Research Policy

Peering into the bowels of the MRC II: review systems

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If it comes to prohibiting, there is not ought more likely to be prohibited than truth it self, whose first appearance to our eyes, belear'd and dimm'd with prejudice and custom, is more unsightly and more unplausible than many errors.

JOHN MILTON, 1644

Many of the medical researchers whom I met think of the Medical Research Council as a vast sausage machine that slowly and laboriously but usually fairly processes grant applications. Here I take a critical look at the council's mechanisms for deciding which research will be supported. They hinge around peer review, a time honoured system that is increasingly being questioned.^{1,4} Most flamboyant of the critics is the American materials scientist, Rustum Roy, who argues that peer review is "extremely wasteful of a resource in limited supply, the time of talented scientists and engineers . . . is inherently anti-innovatory . . . [and] presupposes an unrealistic view of human nature."⁴

Although many other bodies in Britain fund medical research, the MRC's mechanisms are important as they are a model for other organisations, and many of the points that can be made about the MRC's mechanisms apply elsewhere. Key features of the MRC's mechanisms are that they use anonymous peer review and do not (formally) give reasons for turning down grant applications. Nor does the council have an appeal mechanism. This was roughly the state of affairs at the National Institutes of Health in the United States until about 10 years ago, when after a heated debate the institutes decided to give reasons for turning down an application and to develop appeal mechanisms.

Funding project grants

The MRC has two main ways of supporting research—through grants and through its own establishments. Grants are divided into three year project grants and five year renewable programme grants. The trend is away from project grants and towards programme grants.⁵ The decisions of the grants committees are approved by their parent boards, and obviously decisions on programme grants are considered in much more detail.

In 1986-7 the MRC spent 16% of its budget on project grants⁶ (1% less than in 1985-6), and figure 1 shows the number of applications received and awards made from 1981-2 to 1985-6: the trend in both applications and the number awarded is down. Applications are probably falling because researchers know that it is becoming more difficult to get a grant from the MRC; many potential applicants are diverted by their professors to the charities (or drug companies). More and more applications that the council would like to fund

cannot be funded. In 1986-7 the council approved but could not fund 230 applications.

Project grants are awarded for "a piece of work aimed at seeking, normally within three years, the answer to a single question or a small group of questions." The MRC has a standard 14 page application form for project grants and an ugly little booklet that in bureaucratic language tells applicants a little about project grants and the process of deciding which grants will be awarded. (An example: "Should the principal investigator, or one investigator named in a shared equipment grant move to another institution during the tenure of the award (or within the three years if the grant is for apparatus only), the council has the right to require the apparatus to be transferred with him after discussion as necessary with the institutions concerned.") The booklet contains a lot of information about how to calculate expenses and on using human subjects, radioactive material, etc, but it tells an applicant little about how to write a good application. The MRC does not think that it is responsible for teaching people how to write grant applications. This is a job for heads of department, and it is just tough on junior staff who have a bright idea for a research project but little idea how to write a grant application and nobody senior to help them. They must look elsewhere for help with grantsmanship, one source being a book called *How To Obtain Biomedical Research Funding*.⁸ (Many researchers complain about the tedium of writing grant applications, while others think that developing the protocol is often the most creative part of research.)

The MRC sends virtually all the applications it receives to two to four external referees. The only applications not referred are those

that are poor to the point of being illegible or incomprehensible or those that are deemed outside the scope of the MRC—which may be directed to another research council. When discussing with the MRC its system for processing grant applications I naturally found myself making comparisons with the *BMJ*'s own peer review system, which has been described in detail and evaluated to some degree by the editor.¹

FIG 1—Number of project grant applications and awards from 1981-6.

One immediate difference is that the *BMJ* rejects about half of the papers it receives without refereeing them. This is because we do not want to exhaust our referees and because we believe that many of the papers we receive are so unsuitable or poor that it would be a waste of everybody's time to referee them. The MRC may not receive so many applications of a very low standard and it may feel a duty as a public body to deal with all applications in the same way. This duty should now be less pressing when most short term medical research projects are funded by other organisations. The *BMJ* recognises that it is by no means the only outlet for publishing medical research, and this is one justification for our policy of rejecting papers without refereeing them. The MRC now has a similar justification.

