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# Priority Setting and Resource Allocation in Australian Biomedical Research: Muddling with Some Skill[1]

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ABSTRACT *Examined here are models of resource allocation adopted by Australia's premier biomedical research funding council, the National Health and Medical Research Council (NHMRC), since pressure to make research more 'relevant' has been exerted. For a council that disburses its funds chiefly to high-impact fundamental research, allocating resources to priority-driven research that contributes directly to population health and evidence-based health care is a challenging transition. It is contended that while the NHMRC has attempted to accommodate a 'rationalist' user-driven approach to resource allocation, it has moved only marginally away from a highly decentralised (investigator-driven) model to a mixed-mode system that resembles 'muddling with some skill'.*

Keywords: priority-driven research, resource allocation in science, research management, research councils, biomedical research.

## Introduction

Given that financial constraints on and public support for science and technology are under constant review, there is increasing pressure for research councils receiving government funding to formulate priorities for the internal allocation of funding, as well as to account for both the inputs and evaluate the outcomes of their research endeavours. As research costs have increased, governments that fund research councils are increasingly exercising their right to call the tunes they pay for.[2] In Australia, as in other OECD countries, more stringent accountability measures for the allocation of public funds for research have contributed to the now widespread practice of resources being distributed according to pre-determined priorities that relate directly to social and economic benefits. Australia's National Health and Medical Research Council (NHMRC) has not been exempt from these pressures.

Traditionally, biomedical research priorities in Australia have been set 'bottom-up' by scientists and funding for research has been allocated by the NHMRC on the basis of scientific merit, never according to 'utility'. The NHMRC disburses its funds chiefly to basic, investigator-initiated research that is judged on scientific excellence and track record of applicants via a rigorous and elaborate peer review process. Of Australia's 40 or so public sector research funding agencies, only the NHMRC and the Australian Research Council (ARC) have budgets of any consequence committed to basic research. In adapting to the new accountability measures of government, however, the NHMRC has not escaped the rationalist approach to planning for the purpose of resource allocation, as pressures to become more 'relevant' to the health needs of the community

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grow stronger. These trends reflect current Australian Government policy to steer research more in the direction of the 'user-needs' market, particularly in areas of national priority that will enhance economic development. Such developments mirror a world-wide trend away from 'command' systems of research management towards more market-driven systems.

This paper examines the processes and criteria that guide allocation of resources by the NHMRC and identifies some models of resource allocation it has adopted since the early 1990s when government pressure to target research more strategically became increasingly apparent. Specifically, the paper attempts to classify these models according to what extent restrictions or other external pressures have been imposed on the NHMRC and to how centralised or decentralised the criteria are for decision making.

## The Priority Setting/Resource Allocation Nexus

Especially in times of fiscal restraint there is a need for funding councils to make tough choices between any number of possible alternatives and no matter what model is applied, for example 'direction setting' or 'picking winners', priority setting is a challenging and time-consuming process. Setting priorities acts as a way of highlighting key issues that demand attention especially where resources are concerned. If priority setting is about 'money going to objectives' then wherever funding outcomes are considered (that is, the relative amounts of resources going to particular activities), priority setting is indistinguishable from resource allocation.[3]

Priority setting in science is not a recent phenomenon. In fact, concerns with the criteria used for scientific choice date back to the early 1960s and sporadic attempts to deal with the problem have been made up to the present. The best-known approach of the 1960s was that of Weinberg[4] who, in dealing with 'big' science, proposed that criteria should be both 'internal' and 'external'. Internal criteria were those of efficiency—how efficiently would a proposed scientific activity be carried out; were those seeking support competent and the stated goals likely to be achieved? Weinberg's external criteria were those of utility or usefulness in the broadest sense—how useful would the proposal be to technology ('technological merit'), to social aims ('social merit') and to the rest of science ('scientific merit')?

Ziman[5] differentiates criteria for setting science priorities in a similar vein. Internal criteria relate to scientific merit determined by peer review. External criteria are about anticipated results that have scientific, technological or social implications which raise much broader 'commercial, political, medical, legal, or even ethical judgements that naturally take precedence over research expertise'. While both are seen to be important and need to be taken into account, the danger is that as the allocation process itself comes under closer scrutiny by the councils funding the research, 'the balance inevitably swings towards the external criteria, which are so much easier to explain to non-scientists'. Thus the problem arises of non-specialist opinion becoming more important in judging the merit and relevance of research to socio-economic problems outside science.

The internal/external tension has existed for some time. Over 20 years ago, Brooks[6] argued strongly that fundamental research should not be guided solely by external criteria:

> It would be a great mistake to think that we can have much influence on social and political priorities by conscious tampering with fundamental research priorities in accordance with external criteria. The most important activity is to maintain basic

> research and ultimate application to society's problems, but not to operate the research enterprise by 'command and control' from the center.

The demand for accountability moves setting priorities towards more centralised decision making and much greater emphasis on ends/means rationality that includes calculating the ratios of inputs to outputs, of costs and benefits and of investments and impacts. Before these calculations can be made, objectives need to be clearly articulated and their relative importance decided. However, one problem of applying any kind of rational-comprehensive models to universities or funding agencies like the NHMRC, whose membership is drawn largely from universities, is that the goals to be prioritised and the means of reaching them can be extremely uncertain.

