

Evaluating value-for-money of complex interventions within complex settings: Difficulties and proposed methods

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This paper aims to introduce ideas from complexity theory, supported by new institutional economics, to suggest principles and methods for conducting value-for-money evaluations on complex public policies. To illustrate why these methods are needed, a recent value-for-money evaluation of the Healthy Eating – Healthy Action Strategy in New Zealand is described.

Background

Complexity theory focuses on the study of complex systems, where a ‘system can be any collection of objects or processes deemed to be of interest’¹. Complex systems have particular properties, including: responsiveness to local context; being comprised of numerous system elements, including other complex systems; and, behaving in a non-linear manner²⁻⁵. A social phenomenon, such as increasing prevalence of obesity, is seen as emerging from the relevant social system as a whole. To understand a complex social phenomena, the social system from which the phenomenon emerges must be understood as a whole⁶, including constituent parts and their interactions.

There has been relatively little research into policy evaluation methods using complexity theory⁷. Insights into evaluation methods may, however, be gleaned from realist evaluative techniques^{8 9}, deliberative methods¹⁰, and developmental evaluation¹¹. Several common threads run through these evaluation approaches which allow a borrowing of approaches and methods. The first is that evaluation should be theory driven. That is, a theory of change of how the policy intervention is likely to impact on the social phenomena of interest is explicit within the intervention¹². The second thread is that the context within which the intervention is being implemented must be taken into account and interventions tailored for the relevant context. The third thread is that interventions should be developed through iterative stages, that is, evaluation information should refine the intervention in an ongoing and timely way.

The *Healthy Eating - Healthy Action: Oranga Kai - Oranga Pumau* (HEHA) Strategy was launched by the Ministry of Health in 2003 in response to increasing New Zealand concern about poor nutrition and sedentary lifestyles. The HEHA Strategy is an intersectoral framework, managed by the Ministry of Health. It has three linked goals: improve nutrition, increase physical activity and reduce obesity, with action directed at policy, environment, community and personal skill enhancement. A mixture of national level programmes and local initiatives have been used. At a regional level, funding was devolved to District Health Boards (geographically based health planning, funding and service agencies). The Ministry of Health also directly contracted with Public Health Units (PHUs, geographically based public health service agencies), community and NGO providers in the regions.

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The HEHA Strategy can be considered a complex policy due to its three linked goals, multiagency development and large number of programmes and initiatives. It can also be considered as operating within a complex setting due to operating across geographical layers, having different target population groups, including Māori (indigenous) and Pacific ethnic groups and children, and the flexibility for DHB regions to identify local priorities and some funding decisions.

In 2007 The Ministry of Health contracted a consortium of researchers to conduct an evaluation of the HEHA Strategy. The framework to evaluate the HEHA Strategy included investigation of four components: implementation; outcomes; ongoing learning and improvement; and value for money. The detailed evaluation framework is described elsewhere¹³. This paper will focus on methods related to the fourth evaluation question, assessing value-for-money.

The original value-for-money analysis was to consist of three types of analysis: (i) direct analysis of value-for-money, identifying costs (budgets) and benefits (outputs and outcomes); (ii) Programme Budget Marginal Analysis (PBMA); and (iii) Comparative Institutional Analysis (CIA), identifying the historical development of institutional arrangements supporting (or otherwise) the HEHA strategy. This paper focuses on the PBMA analysis, although the discussion also has implications for the direct and CIA analyses, as in practice it became difficult to separate these analyses for reasons discussed below.

PBMA seeks to compile a programme budget and then work with informants to conduct a marginal analysis to assess the impacts of changing costs or benefits. PBMA is a tool for considering the mix of activities to achieve maximum benefit from a given set of resources. PBMA is based on the economic principles of opportunity cost of not undertaking alternative activities, and marginal analysis of the benefit gained or lost from having one additional or less unit of activity^{14 15}.

The focus of this research was on exploring value-for-money through interviews with key stakeholders, and in particular identifying their views about which initiatives they felt were working to improve nutrition, increase physical activity and reduce obesity. The interview data would be supplemented by an analysis of budget data on financial allocations to particular initiatives. In addition, the research aimed to identify why stakeholders believed particular initiatives to be effective and what evaluation data existed to support these beliefs. The intended outcome of the PBMA analysis was to gather stakeholders' views regarding perceived value and effectiveness of initiatives, by asking what initiatives would be kept/abandoned, enhanced/reduced following marginal changes in budgets.

The PBMA data collection centred on key informant interviews. Interviews were conducted with informants within DHBs, PHUs and two Central Government departments. Nineteen interviews were conducted by phone and face-to-face, using a semi-structured interview format designed using the PBMA method. Originally around 35 interviews were to be conducted, however the data was proving to be of limited use, for reasons described below, and a decision was made to end data collection early.

Challenges in applying the PBMA method

The results of the PBMA exercise highlight limitations in the method for application to a complex policy. The limitations experienced are summarised below, and closely resemble limitations described by some authors coming from a new institutional economic position within the literature^{16 17}.