One of the reasons why the *BMJ* is able to reject papers without refereeing them is that all the papers are seen by two medically qualified editors or associate editors who sit on the committee that takes a final decision on publication. The MRC's grant applications, in contrast, are not seen at this stage by a member of the grant committee. (An exception is applications for grants costing less than £20 000 and lasting for a year or less: these can be approved or declined by individual members of the committee.) The MRC's staff do the initial screening and select the referees; this selection is sometimes done with the help of one of the committee members, but he may well not actually see the application. He simply advises on somebody with the right specialist knowledge. This seems to me one link in its chain that the MRC might investigate. Much time and effort might be saved by having committee members doing an initial screening. Whether or not such a system would be an improvement could be scientifically investigated.

The external referees are chosen by the MRC's scientific administrative officers with the help of a computer listing that

contains about 5000 referees. Referees will be chosen to cover the various specialist aspects of the paper and to supplement the expertise of the grant committee; to some extent the referees thus choose themselves because only a few will have the necessary knowledge. The referees know the identity of the grant applicants, but the applicants do not know the identity of the referees. The referees are asked standard questions in six categories (fig 2) and are not paid.

The MRC treats the refereeing of applications almost as if it was a simple administrative task, but many seemingly small decisions taken at this stage may strongly influence an application's chance of succeeding. Cole and others in their experiment with 150 proposals submitted to the National Science Foundation concluded that "whether or not a proposal is funded depends in a large proportion of cases upon which reviewers happen to be selected for it."² The research world is famous for its rivalries, and only a handful of researchers may be investigating one particular topic. A grant application may thus be referred to an arch rival of the applicant, particularly when the choice of referee is made largely on the basis of who has the right expertise. The MRC knows about this possibility and will sometimes use referees from outside Britain, but sometimes the administrative officer may be unaware of a particular rivalry.

Referees also tend to divide into "hawks" and "doves," and this knowledge can be used to influence the outcome of a proposal. Horrobin has argued that "it is possible to destroy an application by deliberately sending it to eminent referees who are known to be opposed to the work. . . . Real power is potentially in the hands of the administrators, who can manipulate the refereeing process to sink a good application or encourage a poor one."² Roy also pursues this point: "Every experienced programme manager knows her/his community, the tough reviewers, the easy graders; they know well the various camps of friends and enemies. The judicious placement of a proposal with the right reviewer can 'tilt' the system strongly in a desired direction."⁴ Cole and others in their study of research

(1) The applicants

- How well and by what route do you know the work of the applicants?
- How do you rate the applicant's research standing and ability to carry out the enclosed work?

(2) Importance

How important to the advancement of biomedical science/clinical practice are the aims of the proposed work and why?

(3) Originality

Have others attempted to answer the same questions (or are they doing so now)? If so, please explain and indicate whether the work needs repeating or the proposal offers anything new.

(4) Methodology

Is the plan of investigation proposed likely to yield decisive results and if so on what time scale? Please give reasons and feel free to suggest improvements that might, if the committee considered it helpful, be fed back (unattributed) to the applicant.

(5) Support

How much of the support requested is justified?

(6) Conclusion

What rating would you give to the award of a grant towards this proposal?
High Medium Low Zero

FIG 2—Questions asked by the MRC of referees of project grant applications.

proposals made to the National Science Foundation could not find any evidence of systematic bias in the selection of reviewers,⁹ but they probably could not be expected to find such evidence. One way round the problem (if it does exist) would be to select reviewers randomly from a group who were all adequately qualified.

Another problem with referees is that they vary widely in the quality of the opinions they give. Horrobin has detailed important errors contained in referees' opinions on grant applications of his, and abundant evidence is available of important errors that have appeared in peer reviewed journals. The answer of Horrobin and others to these errors is to do away with anonymity, which, say Frost and Jay, "encourages authority to behave with a degree of stupidity and cruelty quite alien to human beings."¹⁰ An alternative to trying to do something about the quality of referees' opinions is to grade the opinions and perhaps link them to later outcome. The MRC does not have a mechanism for grading the opinions of its referees, and this is something it should surely consider doing. We have done so at the *BMJ*. The MRC might also experiment with different numbers of referees.