Typically the two major approaches to decision-making which are brought into contention when resources are allocated are the 'rationalist' and the 'incrementalist'. The former is defined by Tisdell[7] as a system 'with overall goals consistently specified and centrally distilled; decision making … [is] centrally co-ordinated (if not centrally directed) in accordance with a theory or model of the operations of society and its interrelationships'. His incrementalist model relies 'upon the interactions of groups with different goals and with limited perspectives … [where] there is no overall co-ordination nor need there be agreed common goals'. While countries like France and the United States, respectively, may tend to approach these two extremes in dealing with their scientific R&D, in many countries there is something of a mix between the two.

In arguing against the comprehensive-rationalist approach and drawing on his earlier work, Lindblom[8] claims that incrementalism (or 'muddling through') is and ought to be the usual method of policymaking 'because no more than small or incremental steps are ordinarily possible'. From the three forms of incremental analysis he distinguishes—simple incremental analysis, disjoined incrementalism and strategic analysis—the latter is seen as 'muddling with some skill'. It is limited to 'any calculated or thoughtfully chosen set of stratagems to simplify complex policy problems', a process that helps to circumvent conventional comprehensive 'scientific analysis'. This kind of 'fiddling' differs from the 'bigger steps' approach which, in claiming to be more comprehensive and complete (or 'synoptic') is a more scientific form of policy analysis that looks at the bigger picture as an integrated whole (for example, energy problems). As it aspires to be complete, this approach comprises notions of rational 'planning'. Lindblom queries whether this is merely a kind of 'new and improved muddling' as it is not possible to take account of all interacting values and alternatives but only to do a partial analysis.

Examining priority setting in research by the Medical Research Committee in the UK, Smith[9] identifies the rational and the incremental modes. In the rational model, decision makers collect as much information as possible on what research is needed and what is possible. They then identify objectives, collect data on the value placed on these objectives by various groups, survey the means of achieving these and examine the consequences of using each of these means. The outcome of this comprehensive approach is a plan or policy that will achieve what is required. By way of contrast, incrementalism is seen as 'step by step adaptation, piecemeal, bargaining and mutual adjustment between rival interests'. Government-sponsored priorities are seen more often as set incrementally—research managers do not consider all choices available, 'rather they inch forward from what is happening now'. Smith sees incrementalism to be effective and democratic, especially in bottom-up organisations and to work best 'when neither opportunities nor resources are changing too fast'.

Another form of incrementalism described by Ham and Hill[10] is 'bounded rationality' which is seen as a more realistic (as opposed to idealistic) means of making decisions on

priorities. It involves decision makers choosing an alternative intended not to maximise values but to be satisfactory or good enough ('satisficing'). Arguing against purely rational models and noting the prevalence of incrementalism in organisational decision making, Ham and Hill suggest two alternatives to a rationalist approach: (a) a normative optimum model that combines realism with idealism (somewhere between rational-comprehensive and incremental); and (b) mixed scanning which distinguishes fundamental decisions and incremental or 'bit' decisions that involve the decision maker undertaking 'a broad review of the field without engaging in exploring all options as suggested by the rational model'. This strategy adopts essentially a 'rule of thumb' approach, which is close to Lindblom's 'strategic analysis' or 'muddling with some skill'. Similarly, in the evaluation of research and allocation of funds, Anderson and Parton[11] claim that intuitive methods based on 'rules of thumb' are probably those that are used most commonly, a model akin to a BOGSAT—'bunch of guys sitting around a table'—method, as noted by Martin and Irvine.[12]

Stewart[13] argues that the usefulness of rationalist approaches such as benefit–cost analysis is limited in public sector agencies and that priority setting is best understood as a 'systemic process with outcomes determined by the incentives and inter-relationships of choice rather than by ex ante calculation'. She offers three systemic models of priority setting as alternatives to benefit–cost models—user-based, institutional and political. The user-based model is a market-like arrangement that brings in users or consumers so that demand and supply are brought into balance. The institutional model is where members are influenced by their personal values and objectives and by the incentives and disincentives offered by their institution. The political model is one that applies particularly to organisations that are highly dependent on governments for funding. In such cases, there is likely to be considerable change and disruption flowing from government and priorities need to be adjusted accordingly.

A variation on the user-based approach is evident in the advocacy model set up for the US National Institutes of Health (NIH)[14] in 1998 whereby the agreed criteria for priority setting are supplemented by officially sanctioned mechanisms for public input. This is largely the result of intensive campaigning by more and more disease-specific interest groups. NIH has been influenced also by a congressional reluctance to intervene in the priority setting process to advocate the setting aside of certain funds for specific diseases. The belief that there should be a closer correlation between the allocation of funding by disease, the distribution of disease burden and cost reinforces this position further. While NIH has the usual mechanisms for including lay/public input to advisory bodies, it is seen that the present level of 'user' advice needs to be supplemented by advocacy for patients/special populations through Offices of Public Liaison from each institute level up to the Office of the Director of NIH and the Director's Council of Public Representatives.

