service expansion and resource release, in order to assess, at the margin, the impact of potential shifts in resource use on the overall health of the population. While the specific domain of the expert panel will vary depending on the question being asked and scope of the project undertaken, it is important to define this at the outset. In the next step, scenarios that involve increases and reductions in spending can be presented to the panel, who can then make priority lists of which services should be expanded or reduced. The impact of changes in these options are then evaluated, and can be supplemented with evidence on effectiveness and cost from the literature, as well as local data on needs and outcomes, and guidelines from professional bodies, to determine what the impact will be of proposed changes, at the margin. Finally, the given health authority or relevant key decision maker has to decide whether resource shifts will actually follow the recommendations of the expert panel, and specifically address any trade-off with equity, or any other pre-determined criteria, that may result with the potential increases in efficiency (10).
4.0 Results

4.1 Key findings

The survey of authors identified the PBMA framework to have been used 78 times in 59 health regions, in seven countries. Further, 84 published papers or reports were identified, representing 36 of the 78 exercises in 27 of 59 health regions. Overall, the vast majority of PBMA activity has occurred since 1992. Where longer term use of the framework was known, use continues in 23 of 46 health regions (52%). The framework is commonly used in strategic planning, and in cases of discontinuance, primary reasons related to changes in health authority personnel and a lack of a champion pushing the priority setting agenda. A number of key determinants of the framework having a positive impact in a health region were derived from survey responses, and included the need for both high level champions and continuity of staffing in the strategic planning process. Further, respondents suggested that outcome should not only be measured in terms of resource re-allocation, but also its influence on the way of thinking in the organization.

For the key decision makers survey, 62 of 73 potential respondents participated (85%) across the three health regions in Alberta, with the majority having extensive health care experience, reflective of their senior administrative or clinical positions in the organizations. As whole, the ‘process’ of priority setting and resource allocation was reported to be really not a process at all. There was no consistent, organization-wide approach to priority setting in these health authorities, and resources are generally allocated on the basis of historical patterns. The majority of respondents held that in order for the process to be improved, a formal, systematic priority setting framework should be adopted. Many participants also stated the need for longer term planning in the priority setting process and better outcome measures to weigh competing priorities across disciplines. Only 19% of this sample of senior managers knew of other specific priority setting tools or frameworks, and 92% held that PBMA would be of benefit to their health region.
Several lessons about the PBMA process itself were highlighted from the case studies and follow-up surveys, and are presented in Table 2.¹

Table 2: Specific points to consider for future PBMA exercises

<table>
<thead>
<tr>
<th>Point to consider</th>
<th>Ideal time to address</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strategically select the first PBMA exercise in a health region in an area where there is a confirmed champion and an ‘easy-win’</td>
<td>Prior to specific applications being selected</td>
<td>Need champion for group buy-in and follow-through of recommendations; early success will aid in the organizational uptake of the framework</td>
</tr>
<tr>
<td>Expert panel should have representation from key stakeholders but not too large to prevent decision-making (7-10 max)</td>
<td>At the outset of the given exercise</td>
<td>Need to be able to get group consensus for decisions, but do not want to exclude important players; group dynamics in the process becomes critical</td>
</tr>
<tr>
<td>Use the introductory session to communicate underlying economic principles and specifically what the application plan is</td>
<td>At the outset of the given exercise</td>
<td>Panel members have to understand opportunity cost for buy-in; provides opportunity to adjust the plan early on</td>
</tr>
<tr>
<td>Conduct literature review on service re-design potential, compile program budget, identify other important inputs</td>
<td>As soon as the research question has been identified and the group has bought into the process; after the introductory session but before the first actual marginal analysis session</td>
<td>Saves time in long run; provides a starting point for panel members to start thinking about re-design issues; enables iterative process</td>
</tr>
<tr>
<td>In presenting the literature, stick to the key points with minimal discussion of methodology</td>
<td>First and second meetings when literature is presented</td>
<td>Decision-makers want the bottom line; job of the researchers (or PBMA facilitators) to identify relevant papers and discard studies with low validity</td>
</tr>
<tr>
<td>Expert panel meetings held at 2-4 week intervals</td>
<td>Throughout the PBMA process</td>
<td>Need adequate time to review literature and do background work but do not want a drawn out process; complete in &lt; 6 months</td>
</tr>
<tr>
<td>Develop a base criteria listing on which priority decisions will be made and bring this to the group for consideration</td>
<td>Prior to second meeting, for discussion at the second meeting</td>
<td>There are a limited number of criteria used in this type of decision-making found in the literature; saves time by starting with a base</td>
</tr>
<tr>
<td>Consider using one-on-one meetings with panel members and ensure that each member knows that the researchers are open for discussion at any time</td>
<td>Throughout the PBMA process</td>
<td>Each panel member thinks differently, needs different amounts of information, and all may not feel comfortable presenting a view in the large group</td>
</tr>
<tr>
<td>Put less emphasis on having all the ‘data’ to support a decision and more on drawing out opinions from the expert group</td>
<td>Particularly in the later sessions of the process</td>
<td>Data can only take the group so far and can be used as a crutch to not make a decision; ultimately they need to have confidence in making their own recommendations</td>
</tr>
<tr>
<td>Earmark resources for following through with recommendations</td>
<td>Stated at the outset, carried out following the exercise</td>
<td>Recommendations will not see action without dedicated resources</td>
</tr>
</tbody>
</table>

