

Mapping the impact

Exploring the payback of arthritis research

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The Arthritis Research Campaign (**arc**) invests over £25 million a year in universities and medical schools to fund a wide spectrum of research. This is raised entirely through voluntary contributions, not only substantial donations from the corporate sector and endowment trusts but also organised fundraising efforts in the community, such as charity shops, and the efforts of thousands of individuals who make bequests or raise money through sponsorship.

The Arthritis Research Campaign has a responsibility to these donors to demonstrate that their money is being spent effectively. The charity also needs to understand the strengths of the various research streams in which it invests. It is important to identify the nature of different impacts in order to decide how to allocate future research budgets.

Previous extensive case study work by RAND Europe had shown that there are substantial and diverse benefits and impacts resulting from arthritis research. These include improved treatment for people with the disease, advances in practitioner learning and patient care, improved public health service advice, and the acceleration of future research.

Like most other funders, **arc** has traditionally monitored its expenditure and collected information about the research it funds through end-of-grant and progress reports. While these are an important source of information, they are generally presented as free-form descriptions of achievements, from which it is very difficult to extract data to provide an overview. Previously, **arc** had no systematic method for reviewing its research portfolio as a whole or for gathering and analysing data from the entire span of its investments.

Our investigation of methods of data collection and analysis used by similar funding bodies revealed that none had a method for capturing the diverse range of impacts produced by research. Our aim was to develop a survey system that would be applicable to the entire **arc** research

Abstract

The decision of the Arthritis Research Campaign (**arc**) to map its entire research portfolio and analyse the returns and outcomes associated with individual investments was groundbreaking. Nothing similar had been attempted by other major funding organisations and there was no freely available tool for the task.

The mapping tool had to be capable of producing data that would stand up to sophisticated analysis while imposing minimal time and cost burdens on administrators, researchers and data processors. The final tool took the form of a simple, tick-box-based Web questionnaire that took most researchers less than an hour to complete.

The impact map generated by the tool enables **arc** to see the returns from individual grants and compare different types of grant. The charity intends to use accumulated data to inform its funding strategy and project evaluation.

portfolio, yet remain simple to administer, complete and analyse. We set out to satisfy a number of basic criteria and principles (see text box on next page).

We devised a survey tool – an easily implemented online questionnaire – that will map the impacts from **arc**'s research portfolio on a grant-by-grant basis – capturing the impacts produced by every funding initiative.

We designed and evaluated a variety of approaches to this task before selecting the most promising and appropriate methods. Throughout the process, we were guided by extensive consultation with over 40 **arc** researchers and the **arc** senior management team.

The survey tool

The interactive Web questionnaire asks researchers about the work they have done, how it has

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The ideal survey system	
Benefits captured	<ul style="list-style-type: none"> The largest possible range of benefits and impacts (beyond publications and research qualifications).
Low burden	<ul style="list-style-type: none"> Low burden in terms of time taken for completion and cost of administration. Collection of analysable data only.
Overview	<ul style="list-style-type: none"> A portfolio overview to inform strategy, influence future funding decisions and provide a foundation for detailed evaluation.
Wide applicability	<ul style="list-style-type: none"> Applicable to all areas of arc research.
Fairness	<ul style="list-style-type: none"> Capture information fairly, allowing reasonable comparisons of groups of grants/types of research.
Aggregation	<ul style="list-style-type: none"> Enable impacts of many grants to be aggregated.
Granularity	<ul style="list-style-type: none"> Separate impacts of different types (e.g., the production of knowledge and influence on health policy) to allow the strengths of different types of research to be explored.

developed and the impacts it has had. The questionnaire is divided into nine sections containing 216 different types and stages of impact. Researchers do not have to answer every question – they start by navigating the survey and identifying the areas pertinent to their work. They can complete it in stages and revisit some responses before submitting their data. The vast majority of researchers complete the questionnaire in 30–60 minutes.

