Title: An Analytical Approach to Setting Medical Research Future Fund Priorities: Adding Value to Research Prioritisation

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1. The issue is that the current approach to research prioritisation in Australia does not explicitly consider the value for money of research programs

Medical Research Future Fund (MRFF) aims to support health and medical research in Australia in order to drive innovation, improve delivery of health care, enhance the efficiency and effectiveness of the health system, and contribute to economic growth. However, hard choices are needed on how to best allocate MRFF budget.(1) The criteria for identifying research priorities to guide Government decision making on program level funding, as set out in the MRFF legislation, focused on the ability of research programs to deliver the greatest value for as many Australians as possible.(1) But how the value of research programs would be objectively, transparently, and practically assessed to inform research prioritisation and ensure efficient utilisation of the MRFF budget.

In Australia, priorities for medical research are typically identified through consultations with major stakeholders such research funding organisations (e.g. The NHMRC and the ARC), researchers, and direct consultation with patients and their representatives. The burden of the disease is often considered during this process based on the notion that focusing research on diseases of high population and cost will deliver high societal value. Unfortunately, there is often a chasm between national priority areas and the bottom-up approach whereby individual researchers submit grant applications on the topics of their own interests and compete with other researchers for funding from the limited funding pool. Decisions on which research programs to fund are usually made based on the subjective assessments of the merits (e.g., scientific rigor, innovation) of the submitted research proposals based on the opinions and judgments of experts on research panels.

The value of a particular research program, however, can be only inferred if it addresses a well-defined decision problem in a specific population, but not through aggregate measures across broad clinical topics. Failure to estimate and compare the expected benefits and costs of research may lead to suboptimal funding decisions; for example, a research program on a disease with high burden may not be cost-effective. Thus, funding decisions should be based on the research proposal's ability to provide the best value for money. Similar assessments of benefits and costs have been the standard in guiding funding decisions of other healthcare investments in Australia (e.g., pharmaceuticals and health services). There is, therefore, no reason why research funding should not be subjected to the same scrutiny to achieve efficiency in public funds spending.

2. A potential solution is to use an analytical approach to assess the value of research programs

Research prioritisation efforts should consider quantitative methods to explicitly assess the potential benefits and costs of research programs. Adding this economic perspective allows for a transparent and efficient allocation of limited research funds to generate evidence that is useful for medical decision making. Value of information analysis (VOI) has received an increased attention as a key quantitative approach to inform research prioritisation, particularly in research intended to evaluate healthcare interventions (e.g. clinical trials and observational studies).(2-8) This decision tool provides
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a coherent systematic approach to guide research funding decisions through quantifying the expected value of acquiring new evidence to inform a decision problem.(7, 9) It considers the uncertainty in the relevant available evidence, the consequences of this uncertainty (i.e., the cost of making a wrong decision), the population that would benefit from the results of the intended research, and the expected cost of research.(4, 7, 9) Research benefits can be expressed as improved health outcomes (e.g., survival) or in terms of monetary benefit using a willingness to pay value for an additional unit of health outcome (e.g., $50,000 per life year gained). The overall value of a specific research program can be assessed by comparing its expected benefits with its expected costs whereby research proposals with the highest expected net benefit (i.e., difference between benefits and costs) should be given top priority.(9) Notably, by accounting for both the uncertainty in previous evidence and the size of the population (i.e., burden of the disease), VOI can reduce research duplication and wastage by directing research funds to worthy innovative research programs, and improve equity by improving the opportunity of research funding for programs addressing rare diseases where there is small population but high evidence uncertainty. Further, value of research estimates obtained using VOI can be adjusted to the expected level of implementation to reflect the impact of research findings on real-world practice.(8, 9)

Typically, VOI analysis is conducted with economic evaluations of new technology to inform funding decisions, mainly using decision analytic models and computer simulation. Nevertheless, great advances have been made to simplify VOI computation.(10) For instance, the Agency for Healthcare Research and Quality in the United States has issued a working paper on research prioritisation using VOI with minimal modelling.(11) Recently, Claxton et al demonstrated how VOI analysis can be used to estimate the value of additional research directly from systematic-reviews and meta-analyses.(12) VOI has been tested in a number of international research prioritisation initiatives. The first application was in 2004 through two pilot projects in the United Kingdom, one for the National Coordinating Centre for Health Technology Assessment and another for the National Institute for Health and Clinical Excellence.(13) In Australia, we have applied VOI analysis to a range of research projects under an NHMRC funded centre for research excellence and we have demonstrated the value and practicality of the approach in prioritising research and optimising trial design.(14) From the United States, Carlson et al have reported the outcomes of incorporating VOI analysis into a stakeholder-driven research prioritisation process within a program to prioritise comparative effectiveness research in cancer genomics.(15) Recently, Bennette et al developed and applied an efficient and customized VOI-based process to prioritise cancer clinical trials within the Southwest Oncology Group.(2)

An ideal framework to prioritise MRFF spending should include both qualitative and quantitative methods. A possible option would be to use consultations with major stakeholders and the burden of the disease considerations to identify the broad areas of research funding priority, and to use VOI analysis to assess the value of research programs within each priority topic. To further reduce the burden of VOI analysis, the analytical approach can be reserved to the most costly research projects.(3) Another strategy would be to use multi-criteria decision analysis as a means of considering the different attributes of potential benefits of the proposed research. The attributes should include the criteria set for research prioritisation in the MRFF legislation together with relevant quantitative and qualitative aspects such as research value, feasibility, equity, and innovation. In this regard, competing research programs are scored against these attributes using weights that represent the value of each attribute to research funding decisions.

3. How our submission fits within the suggested Strategy building blocks

Our submission suggests the incorporation of the novel VOI analysis as a robust, objective, and transparent approach to assess the value of research programs. Our suggested framework would ensure that research funding is effective, efficient and
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equitable and at the same time responsive to the clinical needs for innovative medical research to drive sustainable, high-quality, and cost-effective health care that improves lives and deliver economic benefits.

4. Outline of measures of success

Our suggested framework would maximise societal benefits from the MRFF budget. VOI prospectively estimates expected research benefits; however, the achieved benefits of research (e.g., improvement in practice) can be compared (after the completion of research) with the actual money spent to calculate the return-on-investment for every dollar spent on research.

References