Although many of these are also reflective of findings in the PBMA literature (e.g., 13), what is new about these findings is in pulling together numerous diverse lessons into a

¹ For the purposes of this report, specific details or results on the individual case studies are not presented.
sequential form, providing insight into the methodological components of the PBMA process. Reporting on these lessons provides an important depiction of issues that should be considered at the outset of, or during, a PBMA process. More broadly, the majority of participants who partook in a PBMA priority setting exercise held that recommendations were derived which would not have resulted had they not gone though the PBMA process, and that because of the opportunity to evaluate historically provided services, the process was viewed to be of value even if recommendations for re-allocation of resources were not made. A number of key challenges were also identified through the Alberta case studies, including difficulty in obtaining resource releases to fund candidates for expansion, as well as finding time and resources to follow-through on given marginal analysis recommendations. A summary of these research findings is found in Table 3.

**Table 3: Summary of project results**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Key Findings</th>
</tr>
</thead>
</table>
| Authors Survey               | - PBMA used at least 78 times in 59 health regions  
- in 59% of cases, approach viewed as having a positive impact  
- PBMA continues to be used in at least 52% of the health regions  
- barriers to success include personnel changes and lack of ‘champions’ |
| Key Decision Makers Survey  | - clear process of setting priorities in 3 Alberta health regions does not exist  
- allocation of resources based on historical trends  
- 22% of managers believe that the priority setting process works well  
- key concerns include lack of transparency of process, political influence, lack of meaningful physician involvement  
- 92% of respondents believe that PBMA would be useful in their region |
| Case Studies                 | - seven PBMA case studies at micro and meso levels in three health region were conducted and evaluated against a diverse set of outputs  
- challenges included, in some cases, difficulty in uptaking the framework and in others difficulty in following through on exercise recommendations |
| Follow-up Survey             | - as a whole, managers and clinicians involved in PBMA case studies were positive about their experience and suggested future use of the framework  
- respondents highlighted numerous important outcomes on which a PBMA exercise should be judged: the effect on patient benefit, evaluation of historical services, identification of re-design options, resource re-allocation |

This experience with PBMA in Alberta lead to a number of additional broader findings. Previous literature has suggested data issues to be a key barrier in PBMA exercises. In fact, in Alberta, data is already used routinely in decision-making; the key issue in the case studies was really not data but rather was organizational and managerial barriers to change in an integrated delivery system. Change here refers both to the uptake of a new mechanism and implementing recommendations as a result of a given exercise. Set in the
context of the decision-making environment, strategies to facilitate success must be formulated, drawing in management and organizational behavior literature.

A second major theme in the priority setting literature is in finding resource releases to fund proposed expansions. This work would suggest one-on-one meetings, piloted for the first time internationally in this research project, as a sound means of identifying areas for releases. Organizational issues including the structure and environment, as well as the mix of players involved in the process and the degree of empowerment of the expert panel, will be primary determinants of action taken on identified releases. Clarity in who is to implement the recommendations and resources to support the action are necessary.

Third, marginal analysis expert panels must be representative of key stakeholders, but also the panels must not be overly large as decisions need be made in a timely manner. While not tested directly here, public input may be a valuable component of a particular exercise and as such should be considered at the outset of future studies.