Determining costs and benefits –

A mixture of Ministry of Health and DHB contracts were held with providers in a region. Most informants had an incomplete picture of activity and therefore had difficulty assessing benefits between initiatives. Many of the DHB contracts were funded from Nutrition and Community Action Funds, responsibility for which was devolved to each DHB. Several informants suggested that the value of activity within these funds came from a mixture of the engagement and collaboration of communities in the process of developing nutrition and physical activity projects, as well as the specific projects themselves. Collaboration between agencies and community group involvement was seen as important for achieving HEHA Strategy aims, but analysis of the impact of increasing or reducing collaboration was difficult. The perceived value of collaboration suggests there are several consequences to interventions beyond the intended outcomes of interest.

Availability of evidence on which to base value judgements –

Many of the projects funded through the Nutrition and Community Action Funds had been small, and many were ongoing. Not all had been evaluated for impact on nutrition and/or physical activity outcomes, as the timeframe was too short and sample sizes too small to assess these in many cases. A lack of evidence of project effectiveness hampered the degree to which informants could consider the value of specific projects, as separate from the collaboration involved in delivering the projects.

Close tie between institutional arrangements and marginal value –

Where informants did identify areas for gains or losses through changes to programmes, these often related to institutional arrangements between the Ministry of Health, DHBs and communities. The particular institutional situation differed across the organisations within which the key informants were based. This created different contexts for assessing benefits and disbenefits of programmes, and made comparison between informants difficult without taking into account a range of institutional and contextual issues. For example, an informant in one DHB described funding for co-ordination and project management as the most important funding stream for their area, within a context where they described the existing infrastructure to deliver nutrition and physical activity programmes as limited. Another informant from a different DHB identified the Community Action Fund as most valuable as it addressed a need amongst local Māori communities, this time within a context described as a well-developed institutional arrangement for distributing money for Māori community projects. In both cases a mixture of identified need in the DHB area (e.g. infrastructure development or Māori health) and institutional arrangements to deliver programmes determined perceived value by key informants.

Political context of HEHA Strategy and funding –

Related somewhat to the institutional arrangements, the research took place during 2009 when the newly-elected National-led government made several decisions to re-prioritise HEHA related programmes and funding. Within a context where potentially

whole funding streams could be changed and government priorities for DHB actions were changing, several informants seemed to have difficulty thinking of value and impact of marginal changes in HEHA related funding and programmes.

Interpreting PBMA results using Complexity Theory

The ability for DHBs to vary implementation of the HEHA Strategy was built into the design of the Strategy itself. This means that the theories of change, contextual characteristics and iterative development of interventions were likely to vary between regions. The local variation created a barrier to developing a national picture of the HEHA Strategy. An averaging of experience across the country will remove the data from its local context and lose the link between context, mechanism and outcome. This is why the evaluation design included a CIA method to follow the PBMA exercise. What is suggested below is that these two methods are combined to consider value-for-money for complex policies within complex settings.

Complexity theory provides an insight into why the PBMA analysis of the HEHA Strategy value-for-money evaluation could not be separated from institutional considerations. Several informants had difficulty separating the value of collaborations used to identify initiatives and distribute funding, from the value of the initiatives themselves. Institutions can be viewed as complex systems of interacting elements¹⁷. The nature of the institution will have an influence on the costs of implementing an intervention, the nature of the outputs and the emergent outcomes.

The nature of complex systems means that the same outcome can be caused by different configurations of elements within a system, and interactions with other systems and their environments^{6 8 18}. To understand causation therefore, whole systems with differing configurations should be compared (comparative case studies)¹⁸.

Principles of a complexity theory informed economic evaluation

For the purposes of economic evaluation, a new institutional economic perspective has a number of similarities with complexity theory¹⁹. Jan²⁰ describes institutionalist theory as being a dynamic and evolutionary framework, which analyses the social rather than individualistic, and a holistic approach where economic order develops from the interaction between factors.

PBMA seeks to maximise efficiency through analysis of marginal costs and benefits, taking into account opportunity cost. It seeks to influence both allocative efficiency (are we doing the right things), and technical efficiency (are we doing things right). From an institutionalist (and complexity theory) perspective, both allocative and technical efficiency remain relevant questions – some interventions are likely to be more efficient at achieving certain outputs than others, or more relevant for a particular community. However, in assessing these they cannot be separated from the institutional arrangements within which programmes are operating¹⁶. In particular the concepts of instrumental and intrinsic value of the institutional arrangements may provide a useful addition to allocative and technical efficiency considerations^{2 17 21}.

Instrumental value considers how institutional change may influence future activities, reducing future transaction costs²¹. Key informants in the HEHA Strategy PBMA exercise discussed collaboration between agencies in their local communities initiated

for a particular purpose as being useful in other health needs assessment, programme planning and project implementation tasks.

Intrinsic value results from institutional change brought about by the interventions and considers 'how an intervention can institutionalise a prevailing set of values in decision making'^{21: 928}. Several key informants in the PBMA exercise discussed issues of reducing inequalities in health outcomes as important in valuing programmes and projects. Interventions were being judged against their ability to impact on an 'intrinsic' value of equity.

