

Models and applications for measuring the impact of health research: update of a systematic review for the Health Technology Assessment programme

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Scientific summary

Systematic review update for HTA programme

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Scientific summary

Background

In 2007, the Health Technology Assessment (HTA) programme published a review of approaches and tools for measuring the impact of health research programmes [Hanney S, Buxton M, Green C, Coulson D, Raftery J. An assessment of the impact of the NHS Health Technology Assessment Programme. *Health Technol Assess* 2007;**11**(53)]. We sought to update and extend that review in light of considerable advances in the field in recent years. Internationally, there has been a growing interest in assessing the impact of programmes of health research. Recent developments in the UK create a new context for considering impact assessment. These include the increasing recognition that much research is wasteful, the pressure on higher education institutions to demonstrate accountability and value for money, the expansion in routine collection of research impact data through national databases, such as researchfish® (researchfish Ltd, Cambridge, UK) and the large-scale assessment of research impact in higher education through peer review of case studies in the Research Excellence Framework (REF).

Objectives

Our objectives were to (1) identify the range of theoretical models and empirical approaches to measuring the impact of health research programmes; (2) develop a taxonomy of models and approaches, highlighting their underlying assumptions and their strengths and limitations for different purposes; (3) summarise the evidence on the application and use of these different models; and (4) evaluate the different options for taking impact assessment forward in the National Institute for Health Research (NIHR)/HTA programme.

In this we built on the previous HTA review, published in 2007, which covered the literature up to 2005.

Methods

The study design was a narrative systematic review, consisting of three linked phases: an update, an extension and an analysis/discussion. In the update phase, we systematically searched eight databases from 2005 (in August 2014); hand-searched selected journals; undertook reference checking and citation tracking of reviews and other key sources published since 2005; and drew on other studies known to the authors. We included conceptual or methodological studies describing models and approaches, and examples of empirical applications. We excluded studies that speculated about future impact or addressed solely the implementation of guidelines. Two assessors checked each potential paper for inclusion for relevance. Using a structured data extraction sheet, we extracted a standard data set from each paper, including source, model(s) or approach(es) used, factors associated with impact, and strengths and limitations. We charted these data on spreadsheets and produced a narrative overview of key findings.

In the extension phase, we explored a wider literature, with a view to theorising the range of different approaches to impact assessment. We used relevant papers from the main search described above and added selected studies published before 2005 if they provided theoretical insights for our taxonomy. Our analysis identified five 'ideal types' of philosophical perspectives underpinning impact models, although we acknowledged that most models in practice drew pragmatically on elements of more than one ideal type. The ideal types were positivist (which maps broadly to unenhanced logic models), constructionist (which links to interpretative and interactionist models), realist (which underpins models that emphasise context–mechanism–outcome–impact links), critical (which refers to participatory models of research) and performative (which informs many Co-production or co-creation models). The Payback Framework,

for example, includes an underlying logic model drawing out causal links between funded research programmes and subsequent impact. It has been enhanced with interpretative elements (a detailed narrative of how, and by whom, the study was set up, conducted and its findings disseminated). The Payback Framework's emphasis on how context affects the success of impact efforts also reflects elements of a realist philosophy.

In the analysis phase, we drew together the findings from the different components of the review and considered some higher-order questions.

Results

The literature on impact assessment has much expanded since 2005. It now includes a potentially confusing array of models that draw on different epistemological assumptions about the link between research and impact. Our search identified an initial sample of 513 potentially relevant sources, which was later reduced to a final sample of 161 papers including over 20 different models and with 110 empirical applications of these models.

The Payback Framework remains the most widely used model for evaluating the impact of funded health research programmes; it has been extensively applied, and sometimes adapted and refined by various research groups. Twenty-seven out of the 110 empirical studies of impact published since 2005 were based at least partly on the Payback Framework. Other robust models that show promise in capturing the diverse forms of health and non-health impacts from research include the Canadian Academy of Health Sciences framework, the research impact framework and various approaches to considering the monetised impacts of health research.

Different models and approaches rest on different assumptions. Some logic models imply a more or less linear link between a funded programme of research and its subsequent impacts, although most contemporary logic models acknowledge, and seek to capture, multiple intervening influences on this link. Social scientists tend to take a 'complex systems' approach, arguing that an emphasis on 'hard' (that is, measurable and attributable) impacts is misplaced and that more attention should be given to the relationships and 'productive interactions' occurring in a multistakeholder network. The most widely used models (notably the Payback Framework) are eclectic and pragmatic, supplementing an underlying logic model with attention to the key relationships and interactions at different stages in the chain of causation. Such approaches enable factors in the organisation of research to be identified that seem to be associated with an increased possibility of achieving impact, for example collaboration to set research agendas relevant to needs of the health-care system.

