

REPORT ON THE RESEARCH MANAGEMENT
OF
THE UNIVERSITY MEDICAL CENTRES
IN
THE NETHERLANDS

Report by the International Research Management Evaluation Committee

June 2005

Report by the International Research Management Evaluation Committee

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Summary

The committee was impressed by the generally high level of the research output of the UMCs in the Netherlands.

This high level of both the quality and quantity of research of the UMCs in the Netherlands is a valuable national asset. The societal impact of research is not confined to the direct results of research itself. The existence of concentrations of excellent research has much wider implications for a knowledge based culture and economy. The unique situation of a number of centres of concentrated multidisciplinary research of high quality in the biomedical field should be carefully guarded and nurtured

The generally high level of research of the UMCs implies that, on the whole, research development and research management by the UMCs has been effective and successful. The challenge for the Dutch UMCs is now to move from (very) good to even better and to maintain and improve international levels of excellence. Such an ambition is necessary not only in view of the very rapid developments in the biomedical sciences in general, but also as an answer to the challenges inherent in the rapid development of new technologies and insights in both diagnostics and therapy and to the formation, on a European scale, of international research consortia and centres for biomedical and clinical research. Improving quality from an already high level presents a special challenge. Considering the UMCs as a whole, and allowing for individual variations, the committee sees no reason for radical changes in the way medical research is managed in the Netherlands. Nonetheless, the committee does see opportunities for further improvement. These will be discussed later in this report.

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Overall conclusions of the committee regarding research and research management of the UMCs in the Netherlands are:

- The level of research in the UMCs is across the board well above the European average.
- The talent policies of the UMCs need to be made more structural, transparent and comprehensive.
- The organisational structure of research is not, in itself, a prime determinant of success. However, the different organisational structures do have specific inherent shortcomings regarding the further improvement of the quality of research. In particular the risk – to the quality of research - of compartmentalisation inherent in the organisational structures must be considered. Special measures need to be taken to counter-balance specific shortcomings of the different organisational structures.
- The reward system is the most important factor in the success of the research endeavour. Reward systems must be fully focussed on the realisation of the stated policy goals regarding the quality of research. As an integral part of reward systems, a policy of discontinuing unproductive research needs to be developed as well as procedures for rapid extra rewards for the best performing scientists/groups.
- In general, if ambitions are to be realised, more can, and should, be done regarding the alignment of all the available managerial and organisational tools within a UMC to reach the strategic aims. Further improvement of the already high quality of research and improving the relative position of each UMC amongst their peers (nationally and/or internationally) requires that all conditions and instruments are working in the same direction and are mutually reinforcing.

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Introduction

In 1998 an international assessment committee evaluated the research management of medical faculties and non-University institutes in the Netherlands. The report of this committee was published as part of the broad “Discipline Report on Medical and Health Sciences Research in the Netherlands 1998”. Following this report organisational changes involving the merging of medical faculties and University hospitals to create University Medical Centres (UMCs) have occurred. This process did not start in all centres at the same time. Indeed, discussions about the proper organisational model for the UMC were still continuing in one of the universities during the evaluation period.

In 2004, six years after the “Discipline Report”, the Deans of the University Medical Centres (DMW) decided to have an assessment of the research management of the University Medical Centres (UMCs). The DMW has therefore taken the initiative to invite an International Evaluation Committee to carry out this evaluation.

In this report the Evaluation Committee presents its general findings to the Deans of the UMCs.

Preamble to the Report

The terms of reference for the committee¹ were the following:

1. To evaluate the effectiveness of the research management of the eight University Medical Centres.
2. The effectiveness of the research management will be evaluated for each UMC separately, against the background of the UMCs own mission and strategic goals.

¹ For members of the committee, see appendix

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3. More general observations regarding research management, going beyond the level of the individual UMCs, will be put forward if and when the committee considers them to be conducive to improving the conditions for individual UMCs.
4. The committee will operate as follows:
 - a. A delegation of the committee will pay site visits to each of the UMCs prior to the evaluation in February 2005 by the full committee. During these site visits the committee will talk with representatives of the research institutes directors and with project leaders and post-doctoral researchers.
 - b. Notes from these visits will be sent to the international members of the committee in addition to the documentation (self-evaluations) from the UMCs themselves. The UMCs will be informed about specific issues to be discussed, prior to the site visit.
 - c. The committee will issue a general report to the Deans of the UMCs and, a confidential report to each individual UMC.

As input for the evaluation, each UMC compiled a self-evaluation report using a commonly agreed structure and format. Furthermore the DMW has committed the Centre for Science & Technology Studies (CWTS) to perform a comparative bibliometric study on the research of the eight UMCs in the Netherlands.

The site visits by the Chairman, the Vice-Chairman and the Secretary of the committee, were performed during the period of October to December of 2004. Written reports of these visits were sent to all committee members. In February 2005 the committee has convened in full for a week. During this period of time the Evaluation committee met with

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delegations of the eight UMCs separately. Each delegation was interviewed by the committee, following which the committee discussed and formulated its findings concerning the UMC. At the end of the evaluation week the committee formulated its overall impressions and conclusions. The information from the site visits is used both for the composition of the general report and, on a more specific level, in the confidential reports about each of the UMCs.

