UNIVERSITY OF PRIMARY HEALTH CARE AND RESEARCH & INFORMATION SERVICE

FOCUS on...

UNDERSTANDING & MEASURING RESEARCH IMPACT

Main messages

- Research impact refers to the value and benefit associated with using the knowledge produced through research, and being involved in conducting research.

- Knowledge produced through research can be used in three main ways - instrumentally, conceptually and symbolically. Instrumental use influences direct changes in policy, practice and behaviour. Conceptual use influences changes in levels of knowledge, understanding and attitudes. Symbolic use is about persuasion, leading to action or inaction.

- The conceptual use of knowledge produced through research is more important to the day-to-day professional activity of professionals and managers in government agencies than symbolic use, which in turn are more important than instrumental use.

- Factors in the users' context are the main predictors of the uptake of research knowledge by government officials.

- Measuring research impact is a challenging endeavour because of its multi-dimensional, unpredictable, non-linear and contingent nature.

- Meaningful approaches to measuring research impact should relate to the main ways research is used and the range of forms in which research impact occurs. They should also acknowledge the contribution of activity occurring at different stages of the research cycle and in both the researcher and user settings.

- Effective measurement of research impact needs to incorporate assessment of conceptual and symbolic use of research knowledge as well as instrumental.

- Capacity for effectively measuring research impact is still developing; however experience so far provides some valuable learning for methodological, practical and policy activity.

CONCENTRATING ATTENTION - MAXIMISING CLARITY AND DEFINITION

With the aim of informing primary health care policy and practice in Australia, this research summarises examples of key recent research findings identified by the authors. Feedback and suggestions for future issues in this FOCUS on... series are welcomed.

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Introduction

The current interest in measuring research impact is driven by the ‘accountability agenda’ world wide. This agenda puts greater requirements on researchers and research bodies to demonstrate utility and value to funders (and to the public more generally) for investments in their projects and programs.¹ In the health sector this activity is becoming increasingly important when funding for research and development is often seen to be in competition with spending on direct health services.²

In Australia pressure to demonstrate research impact comes through a number of channels. The Wills Review of Health and Medical Research³ identified a potential virtuous cycle between government, research and industry, where increased investment in research and enabling initiatives could deliver benefits to all Australians. The subsequent Investment Review of Health and Medical Research⁴ undertaken in 2004 checked on progress towards achieving this virtuous cycle, and recommended vastly improving capacity to translate research into effective policy and practice. One recommended strategy was funding policy-and-practice-focused research, which has a goal of delivering insight into improvements in delivery of health outcomes. It involves top-down and bottom-up initiated research focused on driving changes in the health system or underlying population health in the short to medium term. The Investment Review identified the potential returns on national investment in health and medical research as consumer benefits in terms of extending and improving the lives of Australian people, and producer benefits by providing economic benefit through more knowledge-based jobs.

The Research Quality Framework announced during 2005, was set up to ensure government resources provided to carry out research are directed to areas of research excellence and research impact and benefits to Australia (retrieved 7 September 2005 from http://www.dest.gov.au/sectors/research_sector/policies_issues_reviews/key_issues/research_quality_framework/rqf_preferred_model.htm#The_RQF_Preferred_Model). Approaches to putting the framework into practice are currently being developed, with a preferred model released for consultation in September 2005.


In focusing on Understanding and measuring research impact, this paper covers:

1 Aspects of health research impact
   • what does research impact mean
   • the users of research and the types of research use
   • factors influencing research use and approaches to increase research use

2 Measuring the impact of health research
   • challenges for measurement
   • forms of research impact
   • determining approaches and criteria
   • approaches to measuring research impact
   • learnings from practice.
1 - Aspects of health research impact

1.1 What does research impact mean?

The term research impact describes the effects and outcomes, in terms of value and benefit, associated with the use of knowledge produced through research. Some argue that research use or utilisation is not quite the same as research impact. In their view ‘the concept of payback [research impact] is broader than use or utilisation including knowledge at one end of the spectrum and valuation of the impacts of research use at the other’.

Multiple terms are used to refer to the concept of research impact. These include research ‘benefit’, ‘payback’, ‘translation’, ‘transfer’, ‘uptake’ and ‘utilisation’.