Researchers fill in the questionnaire by ticking boxes, usually indicating Yes, No or Not Known, and have the opportunity to submit comments and additional information if they wish. Figure 1 shows typical questions from the Future Research and Interventions/Products sections of the questionnaire.

Implementation and piloting

The tool was implemented using Open Source software. Personalised email invitations to complete the survey were sent out to researchers across **arc**'s portfolio including basic scientists, research clinicians and health service researchers. Hyperlinks in these email messages took them straight to their individual questionnaire. Completion was monitored online, and late respondents were chased through email, telephone calls and personal follow up from **arc**.

As a proof of concept, we applied the instrument to **arc** research grants that finished in 2002 and 2006. The response rate was 87% of researchers for which **arc** had contact details (75% of all eligible grants), and over 90% of researchers reported that they spent less than an hour filling in the questionnaire.

Figure 1
Sample tick-boxes eliciting different types of information

4.2: Future Research - Further Research

Has your research on this grant led to discussions about possible collaborations, consultancy or similar? If so, which of the following have taken place? Note that we ask about Material Transfer Agreements (MTAs) in this section, as a marker of collaboration; patents and intellectual property impacts are dealt with later in the questionnaire.

1. Interactions with researchers in academia/non-profit organizations:

	Yes	No	Not Known
Have you had initial discussions about collaboration or informal knowledge exchange?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Did these discussions lead to co-applications for funding?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If so, were these successful?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, did these discussions lead to co-publications?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, did these discussions lead to Material Transfer Agreements (MTAs)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, did these discussions lead to sharing of reagents without MTAs?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

2. Interactions with researchers in industry:

	Yes	No	Not Known
Have you had initial discussions about collaboration or informal knowledge exchange?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
If so, did these lead to consultancy?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, Material Transfer Agreements (MTAs)?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, collaborations leading to co-publication?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
And/or, an industry initiated research programme?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

3. Other interactions not captured above

8.1: Interventions/Products - IP

1. For the research cited by patents, or intellectual property protection, which stages were carried out during the grant, or have happened since?

	Yes	No	Not Known
Cited in a patent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patent applied for/filed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patent granted	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Patent licensed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8.3: Interventions/Products - Diagnostics

1. For the diagnostic test, which stages were carried out during the grant, or have happened since?

	Yes	No	Not Known
Test development	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proof of concept	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Proof of efficacy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Regulatory approval	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
On the market	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
trials a current diagnostic in a new environment or context	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

8.8: Interventions/Products - Health Advice

1. For the new, or revised, public health advice, at what level has this advice been disseminated?

	Yes	No	Not Known
By your research group	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
By arc	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
By the Department of Health	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Internationally	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Caveats

All research assessment involves compromise. The challenge of this project was to develop a tool that could be used across a portfolio, and inevitably trade-offs had to be made. Four of these compromises were typical of research evaluation. First, we had to balance a desire for more detailed information with the need to minimise the burden on researchers. Second, our data depended on the extent to which researchers are aware of their impacts, and their honesty. However, aggregation should dilute the effects of individual exaggeration, and there is evidence that researchers do not generally overstate their impacts (Hanney, 1999). Third, researchers might misinterpret or misunderstand our questions. To minimise confusion, we made questions as concrete as possible and trialled them extensively. Finally, for attribution we relied on researchers' judgement and asked them only for impacts that were 'significantly' attributable to the grant in question.

One more novel trade-off involved quantifying impact. We chose to ask only whether a grant produced a particular impact. We did not ask researchers to quantify numbers or size. If a grant produced more than one of a particular output – e.g., PhDs – we captured only that a PhD was produced, not how many. While it would be simple to capture the number of PhDs (although a PhD may be funded by more than one grant) other outputs are more problematic, e.g., 'Discussions with Industry'. It is easy to say discussions happen, but hard to quantify how many. To keep things simple and consistent, we captured the presence or absence of each type of output. This issue becomes most acute when comparing grants that may have very different numbers of impacts.