General remarks

The committee appreciates the thorough preparation by the UMCs of the evaluation process. A lot of effort has been invested both into the compilation of the self-evaluations and into the preparation of the site visits and the final discussions with the committee. The committee was struck by the openness of the discussions and the willingness of the delegations to discuss every detail of relevant topics.

The committee was likewise impressed by the generally high level of both the output and the quality of the research performed by the UMCs and by the high number of MD's that combine their clinical training with formal PhD training. Judged by the CWTS analysis, all eight UMCs perform well above the European mean level of performance, some even very substantially. This high level of both the quality and quantity of research of the UMCs in the Netherlands is a valuable national asset. The societal impact of research is not confined to the direct results of research itself. The existence of concentrations of excellent research has much wider implications for a knowledge based culture and economy. The unique situation of a number of centres of concentrated multidisciplinary research in the biomedical field of very high quality should be carefully guarded and nurtured. In this respect the possible effects of the new healthcare system on the funding of biomedical research and of new financing mechanisms of the universities must be carefully considered. Any new system or methodology should at least maintain and preferably

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increase, the present level of funding. Care must be taken to preserve the position of the UMCs as important centres of innovation both nationally and internationally.

Another special area of concern regarding the research position of the UMCs, is the rapid increase of legal and bureaucratic requirements resulting from national and European guidelines that confront researchers. In particular clinical research on drugs and research involving experiments with animals has seen a rapid increase in bureaucratic control that is of great concern to scientists. Government should introduce a policy to reduce, as far as possible, the administrative and bureaucratic controls that affect research in the life sciences, comparable to the kind of initiatives the ministry of economic affairs has undertaken regarding the industrial sector.

The generally very high level of research of the UMCs implies that, on the whole, research development and research management by the UMCs has been effective and successful. The challenge for the Dutch UMCs is now to move from good to even better and to maintain and improve international levels of excellence. Such an ambition is necessary not only in view of the very rapid developments in the biomedical sciences in general, but also as an answer to the challenges inherent in the rapid development of new technologies and insights in both diagnostics and therapy and to the formation, on a European scale, of big collaborative centres of biomedical and clinical research. Improving quality from an already high level presents a special challenge. Considering the UMCs as a whole, and allowing for the individual variations, the committee sees no reason for radical changes in the way medical research is managed in the Netherlands. Nonetheless, the committee does see several opportunities for further improvement. These will be discussed later in this report.

The UMCs are facing a variety of general problems regarding the improvement of the quality of research. These have to do with the hiring, training and retention of top research talent in the medical field. Among the most important pressures and influences are the

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increasing numbers of students; the need for adapting existing research conditions and practises to changing requirements of researchers (e.g. as a consequence of the increasing number of female doctors in healthcare who make different choices about the balance between work and family); the increasing bureaucracy resulting from national or EU law (e.g. regarding experiments with animals and clinical drug research, requirements for GMP laboratories, procedures regarding the dealing with ethical questions); the increasing political pressure resulting from the rising costs of healthcare; the less than adequate funding for research; the need to effectively and quickly transfer the rapid development of new multidisciplinary approaches to the diagnosis and treatment of diseases into healthcare practice. These problems are not unique to the Netherlands and concern most countries of the western world. For the UMCs that lack external advice at the level of research management, it is recommended that informal scientific advice on an “ongoing” basis from independent international experts is arranged.

While facing these societal and political challenges the UMCs have a threefold task to fulfill: to teach (a large number of) students, to deliver high quality care and to perform top-level research. These, often competing priorities commit the UMC managements to a permanent balancing act. Under the circumstances, the further improvement of the research effort is a challenging task.

Recommendations

- Research output of the UMCs is, both quantitatively and qualitatively, on a very high level. There is no need for radical changes in the way biomedical research is managed in the Netherlands.

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- In the re-design of the healthcare system and the financing mechanisms of universities the possibility of negative side effects on the funding of biomedical research in the UMCs must be carefully taken into consideration.
- Bureaucratic requirements in biomedical research are on the increase and take up an increasing amount of time of the scientists. They threaten to slow down the progress of research unnecessarily. Government should take action to keep these bureaucratic controls to a minimum.
- The UMCs operate in an increasingly competitive international context. This should be reflected in the availability to the management, on an “ongoing” basis, of scientific advice by independent international experts.

The evaluation-procedure

All eight UMCs took part in the present evaluation. This offered the opportunity for the committee to review the whole spectrum of choices and individual solutions of the UMCs to largely common challenges. For the committee this was a very valuable approach that allowed a more thorough understanding of the existing complexity and diversity of management systems and organisational structures, and greatly assisted the assessment of the research management situation in the different UMCs. The information provided on the individual UMCs and the discussions with their key managers allowed the committee to better formulate its general comments about biomedical research management in the Netherlands.

