Assessment of Research Quality
Research in Veterinary Sciences
Utrecht University

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Preface

For many years, the FVM at Utrecht has held a very strong international position, which is to an important degree due to a strong commitment to veterinary research. The previous external research evaluation came to the conclusion that the IVR at the FVM was performing among the top veterinary faculties in the world. This very favourable assessment did not lead to complacency. On the contrary, the IVR has continued its drive to enhance quality and to get the most out of its resources by ever concentrating its research efforts. This strategy has resulted in a very ambitious new concept: “more focus and critical mass”, which is now being implemented. The Committee was impressed by the strong leadership and the internal coherence of this faculty as well as by the enthusiastic support of its members for the new research organisation. The present evaluation shows that the IVR is keeping up its strong position in the world and may even improve it in the future.

The work of the Committee was greatly supported by the excellent documentation prepared by the IVR for this evaluation. We are also very grateful for the impeccable organisation of the visit, the uncomplicated open minded discussions with the programme leaders and the hospitality of the faculty. We found this evaluation a very interesting and instructive experience.

Marc Vandevelde
Chairman
1 Introduction

1.1 The Dutch System for Quality Assessments of Research

The Universities in The Netherlands have a long tradition in systematically evaluating the quality of their research and teaching programmes. The assessment of the academic quality of university research programmes started in the nineteen-eighties, and in 1992 the Association of Universities (VSNU) was made responsible for the assessment system. VSNU developed standard protocols and organised two five-year rounds of the evaluations in the nearly thirty distinguishable academic disciplines.

In 1999-2000 the assessment system was evaluated under the auspices of the three main Dutch organisations responsible for publicly funded research - the universities (cooperating in VSNU), the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organisation for Scientific Research (NWO). This resulted in the Standard Evaluation Protocol (SEP), which forms the basis of the assessment described in this report. For each evaluation more specific elements of the evaluations can be described in a Discipline protocol.

The SEP indicates that the primary responsibility for the organisation of the assessment is in the hands of the Universities or Institutes themselves. For the assessment of Research in Veterinary Sciences as described in this report the Utrecht University Board commissioned this task and appointed the Review Committee.

The evaluation system has three objectives with regard to research and research management:
- Improvement of the quality of research through an assessment carried out according to international standards of quality and relevance;
- Improvement of research management and leadership;
- Accountability to higher levels of the research organisations and funding agencies, government, and society at large.

This will be achieved by:
- assessment of the quality of research programmes (groups) on the basis of self-evaluations and appraisal of how the work is related to the group’s mission, as well as to the mission of the faculty or the institute of which the group’s programme is a part;
- evaluation of the mission of faculties or institutes, as well as the group’s own mission;
- appraisal of the state-of-the-art in the discipline or academic area concerned.

The assessment takes place at the aggregate level of research programmes. The faculty or the research institute submits a description of the results that have been achieved in each research programme during the previous five years (including quantitative data on staff input, five key publications and a list of publications), a short outline of the ‘mission’ statement of every programme, and anticipated developments in the context of the research profile of the faculty or institute.

Highly valued features of the assessments are the Committee’s interviews with delegations of the faculty boards, the directors of the research institutes or research schools, and the programme directors. The interviews with the delegation of the faculty boards are especially directed toward discussions of the faculty’s research profile as a result of a faculty’s research policy.

1.2 The Review Committee for Research in Veterinary Sciences

The evaluation described in this report was initiated by Utrecht University in 2004. A Discipline Protocol was agreed between the University Board and the Faculty of Veterinary Medicine (see Appendix 3 for the text of this protocol). It describes the areas of research that will be evaluated as follows:
- Biochemistry, Cell Biology, Pharmacology and Pharmacy;
- Pathology, Anatomy and Physiology;
- Microbiology and Immunology;
- Public & Environmental Health and Risk Assessment (including Toxicology);
- Animal Behaviour, Animal Husbandry and Animal Genetics;

1 This Standard Evaluation Protocol can be found on the following web page: http://www.qanu.nl/comasy/uploadedfiles/sep2003-2009.pdf
For each of these eight areas the Faculty Management proposed multiple candidate members of the Review Committee and the University Board used these proposals as the basis for the Committee member appointments. Two extra members were appointed who assisted the Committee in evaluation of the Institute for Risk Assessment Sciences (IRAS). The Standard Evaluation Protocol specifies that the majority of the Committee Members should come from outside the Netherlands. The Review Committee was appointed in the summer of 2005 and consisted of:
- Prof.dr. Marc Vandeveld, (chairman), Faculty of Veterinary Sciences, University of Berne, Switzerland;
- Prof.dr. Peter Lees, Department of Veterinary Basic Sciences, Royal Veterinary College, Hawkshead Campus, Hatfield, Hertfordshire, UK
- Prof.dr. Robert Gerlai, Department of Psychology, University of Toronto, Ontario, Canada
- Prof.dr. Travis C. McGuire, Department of Veterinary Microbiology and Pathology, Washington State University, Pullman USA
- Prof.dr. Thomas J. Rosol, Department of Veterinary Biosciences, College of Veterinary Medicine, The Ohio State University, Columbus, USA
- Prof.dr. Peter S. Thorne, Department of Occupational and Environmental Health, College of Public Health, The University of Iowa, Iowa City, USA
- Prof.dr. Mats H.T. Troedsson, Department of Large Animal Clinical Sciences, College of Veterinary Medicine, University of Florida, Gainesville, USA
- Prof.dr. John W. Wilesmith, Animal Health and Welfare Directorate General, Department for the Environment, Food and Rural Affairs, London, UK

The additional members for the evaluation of IRAS were:
- Prof. dr. Linda S. Birnbaum, US Environmental Protection Agency, Research Triangle Park, USA
- Prof. dr. Richard E. Peterson, School of Pharmacy, University of Wisconsin, USA

The University Board appointed as the secretary for this Review Committee:
Dr. Bas J. Blaauwboer, Utrecht University

Short curricula vitae of the members are included in Appendix 1.

1.3 Scope of the Assessment
The Institute of Veterinary Research submitted a total of 9 programmes, mainly following the boundaries of the Faculty of Veterinary Medicine’s Department structure:
IVR1: Biochemistry and Cell Biology
IVR2: Pathobiology
IVR3: Risk Assessment Sciences
IVR4: Public Health and Food Safety
IVR5: Animal Science and Society
IVR6: Infectious Diseases and Immunology
IVR7: Equine Sciences
IVR8: Clinical Sciences of Companion Animals
IVR9: Farm Animal Health

A summary table for the scores for quality, productivity, relevance, and viability for these programmes is presented in Appendix 2.

The Committee was asked to operate according to the Standard Evaluation Protocol. For this assessment, that protocol was elaborated in the Discipline Protocol Veterinary Sciences, prepared by the faculty and approved by the University Board. Furthermore, the Committee was asked to pay special attention to the newly formulated research policy denoted as “More focus and critical mass”, and the five larger research programmes herein.

The period being assessed was from 2000-2004.
1.4 Data provided to the Committee
The basis for the assessments consisted of written documentation compiled and provided by the faculty, and of interviews by the Committee with representatives of the research programmes and the faculty research management. The documentation consisted of a self-evaluation report containing a research profile and the key-data of the faculty as a whole, as well as documentation per programme.

The Centre for Sciences and Technology Studies at Leiden undertook a bibliometric analysis for publications produced by a set of investigators (selected on the basis of a tenured position for at least 0.3 fte on 31 December 2004) in scientific journals in relation to all programmes that were assessed by the Committee. The bibliometric analysis was an integral part of the Self Evaluation Report.