TO THE GRANTS COMMITTEE

Once the MRC has its referees' opinions the application is presented to the grants committee. The members of the committee will receive the application two weeks before the meeting. They do not receive the referees' comments but they do know their names. The grant committees meet about five or six times a year and consider about 30-40 proposals each time. For each proposal there will be a "designated member," who introduces the application to the committee. He or she is chosen by the administrative officer, usually because of particular expertise in the subject, when the choice of referees is made.

At the meeting the designated member introduces the application and gives his critical comments. The application is then discussed, and once that discussion is complete the referees' comments are read out. The designated member, who has not seen the comments before, then responds to them and there is further discussion, which is likely to cover not only the scientific aspects but also the financial. Once the discussion is complete the chairman sums up and the members of the committee each grade the application. Sometimes, but not often, applicants will be asked to provide more information or another referee's opinion will be sought.

The committee considers three main factors in making its grade: Does the applicant have a thorough understanding of the background to his proposed piece of work? Will his methods answer the question he is asking? Do the applicant and his department have a good track and publication record? These questions are answered, the MRC emphasises, on the basis of what is written in the application not on the basis of what else is known about the applicant and his department. The committees are not much concerned, say some critics, that certain sorts of research—for instance, on drug addicts—are inherently difficult to do flawlessly.

The scale of scoring extends from 0 to 6, with 0 being a bad application and 6 an excellent one: those that score 3 or more are said to be of alpha quality. Each member of the committee has the same vote, and the score is averaged to one decimal place. Usually proposals scoring 4 or above are automatically funded, those scoring 2.9 or below are refused, and those scoring 3 to 3.9 are referred to the parent board. I say usually because shortage of money is changing these customs. The parent board will make final decisions on whether to fund the applications scoring between 3 and 3.9 based on how much money it has available and on how important it thinks the particular subject. Sometimes applicants will be funded conditionally, but the committees are rarely creative in the sense that they suggest other questions that applicants might pursue.

When they make their decisions the grants committees are primarily concerned with the scientific rigour of the proposed application rather than with medicosocial importance of the work, and one of the difficulties of all science is that the small questions are often much easier to answer than the big ones. The MRC in this part of its work is being essentially reactive.

FEEDBACK

Applicants who fail have not in the past been told why their applications have been refused, and they have not seen the referees' opinions. This policy has been heavily criticised, and in 1984 the MRC did soften its line a little. Applicants are now told the score range into which their applications fell and the cut off point. They are also told if their application was scientifically approved but could not be funded because of lack of money. Sometimes, too, those who fail are "provided with feedback which they may wish to take into account in formulating future proposals or which contains information or advice which the committee considers to be particularly important to applicants (particularly younger and first time applicants)."¹¹ Informally, too, I understand, even more information may be given.

Most of the researchers whom I met thought that the MRC should give more feedback. Many pointed to the United States National Institutes of Health, which provide extensive feedback and many creative suggestions. The American system also allows appeals. The MRC does not. The American system has all the advantages of openness and is educational. The MRC is against such glasnost because it thinks that valuable time and resources will be wasted arguing over marginal applications. Whether or not it would be unknown, but this has not happened in the United States. Here again the MRC could perhaps experiment, offering feedback to some and not others. It could also experiment with other aspects of its system for funding project grants: the numbers on the committee; the use of designated members; the number of applications considered at a meeting; and the point at which the referees' opinions are introduced. The MRC might even experiment with not using referees, as the editor of the *BMJ* did for our review process.¹

My point is not that the MRC's system is a bad one, or, indeed, a good one, but rather that the system could be studied in a systematic and scientific way. Whether or not a piece of work will be supported is a decision of great importance, and the system that makes that decision should surely be investigated, just as scientists have been concerned to investigate the system that pumps blood round the body and the ways in which it can go wrong.