In retrospect, given the organisational complexity of the research management and the diversity of procedures and choices among the different UMCs, it would probably have been easier for the committee if the discussions with the Deans and their delegations had been undertaken at the same time as the discussions with representatives of the researchers of a particular UMC. This could in future take the form of a one-day site visit by the full

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committee to each Centre. The evaluation of all UMCs would then need to be spread out in time. The eight site visits could, for example, be planned in four blocks of two days.

Producing self-evaluation reports as an input to the work of an external committee is a useful start to an evaluation process. Unfortunately, the self-evaluation reports, almost without exception, proved to be somewhat self-congratulatory and provided mainly a description of the status quo instead of open appraisals of the problems and dilemmas facing individual UMCs. Also, the inconsistency in, and non-comparability of, the terminology and of data and statistics in the self-evaluations put an unnecessary extra burden onto the task of the committee and on the international members especially. The evaluation task would have been made easier, and probably more effective, if the initial self-evaluations had contained a truly critical assessment (SWOT analysis) of the existing situation within each UMC and a summing - up of the concrete problems and dilemmas that research management are presently facing. Furthermore, a comprehensive and comparable overview of figures and numbers, which would provide a gross general picture of the effectiveness of the different UMCs relative to each other, was lacking.

In conclusion: for the future there is room both for the improvement of the self-evaluation reports and the evaluation procedure as a whole.

Recommendations regarding the evaluation-procedure.

- Design a uniform and research oriented way of presenting figures regarding finances and personnel so as to make data and statistics transparent and comparable. The self-evaluation reports should at least contain, on a general level, comparable figures and numbers about the first, second, third and fourth flow of money, about the total turnover of the UMC, about the number of tenured and non-tenured staff and the number of PhD's and of clinicians. The combined figures should allow general conclusions about the relative levels of

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output of the different UMCs. The report should clearly indicate the approach of the UMC to training at all levels, the mechanisms by which funds are distributed to research teams, the procedures for identifying and rewarding research achievement and for dealing with unsatisfactory performance, and the mechanisms in place for reviewing the research portfolio and developing new research priorities

- Re-design the format of the self-evaluation report such that a critical assessment of the research position, including the dilemmas that confront management, is included. Such a critical assessment should form the heart of the self-evaluation. A statement, in concrete terms, about the ambition of the UMC regarding its research effort should be the reference point for the (self-) evaluation.
- Redesign the evaluation procedure in such a way that the full committee will pay one-day site visits to each Centre.

The UMCs as the new context for research

The process of merging the medical faculties and University hospitals into an integrated organisational structure, the University Medical Centre (UMC), is still ongoing in some universities in the Netherlands. The unique feature of the UMCs is that the combined responsibility for all three main tasks of the UMCs (i.e. patient care, education and research) lies within the board of the UMC. The committee concludes that in general the formation of the UMCs has been advantageous for both fundamental (basic) and applied (clinical) research. Notably the collective responsibility for the three main tasks has created more and better opportunities for investment in research, for the strengthening of the links between research and clinical care and for the translation of research results into the clinical domain.

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However, the UMC context also carries a few potential risks for (bio)medical research in the long-term. These are:

- The external (government) and internal (healthcare system) pressure on research to be oriented directly towards concrete health care problems may lead to an imbalance between basic and (applied) clinical research to the detriment of the basic and innovative biomedical research that will underpin new developments in the delivery of care in the future.
- Nationally, as a consequence of the changes in the healthcare system as a whole, the financial pressures on the UMCs are likely to grow. The UMCs may in the future, to a greater extent than before, have to compete with the non-University hospitals on the basis of price. This may put the budgets of the UMCs paid for by the healthcare system, under pressure.
- The UMCs are faced with an increasing teaching load, due to the recent near doubling of the number of students. Although at the moment there seems to be no problem accommodating these increased numbers, the full impact on the teaching system will only become manifest in a few years' time.
- The pressure of government towards higher productivity/efficiency in the healthcare system as a whole may make it more difficult to find and accommodate, next to the healthcare tasks, the "protected and undivided" stretches of time needed for doing excellent research.

These developments may eventually pose a threat to research funding by the UMCs.

Against this background it is important for the UMCs to continuously rethink, redefine and renegotiate their position and role in the healthcare system. While it is clear that the UMCs will always be the most important treatment reference centres in the healthcare system, the UMCs should make sure that, in the midst of the changing environment, their *academic* tasks remain centre-stage as well. The UMCs are academic institutions and as such part of

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the wider academy. Herein lies one answer to the abovementioned threats. The UMCs should enlarge and strengthen research alliances with other faculties of the University so as to secure, strengthen and support innovative basic – multidisciplinary - research and to secure sufficient freedom of choice of research topics.

The UMCs should speak out strongly for the importance of research for the long-term vitality of healthcare. In presenting the strongest possible case in the political arena, the UMCs should work together with a joint approach in the context of the NFU.

Recommendations regarding the maintenance of the UMCs as front-rank research institutions

- In addition to developing their own research agendas the UMCs must remain vigilant in grasping opportunities for the setting of their research agendas in the wider context of academia and the University structure. Organisational structures and/or financial incentives that facilitate the formation of research connections between the UMC and other University faculties are necessary to ensure strong links between basic biological and sociological research and applied medical science
- The potential of the NFU for the UMCs to speak out collectively for the importance of biomedical research should be fully used.
- Within the changing environment the UMCs should continuously re-evaluate their position in the healthcare system and keep on focussing on their academic tasks.