Classifying the size of an impact presents a similar problem of additional complexity. We felt that attempting to gather this degree of detail would compromise the simplicity of the questionnaire.

Preliminary findings

To provide a flavour of the potential of the system we present preliminary data from the pilot work on **arc** grants ending in 2002 and 2006. At this stage, such data are only illustrative. Figure 2 illustrates and compares the impacts from the grants from 2002 and 2006 as an 'Impact Array'. Impact Arrays show all the impacts of each grant, allowing detailed exploration of data and an overall impression of the range and number of impacts. Each row of blocks is one grant, each column one question and each coloured block shows an impact. Within each year group, grants are sorted by the total number of impacts. Sections in the questionnaire are delineated by lines, and individual answers are shaded according to the progressive development of the impact. The total number of 'Yes' responses in the 2002 and 2006 sections of the Impact Array is shown in the red bar charts in the centre.

Concluding observations

The high response rate for the questionnaire indicates that researchers felt very comfortable using it. The results demonstrated that **arc** research produces impacts right across the 216 impact questions, and very few additional areas of impact were suggested. The tool proved to be a highly effective way of mapping the paybacks of **arc**'s research funding.

The Arthritis Research Campaign now intends to use the tool to supplement a reformed end-of-grant procedure, and to follow up grants six years after completion to build a more comprehensive picture of the impacts developing from its research. This tool will help **arc** understand the impacts of its research and provide a solid sampling basis for more detailed evaluations. ■

Further reading (available on www.rand.org/randeurope/publications):

Wooding S, Hanney S, Buxton M, Grant J. (2004) *The returns from arthritis research, volume 1: Approach, analysis and recommendations*. Cambridge UK: RAND Europe, MG-251-ARC.

Wooding S, Anton S, Grant J, Hanney S, Hoorens S, Lierens A, Shergold M. (2004) *The returns from arthritis research, volume 2: Case studies*. Cambridge UK: RAND Europe, TR-176-ARC.

Wooding S, Nason E, Starkey T, Hanney S, Buxton M, Grant J. (2008) *Mapping the impact – Exploring the payback of arthritis research*. Cambridge UK: RAND Europe (forthcoming).