EVALUATION OF PROJECT GRANTS

Once a project grant is ended the recipient is required by the MRC to submit an account of the project together with copies of any published papers that have resulted from the project. Usually, however, this information is simply read by a scientific administrative officer and then filed. Only if the recipient applies for another grant will the value of his previous work be looked at carefully. The MRC argues that it would be a waste of limited resources to spend more time evaluating the results of project grants. But others would argue that "closing the feedback loop" might produce valuable information. For instance, projects carried out in certain disciplines might prove particularly fruitful, suggesting that more money should be put into the subject; or projects backed by particular committees might be consistently unproductive, perhaps indicating deficiencies in that committee.

Dr Joe Anderson, a science policy researcher, suggested that instead of simply awarding a project grant and then filing the results at the end the MRC could ask for targets and verifiable objectives to be built into the project. The process of evaluation would thus be built in at the beginning of a project, and it would then become apparent early on how well the project was progressing. Whether this would be worth doing for a three year grant is perhaps doubtful, but the trend in science is very much towards increasing evaluation and insisting on "value for money."

Special project grants

The MRC does have some money (about £3-4m annually) set aside to pay for projects that it wants done. Most of the money is

spent on clinical trials, but this is one way to encourage research into problems that are not being well researched or are not being researched at all. The snag is to identify such problems. Imagine, for instance, sitting down with a dictionary that is 90% written and trying to think of the words that are not included. I think some method might be necessary to spot the holes—for instance, using a computer program that would match *Index Medicus* headings with research done by an organisation. Research funders whom I spoke to in Britain mostly did not agree, although those in the United States did (see article after next). Those in Britain thought that it was not difficult to identify gaps. "Everybody knows what they are," said Dr Peter Williams, secretary of the Wellcome Trust.

The MRC uses discussion within boards and "portfolio reviews" to identify deficiencies. Boards are annually given a statement of the research that they are supporting broken down by category and cost. They may then decide that there is too much on one subject and not enough on another and then take these decisions into consideration when funding grants. More detailed reviews that cut across boards may be done by people with common interests. A researcher interested in, for example, skin will review the council's work on skin and try to identify deficiencies. Once he has spotted a deficiency he may suggest that a scientific working party should be set up or that a special project grant should be made available (and somebody invited to apply), or he may simply encourage the awarding of a grant application on the subject. The MRC has, for instance, been concerned about its lack of work in respiratory medicine, and two programme grants have recently been made for research into asthma. The publishing of statements that applications are invited on particular subjects, a system that was used when Sir John Gray was secretary of the MRC, has gone into abeyance.

Programme grants

The procedure for awarding programme grants, which last for five years and are renewable, is more prolonged and elaborate than that for awarding project grants, and there is much more evaluation after the grant is awarded. In 1986-7 the MRC spent just over 13% of its budget on long term grants,⁶ and it does not find (yet) that it cannot afford to fund alpha quality programmes, although they are often pruned. The criterion is still scientific excellence. In its notes on programme grants the MRC says that "an extremely high standard is set."

Those thinking of applying for a programme grant are required to discuss their ideas with the MRC's headquarters staff, and the staff will need to be convinced that this is work that could not be done on project grants (perhaps several) and that the applicants have a good enough track record and are "at the starting line." Programme grants are not for newcomers and are effectively available only for those working in well equipped centres with considerable back up. Some potential applicants may be advised by the headquarters staff that they would probably be wasting their time to apply for a programme grant, and they drop out at that stage.

The next stage is for the applicants to submit an outline proposal, which must include costings, on three or four sheets of paper. This proposal will be sent to about four external referees, and they will be asked not only about the merit of the candidates, their previous work, and the proposals but also whether this work needs a programme grant rather than several project grants. The referees may make creative suggestions. If the outline proposal is thought worthy then the applicant will be asked to make a full application. This will again be refereed, possibly by the same referees.