Fourth, as has been found in Australia, participants in PBMA exercises should recognize that resource re-allocation may not always be the primary outcome of a given case study. That a group is able to come together, put their individual values on the table, and attempt to evaluate services that have been provided historically is extremely important in and of itself. Further, that outcomes of the process are not always quantifiable does not mean that the framework should be viewed negatively; rather, managers can be made aware of the range of potential results, noting that an explicit plan for re-designing services is only one such outcome.

Fifth, the question guiding a particular exercise should match the scope of the program. That is, the group must have a realistic sense of what can be accomplished within the constraint of budget neutrality. In fact, it is realistic to expect that following a priority setting exercise, a program may have to advocate for more resources from the health region to fund potential expansions. This is the culture that has been bred in health care, and thus to varying degrees different programs (and specific managers) will differentially acknowledge the need for genuine re-allocation as opposed to simply accepting that resources should always increase.
Finally, there is a need to examine the relationship between physicians and health regions with respect to priority setting. The broader issue is that there is often a mis-alignment of incentives between these two groups; specific to setting priorities, unless the relationship between physicians and health regions are clarified, particularly in countries like Canada, health regions will continue to hold the responsibility for setting priorities but will have less power than they could otherwise to influence change.

4.2 Development of an Empirical Framework

Based on the empirical evidence from this research project, a model of the PBMA process was depicted as per Figure 1 (pg. 19), which draws out some of the important organizational barriers and facilitators to the uptake of the framework and ultimate follow-through of recommendations. This model encompasses key issues highlighted by Peacock (13), for the development and application of PBMA as a practical decision-making aid, and serves as a summary of important issues identified in this Alberta-based research project. Previous work in the PBMA literature has essentially examined the PBMA process in isolation. That is, the focus has been on defining a program, developing a program budget, striking a marginal analysis expert panel, developing incremental wish-lists and resource release options, and then making recommendations for potential service re-design. While the findings from the survey of authors indicate that this process is not necessarily flawed, the lack of even greater proliferation of PBMA than that observed to date has likely been due to the PBMA process not being properly applied with an understanding of the decision-making context of health regions. Figure 1 attempts to set the PBMA process within the context in which it is to be applied.

Thus, the empirical model was depicted to portray a number of ‘inputs’ which should be in place for the PBMA process to be conducted. Then, listed under the ‘PBMA process’ box are a number of the key ‘lessons learned’, as per Table 2 (pg. 14). From there, numerous ‘outputs’ potentially result from any given PBMA process. As per Mooney et al. (11), these outputs include resource re-allocation and patient outcomes, but are expanded to include a broader list such as the evaluation of historical services and improved knowledge of a given service area. Barriers and facilitators to the PBMA process are also included in the model, based primarily on the case studies and follow-up
survey in Alberta, although certain factors also arose from the survey of authors. In some cases PBMA exercises will not even get off the ground, thus an accurate depiction of the process requires that barriers and facilitators be highlighted after the input box but before the process commences. Similarly, factors following the PBMA process may prevent recommendations from being reached or followed-through to the point of being put into practice, and other factors may serve as facilitators. Further testing of this model is required to validate the barrier and facilitator boxes in the model, as it is not known whether the empirical observations from this study are truly generalizable to other jurisdictions.

Interestingly, based on the empirical observations from this research project, three recommendations put forth by Peacock (13), as prerequisites for the application of PBMA, also arose here, namely the need for organizational stability, training on relevant economic principles and the presence of high level leadership. Several of the other points suggested by Peacock, including the need for integration of funding and priority setting mechanisms, acceptance of key players to examine both costs and benefits, the involvement of clinicians, and an ongoing commitment to refining priority setting activity, did not arise directly in the Alberta case studies, although they are certainly not contradicted either. In fact, intuitively, each of these further points are helpful, and thus should be considered in the refining of the empirical framework, as it is put to the test following the application of the PBMA framework in other settings, through future research. Indeed, as Peacock states, ‘Organizational context and policy changes during a PBMA study may ultimately determine whether the priority setting process is successful in changing the culture of planning, and in the implementation of study results.’