## Strategic Prioritising by the NHMRC

Not until the early 1990s was the NHMRC to face the direct challenge of strategic prioritising for resource allocation. From 1991 to the end of the 1997–99 triennium, a series of moves in this direction resulted following the release of an internal report by the chairman of the 1988–1990 triennium (Chalmers Report),[15] which proposed that a strategic plan be developed.[16] Consequently, the NHMRC's overall plan[17] was spelt out while at the operational level the Research Strategy Committee (RSC) was set up. The RSC, a joint committee of the then Medical Research Committee (MRC) and Public Health Research and Development Committee (PHRDC), was responsible for carrying

out strategic planning for health and medical research, identifying priority areas for funding and recommending appropriate methods for achieving these, evaluating research and training programs, and preparing funding submissions.

However, it was as a result of an external review of the NHMRC in late 1993[18] and in fulfilment of its 1992 legislative requirement,[19] that a more formal process of strategic planning and priority setting was begun during the 1994–96 (Smallwood) triennium with the establishment of a new principal committee, the Strategic Planning and Evaluation Committee (SPEC), to oversee this exercise. A strategic plan was subsequently drafted by SPEC for the remainder of that triennium.[20] Concurrently with the deliberations of SPEC at the operational level, the Research Strategy Development Committee (RSDC, formerly RSC) of the MRC produced *Researching for Health 1994* (later updated for 1996) as the strategic plan for health and medical research.[21] At the operational level, each of the other major committees developed its own plan and priorities within the framework endorsed by the NHMRC on the advice of SPEC.[22]

SPEC was dissolved at the June 1996 council meeting before the end of the triennium (3 months after the election of a new federal Coalition Government), and its functions were taken over by the Council's Executive Committee.[23] For the 1997–99 (Larkins) triennium, and on the advice of the minister, Dr Wooldridge, SPEC was replaced by the Strategic Research Development Committee (SRDC) and Dr Jack Best (Managing Director of a medical diagnostic company and public health expert) appointed as its chairman. Of the four NHMRC principal committees the membership of the 1997–99 SRDC was undoubtedly the most eclectic, comprising those with expertise in journalism, finance and aeromedical research as well as the medical/research experts.[24]

The new Coalition Government of 1996 substantially reduced total budget outlays of all sectors of the economy and, although the NHMRC was fortunate to retain and then increase funding in early budgets, forward estimates for the outlying years indicated declining allocations to health and medical research. Forthright protests resulted and with an election pending (held October 1998), the minister announced a comprehensive Health and Medical Research Strategic Review to be chaired by businessman Mr Peter Wills, chairman of the Garvan Institute of Medical Research. The review committee subsequently presented its interim report in December 1998[25] but the suggested outcomes could not be achieved without an injection of new funds. However, release of the final report the following May,[26] coincided with a government announcement of substantial funding to health and medical research over the next 6 years. The report sets out its aim for the health and medical research sector for the next 5–10 years which involves a mutually reinforcing 'virtuous cycle', comprising a sector built on high impact fundamental research, priority-driven research which would contribute directly to population health and evidence-based health care, industry input that mutually reinforced research and increased public investment in a well-managed research sector.

It seems, however, that moves by Australian governments (of both political persuasions) to steer research more in the direction of the user-needs market, particularly in areas of national priority that would enhance economic development, have been only partially successful. One reason is that pressure to prioritise research conflicts with the customary 'bottom-up' way scientists work out their research agendas. Also, the NHMRC is guided still by the deeply embedded value that research deemed worthy of support needs to be investigator-initiated, the argument being that researchers are best placed to identify new opportunities to investigate and to generate new ways of conceptualising problems from their latest research findings. Another rock solid value is that excellence is not to be compromised—judgments on scientific merit must be made

via stringent peer evaluation rather than by externally imposed criteria geared to particular targets or specified priorities.[27] Perhaps in order to circumvent criticism of compromising these values, the 1999 Wills Review attempts to draw upon the existing NHMRC predilection for peer-reviewed excellence in its recommendations for instituting a peer reviewed priority-driven research agenda.[28] At the same time it acknowledges that current NHMRC grant structures may not be well suited to priority-driven research and proposes that new grant types may need to be considered.

Despite considerable tensions within the NHMRC (especially between the scientific and health areas) over the issue of priority setting as a basis for resource allocation, strategic planning and priority setting nevertheless have become increasingly important and priority areas have been identified and supported in order that some research will be directed to areas of perceived need. The planning exercise adopted in the early 1990s and continued throughout the decade, has attempted to respond more to community health needs, provide for research training and career opportunities in specified areas of need and encourage commercialisation of research results. While this approach does not necessarily imply a departure from excellence as a prime criterion for funding research, it does reflect the NHMRC's response to external pressure to prioritise research for purposes of resource allocation, especially in areas of public health.

## Allocative Mechanisms of the NHMRC

Since its inception by an Order-in-Council in 1936 and the consequent passing of *The Medical Research Endowment Act 1937* to set up its formalised funding mechanism, the Medical Research Endowment Fund (MREF), the NHMRC has become the major public provider of funding for basic medical, biomedical and health research, through to public health and health services research. Its brief, however, extends further to being Australia's peak health and medical advisory body which, in accord with its legal charter, makes decisions that affect nearly all Australians on public health matters such as food standards, environmental problems, safety standards, drug controls and health ethics.