Once refereed the application will be submitted not to a grant committee but to one of the boards. It will be presented to the committee by the designated member, as with project grants, except that the designated member will have seen the referees' opinions in advance. The decision making process on whether to fund the programme is more complicated than for a project grant, and the committee is "not just a scoring machine." The health department representatives on the committee will advance a formal view on whether they think the work important, and the board will also

relate the work to its existing "portfolio": Is this a subject in which the MRC is already supporting work or is it a subject in which the council is doing little?

The board will then score the application and will place the applications in order, as with project grants. Numbers on what percentage are funded are not available as they are for project grants, but the MRC estimated for me that about half of the applications get as far as the boards. The boards try to give more feedback to unsuccessful applicants than is the case with project grants, but appeals are not officially allowed. Appeals have, however, been heard occasionally, but nobody could tell me whether they had ever been successful.

Those awarded programme grants can be required to submit progress reports at any time, and the grant can be stopped at any time. In practice, however, progress reports are usually submitted 18 months before the funding is due to finish, and a decision is then taken on whether to extend the funding. External referees are again used, and the extension will again be considered by the relevant board.

CRITICISM OF THE PROCESS FOR PROGRAMME GRANTS

Many of the same criticisms that I made on the process for awarding project grants apply to that for awarding programme grants. Applicants are, however, helped much more and given more feedback, and more emphasis is given to the medicosocial importance of the proposed work. The awarding of programme grants is, however, still more cosy and elitist, and because the money and timescales are greater it might well be worth experimenting with more objective measures of the value of the work and the people doing it. The MRC might also consider building into the programme verifiable objectives and targets.

Starting, reviewing, and closing units

Project grants may grow into programme grants, which may in their turn grow into units. Institutes and units absorb more than half of the MRC's budget, and starting a new unit, where new buildings may be needed and most of the staff will be salaried (for life), is obviously an important decision. The MRC has three main reasons for starting a new unit: one may be needed to satisfy a public need or a new technique as with units for pneumoconiosis, nutrition, toxicology, or the cyclotron; units may be needed to encourage subjects that are not yet incorporated into universities as was the case with immunology, virology, and molecular biology; or units may be set up around outstanding researchers. The last reason is obviously risky if the outstanding researcher dies, resigns, emigrates, or goes off the boil shortly after the unit is established.

Some of the proposals for units come from inside the MRC and some from outside, and this presumably is where conversations at clubs like the Athenaeum are important. Proposals that come from outside have to jump hurdles similar to those that have to be jumped by those who want programme grants, but few of the proposals that get as far as boards are turned down. The units are started for a fixed period at first with some of the staff on salaries and some on fixed term contracts.

Units are intensively reviewed, and the MRC plans to make the review process still tougher. The review is conducted every four to five years, and the unit director must submit a detailed progress report and a proposal for the work for the next five years. These are refereed, and the members of the unit see the referees' reports. The unit is also visited for about two days by a group that includes members of boards and external assessors. The unit staff will give presentations, which are then discussed, and the trend has been towards fewer formal presentations and more informal discussions.

The visiting panel will present its conclusions to the parent board, which will recommend whether or not the unit should continue and may attach conditions to continuation. If closure is recommended then the unit can appeal, and even if the decision is upheld then the process of closure is protracted, necessitating prolonged

negotiations with unions. The table shows units that have been closed in the past eight years and why; what is striking is that in all cases the reason has been the resignation or retirement of the director. (It may, of course, be that the reason given for closure is not the real reason and that internal pressure led to resignations.) The MRC does not seem to close units because the work is too poor or because funds could be better spent elsewhere.