1.5 Procedures followed by the Committee
The Committee started its review by reading the self-evaluation reports. For each research programme a first and second reviewer were selected. They were asked to read all information in detail and to assess the programmes with the help of a preliminary assessment form (see Appendix 5). Notwithstanding this procedure, the final outcome of the assessment as published in this report represents a consensus view of the entire Committee. The assessment forms were collected as input for a thorough discussion in the full Committee.

The Committee was in the Netherlands from 28 November – 2 December 2005. In the first meeting, consensus was reached on a first approximation of the scores and of the subjects that were relevant for each programme to be discussed during the visit.
During the site visit in Utrecht, the general and specific questions were discussed with delegations of the faculty board, the directors of the research programmes and a delegation of PhD students. During these visits, additional information was acquired about the problems and features of the faculty as a whole and about the research groups in particular.
The visits ended with a final meeting with the University Board, representatives of the faculty board and research management and programme leaders where the Chairman expressed the preliminary general findings of the Committee. After the visits in Utrecht, the Committee formulated conclusions and drafted the final assessments and comments.
The provisional text of the report was sent to Utrecht University for factual corrections. The final version of the report was subsequently completed and presented to the University Board.

1.6 Remarks on the Assessment Scales
The Committee was required to give judgements on four aspects: quality, productivity, relevance and viability. A five-point scale was used to give scores on the four criteria and an additional commentary was added for each research programme. These commentaries are an integral part of the assessments. The Standard Evaluation Protocol allowed the Committee considerable freedom to interpret the four aspects and the assessment scale in such a way that the assessments reflect what they see as important.
For quality, a veterinary reference frame was used, comparing the IVR programmes to their peers in the veterinary science world. The highest score (5) means that the programme performs in the top 5% worldwide, does cutting edge research and has a leading position in the world. A score of 3 means that a group is doing good work on an international level comparing well with its peers but has no leading position in the field.
Productivity scoring was based on the total number of refereed papers of the programme as presented in the Annex 1 of the SER. The number of PhD theses, listed in annex 1 of the SER was also considered. These data were set in relation to the total fte of tenured staff in the programme. In those research lines where it seemed appropriate, professional publications had an additional small impact on the score.
For a general description of the scoring system see appendix 4 of this report.
2 Research of the Faculty of Veterinary Medicine
the Institute of Veterinary Research

2.1 General
In assessing the different aspects of the faculty research management the Committee evaluated the different aspects as given in the Discipline Protocol.

2.2 Assessment of the Faculty Research Management and Policy

Leadership
Assessment: 5
There is a longstanding tradition of research management in The Faculty of Veterinary Medicine (FVM). Within the Faculty, the Institute of Veterinary Research (IVR), evolved over the years to a management structure overseeing and co-ordinating the whole research effort. The IVR is headed by a research director who is directly responsible to the dean and is assisted by a permanent research Committee. The latter is recruited from researchers from various programmes of the FVM. This degree of research organisation is quite unique for veterinary faculties anywhere in the world. On the whole, much of the responsibility and initiative for the research effort lies in the hands of the departments, as reflected in the Self Evaluation Report. However, the IVR has two important instruments: regular retrospective evaluations of the research programmes (along the same criteria as applied in this report) and the ability to increase (or decrease) the funding of the programmes according to the results of the evaluations. Recently, the “more focus and critical mass” plan calls for stronger management since research strategy will be more prospective than retrospective and interdisciplinary groups across departmental boundaries are being created. Within the FVM a two-dimensional organisation is envisaged: the discipline-oriented department structure is retained (because the FVM also has teaching and service duties) on the one hand and an inter-departmental research organisation, crossing departmental barriers, on the other. New management structures, in the form of group coordinators and programme leaders, have been implemented. The Committee felt that these new structures have the full support of the faculty. Clearly, the fact that such a major move was made reflects strong leadership at the FVM. The leadership clearly used a bottom up approach to develop the new plan.

Mission and goals
Assessment: 5
It goes without saying that the IVR intends to maintain its top rank status. However, the IVR also has a very clear veterinary mission. It supports a broad multidisciplinary research programme covering topics of veterinary relevance. The representation of basic biomedical research as well as applied veterinary science in the FVM research profile is actively pursued and successful cross-fertilisation between them is apparent in many programmes. This veterinary signature is one of the greatest strengths of the IVR. Even though high profile research based on domestic animals may lead to lower citation frequencies in top biomedical journals, this IVR strategy has undoubtedly led to the fact that the FVM is one of the most cited and visible institutions in the veterinary literature. The integration within the ABC cluster in the new “more focus and critical mass” plan offers many opportunities but also perhaps a certain threat to the veterinary identity of the FVM research since the research within this construct should be “relevant to the wider biomedical field”. But the IVR management is obviously well aware of this potential threat. Highly positive in the plan is the integration of the clinical sciences in the research programmes.

Strategy and policy
Concentration
Assessment: 5
Over many years the faculty has consciously and continuously decreased the number of (small) projects to release human energy and facilities to provide more power and depth in the remaining projects. Internal and external evaluations (such as the VSNU 1999 evaluation) have been used to implement this process. The faculty has undergone a series of restructurings, fusing several
disciplines into fewer and larger departments, further integrating the research effort. However, as compared to the previous evaluation period, the original programmes of 1999 are still visible. Implementation of the “more focus and critical mass” plan has been a major step towards further concentration of the research effort in order to enhance focus, competitiveness and quality. The decision was taken to focus on five themes with about 20 research groups. These five FVM themes are integrated in three major programmes of the ABC arena, again with the potential to greatly enhance research power through collaboration with other faculties at UU. The Committee was deeply impressed by this plan of action.

As stated by the IVR, in the coming period it will be important to validate the plan and to implement concrete actions to focus the research. An important first step in this process will be to regroup existing projects whilst resisting the temptation to merely re-label them in order to fit the name of the new programme. Phasing out, re-directing, setting priorities and redistributing funding accordingly is the major challenge for the coming years. Crucial to the success of the new research strategy is the new funding system with task-oriented financing. The steering of the new system is inevitably complex, with the departments receiving the research funds, the programme leaders managing the research and the IVR responsible for control.

At the moment it is not clear what the position is of the “Developmental Veterinary Medicine” programme dealing with research which is not relevant to the wider biomedical field.

**Personnel policy**

*Assessment: 4*

FVM strategy is to recruit leading scientists for senior faculty positions. This has already paid dividend, and recently appointed new faculty has increased the research potential of the FVM. The IVR recognizes that the future of its research depends also on recruitment of young scientists. However, although there are a number of young people appointed, in some specific areas such talents were significantly lacking and this needs the attention of the faculty research management.

A considerable effort is made to recruit and educate future scientists at the level of the undergraduate (excellency track), graduate school and post-doc positions. Selection for these positions is based on scientific output. It is commendable that young scientists receive training in management and leadership. Pivotal in this respect is the graduate school. Since the VSNU evaluation of 1999, some defects in the graduate programme have been taken care of. A new quality management programme is in place. The Graduate School of Animal Health will soon be integrated in the university-wide Graduate School of Life Sciences in line with the general strategy to achieve greater critical mass, and thus enhance the attractiveness of the programme. All graduate schools will be under one administrative structure: The Utrecht Graduate Division. The latter is also important to implement the master degree programmes under one quality scheme. The two step (masters, PhD) post graduate education is also attractive allowing departments to broaden the recruitment base for the PhD programme. A remaining concern is the combination of specialist training simultaneously with the PhD programme in the clinics. The Committee recommends implementing a much higher degree of temporal separation between the two. The IVR output of PhD’s over the past several years has been good. Post docs are actively supported with the opportunity to obtain substantial grants especially set aside for young beginning scientists. Well performing scientists can achieve a strategic professorship.