Career Development in Research

The health of academic research is critically dependent on the availability of excellent researchers who are willing and able to connect their scientific interests with medical problems and vice-versa. The constant challenge is to create optimal conditions not only for present generations of researchers but for the training of future generations as well. This touches upon many areas of research management. In the following section we discuss the areas of research management concerning the development of human resources that require special attention.

Career-structures for top-level clinician-scientists

The quality and effectiveness of medical research is critically dependent on the availability of a sufficient number of excellent clinician-scientists. These individuals form essential components in the medical research system, linking basic understanding of diseases and disease patterns to applied medical problems. They are scientists who have a sincere interest and long-time expertise in both basic and clinical research.

The successful training and retaining of these scarce individuals is a problem for all medical schools in the western world. The UMCs in the Netherlands have a unique advantage and strategic asset in the fact that a relatively high percentage of medical students (compared to other countries) receiving an MD go on to undertake a PhD.

The AGIKO grants from NWO and other similar constructions allocated by the UMCs themselves are excellent instruments. These schemes provide grants for MD's who will perform their PhD while in training as medical specialists. They involve a combined period of training as a medical specialist and proper research training in an established research group. These schemes, important as they are, are not sufficient to fill the need for top-level clinician-scientists. The main reason is that the training of these highly specialised individuals takes more than the successful completion of both a medical specialisation and

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a PhD. To be properly trained, the top-level clinician-scientist needs to spend, after receiving his/her PhD and after having completed his/her medical specialist training, at least the equivalent of two post-doctoral periods in basic research while at the same time treating patients. For this extended period of 6 – 10 years of continued research training special arrangements with protected research time need to be put in place. There are already the Clinical Fellowships of NWO that cover (part of) this extended training period. However, these fellowships are relatively short term, too few in number and only concern the funding of the clinician scientist himself. Proper funding of these top-level clinician scientists comprises not only the scientist himself, but of some supporting staff and consumables as well.

To ensure a career in research for these people subsequent to their extensive training, tailor made career track policies need to be in place, covering the whole of their PhD training, the training as a medical specialist, the extended period of 6 – 10 postdoctoral years and beyond.

The committee has the impression that the number and the conditions of the programmes for the combined specialist and PhD training (AGIKO and similar schemes) on the whole are sufficient. However, the committee strongly recommends that a competitive programme for additional training to the level of accomplished clinician-scientists will be put in place in collaboration with NWO. Such a provision is urgently needed.

The increasing percentage of female students

At the moment about 70% of the medical students in the Netherlands is female. Female doctors/ researchers tend to make different choices about the way in which they divide their time over work and family, resulting in increasing numbers of part time contracts (both for male and female researchers/clinicians). Within the UMCs, where doctors usually are supposed to perform the triple task of teaching, patient care and research, it is

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exceptionally difficult, in the context of a part time job, to find adequate time for research, and nearly impossible to be a high-quality, independent, investigator. Special measures regarding the amount of research time for this category of researchers, need to be taken to prevent this talent from being lost. In order to provide sufficient space for research in part-time job conditions, it will increasingly be necessary to create “protected” research time. This will require an adaptation and possibly a re-organising of the teaching-, research- and clinical tasks within the UMCs.

PhD students and Postdocs

The number of medical students that take a PhD has grown substantially over the past years. Students with non-medical backgrounds taking a PhD in the biomedical field are an essential contribution to the quality and the diversity of research. The committee is, however, concerned that a proper balance between the number of Postdocs and the increasing number of PhD students is maintained. This balance may be upset by a rather perverse side effect of research funding, which is tied to the number of PhD degrees awarded. The committee strongly recommends that the UMCs and funding organisations take the long view in establishing the mix between PhD students and more senior staff, especially in view of the expected high turnover of retiring senior staff in the near future (see also the following point).

Self-renewal

Securing talent is an essential condition for the long-term welfare of UMCs as academic institutions. Securing new talent will always be a combination of the nurturing of in-house talent and outside recruitment.

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As far as the nurturing of in-house talent is concerned, all UMCs do have formal or informal policies and procedures in place. These policies comprise diverse elements like career track schemes for excellent post-doc's, “dakpan” (roof-tile like) constructions for the timely replacement of tenured professors, different categories of professorships (like tenured full professors, strategic professors, associate professors) and extra-curricular courses for the most talented undergraduate students. The existing policies seem to be rather effective. However, in many cases the talent policy procedures and incentives are to a greater or lesser extent informal. Success in attracting, nurturing or retaining young talent is in these cases entirely dependent both on the initiative of the researcher him/herself and on the inventiveness, personal contacts and influence of the research (institute) director.

Due to the aging of the tenured staff, most UMCs will soon need to find replacements for an unusually large percentage of their staff². These UMCs may thus find themselves (more than usual) in direct competition with each other for the available talent. Surprisingly, the committee has not found evidence for the existence of focussed strategies within individual UMCs, or a joint policy to deal with this challenge. The solution of recruitment problems resulting from the foreseeable retirement over a short period of time of a relatively large percentage of staff may well require a concerted effort of all UMCs together. It may also require the co-operation of the ministry of education to create the right conditions for solving this problem.