In this paper we use a broad definition of the term, recognising the different ways research knowledge can be used, and the range of possible effects and outcomes that may occur as a result of this use. We acknowledge that this broad definition may not always be feasible when measuring research impact in practice. For example, researchers at McMaster University, Canada, argue the use of research knowledge to inform decision making (not a change in health status) is the most appropriate measure of the impact of research that can be assessed in the health sector (retrieved 7 September 2005 from http://www.researchtopolicy.ca/documents/printManager.asp).

1.2 Users of research and types of research use

1.2.1 Users of research

Knowledge produced through research can be used individually, organisationally and at the system level. In the health sector in these setting the main types of users of research knowledge are the public, patients and health consumers, civil society, non-government organisations, clinical service providers, health system managers, researchers and policy makers.

1.2.2 Types of research use

An understanding of the different ways research can be used is critical to approaches to measuring research impact (Table 1). This understanding also assists in:

- indicating areas on which any subsequent assessment approaches should focus
- informing the scope of measurement activity (e.g. assessment in relation to contribution to knowledge, decision making or broader public good benefits),
- highlighting the factors appropriate to measure
- identifying what criteria would be most relevant to use.

Research can be used either directly or indirectly. For instance, research knowledge can be used directly in decision-making related to policy and practice. Indirectly it can contribute to the formulation of values, the creation of new understandings and possibilities and the quality of public and professional discourse and debate.

Different types of research use represent attempts to describe the many ‘routes to influence’ of research knowledge. These different types are complementary and can simultaneously play a significant role in research impact in government agencies. This view highlights the cyclical, iterative nature of the process of research use.

<table>
<thead>
<tr>
<th>Type of research use</th>
<th>Basic characteristics</th>
<th>Key area of influence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Instrumental</td>
<td>Direct/linear</td>
<td>Changes in policy, practice and behaviour</td>
</tr>
<tr>
<td>Conceptual</td>
<td>Indirect/enlightenment</td>
<td>Changes peoples’ level of knowledge, understanding, and attitudes</td>
</tr>
<tr>
<td>Symbolic</td>
<td>Indirect</td>
<td>Attempts to sway people in a persuasive way. Can lead to mobilisation of support for action, or inaction, and wider influence</td>
</tr>
</tbody>
</table>

Table 1: Main types of research use, their characteristics and key area of influence

Acknowledgement

The idea for a paper addressing measurement of research impact was initially proposed and outlined by Professor Mark Harris and Gawaine Powell-Davies of the Centre for GP Integration Studies at University of New South Wales in 2004, after a meeting of the Australian Primary Health Care Research Institute, the National Institute for Clinical Studies and the Primary Health Care Research and Information Service (PHC RIS). The idea has been carried forward in this paper by PHC RIS, with their support and encouragement.
A recent study found that the conceptual use of research was more important to the day-to-day professional activity of professionals and managers in government agencies than symbolic use, which in turn was more important that instrumental use. The results also showed that policy domains like health, social services and education rely more intensively on all forms of research use, than other policy domains. This indicates that effective measurement of research impact needs to incorporate assessment of conceptual and symbolic use as well as instrumental.

The knowledge utilisation literature emphasises that process factors associated with each type of research use play an important role in supporting (or inhibiting)
2 - Measuring the impact of health research

2.1 Challenges for measurement

Measuring research impact is recognised as a challenging endeavour.\textsuperscript{5,17,21} The challenges include that benefits and value from research knowledge may accrue slowly,\textsuperscript{21} are often unpredictable,\textsuperscript{2} can be difficult to track or trace,\textsuperscript{2,17} and that benefit or value is contingent in nature.\textsuperscript{17} Furthermore, the criteria and indicators used to assess impact will always be dependent on the mission of a specific research group or institution.\textsuperscript{25}