**Research management**

*Assessment: 5*

The quality of the management of research at the IVR is excellent. The system of internal evaluations was started many years ago and has been fine tuned to an instrument of objective assessment of the FVM research programmes. Bibliometric assessment plays a central role in this system whereby publication goals are defined in average impact factors. Together with the IVR management, programme leaders determine the standard that should be met and the yearly result is expressed as the relation between standard and obtained average impact scores, allowing direct comparison between the disciplines/programmes. Additional aspects such as grants and invited lectures are also taken into account. This policy of setting standards and subsequent evaluation has shown a marked effect on scientific output over the years.
Adequacy of resources
Assessment: 3-4
On an international scale, the FVM is a large operation. Despite the large number of students, a high class patient care system and an ambitious undergraduate curriculum, the FVM manages to allocate a significant portion of its financial and human resources to research. It is important to note that human resources, especially in the clinical areas, are frequently fragmented, thereby possibly reducing the efficient use of these resources for research. The problem of fragmentation of research time in the clinical areas is being addressed by enhancing task-differentiation. Nevertheless, a sufficiently critical mass of primary money flow appears to be available, although in some disciplines this allocation is quite small. The new IVR strategy of pooling the human capital into larger research groups is necessary, the more so, since the budget of the primary money flow will remain static at best. The IVR manages to generate one third of its overall budget by external funding. For a veterinary institution this is a good performance, considering the difficulty in securing second flow money in the Netherlands.

The limited access to research funding (second flow) remains a serious problem. Since the last evaluation, this situation has somewhat improved (e.g. the ADIKO system) but this may change yet again. It is not only important to convince the granting agencies of the importance of research in animal health for its own sake but also that animal health will eventually have a major impact on human health. The concept of translational medicine is well embedded in the IVR. It seems short sighted of the granting agencies to restrict this concept to small rodents only, as many diseases in domestic animals reflect their human counterparts much better.

The IVR plan to increase the extramural funding from 30 to 50% is a very ambitious goal. The challenge will be to maintain the veterinary focus at the same time because the drive for more research money and the enhanced integration into the biomedical sciences will tend to drive the IVR away from domestic animal research. Yet, it is clear that the top international position of the FVM in its primary field: “veterinary sciences” depends on a serious investment of the first money flow because of the lack of interest of the granting agencies to fund veterinary research for its own sake. Therefore it seems crucial that the primary internal resources for research are safeguarded. The plan to divert funds from the first to the second flow is a serious concern in this respect.

Facilities
Assessment: 4-5
The facilities, technical infrastructure and laboratory animal facilities are of high quality. The policy of pooling and sharing expensive high tech equipment and lab space in the frame of the ABC also pays off in this respect. The creation of a central laboratory facility in the clinical areas is excellent. There is some concern, as raised under the heading “adequacy of resources”, that a budget cut in the first money flow may make it difficult to maintain the quality of facilities.

Academic reputation
Assessment: 5
At the latest external research evaluation (VSNU 1999) the FVM was rated as being among the top five veterinary institutions in the world. This assessment was made on the basis of objective data and subjective impressions and reflections. Bibliometric assessment which has, since then, become more powerful, now supports this judgement with hard numbers showing the FVM on the fourth position of the most cited academic veterinary institutions. This is not unexpected as one sees the impressive output documented in the present SER. Apart from such scientific data, it is safe to say that the FVM is widely perceived as one of the leading veterinary institutions in the world not only in research but also in teaching, postgraduate training, veterinary specialisation and patient care. Among veterinary schools in Europe the FVM in Utrecht is accepted as number one and for institutions striving for excellence an important reference frame.
Societal relevance

Assessment: 5

Animal production has an important position in society in the Netherlands. Companion animals play an important role in a modern society, greatly contributing to quality of life and human well-being. The public has a growing concern for safe and healthy food as well as for animal welfare. Awareness of the close relationship between human and animal health is steadily increasing. All these aspects are being addressed in the IVR. The research programmes from the past 5 years which were evaluated in the present report, but also the new research plans for the coming period, focus on many aspects of domestic animal health at multiple levels from the molecular to the clinical sciences. Thus, there is no doubt that the research carried out at the IVR is highly relevant to society. However, the Committee recommends that this relevance be communicated to the public properly so that research at IVR and the expertise of its scientists can have maximal impact on public awareness and policy making.

Strengths and weaknesses as formulated by the IVR

Assessment: 4-5

As may be expected from a long standing culture of strategic reflection, the analysis of strengths and weaknesses by the IVR is comprehensive and well done. The Committee agrees with the list of strengths and weaknesses. We missed some in-depth analysis on the effect of the other activities (teaching and service) on the research effort. It has been brought to the attention of the Committee that FVM has gone through a massive curriculum renewal and has increased its student intake by 25%. While the new system of tracking and electives is quite attractive, it would be of interest to know how expenses for teaching have increased perhaps at the cost to the research effort and how this aspect will be managed in the future.

The conclusions and adjusted goals/strategies from the SWOT analysis are logical and clearly formulated. The IVR wants to strengthen its already strong international position while maintaining its veterinary mission. Moreover, the new plan: “More focus and critical mass” is already being implemented. Fundamental changes in funding policy are envisaged, with task oriented rather than discipline/department-oriented financing.

Clearly, the IVR has given the future of clinical research a lot of thought. It is pleasing to see that substantial research groups from the clinics are integrated in the 5 programme IVR/ABC package. In addition, the plan is to have a programme in “Developmental Veterinary Research” which is separate from the “more focus and critical mass” effort at the cost of 2 M€/year.
3 Assessment per Programme

3.1 Introductory remarks
The previous evaluation (VSNU 1999) covered 13 programmes. This number has been reduced to 8 for the present evaluation (one additional programme, IVR3, included in the present evaluation was not part of the previous evaluation). However, this reduction was to a certain extent due to administrative reorganisation with the creation of larger departments and re-labelling research programmes accordingly. Much of the original 13 research programmes is still visible since orientation of research remained largely discipline-related. Therefore, the grouping of the different research lines into the 8 programmes of the present evaluation is somewhat artificial, which also leads to the fact that in some programmes significant differences between the different lines were found in terms of the 4 main criteria of the assessment. In these cases, the Committee decided to evaluate different lines within a programme separately, either in the scores or in the verbal comments or in both.
3.2 Assessments