Those in the national and international talent-scouting arena are all confronted with institute-specific limitations regarding recruitment that may result in a competitive disadvantage in comparison with similar institutions both in the Netherlands and abroad. Such limitations range from being situated in an internationally less attractive city or in a geographically isolated location, the lack of a multi-faculty University next door, to more financial and personal problems like high house prices and cost of living and (very important nowadays) the availability of jobs for spouses of applicants.

² Clearly there are differences between the different UMCs in this respect.

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On the whole, talent policies do not seem to be systematically developed and implemented by the UMCs. To meet the ‘talent challenge’, it will not be enough to have some aspects of the problem taken care of and others partially or not at all. With regard to the central importance of the issue of the nurturing and recruitment of talent as such, the committee suggests that more be done in this respect. For instance, each UMC should define a comprehensive and transparent talent policy in which the development, the nurturing, the recruitment and the retaining of talent are considered. Such a policy should deal with all aspects of training, recruitment and career development and might include measures regarding short-duration sabbaticals for clinical and non-clinical research staff, the creation of protected time for research, the creation of an institutional career track policy with clearly stated criteria and milestones, the relaxing of the “formation-principle” in the appointment of professors³, the exposure of students to advanced basic biomedical research as part of their standard undergraduate training, the quality of the wider intellectual infrastructure and the cultural climate of both the University and of the city it is situated in. Relocation packages and “spouse programmes” in which help is given to find jobs for spouses of candidates might be part of such a policy. The committee considers talent policy to be of such importance that special measures must be taken and structural approaches developed. The costs of such programmes are a legitimate use of research money.

Recommendations regarding career development

- Policies should be developed for the training and retaining of accomplished clinician-scientists. If possible such policies should be designed and negotiated jointly rather than each UMC developing its own policy. Joint policies should as a minimum involve the setting up of a competitive scheme for the training of

³ Nearly all UMCs have a fixed number of professorships, based on the “formation principle”. In our discussions we have not come across sufficiently convincing research based arguments for the continuation of this situation.

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a limited number of clinician scientists with protected time for research, and a career-track system. A clinician scientist fellowship typically should involve the salary of the clinician scientist him- or herself but also technical support and a PhD or post-doctoral student as well as a budget for consumables, for a period of at least 5 years. Perhaps ten of these fellowships should be available per year for all UMCs and specialties together.

- In order to retain the research talents of female clinicians, policies for providing part time clinician-researchers with prolonged protected research time must be developed. Also, attention should be given to finding helpful solutions to more mundane problems coming forth from combining a scientific career with family obligations. Measures may range from the very practical level (crèches for children/ a school bus from the UMC to the different schools and back) to defining a more flexible definition of a working week and (on an individual basis) the creation of more flexible job structures.
- Comprehensive talent policies, covering the whole range of the scouting, nurturing, hiring and retaining of talented individuals, should be developed at each UMC. Specialised relocation and mobility packages to underpin recruitment policies and strategies should be part of these policies. These packages may contain elements like spouse programmes, start up grants for post doc's and aio's involving assistance in finding proper housing, etcetera.

The stimulation of innovative and collaborative research-initiatives

The availability of a central budget in each UMC for the stimulation of innovative initiatives and of research across the boundaries of the existing organisational structures is an important instrument of research management. Such a budget should be used for special investments, for temporarily supporting new research initiatives in the early stages of

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development, to create well-focussed incentives for the implementation of specific research policy objectives. This may be the furthering of translational research or additional funding for innovative interdisciplinary research projects the funding of which is frequently handicapped by well-focussed funding agencies etcetera.

We have found that all UMCs have in fact limited budgets available on the level of central management to fund the aforementioned kinds of research initiatives or special investments. The procedures for the allocation of these funds vary from one UMC to another. In some UMCs researchers are of the opinion that the allocation procedure for this money and the criteria for success are rather unclear. They would like these funds to be allocated on the basis of an open competition in which the best proposals are selected. They feel that open competition is a transparent procedure and most conducive to the quality of research. The committee wants to underline that access to these funds must be based on clear rules and transparent procedures. Furthermore, in order to optimize the innovative effect of such a fund, it is advisable that the Dean should regularly seek external advice about how to best spend the money, both in the light of the internal research priorities of the UMC and the wider developments in the world.

Responsible research management also entails (the possibility of) making decisions that are not entirely based on or compatible with the logic of existing procedures or “going concerns”. Therefore it is important that a small budget exists which does *not* have to conform to existing criteria and fixed allocation mechanisms. Such a budget should comprise some 10% of the abovementioned development fund and should be used at the discretion of the Dean to fund activities that may not formally qualify under the existing rules, but which the Dean considers important for other reasons.