The 1992 Act, which established the NHMRC as a statutory authority, empowered it to advise the Commonwealth minister responsible for health on matters related to the allocation of funds for medical research. Commonwealth grant allocations to the NHMRC were channelled previously through the reconstituted MREF. However, with the Government now controlling more tightly the operations of statutory authorities, funding for the NHMRC no longer comes by way of appropriation directly from the parliament but via the recently renamed Medical Research Endowment Account to the Department of Health and Aged Care which 'receives appropriations from Parliament to provide the resources to meet the NHMRC's objectives'.[29] Despite these structural ties to the bureaucracy (the Secretariat remains within the Department) and tighter political control, the NHMRC nevertheless exercises a great deal of autonomy in allocating research funds. And, despite the low level of private funds directed to medical research in Australia compared with many other countries,[30] funding has been steadily increasing over the last few years. Funds available to the NHMRC from the government purse have increased from $150m in 1996–97, to $176m in 1999–2000 and to a proposed doubling of funding to $614m over a 6-year period as part of the government response to the Wills Review.

Traditionally the NHMRC has used a two-pronged or mixed-mode approach to the allocation of resources and implicitly to the setting of priorities. The bulk of funds has been directed to investigator-driven research, either to individual or group projects, or

within the 'block grant' units. However, during the early 1970s the NHMRC began to experience indirect pressures to acknowledge areas of 'special need' with finance first set aside for the funding of: (a) special research units; and in 1984 (b) special initiative (SI) grants. From 1975, despite funding limitations, several special research units were established (social psychiatry, cardiovascular research, renal diseases and rheumatology were the first). Then from 1984 a small proportion of funding was devoted to SI grants in areas such as arthritis, addictive behaviour, Aboriginal health, ageing and related diseases, rehabilitation, breast cancer, HIV/AIDS and schizophrenia.

Strategic approaches such as these correspond more with the problem-led, demand-pull or 'user needs' approach. While there has been no suggestion that the latter approach should substitute for (or encroach substantially upon) investigator-driven research, there remains a tension between the two as public opinion now is easily directed (some would argue manipulated) to certain diseases, and to some extent is reinforced by government edict on the need to set priorities. This inevitably focuses on the user-needs, problem-led approach, an approach which led the US Congress in 1998 to request that the Institute of Medicine conduct an independent assessment of priority setting at the NIH. Some segments of the public and its congressional representatives expressed dissatisfaction in that, 'NIH cares more about curiosity than cure, more about fundamental science than clinical application'.[31] Consequently, the Institute of Medicine was asked to examine four issues: allocation criteria; decision-making process; mechanisms for public input; and impact of congressional directives. Testimony given to the committee by the president of a diabetic foundation was to the effect that foundation members 'want as much say in the choice of funded research projects as consumers have in the products they buy'.[32] In Australia, pressure exerted on government from outside bodies to address public health needs is no less real. The current minister has announced a joint NHMRC $10m initiative with an Australian diabetic foundation to develop a juvenile diabetic vaccine, plus an extra $2.5m provided by the NHMRC in the general area of diabetic research.[33]

Because of growing concern in the mid-1980s about the emphasis given to biomedical research to the detriment (but not exclusion) of public health and social medicine and, as a result of recommendations of a government-initiated review of the status of public health research in Australia, the Public Health Research and Development Committee (PHRDC) was established in 1986 to fund research in more strategically defined areas. At the time this was essentially the minister's decision in response to criticism that public health was viewed as a second-rate and undervalued area. Hence the need to redirect priorities here. Regarding the importance of science for maintaining the health of the population, it is interesting to note that a few years before the PHRDC was established, Tisdell[34] stressed that market mechanisms were unlikely to encourage enough R&D in health and that if the Government was to fund medical and health research on a large scale 'it does need to establish priorities between competing claims for medical and health needs'.

With the scrapping of the Strategic Planning and Evaluation Committee (SPEC) in early June 1996, two new committees of the NHMRC were set up for the 1997–99 triennium—the Research Committee (RC) which combined the MRC and the PHRDC, and the SRDC. These were regarded as 'complementary research funding mechanisms'.[35] The 1997–99 triennium encroached upon the first year of the 2000–02 (Saunders) triennium and the Chair of the Council and chairpersons of the four principal committees[36] for this new triennium were not announced by the minister until 18 May 2000. This now continuing 'time lag' in triennial operations was the result of the newly elected Coalition Government of March 1996 failing to have arrangements for the next

triennium in place by the end of that year, with the result that the incoming NHMRC did not commence operations until June 1997. The delay in commencement was exacerbated by, if not directly the result of, political considerations which impinged heavily on the choice of the new council chairperson,[37] while one of the principal committees (AHEC) did not commence operations until the end of 1997. Indeed, the Office of the NHMRC must have been placed in an onerous position during the first half of 1997 as the normal grant cycle had to proceed on schedule despite the fact that the NHMRC was not functional at that stage (as has happened again with the delayed start of the present triennium and the grant cycle for 2001).

The RC and the SRDC of the 1997–99 triennium handled the disbursal of research funding and NHMRC's recommendations on grants were made to the minister on the advice of these two committees. Over the years the precursor to the RC, the MRC, had been composed largely of eminent and active biomedical scientists, one of whom was its chairperson. At the same time there had also been broader representation on this committee evidenced by representatives from the health sciences and dental fields, as well as from consumer and social services organisations. The MRC had in the past by far the larger budget allocated primarily for basic research, with over half of this supporting project grants for individual researchers. This differential remains substantially the same as indicated in the year 2000 grants where project grants cover $107m as opposed to SRDC grants of $2.8m.