Associated challenges include:

a The impact of research has many possible dimensions,\textsuperscript{22,11} which may require:
- Identifying the impact of research knowledge in a variety of settings, for example on researchers; policy, managerial and professional practitioners; social behaviour or public discourse.\textsuperscript{17}
- Assessment across the types of research impact (instrumental, conceptual or symbolic), and of process factors associated with impact\textsuperscript{2}
- Assessing the effects of new knowledge on the value of old, ignored, used up or simply unrecognised research by lending new life to previous findings.\textsuperscript{21}

b Whilst it is relatively simple to measure outputs from research, it is far more complex to measure less tangible effects and consequences of research knowledge use. For example in their 2003 Performance Report, The Canadian Institutes of Health Research, identify that:

'while an agency can quite easily count research outputs such as the number of articles produced by the research, the number of students who trained in research while working on a given project or the number of potential users with whom the research collaborated, an analysis of the social and/or economic outcomes flowing from these outputs requires in-depth study' (retrieved 12 September 2005 from http://www.tbs-sct.gc.ca/rma/dpr/02-03/CIHR-IRSC/CIHR-IRSC03D01_e.asp> pp 45).

The unpredictable, non-linear and contingent nature of research impact and its associated processes needs to be taken into account in approaches to measuring research impact.\textsuperscript{17,8}
“Whilst it is relatively simple to measure outputs from research, it is far more complex to measure less tangible effects and consequences of research knowledge use.”

2.2 Forms of research impact

Research impact can take a range of forms in the health sector, from contributing to knowledge and understandings through to influencing broader economic benefits to society (Table 2). When developing approaches to measuring the impact of research, different measures may be appropriate for different forms.

2.3 Determining approaches and criteria

To account for the ‘unpredictable, non-linear and contingent nature of research impact’, it is proposed that measurement approaches and criteria are developed within a multidimensional framework, addressing:

- How research impact will be defined
- Where to look for research impacts (i.e. who are the research users?)
- When to look for impact (i.e. when did research take effect?)
- How to assess specific contributions made by research (i.e. was the research knowledge really the key factor in any changes?)

<table>
<thead>
<tr>
<th>Forms</th>
<th>Descriptor</th>
<th>Potential type of research use</th>
</tr>
</thead>
<tbody>
<tr>
<td>Knowledge</td>
<td>Contribution to information and understandings</td>
<td>Conceptual</td>
</tr>
<tr>
<td>Benefits to future research and research use</td>
<td>The better targeting of future research</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>The development of research skills, personnel and overall research capacity</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Critical capability to utilise appropriately existing research including that from overseas</td>
<td>Conceptual</td>
</tr>
<tr>
<td></td>
<td>Staff development/educational benefits (including practitioner receptivity to research and findings from research)</td>
<td>Conceptual</td>
</tr>
<tr>
<td>Political and administrative benefits</td>
<td>Improved information basis on which to take political and executive decisions</td>
<td>Conceptual</td>
</tr>
<tr>
<td></td>
<td>Other political benefits from undertaking research (including deflecting criticism/delaying immediate decision making and justification of a political position)</td>
<td>Symbolic</td>
</tr>
<tr>
<td>Health sector benefits</td>
<td>Cost reduction in the delivery of existing services</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Qualitative improvements in the process of service delivery</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Increased effectiveness of services</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Equity, for example improved allocation of resources at an area level, better targeting and accessibility</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Revenues gained from intellectual property rights</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Organisational development</td>
<td>Conceptual</td>
</tr>
<tr>
<td>Broader economic benefits</td>
<td>Wider economic benefits from commercial exploitation of innovations arising from research and development</td>
<td>Instrumental</td>
</tr>
<tr>
<td></td>
<td>Economic benefits from a healthy workforce and reduction in working days lost</td>
<td>Instrumental</td>
</tr>
</tbody>
</table>
Two potential frameworks for determining criteria are provided below:

1 Key questions for designing a measurement approach

- How is impact assessment to be focused? (e.g. will the focus be on the research environment; user environment or on uptake initiatives?)
- Who are the key stakeholders of the measurement effort and why do they want information?
- What is the assessment primarily for? (e.g. for learning (assessments emphasise process) or for judgments (assessments emphasise outputs and outcomes)?)

2 A three step process for assessing research impact, including determining measurement criteria

Step 1 - Identify target audiences for the research knowledge funded or produced:
- general public
- patients and their families
- clinicians
- managers
- research and development officers
- public policy-makers.