The stimulation of innovative research-initiatives is not only a matter of financial incentives. It is also important that there are adequate mechanisms in place for researchers to meet each other across the boundaries of departments and institutes and to be informed

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about research developments outside their own departments or institutes. With some exceptions, internal communication about research does not seem to have received much policy attention as a separate issue within the UMCs. Structural systems or mechanisms for cross-boundary communication seem to be absent in most UMCs. Where applicable this aspect of management merits more attention. The intranet offers opportunities for the development of efficient signalling and alerting systems. But before such a signalling system can be put in place, there needs to be a seminar and presentation culture and policy. In this respect the graduate schools, which are now being developed in several UMCs may be the vehicles to develop such a culture. But more initiatives are needed.

Recommendations regarding the stimulation of new initiatives in research

- It is important that within the UMCs a central fund dedicated for innovative research initiatives exists. In order to make the allocation decisions of such a fund as transparent as possible, a set of rules should be designed, describing the purpose, the criteria and the procedures for spending. Such a fund should be of sufficient size to be able to have a significant impact on the research endeavour. The spending of: a small portion (in the order of 10%) of the money should be discretionary to the Dean
- It is good practice to organise professional external advice at the level of the Board, so as to create an external frame of reference regarding the UMC policy of spending research funds in general as well as the concrete spending decisions of the special central fund.

Technology transfer

Technology transfer is of increasing importance to the UMCs. This is not only so because it may provide extra money, but also because talented researchers enjoy the challenge of the transfer of their research results into commercial ventures or other practical applications. A professionally run technology transfer operation will thus become an incentive (or pre-requisite) for talented scientists considering accepting a post in the UMC in question. So far, each of the UMCs is trying – either alone or in co-operation with its University - to set up a knowledge transfer service. A successful technology transfer function however, including a patent office and opportunity scouting, requires a very substantial effort on a highly professional level and under a specialised set of conditions regarding intellectual property and the setting up of new ventures. The committee is convinced that UMCs individually lack the size to do this professionally, effectively and successfully on their own.

Recommendations regarding technology transfer

- The UMCs should stimulate the setting up of professional technology transfer offices if these do not already exist or lack sufficient scale. The individual UMCs should collaborate with their universities in the setting up of one such function for the whole University/UMC.
- Research money should not be spent on technology transfer. The office of technology transfer should seek external money and after some time earn back its own costs completely. The creation of new ventures by researchers should be subject to a strictly “pay your way” approach. Without this precaution, new ventures will easily erode the research time of scientists and take away from the research effort of the UMC.

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- The setting up of a new company may have the consequence for the scientist that its mainly “virtual” capital will be valued in real money terms by Internal Revenue. This may result in taxation well in advance of the potential value of the company having materialised itself. Depending on the monetary value placed upon the new initiative by Internal Revenue, the tax to be paid may be considerable. In a situation where the company is not going to produce any concrete revenues on the short term, this clearly is a disincentive to technology transfer through the establishment of new companies. The technology transfer offices jointly, or the VSNU or NFU should negotiate with the departments of internal revenue, economic affairs and education to find solutions for this problem.

The research organisation

The eight UMCs have adopted a range of organisational structures to manage a wide variety of research activities. These structures reflect different philosophies about how the quality of research can best be stimulated. Considering the quality of research in the different UMCs (as presented in the CWTS analysis) it becomes apparent that the form of the organisational structure, in itself, is not a prime determinant of success. Clearly each structure has its merits and limitations and may work well, provided there are high quality researchers who are comfortable with the structure in which they have to work. The committee therefore has no overall recommendations regarding a single or uniform method of organising research within the UMCs. However it is clear that certain organisational solutions can have specific shortcomings that hinder the execution of research policy and the progress towards higher quality research. For example, one of the goals in the research policy of all UMCs is the stimulation of translational and cross-divisional multidisciplinary research. Clearly, not every research organisation is, in itself, equally well geared to the achievement of this goal. Compartmentalisation of research along institutional or

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divisional lines may play a role in sub-optimal collaboration. Where this may be the case, existing structures should be supplemented with top-down policies and incentives, to counterbalance the effects of compartmentalisation. In general, a critical evaluation of the research organisation and research policies with respect to their contribution to achieving the policy goals should be performed regularly by each UMC individually.

The following comments are aimed at making the existing organisational structures still more effective as instruments in the furthering of research quality.

As a background to our comments we describe here the main characteristics of the way in which the UMCs have organised their research. This overview is intended to capture the general characteristics only. No attempt has been made to go into detail or to accommodate individual variations on the general theme.

Generally the UMCs are organised as a matrix: the divisions (formed by grouping together several departments, either clinical or preclinical) form the vertical axis while cross-divisional research institutes form the horizontal axis. Line responsibilities, including integral responsibility for the total budget for healthcare, teaching and research, lies within the divisions. The research institutes obtain their resources, both human and financial from the divisions⁴.

The research institutes are organised along thematic lines. Sometimes such a research theme predominantly coincides with the research interests of just one division. Most research institutes however have themes that cut across several divisions. The research themes of the institutes are seen as instruments to further the overall coherence, as well as to increase the quality and the focus of research: research projects that do not fit into the

⁴ UMC Maastricht forms a notable exception to this general pattern. In Maastricht the research institutes are the direct recipients of the entire research budget. The directors of the research institutes are fully responsible for the management of research, the procurement of researchers in the institutes and for the allocation of the research budget within their institutes.