The SRDC was established for the 1997–99 triennium to manage targeted research, including research commissioned on behalf of other agencies, and to be responsible for development across the board in health and research. In the 1998 Annual Report the Council Chair, Professor Larkins,[38] commended the SRDC on its innovation in developing 'a series of initiatives to define research priorities, respond to urgent research and develop a strategic approach to research in such relatively neglected areas as Aboriginal health and injury'. In addition to this setting of research priorities by classification, the SRDC determined also to establish research priorities by process, following on from the '*ad hoc* request' strategy where relative priorities were assessed 'by testing the issue against a number of criteria, including health impact and gaps in knowledge'.[39] Meanwhile, the two-pronged approach of addressing the *ad hoc* request strategy would run side-by-side with a more proactive approach where the process would 'include (1) an involvement with representatives of major stakeholders in priority setting processes and (2) clear underlying criteria and a framework for priority setting that is rational and transparent'.[40] At the September 1998 meeting of the NHMRC, Dr Best reported that a framework to deal with requests from advocacy or special interest groups had been developed that provided an alternative to the existing strategic initiative areas approach. The idea was to move towards a framework for decision making 'that is clear, equitable and relies on evidence based criteria'.[41] As yet the SRDC has not spelt out its criteria.

A recurring criticism by those in the area of health, however, is that despite its growing budget, funding for health priorities has been less than adequate and that much good research has not been supported in this area because of a lack of capacity. When the MRC and PHRDC merged to form the Research Committee (RC), a commitment was given that health research would be funded close to the national average success rate. Consequently the chairman of the RC reported that cut-off points for the 2000 round were 7.9 for project grants and 7.8 for grants in public health and health services.[42] However, Professor Larkins had earlier warned that while targeted research has much appeal to politicians and community groups, it should not be at the cost of investigator-driven research.[43]

**Criteria for Choice in Allocating Funds**

In the allocation of research funding NHMRC strategies are said to take into account national health goals and targets, other national health indicators, and national science and technology goals. National health goals are determined by the Commonwealth Department of Health and Aged Care on the advice of the Health Advisory Committee. Traditionally these goals have been taken into account in determining the criteria that are used to set priorities for the NHMRC—prevalence of disease, strength of research being undertaken, the needs of the community, government equity objectives, commercialisation potential, and consideration of issues that arise from the consultation process.[44]

At the strategic (council) level, the priority setting process takes into account the significance of specific health issues. NHMRC's criteria for prioritising (similar to the NIH 1998 model) listed in the NHMRC Strategic Plan 1995–96[45] are:

1. the size of the problem;
2. the level of community concern;
3. the potential benefit to the community of NHMRC's involvement;
4. whether or not the NHMRC is well placed to consider the problem; and
5. resources available to NHMRC.

While SPEC had attempted to produce a formula based on a sophisticated weighting mechanism to rank priorities, this idea appears to have been discarded at the time of this committee's disbandonment. With the setting up of the SRDC, the topic of priority setting again emerged. The SRDC now aimed 'to develop a process for determining priority areas for research that will enable requests for funds to be considered, and allocations made, on a strategic basis'.[46]

During 1999, the NHMRC and SRDC were cognizant of the issues surrounding priority-driven research raised by the Wills Review which, it might have been assumed, would bear upon any future measures adopted by the NHMRC, given that the Government accepted the vast majority of the Wills recommendations, including the expectation of a program that included 'a rigorous priority setting process'. A significant Wills recommendation was for the establishment of a 'consultative priority-setting process through a specific arm of an enhanced NHMRC including researchers, health care providers and consumers'.[47] The favoured methodology was that suggested by the World Health Organization (WHO) involving an assessment of the burden of disease and the most favourable opportunities for research that contribute to reducing the disease burden.

Nine criteria were suggested by the Wills Review[48] to assist in choosing among research priority 'candidate' areas. These included: how big an effect would new knowledge have in reducing disease/improving health; effects of increasing efficiency or equity on the health system; cost of research relative to likely benefit; acceptable time limit for research; likelihood of possible new research influencing present practice; the sufficient/timely availability of present research under way here or overseas; the specifically local nature of the problem (or could overseas work solve it?); availability of special opportunities locally to address knowledge gaps; and, if local research capacity is available, is development feasible cost/time wise. Given this, the Wills Review proposed a priority-setting process as set out below:

1. assembling and reviewing carefully focused, relevant, accurate and up-to-date information on health and disease, performance and application of health interventions and performance of health services more generally;

2. identifying areas of research that address the reasons that the burden of disease or lack of health persists, generally or in specific disease or health problem areas;
3. receiving proposals form stakeholders that conform to the Strategic Framework and specifically address the questions raised above;
4. assessing and ranking proposals in a structured way and, if possible, quantitatively against the above criteria; and
5. estimating the amount that should be spent in the highest priority areas to maximise the benefit to cost ratio of the research and constructing a portfolio for funding according to the funds available.