Step 2 – Select the appropriate category of measures based on who has been actively promoting research use among these target audiences
- ‘producer-push’ - if researchers have led effort
- ‘user-pull’ - if decision-makers have led efforts
- exchange - if researchers and decision makers have jointly led efforts.

Step 3 – Select measures given the resources available to measure impact and other constraints
- process measures if limited resources available (e.g. number of papers published)
- intermediate outcome measures if sufficient resources are available to conduct a survey (e.g. changes in awareness)
- outcome measures if sufficient resources are available to conduct case studies that can assess whether research knowledge was used in the context of competing influences on decision-making process and how the research knowledge was used (i.e. whether it was used in instrumental, conceptual or symbolic ways).

2.4 Learnings from practice

Although capacity for effectively measuring research impact is still developing, there are some examples where research impact has been measured. One such example is the work led by the National Institute of Clinical Studies (NICS) where they sought to gather feedback from recipients of NHMRC grants. Findings, based on a response rate of 54% (63/117 grant recipients responded), showed that while 73% had published journal articles discussing findings from research funded by the grants and 77% had presented at conferences/seminars, only 19% had so far resulted in changes in clinical practice.

A project assessing research impact from 115 Departments of Health and National Health Service research and development projects, found that:

- Research impact occurs at various stages in the research utilisation cycle
- It is difficult to show how far behaviours may have changed as a result of research findings alone.
- Some impacts result directly from processes of conducting research, rather than only from the effects or outcomes of research use.
- Impact factor analysis may underestimate the payback from some applied projects in that no account is taken of the journals which nevertheless may be widely read.
- Bibliometric measures (associated with journal impact factor) were not well correlated with ‘benefit’ score; i.e. almost half of the projects in this study that did not have any journal publications had benefit score, indicating they had impact on policy or practice through dissemination by means other than journal publication and/or being applied in the unit in which the research was conducted.
- A well designed questionnaire might be a useful and sufficiently reliable technique to obtain a broad brush picture, even though case studies provide a fuller and more reliable direct comparison of individual projects.
- Assessing research impact can contribute to research governance, and if research impact is to be maximised then time and effort has to be invested.
- If measurement occurs against a broad definition of research impact (Table 2) it would be quite unreasonable to expect most projects to demonstrate impact in all forms.

The process of undertaking a study of factors that improve the use of research in social policy revealed that:
Reflections from a Research Unit for Research Utilisation seminar\(^{14}\) highlighted:

- The need to step beyond using measures of research impact that are straight forward, quantifiable and readily accessible.
- The importance of intermediate outcomes in measuring research impact, because the influence of research on ultimate outcomes is difficult to disentangle.
- The need to evaluate interventions - processes and behaviours – that encourage research impact, and to build interactive cultures that promote two-way flows of information.
- The need to find a balance between impact oriented research and basic research, i.e. in an environment of increasing expectations of accountability the need to protect research that does not have immediate or direct impact.

### 2.5 Models for measuring health research impact

Meaningful approaches to measuring research impact rely on understanding the main ways research can be used and the range of forms in which research impact occurs. Ideally, they should acknowledge the contribution of activity occurring at different stages of the research cycle and in both the researcher and user settings.

They also need to be purposeful, pragmatic and cognisant of the complexities involved.\(^{27}\) In practice, this may mean that when a more comprehensive approach to measuring research impact maybe too complex and expensive, relative to the likely benefits, adopting a few key approaches would be useful. These include:

- Using an expert panel to provide an informed opinion about impact
- Developing a file to record personal testimonies
- Conducting detailed assessments from case studies
- Developing proxy measures of impact.