Programme IVR1

Biochemistry and Cell Biology

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<th>Programme directors</th>
<th>Prof. dr. B. Helms, Prof. dr. W. Stoorvogel</th>
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<td>Tenured staff</td>
<td>Average over the years 7.62 fte</td>
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<td>Viability 5</td>
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The department’s vigorous commitment to both components of its mission, to perform at an international level fundamental research on the dynamics of biological membranes and to apply this research to a range of veterinary problems, is strongly commended. The relatively recent appointment of two high profile and highly committed programme leaders has done much to (a) further motivate the staff of a department which was already successful and well motivated and (b) provide a very effective management structure. In the period of assessment the department has achieved greater focus and coherence through termination of four research lines, and the initiation of two new lines, the latter related to the expertise of the new professorial appointments. The department will continue to prosecute 9 research lines within 3 subprogrammes, and these will contribute to 3 of the 5 newly defined programmes of the new strategy: Biology of Reproductive Cells, Strategic Infection Biology and Tissue Repair. For the department as a whole and each of the subprogrammes the quality and productivity of the research undertaken were very good, as indicated by publications in high impact journals, excellent coherence and the international standing of several group members. The department performed well on both annual internal and the external evaluation. It has an excellent record on collaborative research and interdisciplinarity both intra- and inter-departmentally and also with researchers in the Institute of Biomembranes and other research groups within the Academic Biomedical Centre. Numbers of PhD students and of PhDs awarded were reasonable but both are likely to increase in future. Laboratory equipment is excellent, particularly in the lipidomics facility and the centre of molecular imaging. The department is well funded, including a commendably high percentage derived from second and third flow money, “research funds and contracts”, respectively. Given the department’s dual mission, highly relevant research was conducted in the review period, in respect of the advancement, dissemination and implementation of knowledge. In light of the high achievements of the department, the new senior appointments, and the department’s leadership role within the Biology of Reproductive Cells, Strategic Infection Biology and Tissue Repair programmes, the medium and long-term viability of the department’s research activities is assessed as excellent.
A global evaluation of IVR2 is rather complex. Recently, the disciplines pathology, anatomy and physiology were integrated into one department with widely diverging research interests. The mission statement is accordingly very wide. There was no global leadership for the departmental research effort. Management remained at the level of the individual projects. The line IVR2B Diagnostic Pathology of the pathology division was very productive, producing a wide variety of interesting and important observations but lacked focus. Nevertheless, this kind of work is important and it is a wise decision of the IVR to integrate this service-oriented unit into the “Developmental Veterinary Medicine” programme outside of the new main research programmes. Pathology expertise is badly needed in many research lines. In addition, it remains important to combine pathology residency training leading to ECVP certification with the PhD programme in order to meet this need.

The line IVR2A Pathology of defence mechanisms, growth and differentiation has produced a number of good publications and secured substantial extramural funding, although no second stream funding was obtained. On the whole, productivity is fine. Publication goals were surpassed. A good number of PhD’s were produced. Several of its researchers have a good reputation. The group has substantial resources. However this programme, as already noted in the previous evaluation period (VSNU 1999) lacks coherence. The programme addresses widely diverging topics such as amyloidosis, immunotoxicology, tumour growth and toxic endocrine disruption in small, independent research groups although they share technical support. Research should focus more on mechanisms of disease in collaboration with other programmes.

The former Anatomy and physiology programmes (IVR2C and 2D) were relatively weak as reflected by the modest amount of external funding. However, there has been improvement as compared to the previous evaluation period. Staffing has been improved and programme leaders are successful in seeking collaboration with other departments. Highly commendable is also the continuing effort to redirect the research in order to reach more focus in the newly combined programme. The latter programme concerns heart failure, a highly relevant subject and offers exciting opportunities for collaboration with the clinics.

The department is in a state of transition with recent appointment of 2 new professors of pathology. The existing programmes have been terminated. The group of Prof. de Bruin (Pathology) joined the group of Prof. Everts in the programme Tissue Repair, one of the 5 new interdisciplinary themes of the IVR. Here, the department is represented in three research lines. The latter are well focused, relevant and innovative. The integration of clinical and basic sciences is excellent. Professors Gröne’s group will be active in the new IVR programme “Strategic Infection Biology”. This will undoubtedly greatly strengthen the programme, which is in need of expertise in pathology. One research topic has already been defined, which represents a new area for Prof. Gröne and may require 2-3 years to obtain full productivity. Thus, viability and feasibility of the new programmes seem high. The pathologists are encouraged to develop substantial and effective collaboration with translational and clinical scientists for example in the Department of Clinical Sciences of Companion animals.
Programme IVR

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This is an outstanding group turning out high quality research of great relevance to risk assessment sciences. They are recognized throughout the world as one of the top research groups in risk assessment sciences. Not only are they publishing in the top journals in their fields, but they are also publishing in exceptionally high impact journals. The quantity of publications and PhD theses is also superb with well over 10 peer-reviewed publications per tenured fte per year and more than one PhD thesis per fte per year. IRAS has been highly successful in garnering EU, RIVM, TNO, foundations, and industry funding to support their research which translates into a relatively low proportion of first and second money flow. The combination of outstanding quality and productivity clearly demonstrates a strong institute that is a global leader.

IRAS was formed by merger of the Environmental and Occupational Health group (EOH), which moved from Wageningen in 2000, and the former Utrecht University Research Institute of Toxicology (RITOX). Under the leadership of Drs. Brunekreef and van den Berg, efforts to merge these groups and develop collaborative research have borne fruit with recent joint PhD projects and research initiatives. The recent addition of the Department of Public Health and Food Safety to IRAS presents significant challenges. Although this makes sense programmatically it will require a melding of research cultures over a period of several years. Even as the merger offers multiple opportunities, it also presents challenges to the overall research quality and funding base of IRAS. Physical separation of the EOH group from the rest of IRAS continues to be a detriment to full integration. Participation of IRAS in the RATIO programme will promote further integration of the research of IRAS into selected strategic areas. RATIO leadership will need to be vigilant to maintain focus to ensure critical mass.

IRAS is affiliated with the Faculty of Veterinary Medicine, the Faculty of Sciences, and the Faculty of Medicine. The work of the group is highly relevant to the fields of risk assessment, toxicology and exposure assessment and encompasses interests common to all three faculties. IRAS leadership is successfully satisfying the priorities of these three different Faculties. The future looks very promising for IRAS and suggests they will maintain excellent quality and productivity of their research and educational programmes. They have 56 ongoing PhD projects and 26 additional PhD pending projects in extramural grant proposals. IRAS is well aware of opportunities for future funding and is poised to apply for grant opportunities as they arise.

There are several recent developments in tenured staff lines of IRAS with the initiation of a full professorship in exposure assessment, recruitment of Dr. Roel Vermeulen, and recruitment of a molecular biologist. IRAS leadership is cognizant of the age distribution among tenured staff and plans to continue to seek age balance in future hires to ensure the long-term success of IRAS.
As the two subprogrammes were concerned with two quite different scientific disciplines they were reviewed separately.

Sub-programme 4A, Intestinal Ecology
This relatively new programme has been concentrated on the innate defence mechanisms and particularly antimicrobial peptides. The quality of the research is good and has become more focused. The research team comprises a small number of tenured staff and productivity during the period has been moderate, but research during the period has lead to scientific publications which will be published shortly. International collaborations are well established and the scientific relevance is at the standard level. Although this programme is limited by the number of tenured staff, its viability is good. However, international competition is severe. Therefore, at its current size it is unlikely to become a major internationally recognised group, but it is capable of making valuable contributions to this field.