Finally, the box at the bottom of the model in Figure 1 provides several means for diffusion of the PBMA framework in a health region. Again, these are based on the empirical observations from this research project, and thus do not constitute factors that will necessitate success in applying PBMA. Coupled with work comparing the use of PBMA to other alternative uses of managerial time, an understanding of both how best to use PBMA (i.e., is it doing what it should be doing) and whether it is a worthwhile activity for managers, should result.
Figure 1: Model of PBMA Process

DECISION-MAKING CONTEXT
- Integrated delivery system (regionalization)
- Organizational behavior (barriers/ facilitators)

Inputs
- program with manager
- expert panel
- health economist
- research associate
- knowledge of PBMA
- relative organizational stability

PBMA Process
- one-on-one meetings
- program budget merely to support
- data not to be used as a crutch
- group to choose own criteria
- critical review of literature
- representative panel (not too large)

Outputs
- self-rated usefulness by participants
- further use of PBMA recommended
- improved knowledge of service area
- evaluation of historical services
- options for re-design proposed
- re-allocation of resources
- improved patient outcomes

Facilitators
- high level champion; strong leadership
- culture to learn
- consistent with managerial activity
- faced with actual decision to be made
- earmarked resources for process

Facilitators
- real decision has to be made
- culture open to change
- integrated budgets
- earmarked resources for follow-up

Barriers
- lack of trust between stakeholders
- physicians not on board
- mis-alignment of incentives
- no (real or perceived) authority to change
- lack of allocation experience
- vertical budget silos
- politics trumps evidence based medicine
- specific program ‘too small’

Barriers
- no genuine buy-in
- too many other demands
- politics prevents evaluation
- discontinuity of personnel

Factors which may assist diffusion of PBMA in (or to) a given health region
- select initial easy win
- make it known framework does exist
- disseminate results widely
- follow-up survey
5.0 Additional Resources

The following publications have directly resulted from this research project, or are currently under review at academic journals:

- Mitton C, Donaldson C, Halma L, Gall N. Setting priorities and allocating resources in regional health authorities: a report from two pilot exercises using program budgeting and marginal analysis (submitted).


The following reports were also submitted to the corresponding health regions:


At least two more manuscripts will be developed in the coming months that pertain to the implications of this research project, particularly with respect to Figure 1. Over 20 presentations related to PBMA, and this research project, have been given to health region personnel and clinicians in Alberta. Select slides from these presentations are
available by contacting the principal investigator. Two workshops on priority setting in health care have also been conducted in Calgary (Sept. 10, 1999 and Sept. 27, 2001), and one further seminar was held in Vancouver (June 27, 2000). These seminars were organized by Cam Donaldson and Craig Mitton, in conjunction with local health region personnel and funders. At this time, it is also the intention of the researchers to hold a seminar in Saskatchewan in Winter 2001, in conjunction with HSURC.
6.0 Further Research

Areas for future research are highlighted in Table 4.

**Table 4: Summary of future research areas**

| ➢ examine how evidence is used in PBMA exercises and how specifically the framework interacts (or deals) with political influences |
| ➢ examine whether managers have the power to make decisions in regionalized contexts |
| ➢ further consideration of the formal and informal processes that influence priority setting activity in health care organizations; carry out more in depth study of organizational culture in health regions and how this relates to priority setting |
| ➢ examine why managers often feel that, in the absence of data, historically funded services are ‘correct’; in relation, identify why managers (and clinicians) are apt to stick with the status quo of service delivery |
| ➢ examine whether PBMA is a worthwhile activity given other potential uses of the expert panel members’ time |
| ➢ conduct longer-term follow-up with patients impacted through the current research project case studies to identify long-term patient outcomes |
| ➢ test whether more explicit training in economic principles, and more detailed consideration of the group’s vision for the given case study, will influence the final outcomes |
| ➢ strike collaborations with health management researchers, to more explicitly examine priority setting set in the context of health care organizations |

A number of further key areas arising from this research project should also be mentioned in greater detail. Such activity includes further national and international work, as well as more in depth study within the specific health regions involved in this research project.

In terms of further work internationally, it would be of value to examine a sample of health regions that have used PBMA in order to identify in greater detail the longer-term outcomes of the given exercises. This would likely entail surveying health region personnel, using as a starting point the initial set of determinants put forth from the Authors Survey. Information such as the size of the health region, the employment of a
health economist, the familiarity or prior use of economic evaluations could be obtained, in addition to issues pertaining to the organizational structure and informal managerial processes could be considered. Ideally, based on this international body of literature, a construct of detailed points to consider when embarking on a priority setting exercise would be developed.