Two examples of comprehensive models for measuring research impact relevant to health are provided below:

**Model 1: Input/output model for assessing research impact\(^{5}\)**

This model (Table 3) identifies inputs and outputs according to different stages of the research cycle.\(^{8}\) The approach acknowledges that activity at different stages of the research cycle contributes to research impact. Effects or outcomes are conceptualised as primary, secondary or final impacts depending on the stage of research through which they occur. The model represents an attempt to combine elements of a rational, linear model with a more interactive model.\(^{8}\) It offers some possible measures or data sources for effects or outcomes occurring at different stages and in different forms.
Conclusion

Capacity for effectively measuring research impact is still developing; however experience so far provides some valuable learning for methodological, practical and policy activity.
Table 4: Producer-push; user-pull and exchange processes - Outputs and measures²⁴

<table>
<thead>
<tr>
<th>Type of measure</th>
<th>Effects/outcomes</th>
<th>Data sources/measures</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Producer-push (researcher setting)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process outcomes</td>
<td>Number of products published (e.g. peer-reviewed papers)</td>
<td>Researcher’s CV, literature search</td>
</tr>
<tr>
<td></td>
<td>Number of products targeted at specific decision-makers (e.g. summaries of take-home message from a body of research)</td>
<td>Researcher’s calendars and research organisation files</td>
</tr>
<tr>
<td></td>
<td>Number of interactions with decision-makers held at request of researchers (e.g. academic detailing visits, policy briefings)</td>
<td></td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td>Decision-maker’s awareness of research (and its source), knowledge of research (and its source) attitudes towards research (and its source)</td>
<td>Surveys of, or structured interviews with, decision-makers</td>
</tr>
<tr>
<td>Final outcomes</td>
<td>Decision-maker’s self-reported use of research</td>
<td>Surveys of, or structured interviews with decision-makers, document reviews</td>
</tr>
<tr>
<td></td>
<td>Decision-maker’s actual use of research in the context of competing influences on the decision-making process</td>
<td>Unstructured interviews of decision-makers, observations of processes, analyses of data collected for other purposes (e.g. admin. data, minutes)</td>
</tr>
<tr>
<td><strong>User-pull (user setting)</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process outcomes</td>
<td>Number of information requests by decision-makers</td>
<td>Research organisations files</td>
</tr>
<tr>
<td></td>
<td>Number of web hits by individuals with domain names suggesting a decision-maker organisation</td>
<td>Research organisation’s websites records/counters</td>
</tr>
<tr>
<td></td>
<td>Number of newsletter subscriptions from individuals with mailing addresses for decision-maker organisations</td>
<td>Research organisations files</td>
</tr>
<tr>
<td></td>
<td>Number of interactions with decision-makers held at request of decision-makers</td>
<td>Researcher’s calendars and decision-maker organisation’s files</td>
</tr>
<tr>
<td></td>
<td>Number of research projects commissioned by decision makers</td>
<td>Research organisation’s files, researchers CV</td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td>Decision makers awareness of research organisation’s expertise, knowledge of research organisation’s expertise, attitudes towards research organisation’s expertise</td>
<td>Surveys of or structured interviews with decision-makers</td>
</tr>
<tr>
<td>Final outcomes</td>
<td>Decision-makers self-reported use of research organisations as an information source</td>
<td>Surveys of, or structured interviews with, decision-makers, document reviews</td>
</tr>
<tr>
<td></td>
<td>Decision-maker’s actual use of researcher organisations as an information source</td>
<td>Unstructured interviews with decision-makers, observations of processes, analysis of data collected for other purposes</td>
</tr>
<tr>
<td><strong>Exchange</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Process outcomes</td>
<td>Research organisations involve decision-makers in the research process</td>
<td>Research organisations files</td>
</tr>
<tr>
<td></td>
<td>Decision-making organisations involve researchers in decision-making processes</td>
<td>Decision-making organisation’s files</td>
</tr>
<tr>
<td>Intermediate outcomes</td>
<td>Decision-maker’s and researcher’s assessment of how they were involved in the decision-making process</td>
<td>Survey of, or structured interviews with decision-makers</td>
</tr>
<tr>
<td>Final outcomes</td>
<td>Research organisation’s research reflects (at least in part) the research needs and context of decision-makers</td>
<td>Research organisation’s files &amp; survey or interviews with decision-makers</td>
</tr>
<tr>
<td></td>
<td>Decision-making organisation’s decisions reflect (at least in part) the research available to them</td>
<td>Decision-making organisation’s files and survey or structured interviews with researchers</td>
</tr>
</tbody>
</table>
References


FOCUS on... PHC RIS

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