Sub-programme 4B, Epidemiology and Control
The Faculty of Veterinary Medicine has a strong record in the field of public health and food safety. Close links with specialist medical colleagues have been established. The research programme has, however, lacked focus. This is, in part, due to the wide range of zoonotic pathogens across the farm animal species which can attract attention. This has also resulted in a lack of coherence. Research has concentrated on the epidemiology of diseases at the pre-harvest and slaughter stages. There has been a lack of quantitative objectives in a number of projects and general absence of statistical analysis. A number of areas of research have suffered from a lack of continuity with relatively short term projects. This has produced a programme which lacks coherence and a firm research strategy. The quality has been standard and productivity has been standard. The relevance of the research has also been standard. The potential for veterinary epidemiological research of public health is high given the general concerns, nationally, EU-wide and globally. The viability of this programme is theoretically good to excellent. The success is dependent on the integration of the programme within IRAS. A more quantitative approach to the design and analysis of the epidemiological studies will be of great benefit for future projects together with a more focused strategy on current public health problems. The senior staff have clearly discussed how the PHFS research can be enhanced. In addition to employing qualitative/semi-quantitative risk analysis methodologies, one avenue is to include human health impact aspects. This is an additional dimension to the existing IRAS/PHFS programme, but would greatly assist in focusing and directing the programme. In summary, some consideration of the strategy and objectives needs to be given to fulfil the potential viability of this programme.
IVR 5 plays a crucial role in the “Emotion and Cognition” programme. The Committee was impressed by the quality of science as detailed in the documents provided. The presentations given by the leader and other members of this group and also the discussions with them further reinforced the impression of this Committee with regard to the high quality and future viability of this group. As examples of strength, the Committee would like to highlight the hypothesis driven approaches employed. The ideas are novel and the research to answer the hypotheses is highly innovative and relevant especially in the context of veterinary science. For example, the question of what is rewarding and how one can determine the well being of animals using behavioural techniques is approached in an excellent manner. Behavioural analysis of anxiety and pain and the relationships of these phenomena are also very promising. Neurophysiological characterization of pain responses, another example of a major research line of this group, is also excellent and relevant. The genetic component of IVR 5 is also an important strength. Furthermore, the technological aspects of the research of this group are laudable. Members of this group employ the most-up-to-date methods and concepts of behavioural neuroscience. In fact, they are in the forefront of technology development (e.g. the behavioural quantification methods they are developing in collaboration with Harlan and Noldus). The leader of this group, Dr. Spruijt has an excellent reputation and is an internationally well known scientist in the fields of ethology and behavioural neuroscience. The research presented is highly coherent and is of high relevance to veterinary science in general and to the stated programme cluster (the emotion and cognition programme) in particular. It is also easy to see how IVR 5 will have an instrumental role in collaborating with and helping other research groups within the Institute of Veterinary Research, particularly IVR 8 and 9.

A potential issue that the Committee as well as the programme leader appreciated is the publication quality and publication strategy. On the one hand, the studies conducted and those that will be conducted by this group are at the cutting edge of 21st Century science and are highly original and thus they have been published and will be publishable in the top journals of the field of behavioural neuroscience. On the other hand, given the devotion of this group to veterinary research some of their papers have appeared and are expected to appear in veterinary science journals with relatively lower impact factors. This in general negatively affects their average impact score. The programme director believes that a balanced publication strategy that allows the continuation of publishing in top journals of behavioural neuroscience as well as in veterinary science journals is a viable compromise. However, the result of this is that when measured against behavioural neuroscience publications, the group may experience a disadvantage in terms of bibliographic metrics. This may also represent a challenge for obtaining external funding. The Committee agrees that IVR 5 needs to balance the pros and cons of the above.

Another issue with regard to IVR 5 is its subprogramme B component. The Committee has found it difficult to evaluate the past performance of this component given the lack of

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2 Subprogramme B was not taken into consideration for this evaluation; see text.
information provided in the documentation. This subprogramme currently has a vacancy for its chair. Nevertheless, it was felt that this subprogramme, which is concerned with the societal aspects of animal welfare, is a crucial component of IVR, possibly staying within IVR 5. The Committee sees two relevant aspects of this subprogramme. One, societal aspects of animal welfare can be investigated using the rigors of science, e.g. similarly to opinion polls or controlled behavioural studies. This has not been done nor considered previously despite the fact that such analysis could provide precise numerical evaluation of societal questions. The Committee’s suggestion is that IVR may want to consider expanding IVR 5 subprogramme B towards this direction. Two, the Committee believes that the “public relation” aspect of this subprogramme is essential for the education of the public and of the policy makers. Thus while the current and past performance of this subgroup has been difficult to evaluate given the lack of documentation provided, the Committee sees a high relevance of this group and endorses its establishment.

Given the excellence of the scientists of IVR 5 (A and C subgroups), and given the success of their past research, the originality of their ideas, the cutting edge methods they employ, and the relevance of their current and future research plans, the Committee felt that the viability of this group, i.e. the probability of their future success, is excellent and deserves the highest rating. In summary, we suggest a strong institutional support for IVR 5.
The Department of Infectious Diseases and Immunology has a very high quality research programme. This conclusion is based on assessment of the published research and on the quality of the journals in which the research was published. It is further demonstrated in the amount of second and third flow funds and the outside recognition of some of the investigators in the subprogrammes. With regard to quality, the virology subprogramme was exemplary with strong leadership, high impact in the areas of research, international recognition and publications cited above the world average. In addition, the other subprogrammes were also considered to be of high quality. The productivity of the programme meets international expectations with regard to publications and number of PhDs.

The research subprogrammes and their output were also considered very relevant. The relevance was supported in part by the impact of some of the research discoveries, the recognition received by investigators in the subprogrammes, and the outside support for the research. In regard to viability, it was considered excellent. This potential is further documented by the external prospective analysis demonstrating that research by current faculty in Infectious Diseases and Immunology has a competitive impact compared to their world subfield average which is an improvement. Most of the subprogrammes in the department are now included in the new Strategic Infection Biology programme which also includes some related subprogrammes from other departments. This placement has the potential to increase the output and competitiveness of many of the research areas without impeding those subprogrammes that are already highly effective. It seems likely that the new programme arrangement will also enhance even the strongest research areas. Further, the plans for increased focus in the parasitology subprogramme in the new Strategic Infection Biology programme should enhance research and make the stronger parts of this subprogramme more effective and competitive. In summary, the subprogrammes are strong and viable and have high potential to increase impact and funding.
**Programme IVR.7**

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<td>Prof. dr. A. Beynen</td>
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**Tenured staff**

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This programme consists of three groups with limited scientific common grounds, and each group will be evaluated separately.

**Subprogramme 7A: Equine Sciences**

This subprogramme is divided into reproduction, and locomotion and performance in horses. Research in this group is focused on areas with major impact on the equine industry, and both research programmes have national and international recognition. The reproduction group is specifically addressing research on gamete and embryo biology. Much of this research has been performed in collaboration with other reproductive units within the college. Research from the group has been published in well respected journals in the area of reproductive biology. Gamete and embryo biology has great potential to be attractive for research collaborations with human IVF groups, and initial contacts have been made with groups at the University of Utrecht Medical Centre.

The locomotion and performance group is conducting research on physiology/pathology of tendon and articular cartilage. Specifically, research progress has been made in the influence of loading on the collagen part of the extracellular matrix of articular cartilage, and its importance for resistance against degenerative joint diseases. Pathophysiology of the equine joint and tendon is important as a model for human orthopedic diseases, and successful collaboration with international researchers in this field should increase the potential for external funding.

The productivity of the group is good, and the number of graduate students that successfully completed their PhD-programme is acceptable. The impact of publications is similar to the world subfield average. The impact of collaboration for IVR.7 is listed as weak in all areas except national collaboration. However, no data were available specifically for IVR.7A.

This group has external funding from third money flow sources, but has not been able to attract research funds from second money flow (except for one ADIKO) during the evaluation period. The future organization of this group into Biology of Reproductive Cells (reproduction) and Tissue Repair (locomotion and performance) will likely benefit both groups in critical mass, research support and funding through second money flow. The viability of the groups is good to excellent, and obtaining extramural funding should be a high priority in order to ensure sustained productivity.

Veterinary PhD students within the programme that have current clinical responsibilities do not appear to have enough time dedicated to research. It is recommended that a minimum of 6 months each year be free of all clinical responsibilities.