In order to implement its proposed priority setting process the Wills Review suggested that 'a separate principal Committee of the NHMRC be dedicated to this task rather than integrating it with existing activities … [and that it] should administer its own budget'.[49] On 1 October 1999 the Government issued its detailed responses to the many recommendations of the Wills Review.[50] With respect to the priority-setting program, most of the 'minor' points were agreed to, 'minor plus' recommendations were agreed to in principle and/or referred to the NHMRC for consideration, while the major recommendations were the responsibility of the minister to consider in conjunction with the State and Territory health ministers. The Wills Review recommended that the previous SRDC work be built upon with regard to urgent research needs.

In December 1999 the NHMRC presented its *Review of the Implementation of the Strategic Plan* covering the 1997–99 triennium. It noted that the SRDC recognised the need to be more strategic and to develop an effective comprehensive priority setting methodology and that the SRDC had developed such a framework which was progressively defined during the triennium.[51] According to the government response to the Wills Review, the Health Minister was to work with the State and Territory health ministers on the 'health research priority setting process, including [the] role and membership of an NHMRC committee'.[52] Although the Wills Report does not make clear whether the SRDC is to be disbanded and replaced by the proposed new committee, by June 2000 the minister had announced the SRDC's retention and reappointed Dr Best as chairman for the next triennium. Shortly thereafter the 1999 NHMRC Annual Report[53] appeared and Dr Best indicated that his committee had worked out its research priorities via 'a rigorous process'. While not outlining this process he indicated that stakeholders should be involved in consultations, research efforts should be directed to 'real problems' and the SRDC should support research on the basis of evidence, not advocacy.

Although a proportion of its funding was directed during the 1980s and into the late 1990s to priority areas that were designated by the NHMRC from time to time, a bottom-up decentralised process was still the affirmed guiding principle. This was probably best expressed by the Research Strategy Committee in 1991:

> **World class research is best attained through an investigator driven process, with evaluation by experts for high quality.** Some research goals may be set by the NHMRC where special needs or conditions apply, but as many proposals in this Strategy indicate, the quality and accountability of such research must be high.[54]

As noted earlier, the NHMRC still insists that research needs to be not only investigator-initiated as opposed to bureaucratically determined but, in order to maintain a strong medical research capacity in Australia, peer review by experts is seen as the key to assessing the scientific merit of research in a research community.[55] The NHMRC's agenda of promoting research excellence thus takes precedence over 'mission-oriented' grant schemes targeted at particular research policy objectives. In its report of 1995, the Industry Commission, in confirming its support of excellence as a criterion of choice for

basic research funded by the ARC, also supported the same for the NHMRC despite the strategic nature of its research and the perceived scope to improve its processes of resource allocation and priority setting.[56]

The Wills Review[57] highlighted the urgent need for more research that contributes directly to the health of the population and a well-functioning, evidence-based health system. Strategic R&D and evaluation research are seen to offer great potential for Australia to improve population health and the efficiency, effectiveness and equity of its health care system. Supported for this purpose is a priority-driven research agenda that has the commitment of a wide range of stakeholders, including state health authorities, a strong research capacity, and the ability to integrate research-based knowledge into policy and practice. However, at the same time the Wills Review noted that it was almost impossible to estimate the amount of money spent on priority-driven Australian health research since much was carried out by Commonwealth, State and Territory health authorities, in local health services and in institutions. The Commonwealth Department of Health and Aged Care estimated that in 1997/98 it spent $42m on this type of research, while the NHMRC through its SRDC had core funding of $3.2m and supplementary funding for public health research of $2.6m spread over 1997/98 and 1998/99. The Wills Review argued that the non-NHMRC health funding research is uncoordinated, there are probable areas of duplication/omission, there is little evidence of local or national priority setting to guide funds allocation and probably a good proportion of funding is not rigorously scientifically reviewed.

Although criticism has been aimed at the peer review approach for determining research excellence from the scientific community and a number of science policy analysts,[58] there would be considerable support for the NHMRC's stance on criteria for choosing what gets funded. Although project grants traditionally have been awarded on the basis of scientific merit, as noted earlier two main channels of funding existed previously for priority areas—SI grants and special research units. The criteria for awarding SI grants were slightly less stringent and applications were given additional weighting in the assessment process. SI areas for project grants, worked out by the MRC (later RC) and the Grants Committee, were determined after consideration of proposals received from time to time from various sources. Criteria by which these priorities were worked out are not made clear, but there is some evidence to suggest that the 'gaps' approach has been applied. Certainly by 1997 the then newly established SRDC talked of defining its agenda in terms of 'identified gaps' in knowledge and skills. By all accounts, NHMRC's mode of setting priorities would be a combination of this mode, the previously noted BOGSAT method and Smith's incrementalism—step-by-step adaptation, piecemeal, bargaining and mutual adjustment between rival interests.

NHMRC's previous approach to the support of priority areas is gradually being unravelled. Special research units (commenced in 1975) were funded either because the areas were relevant to the Government's equity objectives related to disadvantaged groups, or fell into scientific areas identified as requiring special attention.[59] The five remaining research unit grants began to be phased out in 1999, with funding exhausted by 2001. In addition, 1999 was the last year that SI grants were awarded, with a carryover of three grants remaining for 2001 when funding would be exhausted. Dedicated training awards to encourage young researchers to enter certain areas have also been used as a way of supporting priority areas. Under the RC's chairman, Professor Warwick Anderson, the emphasis on training awards has shifted slightly (to Clinical Research Fellowships and Part Time Research Fellowships) in order to introduce flexibility into the system, to provide greater salary stability and a clearer career path for those researchers showing an aptitude for health and medical research. All these changes

have formed part of a large-scale restructuring of the complete NHMRC grant system for 2000 and beyond, following an extensive review of the level of support for various categories of research.