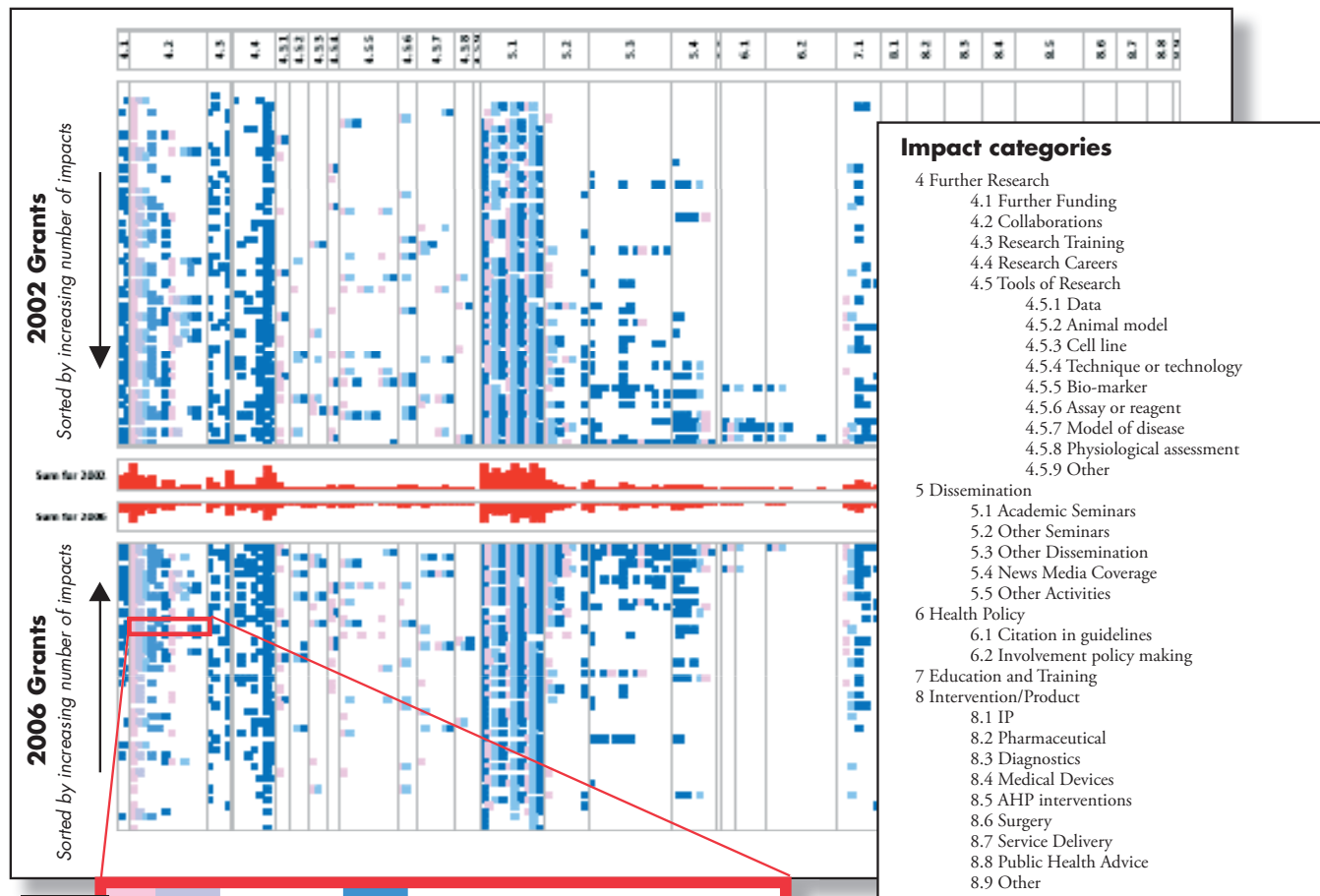
Hanney S, Davies A, Buxton M. (1999) Assessing the benefits from health research projects: can we use questionnaires instead of case studies? *Research Evaluation*, 8 (3): 189–199.

Figure 2
 The Impact Array for grants that finished in 2002 and 2006

The impact array illustrates the range of impacts generated by each grant. The impacts assessed include: levels of collaboration, additional funding, career progression, publications, citations, policy outcomes and and generation of tools for future research (see Impact categories on the right).

Each grant is represented by a row of pink to blue blocks, one for each each type of impact. The grants are sorted as shown, and so the chart lets you identify those with the highest number of impacts (the grants themselves are not listed here, just the overall results).

This process has been applied separately to grants which finished in 2002 and in 2006. The central part of the chart (with blocks in red) details the total number of impact for all the grants we looked at. It allows us to compare 2002 and 2006 impacts.



The impacts in detail

Each impact is represented by a coloured block in the graphic – from pink to blue, with pink representing early stages or local effect, and dark blue being developed or international impact. Here we show a small portion of the main chart for just two of the grants – it covers a section of *Further Research* dealing with *Collaborations* (section 4.2). Blocks indicate a positive response to the various questions.



Interactions with researchers in academic/non-profit organizations:

- A** Have you had initial discussions about collaboration or informal knowledge exchange?
- B** Did these discussions lead to co-applications for funding?

- C** If so, were these successful?
- D** And/or, did these discussion lead to co-publications?
- E** And/or, did these discussions lead to Material Transfer Agreements?
- F** And/or did these discussions lead to sharing of reagents without MTAs?

Interactions with researchers in industry:

- G** Have you had initial discussions about collaboration or informal knowledge exchange?
- H** If so, did these lead to consultancy?
- I** And/or, Material Transfer Agreements?
- J** And/or, collaborations leading to co-publication?
- K** And/or, an industry initiated research programme?



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