**Subprogramme 7B: Inflammation and cellular targets for therapeutic intervention**

The pharmacology unit has been rationalized in terms of research focus and has made significant advances in the period of the review. The group conducts research projects of high quality and productivity, and of clinical relevance to veterinary science. The unit has been well funded by internal and third money flow sources, and should now seek to establish a strong element of
second flow income. The faculty has identified (in the self evaluation report) problems associated with the small number of staff in tenured positions. It is recognized that consolidation of research into two principal lines and extensive international collaborations has in the past partially offset the critical mass issue. The Committee is however, concerned that the viability and sustainability of this group can be threatened if the already small group is further divided into three future programmes. It will, therefore, be essential for future viability of this group to increase the critical mass of staff. The opportunities for maintaining and escalating collaboration of the unit within the veterinary faculty and the Academic Biomedical Centre and embedding the research into the new programme are considerable and should be pursued.

Subprogramme 7C: Nutrition
The group has been in a transition from applied research to more fundamental research. Recent and current fundamental research is focused on dietary aspects of intermediary metabolism in animal models, and applied research has been directed towards diet in relation to health and production of companion animals and livestock Research has been performed on the effect of polyunsaturated fatty acids on metabolism, body composition, energy deposition, and energy. The strength of this group is the impressive productivity in terms of publications and graduate students. However, the impact of publications is significantly below the world subfield average. A concern for future viability is also the lack of critical mass. One faculty member dominates this section, and although he has an impressive record of publications and graduate students, there are concerns about the sustainability of the group.
Programme IVR8

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<tr>
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<th>Prof. dr. J. Rothuizen</th>
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The research programme of Clinical Sciences of Companion Animals (IVR8) has three subprogrammes: A) Oncogenesis and growth factors, and regeneration, B) Clinical and molecular genetics, and C) Clinical immunology and anaesthesiology. Subprogrammes A and B will be combined and will join the new programme Tissue Repair (TR). This is appropriate.

Subprogrammes A and B have multiple areas of investigation that have been strong since 1995 or before. There is programmatic vigour in bone and calcium metabolism, liver diseases, kidney diseases, endocrinology, and oncology of endocrine-responsive tissues. Other areas of study include bone marrow and anemia, auditory function, and heart disease. Based on faculty competence and past productivity it is expected that the programmes will remain strong and contribute significantly to the Tissue Repair programme, including stem cell and cell-stromal cell interaction research. The hepatology programme is currently conducting studies on genetic modification and transplantation of liver cells in dogs. This is a risky programme, but has the potential for significant scientific rewards. All of the research programmes are dependent on effective collaboration with diagnostic and experimental pathologists. A close working relationship with faculty support from Pathobiology is encouraged. There is historical strength in endocrinology and endocrine oncology. IVR8 has international recognition in these areas in the veterinary community and continued support of these programmes is prudent. There is also strength in inherited diseases of companion animals, especially in genetic liver diseases. This is an important contribution to biomedical and veterinary research. The faculty has used state-of-the-art tools and collaborations with the ABC to investigate the pathogenesis of cancer in dogs, including development and use of a novel cDNA microarray. The genetics researchers may be able to collaborate more with other faculty, such as the mouse geneticists in Animals, Sciences and Society. This could lead to a focus of strength and further collaboration with the ABC.

The faculty has the potential to seek second money flow from the NWO if they emphasize the molecular pathogenesis and comparative nature of their research and promote companion animal disorders as models of human disease. Emphasis on stem cells, tissue regeneration, cancer, and epithelial cell-stromal cell interactions should also facilitate success in extramural funding. There has been very good success in support of research and PhD students by third money flow, especially from industry (such as animal food companies). Productivity in subprogrammes A and B has been good in research publications and PhD students. It is recommended that in the future manuscripts are divided into two types for citation index analysis, namely, 1) basic, clinical, and translational research, and 2) clinical case studies. It is likely this will improve the analysis of the research manuscripts. The faculty is encouraged to publish in high impact biomedical journals where appropriate (translational research), but publication in veterinary journals is also fitting for some of the applied research in all of the programmes. The faculty is encouraged to collaborate with basic and medical scientists and physicians in other colleges and universities. It has been recognized that impact of the research manuscripts is significantly better in the veterinary sciences subfield. In addition, in the prospective bibliographic study, IVR8 has a competitive impact compared to the world subfield average, which represents a significant improvement since the 1999 research quality assessment.

Subprogramme 8C, Clinical immunology and anaesthesiology, is a small programme that has had modest success. The productivity in PhD dissertations is less than subprogrammes A and B. Subprogramme C will be incorporated into the programme Emotion and Cognition (E&C). This is logical and will lead to an opportunity for improved productivity and quality of research.
Clinically oriented research will be performed in the Developmental Veterinary Medicine programme. Developmental Veterinary Medicine is supported by significant first flow money, but the organization, support, management, and association with the new research programmes is not developed at this time.

Veterinary PhD students that have completed specialty veterinary medical training and have current clinical responsibilities do not have enough time dedicated to research. It is recommended that a minimum of 50% time (for example 6 months in two blocks of 3 months) of veterinary PhD students is free of all clinical responsibilities including emergency and replacement coverage to conduct research, attend seminars, and develop collaborations.
Initially, parts of this programme were subdivided into three species-based themes: cattle, pigs and poultry. In 2003 the programme was re-structured into disciplines: epidemiology, reproduction, clinical pathophysiology and farm animal health. This resulted in research being focussed into three sub-programmes, which because of their diverse nature in terms of the research objectives were considered separately.

Subprogramme A: Epidemiology of Diseases
It should be noted that the planned formal merger with the epidemiology and economics groups at ID-DLO and WAU, as reported in the Report of the Review conducted in 1999, was not executed. This may have further disrupted the continuity in the planning and furtherance of this programme. However, a strong, high quality mathematical modelling core component of the programme remains. In general, the programme lacked coherence in terms of research objectives as it has been concerned with a number of disparate research topics on a range of diseases. The research strategy was not clear and in 2003 and 2004 funding was more or less dependent on direct funding. Productivity was good in terms of peer reviewed papers and above standard with respect to the number of PhD theses that were generated. The relevance of the programme was variable because of its multi-faceted approach. There has clearly been some thought to the future in view of the new programme structure and organisation. This is evident from the funding gained since 2004 from non-direct sources. The new programme has considerable potential and has an above average viability, especially if epidemiological research themes are developed across diseases as is planned.

Subprogramme B: Adaptation and Stress
Fertility, health disorders, physiological aspects around parturition, and pre- and postnatal stressors, the research areas of IVR9 subprogramme B, are an intense focus of investigation worldwide. Numerous animal models have been employed but most studies have been conducted using classical laboratory rodent species such as the mouse and the rat. The subprogramme focuses on cattle and pigs and this makes the programme somewhat different from the mainstream and more relevant for the mandate of the Institute of Veterinary Research. The scientific rationale, the methodology, and the approach used are not novel but all are reasonable. The productivity of the group is good. There is some concern with regard to the integration of this subgroup into the programmatic organization of IVR, i.e. into the “Emotion and Cognition” programme as well as with its long-term viability.

Subprogramme C: Maturation and Interaction of Gametes
This research programme focuses on communication mechanisms between cells within the gonads, within the genital tract, leading to gamete formation, fertilization and development of the conceptus. The international reputation of this research group is of high standing and the quality of the research is very good. The productivity of the programme in terms of peer-
reviewed publications and the number of PhD theses produced is very good. The relevance of the research is very good. From 2006, this programme becomes part of the new Biology of Reproductive Cells programme. The long term viability is excellent given the past performance, the current and future plans and the research staff and the available resources. The restructuring of the research programmes will be of further benefit to advancing this area of research.
4 The New Programmes

4.1 General remarks
The new “more focus and critical mass” programmes were presented in the written documentation (Annex IC of the SER). During the visit the Committee had the opportunity to discuss these programmes extensively with the researchers and the management of the IVR. These new programmes are now in the initial stage of implementation and their success will only be measurable in future evaluations. The Committee was of the opinion that the themes covered by the new programmes were well chosen because they are based on existing strengths. The scope of the 5 programmes is still wide enough to offer ample opportunity for all disciplines of the FVM to participate. In the following, a prospective assessment for each programme has been formulated.