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general themes of the institutes are discouraged⁵. Where applicable, 80 – 90 % of total research is organised within these horizontal research institutes.

The director of a research institute has a varying but on the whole rather limited formal influence on the priorities and the content of the research within the institutes. The divisions (and the leaders of the research *programmes*) determine which research themes and projects they invest in. The director of a research institute or the leader of a broad research programme within an institute, has to negotiate financial and human resources with the division management. The main direct responsibility of the director of the research institute is the assurance of the quality of research and of the coherence of the research projects within the general themes of the institute. Generally research directors do not (or hardly) have budgetary means of their own in support of the execution of their tasks. In some instances they do have a limited budget, e.g. in the form of several aio or PhD positions or some money for investments. Directors of a research institutes may or may not be the head of a division as well. In those cases that they are, negotiations between the director of the research institute and the head of division are clearly easier than if this is not the case, providing a certain competitive advantage for the directors who are head of division as well.

Comments on the research organisation

- A clear advantage for UMCs of having research institutes is that these are vehicles both for the co-operation between basic and clinical research and for different divisions to bring research together in shared multidisciplinary themes. Also, the institutes are well positioned for linking research themes to the research of other faculties of the University or to nationwide or international

⁵ Clearly there are differences in this respect between the UMCs. Erasmus mc and the UMC Leiden for instance have in fact no cross-divisional research institutes as part of the organising principle for their research. The cross-divisional structures that are in place have as their pricipal role to serve as administrative ‘containers’ for research that happens to fit into a general theme.

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research actions. In most cases this potential for cross-linking UMC research to the rest of the University is not as yet fully exploited. Specific incentives for establishing these cross-links might help speed up this process, especially where there is not much experience in working together across faculty boundaries.

- In the majority of UMCs, the focussing of research into thematic institutes has been an important contributory factor to improving the quality of research over the past years. This success has in turn led to plans for further strengthening of the themes and for bringing more, if not all, research into the institutes. The committee appreciates the positive effect of research institutes. However it is also important to keep a degree of flexibility within the system as a whole. Really new and creative approaches and ideas tend to not fit into existing structures and themes. It is important to develop a keen sense for this kind of truly innovative research in order to prevent creativity being stifled by inflexibility of the research organisation. As a rule of thumb, the committee would think that the UMCs should allow 5 – 10% of research to exist outside the themes of the research institutes.
- The difference in responsibility for research between the divisions and the research institutes (with integral responsibility being attributed to the division management) is understandable and a necessary condition for a transparent organisation and an accountable management. However, for the director of a research institute, to have no budget or steering instrument at all, makes his task unnecessarily cumbersome and difficult to achieve. It is therefore important that the director has his own instruments for active support, especially when research institutes are seen as vehicles for bringing more focus and coherence, for the improvement of quality and for the stimulation of the innovativeness/creativity of research. These need not be large amounts of

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money. A strategic number of PhD and post doc positions, as well as some seed money, will in most cases be sufficient to provide him/her with the extra negotiating power that he/she needs. This will be of special importance in those cases where the director of a research institute is not at the same time head of division. In addition the director of a research institute should be able to apply for additional funds from the central development Fund

- In order to facilitate rewarding mechanisms for the best performing groups and to minimise bureaucracy there should be regular direct contacts between the research groups and the decision making management levels.

The funding of research

All UMCs have the explicit goal to increase the level of quality of their research. As mentioned earlier, the organisational structure of research appears not in itself a determining factor for the quality of research. However, the reward system for research clearly is. If the UMCs want to fulfil their ambitions of raising the quality of research and to move to a higher quality-category relative to their peers nationally and internationally, the reward system must be fully geared to reaching that goal. This will require that a greater part of the research budget be allocated on the basis of research performance and that the performance criteria be tightened. It also requires reconsidering the prevalent policy of non-competition between the different research institutes within each UMC. The main argument for not allowing competition for funds between the research institutes within a UMC is that the research institutes as such represent the ‘research profile’ of the UMC and the aim is to strengthen the quality of research across the full width of this profile. Although there clearly is logic in this approach, it is not necessarily conducive to the goal of increasing the quality of research above the high average level that already exists. In this respect the committee is not persuaded that the research profiles of the different UMCs are so unique that they always need to be preserved in their present form.

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Considering the research profiles of the UMCs there is, on a general level anyway, considerable similarity among them. Fields like cardiovascular disease, epidemiology and proteomics are priorities in most if not all of the UMCs, while other important fields like reproductive and sociological medicine seem hardly to be prioritised⁶. The committee wonders if not more diversity and differentiation between the UMCs is desirable anyway, for instance in order to maintain and enhance existing distinguishing strengths of individual UMCs.

Another argument used against the internal competition between institutes is that this may entail a specific disadvantage for the non-laboratory sciences. The committee disagrees with this argument. It should be possible to design performance-based criteria for competition that take the relative positions and characteristics of the different disciplines fully into account. Clearly the creation of a level playing field is the first priority when designing such a competitive approach beyond the boundaries of research institutes.