## Models of Resource Allocation Adopted by NHMRC

It would appear that the NHMRC is neither purely 'rationalist' nor 'incrementalist' in its resource allocation but a mix between the two. Models developed by Tisdell[60] are particularly helpful in depicting the situation. In detailing a mixed-mode system that involves both partial centralisation and partial goal specification, Tisdell outlines three models with alternative degrees of centralisation in priority-setting which can be applied to a government body in receipt of public funding for science. Moving along the spectrum of the three types, the greater the number of restrictions imposed the more centralised or 'top down' the system. Model A depicts the most decentralised or 'bottom-up', Model B a mixed-mode system while Model C is highly centralised. Model C could also be interpreted as a political model where 'the political process decides the social priorities of the country, and then the scientific enterprises are deployed to match these priorities'. These models are illustrated in Table 1.

**Table 1.** Models of resource allocation for scientific research

| Model A | Model B | Model C |
|---|---|---|
| Recipients use funds as they please, so long as they work within the confines of the granting body's charter | Fund allocation is made by a central controlling authority, which earmarks a certain amount to be spent on scientific effort, but does not allocate this spending by areas | Funds are earmarked for scientific effort; divisions between fields or areas are specified or imposed by central authority on recipient body |

*Source:* Adapted from Tisdell (1981, p. 18).

In its early years, the NHMRC could be observed to be operating under a model which might be categorised loosely as Model A and, while its operating mode is now closer to Model B it does not fit this category precisely. In fact, the Government provides now for the NHMRC through a line appropriation within the Commonwealth Department of Health and Aged Care, allocating a certain amount of money to be spent on scientific endeavour, but does not indicate how this should be spent. The current Coalition Government (following the previous government) has indicated the need for priorities to be set, but has espoused a policy where it is up to the recipient to set their own priorities. In a 1996 response, the then Minister for Science and Technology illustrated well the Government's position on priority setting:

> To what extent should the government be setting the priorities as opposed to what the market will demand and what the science community itself believes are the priority areas for research? It needs to be a combination of all of those elements … I don't see the Government, at least in the short term, laying down the law on priorities … government should leave it to those agencies who know best to set their priorities within the broad directions of priorities agreed upon with the government.[61]

An expanded model for resource allocation is offered which incorporates a greater range of government interventions and changes that have occurred within agencies, particularly in the 1990s (see Table 2). The recipient–donor relationships that have

**Table 2.** Models of resource allocation for funding councils

| **Model A** | **Model B1** | **Model B2** | **Model B3** | **Model C** |
|---|---|---|---|---|
| Science allocation freely spent within Charter—using PEER REVIEW mechanism. | Major portion of funding allocated by PEER REVIEW<br><br>**Balance of funds**: allocation is not specified by area, but some rational distribution is attempted. Priorities are set by *ad hoc*, 'seat of the pants' or BOGSAT method. | Most of funding allocated by PEER REVIEW external criteria<br>**Balance of funds:** certain priority areas earmarked—but no specification as to proportion of finance allocated. Priority setting criteria are expected to be more formalised (could be described as 'muddling with some skill' or disjointed incrementalism). | Part of funding allocated by PEER REVIEW but external criteria (e.g. relevance) also taken into account. Funding may be earmarked for allocation by priority areas set by a formal process—e.g. foresight exercise, rating models. | Total funds earmarked—the division between specified/imposed upon recipient body by central authority who decides what is relevant (strategic/rational analysis). |
| **CRITERIA** | | | | |
| Excellence | Excellence + partial relevance | Excellence + relevance | Excellence + relevance | Relevance |
| Internally determined | Internally influenced | Internally and externally influenced | Externally influenced | Externally determined |

*Source:* Expanded from Table 1.

developed are categorised according to the degree of centralisation and politicisation of decision making evident in the allocation system. The less restrictions that are imposed, the more decentralised the system and the more criteria of scientific choice are internally determined by the recipient. The more restrictions that are imposed, the more relevance and goal specification become key criteria that are determined by the donor.

The early NHMRC operated essentially under the guise of Model A, being free to allocate its budget as it pleased, provided it carried out the functions stipulated in its charter. The situation is notably different 60 years on. It is suggested here that as a result of the recent changes to the NHMRC, the most appropriate model might be reclassified into something like Model B2.