Methods for a complexity theory informed economic evaluation

As stated above, a comparative case study design has been identified as an appropriate method for researching complex systems. The number of cases selected is likely to depend on: (i) resources available; and (ii) the breadth of data required to describe the case (the system of interest). Because complexity theory assumes variation in system configurations across space and time, the generalisation of evaluation research will always rely on theoretical generalisation rather than representative sampling²². Cases should be selected to test theoretically predicted differences between cases²². For example, to evaluate the HEHA Strategy, we may theorise that the DHBs already providing interventions to improve nutrition and increase physical activity prior to the HEHA Strategy, would be able to develop effective interventions with HEHA funding faster than DHBs without such experience. Selection of cases would then be designed to examine differences in the system configurations, inputs and outcomes between two (or more) such DHBs. Indeed, in designing a final proposed stage for the evaluation, this was the approach that was chosen, however the evaluation ended before this final stage began.

For the purpose of economic evaluation, it is suggested that the following types of activity are conducted within each case: (i) description of the institutional context within which interventions are designed and implemented; (ii) description of financial and non-financial costs and benefits; and (iii) comparison of cost-consequence tables and cross-case comparisons. These are described in more detail below.

Describe institutional context

A change in the individuals or agencies involved in a programme, and how they interact, could have continuing influence on the effectiveness and efficiency of the intervention or programme of immediate concern, and future interventions. For this reason the network of agents involved in a programme, and their modes of interacting, should be tracked through the life of a programme.

Hawe et al.²³ propose four aspects to such an analysis: (i) describing how the procedures of an intervention have been incorporated with an organisation's usual routine; (ii) tracking changes in relationships through network analysis; (iii) identifying the distribution of resources through the network; and (iv) identifying what activities have been displaced by the intervention across the network. Each stage of this approach uses quite established methods of: documentary analysis (e.g. meeting agenda and minutes); social network analysis; and interviews. Preferably these four aspects of the analysis will be conducted as the intervention is designed and implemented (to capture changes as institutional arrangements develop); however, it is possible to conduct this analysis retrospectively.

Capturing costs and benefits

The essence of the PBMA method is useful, as long as it allows for consideration of intrinsic and instrumental values as well as direct monetary values of intervention. A useful adaption of PBMA to achieve this may be found in the participative cost-benefit method of Ziller and Phibbs²⁴. Ziller and Phibbs developed a matrix (Figure 1) to be filled in through participative stakeholder workshops. It aims to identify both financial and non-financial costs and benefits to both individuals and groups. Non-financial benefits may include aspects of collaboration that are difficult to quantify in financial terms. By looking at groups and individuals the process examines costs and benefits at multiple levels².

By being participatory, the process incorporates the advantage of PBMA, where informed stakeholders are used to identify costs and benefits in the absence of market signals¹⁶. Rogers et al.²⁵ have built on this method by differentiating between actual and potential costs and benefits, and using documents, surveys, and evaluation reports in addition to interviews and workshops to complete the matrix. This is a similar set of data as that used to describe the institutional context described above. It is likely that these two processes could be completed concurrently.

	Non-financial benefits	Financial benefits	Non-financial costs	Financial costs
Costs and benefits to individuals				
Costs and benefits to groups				

Source: Ziller and Phibbs^{24: 142}

Figure 1 Integrated cost-benefit matrix

Comparison of cost-consequences

To aid decision making regarding the distribution of resources across interventions, some authors have suggested the use of cost-consequence tables^{26 27}. The cost-consequence table acts to pull information together in a type of balance sheet. The cost-benefit matrix shown in Figure 1 would likely form the base of such a table for an intervention, with the addition of institutional context information. If presented to decision makers (relevant to the particular case from which the information was collected), then discussion can then be had regarding any desired changes in the allocation of resources between interventions to achieve certain consequences.

Comparing between cases

The final phase of the analysis requires a comparison between cases. Questions to ask in the case comparison analysis would include: do any cases appear to have similar outcomes emerging from different institutional contexts; do similar institutional arrangements have markedly different outcomes; and how closely does the valuation of interventions appear to be influenced by the institutional context? While the aim of the analysis is not to produce highly generalisable results, it is to provide an indication of what has worked well and in what situations. This can then be used to influence future high level (national) strategy development and allocation of budget. The results of individual cases may be of use in future resource allocation at the more local level at which analysis was conducted.

Conclusion

The HEHA Strategy is a complex intervention, implemented within complex settings. This complexity presents methodological challenges to evaluating value-for-money of programmes and interventions implemented under the Strategy. Complexity theory may offer several principles to guide evaluation, including: being theory driven; taking into account the implementation context; interventions developing through iterative stages; and that 'whole systems' should be compared.

For economic evaluation in particular, similarities between new institutional economic and complexity theories suggests that institutional methods may be usefully applied. This will include consideration of instrumental and intrinsic value of institutional arrangements, in addition to concerns of allocative and technical efficiency. Methods for economic evaluation consistent with these principles would focus on a case comparison, where within each case: a description of the institutional context within which the interventions are designed and implemented is made; the financial and non-financial costs and benefits are identified of interventions and institutional arrangements; and cost-consequence tables are developed to inform decision-makers assessment of programme mix to achieve desired outcomes.

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