Improving research quality through funding mechanisms also implies the closing down of under-performing groups. In practice, it does not follow automatically that a performance based allocation of funds leads to the timely discontinuation of research that doesn't meet the quality standards. This requires additional decisions of research management as well as additional policy criteria. In practice, the closing down of research programmes seems to be more difficult than rewarding excellent research. As part of an overall policy for research excellence and the tightening of the application of quality criteria however, closing down criteria should be developed as well. This may entail leaving behind choices that up till now have been corner stones of research policy, like the existing research profile or the existing size of the financial base rate for departments in the allocation of money.

⁶ The committee is aware of the fact that on a lower level of organisation of research, there exists considerable differentiation within each field of the overall profiles of the UMCs. The actual differentiation on the research level between the UMCs will therefore be greater than the overall profiles suggest. Despite this, the committee believes that further differentiation and focussing of research can be an important factor in enhancing the quality and impact of research still further.

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An important element of research funding in the Netherlands is competitively awarded grants through NWO and the EU. Because these grants imply recognition of quality of the research proposal or of the individual applying, such grants generally carry substantial prestige for the awardees and consequently also for the institution. Typically, such grants do not cover the full cost of research, the reasoning being that such external grants should be used as add-ons and to stimulate existing research activities, funded from the first flow of funds. This construct is increasingly under discussion, largely because the first flow of funds has not kept up with the growth of competitive funding (and funding from charities). In some UMCs the successful researcher can no longer assume that the “matching” required to cover the full cost of research is made available by his/her institution⁷. When the individual researchers or the teams are directly exposed to problems of this kind, it is felt as a very strong disincentive. A number of UMCs have expressed serious concern about the effects of matching on the research budget. Others do not have problems with matching.

The requirement of matching of external funding by UMCs (and non-University research institutes) has now become common policy of research funding agencies, be it NWO (ZonMw), charity foundations or even governmental bodies (Ministries of Health and of Economic Affairs). It should be emphasized that the discussion about the phenomenon of matching in the funding of University research, is not limited to biomedical research. Recently the Science and Technology Policy Advisory Board (AWT) published a special report on this topic⁸.

While the committee finds the situation regarding the matching of competitive funding unsatisfactory in general and recommends that measures be considered to gradually remedy the present situation we do not consider the problems of the UMCs with this form

⁷ In most countries external funding covers the full costs of research including the overhead of the research institute.

⁸ “De prijs van succes”, over matching van onderzoeksubsidies in kennisinstellingen, AWT-advies nr. 58, april 2004.

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of funding to be essentially different to the problems of the rest of University research⁹. The committee suggests that this issue should be further addressed in the context of this wider discussion on the funding mechanisms of universities.

Until there is a specific programme within NWO covering a certain area of multidisciplinary research, it is generally still rather difficult to procure sufficient funding for multidisciplinary research, especially when co-operation with scientists from other faculties, like the faculties of physics, chemistry or sociology is involved. This broad multidisciplinary research is especially important for creating new innovative perspectives and insights that may form the basis for translational research in the future. The selection and funding of multidisciplinary research should be given special attention both by national funding organisations and by research management of the UMCs.

Recommendations regarding the funding of research

- Against the background of the stated ambitions of the individual UMCs regarding the quality of their research, the existing reward and incentive systems for the funding of research must be carefully scrutinised for elements that are not in line with the attainment of this goal.
- The percentage of research money allocated on the basis of performance needs to be increased. The criteria for performance must be fully explicit. More emphasis needs to be placed on rewarding the highest possible level of quality. The best performing groups and scientists should directly experience the

⁹ Indeed, in most countries around the world the opposite situation exists – a substantial overhead on direct costs is included in external funds for research. External funding thus considerably contributes to the upkeep of necessary infrastructure for research. It is unlikely that the Netherlands will be able to maintain their “negative overhead” situation for much longer in a EU wide research environment.

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consequences of their better performance with regard to human and financial resources allocated.

- Parallel to a performance based allocation of research money, a closing-down policy for underperforming groups and research themes needs to be developed and implemented.
- In striving for an even higher quality of research, more space must be created for competition between the research institutes within a UMC. Adjustments in the overall 'research profiles' of the UMCs must be accepted as a possible consequence of the installation of more competitive funding mechanisms.
- Problems associated with matching must under no circumstances be placed at the level of the individual researchers themselves, but should be solved at the institutional level, if possible in collaboration with the University.
- Special care should be taken, both by national funding organisations and the management of the UMCs, to ensure that there is sufficient funding available for multidisciplinary research across faculty boundaries.

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APPENDIX 1

The members of the International Research Management Evaluation committee are

Dr. R. J. van Duinen, former chairman of NWO Chairman

Prof. Dr. W.G. Van Aken, former chairman of ZonMw Vice-chairman

Prof.dr. R. Bouillon, Chairman of the department of Endocrinology, University of Leuven,
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Prof. dr. R. Souhami, Director of Policy and Communication, Cancer Research UK,
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Dr. C.M. Kleisen, Management Consultant Kleisen & Partners Secretary