Medical Research Council units closed since 1980 with reason for closure

Unit	Reason for closure
Environmental physiology	Retirement of director
Experimental pathology of skin	Retirement of director
Clinical genetics	Retirement of director
Clinical psychiatry	Retirement of director
Developmental psychology	Retirement of director
Industrial injuries and burns	Retirement of director
Lipid metabolism	Retirement of director
Laboratory studies of tuberculosis	Retirement of director
Dental	Retirement of director
Pneumoconiosis	—
Neurochemical pharmacology	Resignation of director
Tuberculosis and chest diseases	Retirement of director
Biochemical parasitology	Retirement of director
Mammalian genome	Resignation of director
Trauma	Retirement of director
Mineral metabolism	Premature retirement of director
Developmental neurobiology	Retirement of director
Neural mechanisms of behaviour	—

The MRC spokesman said to me, “The MRC is not scared of closing units—absolutely not.” But many of the researchers I spoke to, including directors of units, thought that the MRC was too slow to close units, and the MRC says itself in its corporate plan that it is to toughen its review procedures “to release resources from the least deserving of ongoing commitments so that the very best units and divisions can be protected from damaging cuts.”¹¹

The MRC is also planning to change its review procedure by measuring cost effectiveness and by requiring “boards and subcommittees to compare the merits and costs of grant supported work in universities with similar ‘in-house’ work wherever possible.” This is the new managementspeak that the MRC is learning from the Advisory Board for the Research Councils, which in its turn is learning it from the outside world in general and from science policy researchers in particular. Quite how it will work remains to be seen, but, presumably more objective measures than straightforward peer review will be necessary.

Accountability

Various researchers whom I spoke to were concerned about the lack of accountability of the research councils. If they turn down your application for a grant or close your unit for what you think are inadequate reasons there is nobody to whom you can appeal to

reverse the decision. The councils are, of course (like all public bodies), subject to the law and to financial audit, but these are not routes for those who think themselves done down by a research council. You can make a noise in the media or parliament, but little is likely to be achieved. You can also contact the Department of Education and Science, but you are not likely to be well received. The government’s line is that although secretaries of state do have theoretical powers to intervene with the research councils they do not use them. (Lord Flowers, once chairman of the Science and Engineering Research Council, said at a recent public meeting organised by *Nature* that this was not strictly true and that he had had commands from the government on some subjects, including decisions on international subscriptions.) The government does, of course, have the power to change the budgets of the research councils.

Ironically some of the same people who resent the lack of accountability of the research councils are also strongly in favour of them being independent from the government and free to support whatever research they choose. It is not easy to balance accountability and independence, and the present balance may be changed without necessarily finding the right one.

Conclusion

Increasingly, young medical researchers go elsewhere than to the MRC for money to fund speculative research. The MRC, under pressure from above, is putting more of its money into long term research. Yet the council has elaborate and costly peer review mechanisms for processing grant applications. Peer review in general is coming in for increasing criticism, and the MRC’s mechanisms in particular are criticised for their secrecy and lack of feedback. It is surely time for the MRC to experiment with other ways of funding research, more objective indicators of performance, better ways of incorporating the medicosocial importance of a project into its assessment, more evaluation of work that is proceeding, different methods of peer review, and more feedback.

The article after next will look at the systems used by the National Institutes of Health and the article after that will look at alternatives to peer review.

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Is verbal consent all that is required for procedures performed under local anaesthetic? Is this consent legally altered if an opiate has been administered before consent is agreed?

Before any procedure is carried out on a patient valid or “real” consent is required. There is no specific guideline either in law or in ethics that consent should be written, but obviously a written consent is less likely to be discounted at a later date. For a procedure that violates the patient’s bodily integrity, and where that procedure is more than, for example, simply taking a blood sample, written consent should be obtained and recorded in the patient’s case notes.

In certain circumstances it may be argued that the patient’s presence in the doctor’s consulting room or clinic is evidence of implied consent. Though this may be so for history taking and a general examination it does not extend indefinitely and in law is limited.¹ For a blood sample to be taken a valid

consent to the tests to be performed—whose nature should be explained to the patient—is required. When an operative procedure, however minor, is carried out a separate and specific consent should be obtained. To get a “real” consent the patient must be informed of what the procedure is, what alternatives there are to its performance, and any side effects that may occur.

For a consent to be valid or “real” it must also be free and informed. If the patient has had an opiate before giving consent it is arguable that his or her ability to give valid consent might have been impaired by the opiate. It is, therefore, always preferable to obtain consent to any procedure before giving an opiate premedication.—VIVIENNE NATHANSON, secretary, central ethical committee, BMA.

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