4.2 Biology of Reproductive Cells (BRC)
This new group consists of research programmes from IVR1, IVR2, and IVR9. Although this is formally a new group, extensive research collaborations between the reproduction groups within IVR1, 2, and 9 already exists, and the reorganization will only strengthen the viability of this group. Research in Biology of Reproductive Cells will focus on basic investigations on gamete and embryo biology, applied to in vitro fertilization and cryobiology of gametes and embryos. This area should be of great interest for research collaborations with human IVF groups, and has great potential for external funding. A challenge for this group may be to maintain a veterinary focus in fundable collaborative research projects.

4.3 Emotion and Cognition (E&C)
The IVR departments have diverse research interests and this may represent both a significant challenge and an excellent opportunity for collaboration and advancement of knowledge. The programmatic organization of these departments is expected to facilitate collaboration among the groups and is designed to focus on major research areas. The Committee regards this programmatic structuring as strength. This Programme cuts across mainly three departments, IVR5, IVR8 and IVR9. This programme is focused on behavioural and neurobiological aspects of Veterinary Science. Although well established, behavioural and neuroscience research is usually not considered an inherent part of Veterinary Science. The Committee, however, agrees that these fields have significant future in Veterinary Science. Ability to monitor brain function and behaviour and utilize the most modern approaches of behavioural neuroscience and ethology will significantly advance understanding of pain, anxiety, stress, reproduction, motor performance, and numerous other aspects of brain function that have immediate relevance to animal welfare and animal husbandry. Thus, the Committee is enthusiastic about the future of this programme.

4.4 Risk Assessment of Toxic and Immunomodulatory Agents (RATIA)
The units participating in RATIA are the Institute of Risk Assessment Sciences (IRAS), the former Department of Public Health and Food Safety (now merged with IRAS), and the Department of Infectious Diseases and Immunology. RATIA provides the ideal platform to cultivate synergistic interdisciplinary interactions. RATIA holds great promise because it provides new opportunities for cross-linking epidemiological, immunological and toxicological research with the more classical approaches used to assess human exposures to chemical, physical, and biological agents. The success of RATIA in building critical mass will be dependent upon focused collaboration between basic biomedical researchers with epidemiologically-oriented researchers. In view of past scientific performance of IRAS and future plans, the long-term viability of this programme should be excellent.

4.5 Strategic Infection Biology (SIB)
The new Strategic Infection Biology programme brings together a number of already successful subprogrammes. This makes the potential viability high if these subprogrammes continue or increase their level of high quality research. Bringing related subprogrammes from five different
departments together presents multiple opportunities for increased collaboration and critical mass. Such new collaborations should increase the amount of second and third flow funds by increasing competitiveness and depth of the subprogrammes. However, because of the number of investigators and subprogrammes involved, considerable effort will be necessary to capitalize on these opportunities afforded by the new Strategic Infection Biology programme without jeopardizing current research productivity.

4.6 Tissue Repair (TR)
The new Tissue Repair programme will have four focus areas: 1) Regeneration of extracellular matrix functions, 2) regeneration of tissues with complex epithelium/matrix/stem cell interactions, 3) progenitor cells, and 4) tumorigenesis in endocrine-related tissues. This is a timely and important research endeavour. It has a good chance of competing for second flow money. Scientists should seek appointments on NWO review panels and share their experiences with the faculty. It will be critical for the scientists to form effective collaborations internally (in veterinary medicine and medicine) and externally. The programme leader should help foster strategic collaborations in the Faculty and provide focus to the research programmes. This is crucial since the programme is populated by a diverse group of scientists with varied expertise. It will be important to build on past areas of strength and focus on molecular mechanisms of disease and translational research. The comparative scientists will need to promote animal models as important translational models for disease pathogenesis and treatment that will have significant impact on human health. Research on veterinary diseases should also be an area of strength that can be funded by third money flow. There should be continued emphasis on high quality PhD programmes with publication in high impact biomedical and veterinary journals.

4.7 Developmental Veterinary Medicine
This programme with a somewhat misleading name is outside of the “More focus and critical mass” scheme. It is not well defined yet but is apparently conceived as a research support system to address ad hoc problems arising in the clinical and other diagnostic areas. It makes sense to provide such support not only because some problems may urgently require solutions but also because new and potentially important research areas can be identified.
A reply from the Dean of the Faculty of Veterinary Medicine
to the issues raised by the evaluation committee

As dean, I have been impressed by the thorough preparations of the Review Committee for the site visit. Our research staff has enjoyed the in-depth discussions with these internationally acknowledged, leading scientists. The Committee has assessed past performance and has also considered future plans with anticipated results. This analysis of our research programme has been appreciated as very stimulating by the faculty. We have taken notice of the report of the Committee and would at this stage like to make the following remarks.

First of all, we are of course more than satisfied with the overall outcome of the assessment. We have worked hard to maintain a leading research position in our domain: veterinary sciences. It is gratifying to see that the Committee acknowledges this and ranks us a number one within Europe and belonging to the top-5 worldwide. In addition, we are also proud of the received appraisal for our research management and our research organization: the Institute of Veterinary Research (IVR). The Committee underscored the quality of our research organization and management by stating that it is “unique and excellent”.

The Committee has indicated that the operation “More focus and critical mass” will result in a further concentration of our research effort and strengthen our future research performance. All research lines that score below 4 in this report have been terminated or will be restructured extensively in line with the recommendations made by the Committee. Recent changes in the organization and selection of personnel with a proven scientific track record only, have already greatly improved the scientific perspective of the latter research groups. In conclusion, the operation “More focus and critical mass” has resulted in five new research foci embedded within the Academic Biomedical Centre, which will be carried by the top scientists of the FVM.

Despite multiple actions taken by the management, the position of the FVM for obtaining competitive research funds from the 2nd money flow remains a matter of serious concern. The position of the basic research groups is competitive in this respect, but the chances for the more clinically oriented research groups to raise 2nd money flow funds are limited. The FVM is still actively engaged in improving this situation. Nevertheless, the FVM fully endorses the view of the Committee that maintenance of the 1st money flow will be crucial for safeguarding the top international position of the FVM in its primary field ‘veterinary sciences’.

The Committee expresses some concern that the drive for acquiring research money combined with the enhanced integration into the biomedical sciences might drive the IVR away from domestic animal research. Therefore, the IVR will set predefined targets and adapt its internal scientific quality assessment method to allow for assessment of the ratio of veterinary versus biomedical output. This will guarantee that the veterinary aspects of the IVR mission will be adequately catered for.

The recommendation of the Committee for the temporal separation of research and clinical responsibilities - including emergency and replacement coverage - for veterinary PhD students, will be implemented. The clinical departments will be asked to allocate the available time as service and research time slots, preferably no shorter than three month periods, in such a way that the clinical PhD students will be able to spend at least 50% of their time on research.

The Committee sees a high relevance of a separate research group focusing on the societal aspects of animal welfare and endorses its establishment. The FVM is well aware of the important ‘public relation’ aspect of this field. This is already embedded in our educational programme, in which we collaborate with the Centre for Bioethics and Health Law of our university. Unfortunately, however, this has not yet converted into substantial funding for research. In the absence of a solid financial basis, activities in this field will distract scientific staff
of the Department of Animals, Science and Society from the focus of the programme ‘Emotion and Cognition’. Therefore, the FVM is bound to raise additional funds first in order to enable adequate input in this important field.