We identified three emerging literatures that have particular potential to inform the HTA's assessment of the impact of its future research programmes: (1) approaches to measuring monetised impact; (2) approaches to assessing the contribution of randomised controlled trials (RCTs) to systematic reviews and meta-analyses; and (3) approaches to assessing the contribution of RCTs to stopping treatments that are ineffective. The case study approach to impact assessment in the 2014 REF, published just as this report was going to press, also deserves attention.

Discussion

Summary of options and recommendations

The findings of this review support the continued use of the Payback Framework by the HTA programme. The fact that the programme's funding, like the rest of NIHR, comes from the funds allocated to the Department of Health, means that a major part of the impact must be concerned with meeting the needs of the NHS. Changes in the structure of the NHS, the development of NHS England and changes in the National Institute for Health and Care Excellence's remit pose new challenges relating to identifying, and meeting, current and future research needs.

The social science literature highlights the importance of building and maintaining relationships between different stakeholders in the design and conduct of research (including sponsors, researchers, citizens and policy-makers) in order to build a shared understanding of research priorities and create interest and engagement in particular programmes of work (hence, improve dissemination and impact after these are complete).

Logic models that assume a more or less direct link between a programme of work and its subsequent impact (e.g. funding a clinical trial of a drug or procedure, which influences a guideline, which, in turn, influences clinical practice and thence patient outcomes) may be appropriate for the bulk of HTA-funded research, especially systematic reviews and trials. These models, however, may need to be modified and/or supplemented by other approaches when the research programme addresses such issues as organisational change or the collaborative development of research partnerships, such as Collaborations for Leadership in Applied Health Research and Care.

Future assessments of the impact of the HTA programme will have to take account of wider policy changes, notably the REF, which may continue to rely on peer review of case studies as a measure of impact. Besides searching the REF case studies to identify examples of work funded by the HTA programme, a recommendation for future research is to explore how case studies of impact from programmes such as the HTA should be structured in the future. The selection of case studies, such as in the REF, but also more generally tends to be biased towards 'good news' stories. Other fields indicate that much can be learnt from failures.

The adoption of researchfish by most major UK research funders also has implications for future assessments of impact. Although the routine capture of indexed research publications has merit, the degree to which researchfish will succeed in collecting other, non-indexed outputs and activities remains to be established.

One option for the HTA programme is to plan how best to meet the data requirements of future impact assessments, both those undertaken by the programme but also external assessments such as the REF. The likely data requirements of future assessments of impact and of the REF need to be planned for, and included, either in management information systems or in special projects.

We recommend a review of case studies and their application to health research, including the 2014 REF, combined with independent preparation of case studies of new HTA projects. This review should include both successful and unsuccessful projects. It should also include cases regarding the monetisation of impact and the linking of trials to systematic reviews and guidelines. Particular case studies might contrast the tracing forward/backward methods of linking particular research projects to policy changes.

Research is required on the role of ongoing electronic data collection of the kind involved with researchfish. This should assess the strengths and weaknesses of this approach, the extent of bias, such as towards indexed publications, and the extent of researchers' compliance and their concerns about this approach.

Research is also required on optimal methods for assessing the impact of randomised trials on systematic reviews and guidelines. The York/Patient-Centered Outcomes Research Institute's methods currently being piloted by the HTA programme should be evaluated along with the scope for use of Grading of Recommendations Assessment, Development and Evaluation. This research should also address ways of assessing the value of randomised trials and meta-analyses that show no statistically significant difference between interventions.

In relation to NIHR more widely, research is required on the appropriate measures of impact for its research programmes and initiatives other than the HTA programme.

Conclusions

Research funders can benefit from continuing to monitor and evaluate the impacts of the studies they fund. Besides continuing to use the Payback Framework, they might consider how best it might assist data collection relating to estimating impact in monetary terms. They might also routinely assess the impact of the trials it funds on subsequent systematic reviews and clinical guidelines.

Financial constraints on health services mean that health research must demonstrate societal impact and value for money. Methods for doing so have developed considerably in the last few years. Although not without caveats, these methods should be applied routinely to help safeguard the effectiveness and cost-effectiveness of research programmes.

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Reviews in *Health Technology Assessment* are termed 'systematic' when the account of the search appraisal and synthesis methods (to minimise biases and random errors) would, in theory, permit the replication of the review by others.

HTA programme

The HTA programme, part of the National Institute for Health Research (NIHR), was set up in 1993. It produces high-quality research information on the effectiveness, costs and broader impact of health technologies for those who use, manage and provide care in the NHS. 'Health technologies' are broadly defined as all interventions used to promote health, prevent and treat disease, and improve rehabilitation and long-term care.

The journal is indexed in NHS Evidence via its abstracts included in MEDLINE and its Technology Assessment Reports inform National Institute for Health and Care Excellence (NICE) guidance. HTA research is also an important source of evidence for National Screening Committee (NSC) policy decisions.

For more information about the HTA programme please visit the website: <http://www.nets.nihr.ac.uk/programmes/hta>

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