A wide array of valuable information was obtained through the survey of key decision makers. However, only three regions were surveyed, and it is not possible to know with certainty, in part because of the limited reporting in the literature on this topic, whether these results are truly generalizable to other provinces and countries. There would be great value in describing the priority setting process in other jurisdictions, particularly in light of the strand of research just mentioned, in identifying what has to be in place in the health region for explicit priority setting to occur. This could then be linked more formally to the management literature, for further investigation in the health care environment as to what is required if in fact managers are willing to move away from historical decision-making. Discussion is already ongoing with researchers in Australia who have expressed an interest in piloting the decision-makers survey with managers in health regions in that country. Developing a body of work that describes the current priority setting processes and elicits specific means of improvement from the decision-makers themselves would clearly be of value in the context of knowledge transfer and resource allocation more broadly.

In terms of the actual case studies, further use of the PBMA framework should be pursued in each of the three regions used for this research project. Seminars are planned in each of these regions to report on the findings thus far and attempts will be made to launch further exercises. However, as the research resources to conduct further case studies are no longer available, the health regions themselves will have to fund the activity. Other health regions in Alberta and elsewhere in Canada should also be approached to pilot the PBMA framework, but here the efforts may move away from the research paradigm and into contracts struck with the health economists to serve as consultants for the various projects. There is precedence for this model in Australia, but certain details would have to be worked out with respect to publication rights and use of
information derived in a given study to be put towards a body of knowledge pertaining to PBMA. In any case, such activity should be carried out with the consideration of the lessons learned from the case studies and follow-up survey, summarized in Table 2.

Importantly, from a research perspective, further to simply conducting more case studies, consideration must be given in each exercise to the context in which the priority setting activity is set. In this way, the empirical model depicted in Figure 1 can be used in two ways. First, the empirically derived model should be tested in further studies to determine if, in fact, relevant material is presented and the process is being accurately reflected; it may be that the model requires refinement, through evidence obtained from further case studies. Second, if the model does stand the scrutiny of further testing, the defined (or revised) outputs can be used as an evaluation framework upon which the success or failure of a particular PBMA exercise can be gauged. This will be an important advance in the literature, as, to date, most case studies have been conducted with little or no formal evaluation.

As well, it would be more important to examine the potential of developing a priority setting ‘office’ within a health region, rather than simply conducting additional PBMA case studies. Such an office could coordinate intra and inter-year funding requests, and begin a systematic rolling out of a framework like PBMA, as opposed to the one-off studies to date. The exact nature of the office, the relationship it would have with managers of all levels in the region, how physicians would tap into this resource, and the staffing of the office could be determined through survey work and introduction of methodologies such as participatory action research. Importantly, a case could be made for a health region priority setting researcher. Such an individual should have at least masters level training in health research, an understanding of the fundamental economic principles, and be able to facilitate groups and work alongside of managers and clinicians. Having resources earmarked for an individual within a health region to bring evidence to the decision-making table and coordinate priority setting activities needs to be examined, in part to determine if proactive decision-making and longer-term, evidence-based planning, would be facilitated.
In addition, a related area for future research would include developing a ‘toolkit’ on priority setting that could be given to managers wanting to conduct their own PBMA exercises. Such a ‘toolkit’, or training manual, would include relevant presentation material, information on how to carry out the various steps of the process, key references, and sources for support (e.g., staff within the priority setting office to assist in reviewing the literature). Based on the comments from the follow-up survey herein, it is feasible that with these resources provided, managers could undertake the activity without full involvement from the researchers. Key research questions for this further research are thus determining whether a priority setting office could be set up and what it would look like, and further working through the development of a priority setting toolkit to be used by managers conducting priority setting activity. Depending on the results from international comparisons with the survey of key decision makers, this strand of research may or may not also have applicability outside of Alberta. These latter two areas for future research (i.e., a priority setting office and a priority setting toolkit) comprise the primary focus for a Canadian Health Services Research Foundation Post-doctoral Fellowship, to be carried out jointly between the University of Calgary and Curtin University, Australia, from 2001-2003.
7.0 References


* Core or seminal articles to which the reader is directed for further details on PBMA, or on priority setting more broadly.