The push for more efficiency, evaluation and greater accountability of resource use during the 1970s impacted only slightly upon the NHMRC. Although from 1972 the NHMRC began to acknowledge areas of 'special need', and indicated those demanding special initiatives which could lead to greater research activity, it was the 1980s before there was any real attempt at reassessment, particularly following the ASTEC Report.[62] Towards the latter part of the decade, and into the 1990s brought further upheavals as a result of the 1990 Chalmers Report, the 1993 Bienenstock Report and, most recently, the Wills Review. Bienenstock appears to be more of a 'centralist' in advocating that the NHMRC 'set clear, consistent and coherent priorities … that are used to steer the agendas of the Principal Committees …'.[63]

However, there is no indication that the changes advocated during the 1990s

culminating in the Wills Review of 1999, are in any way aimed at radically changing the status of the NHMRC from its existing Model B category outlined above. Yet there has been some modification apparent, in that government directions to allocate a certain proportion of the funds to particular areas (be they 'priority areas' or 'priority-driven' research) must be seen as an attempt to meet government policy outlined elsewhere. Consequently, the NHMRC is still at some distance from Model C, since the minister is restricted by the NHMRC Act of 1992 (Section 10 [2]) to giving directions of only a general nature to the NHMRC, and is not entitled to direct on the allocation of research funds or its treatment of particular scientific, technical or ethical issues. In allocating its resources, the NHMRC is seen to be more incremental than rational in its approach to setting priorities and allocating resources.

## Conclusions

A closer inspection of NHMRC's means of priority setting and resource allocation reveals that, in adapting to the market pull of user-demand and according to the degree of centralisation and politicisation in the allocation system, it has moved only marginally towards centralisation. Essentially it has adopted a mixed-mode system which resembles more 'muddling with some skill' as opposed to a strictly rationalist approach. It has also been politically astute in the way it has reacted to government and community pressure via a more strategic approach while at the same time maintaining its essential values of giving greater prominence to investigator-driven research judged on its scientific merit by a stringent peer review process.

A purely rational-comprehensive model of priority setting and resource allocation would appear to have some deficiencies when applied to the NHMRC. For a start, the model is in direct conflict with both the traditional bottom-up way scientists set their research priorities and the norms which guide their criteria for judging excellence. Goal uncertainty and/or ambiguity when prioritising research pose other problems. This situation combined with the composition of the NHMRC's key committees that allocate resources, more direct government steering toward a user market and the direct and blunt political influences on NHMRC and its strategic processes, have presented significant challenges. It is probably no wonder that its approach to priority setting and resource allocation has been so *ad hoc*, piecemeal and disjointed. Whether or not the recommendations of the 1999 Wills Review for the NHMRC to develop a priority-driven program of research will result in significant changes in this direction remains to be seen.

To outside appearances, the transition in the resource allocation process from Model A to its own version of Model B has been relatively smooth in that the pressures to achieve the transition have seemingly sprung from internal sources rather than imposed by government fiat, at least until 1990 when the minister issued a directive on the need for a mechanism for the setting of research priorities to be established. However, the perception of a seamless transition between models of resource allocation, even for the early years, may not in fact be realistic when the evidence is examined in more detail. Moreover, it is difficult to judge the earlier years since ministerial directions (if any) were not included in officially reported council proceedings. Tight government steering will continue to pose challenges for the NHMRC, which traditionally has enjoyed considerable autonomy in allocating its research funds. Recent Coalition Government moves to reject the minister's initial candidate for Council Chair,[64] together with its determination to oversee more closely the work of all statutory bodies previously granted autonomy, are unlikely to improve the situation.[65] Moreover, Leeder[66] argues that 'the NHMRC has often had a difficult relationship with the Department of Health and a more powerful,

more highly funded, adequately supported NHMRC may not necessarily be welcomed by government'.

The notion of capturing and exploiting particular areas of science to increase potential economic performance is certainly an attractive one to most governments. However, given static (or very small real increases in) resources, it does mean that funding agencies must be prepared to make hard decisions (or in a sense 'pick winners'), and consequently reallocate funds from the so-called declining research areas. It is to these kinds of problems that the NHMRC has recently turned its attention, albeit after some pressure from government directives.

The politicisation of the allocative process is an important consideration for the NHMRC. One thing that the NHMRC is very much aware of is the fact that if their scientists do not set their own priorities, politicians will likely do it for them. Teich[67] sees the inherent dangers in this kind of scenario. He goes on to say that,

> … there is no technological fix, scientific method, or method of philosophic inquiry for determining priorities … But what really matters is how that debate is structured: how far it promotes reasoned, informed, and open argument, drawing on a variety of perspectives and involving a plurality of interests … Implications are that the capacity to engage in continuous, collective argument needs to be built up. This means developing institutions that encourage challenge, allowing implications of pursuing different priorities to be tested out and provide the information required for reasoned debate. In short, we should be at least as much concerned with the structure of our institutions, and the way in which they work, as with the development of techniques. The politics of priority setting (in the widest sense) matter as much as the methodologies used.

Some implications arising for science funding councils and research managers in universities would relate to how decisions are made and by whom and what criteria and standards are applied by granting agencies in judging relative merit of research proposals. These are becoming more critical to understand in order to ascertain not only how research proposals can be better matched with the requirements of specific agencies to which they are directed, but to ensure that the research community is better informed about how the allocative system works, what the expectations are and how well the system is working. As ignorance and lack of transparency tend to breed suspicion of practices, funding councils need to become more transparent to their clientele.

One of the difficulties facing science-funding councils like the NHMRC is that progressively more top science projects are seeking support and greater numbers of applications that deserve to be supported are being turned down. Tighter competition for support means that it is becoming increasingly important for researchers, especially first-timers, to understand what criteria are applied in judging relative merit of proposals and what models of resource allocation are used.

## Notes and References

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