The concern of the Committee that the viability and sustainability of the pharmacology unit can be threatened if this already small group is further divided into three future programmes is recognized as a real threat. The resources available from the 1st money flow will not be sufficient to neutralize this threat. Therefore, maintaining critical mass within this high quality, productive, and relevant research group will require a substantial increase of fund raising capacity or further focusing in the immediate future.

I would like to conclude with expressing my sincere gratitude to the members of the Review Committee and its chairman. They have provided us with many valuable suggestions and recommendations, which will enable us to perform even better in the future. Finally, I like to thank the IVR management for the quality of the self-evaluation report and the excellent preparations for the site-visit and the research staff of FVM for their input over the period of review and the achieved quality of their output. Chapeau!

Prof. Dr. Albert W.C.A. Cornelissen
Dean
Appendices
Appendix 1 Curricula Vitae

Curricula vitae of the Members of the Review Committee Veterinary and Animal Sciences

Prof.dr. M. Vandevelde, chairman
Marc Vandevelde graduated as Dr. med. vet. at the university of Gent, Belgium in 1971. He received post-graduate training in comparative neuropathology and neurology in Switzerland and the US until 1979, when he received a faculty appointment at the school of veterinary medicine in Bern, Switzerland. Following his habilitation he became a full professor and head of the institute of comparative neurology at this university. He was dean of the veterinary faculty of Bern 1994-96, head of the Swiss national and OIE reference lab for spongiform encephalopathies 1991-2000 and head of the Department of Clinical Sciences from 2000-2005. He became the first president of the European society for veterinary neurology in 1987 and diplomate of the respective college in 1993. His main area of research is the pathogenesis of demyelination in canine distemper virus infection, for many years funded by the Swiss national science foundation and the Swiss Multiple Sclerosis society. He trained numerous post doctoral students. Currently his research focuses on mechanisms of viral persistence in the central nervous system. He published over 200 refereed publications and serves on several review boards for scientific journals.

Prof.dr. P. Lees
Peter Lees qualified in pharmacy from the University of London in 1961. He then pursued research in renal pharmacology and endocrinology and was awarded the Doctor of Philosophy of London University in 1965. He joined the staff of the Royal Veterinary College as an assistant lecturer in pharmacology in 1964 and has been a member of the college staff since that time, successively in posts of lecturer, reader, professor, head of department of Veterinary Basic Sciences, Vice-Principal for Teaching and Deputy Principal. He is now emeritus professor. His research interests have been varied and include the pharmacology of centrally acting drugs in large animal species, inflammation and anti-inflammatory drugs and antimicrobial drugs. His most recent work has concerned PK-PD integration and PK-PD modelling of non-steroidal anti-inflammatory drugs and antimicrobial drugs. He has served for 13 years as European Editor of Journal of Veterinary Pharmacology and Therapeutics. For a period of 20 years he served on the United Kingdom’s Registration Body, which advises on the licensing of veterinary drugs, the Veterinary Products Committee. He has served terms as Junior Vice-President, President and Senior Vice-President of the European Association for Veterinary Pharmacology and Toxicology. He is an Honorary Fellow of the European College of Veterinary Pharmacology and Toxicology.

Prof.dr. R.T. Gerlai
Robert T. Gerlai completed his Ph.D. in Biology at the Hungarian Academy of Sciences with highest honours in 1987. He has held numerous academic positions (Eötvös University of Budapest, University of Toronto, Indiana University and Purdue University, University of Hawaii) and has been a leading scientist and executive in the US biotechnology and biopharmaceutical research Industry (Genentech Inc, Eli Lilly and Company, Saegis Pharmaceuticals). He is currently at the Department of Psychology of the University of Toronto at Mississauga. He published over 100 publications in peer reviewed journals and books, edited large monographs and special journal issues, and is the Review Editor of ‘Genes, Brain and Behavior’. Dr. Gerlai has been a permanent grant review panel member for NIH (USA) and ad hoc referee for numerous other grant funding agencies (NSF of USA, CIHR of Canada, ISF of Israel, Welcome Trust of UK). He has been elected to hold numerous posts in international societies including the International Behavioral and Neural Genetics Society (founding member, Treasurer, Executive Committee member, Member-at-Large) and the International Behavioral Neuroscience Society (Chair of numerous Committees, Fellow of the Society). Dr. Gerlai is most known for his research using knock out and transgenic mice in behavioural neuroscience and for his discovery of the roles of EphA tyrosine kinase receptors in mammalian learning and
memory. His current research focuses on zebra fish, a forward genetic approach with which he studies the genetics of memory, social behaviour, and alcohol abuse.

**Prof.dr. T.C. McGuire**
Travis C. McGuire has been a Professor in the Department of Veterinary Microbiology and Pathology, College of Veterinary Medicine, Washington State University, Pullman, Washington, USA since 1978. He was a Visiting Scientist at the International Laboratory for Research on Animal Diseases, Nairobi, Kenya from 1976-1978 and an Assistant and Associate Professor, Department of Pathology, Washington State University from 1968-1976. He received his DVM from Texas A&M University and his PhD from Washington State University. He was a Programme director for a U.S. National Institutes of Health (NIH) grant for post doctoral training (PhD or DVM) which was continuously funded for 27 years. Research on the immunology of infectious diseases, particularly emphasizing those diseases that persist in the host and avoid clearance by the products and cells of the immune system has resulted in 287 refereed publications. He is Principal Investigator for a research project funded by the NIH and has had multiple other projects funded by the NIH and U.S. Department of Agriculture competitive grants program and has participated on several peer review panels for those funding agencies.

**Prof.dr. T.J. Rosol**
Thomas J. Rosol is dean of the College of Veterinary Medicine at The Ohio State University and Professor of Veterinary Biosciences. He received his veterinary qualification in 1981 at the University of Illinois as valedictorian and his PhD in 1986 at The Ohio State University in experimental pathobiology. He has received numerous awards, including two research career awards from the National Institutes of Health (NIH), and was elected to the American Association for the Advancement of Science (AAAS) in 2004. He has published ca. 170 peer-reviewed scientific manuscripts and trained over 25 postdoctoral fellows and PhD scientists from North America, Central America, Europe, and Asia. His areas of research include endocrine and bone diseases and cancer. He currently focuses on the pathogenesis of cancer-associated hypercalcemia and bone metastasis of prostate, breast, and lung cancer using in vivo bioluminescent and nanotechnology-enhanced ultrasound imaging.

**Prof.dr. P.S. Thorne**
Peter S. Thorne is Professor of Toxicology and Environmental Health in the University of Iowa, Faculty of Public Health. He also holds a secondary appointment as Professor of Environmental Engineering. He received his MSc in biomedical engineering and PhD in toxicology from the University of Wisconsin-Madison in 1978 and 1980, respectively, and did his post-doctoral training in immunotoxicology at the University of Pittsburgh from 1984-1986. He is Director of the Environmental Health Sciences Research Center, Director of the University of Iowa Pulmonary Toxicology Facility and leader of a producive research laboratory engaged in studies of environmental risk factors for asthma, inflammatory lung diseases, endotoxin- and glucan-induced immunomodulation, and novel methodology for exposure assessment. His research is presented in 150 peer-reviewed publications and book chapters. He teaches graduate level courses on environmental health, human toxicology, and research methods in biological agents. He has served on a variety of editorial and review boards for scientific journals, government agencies, and academia and currently serves on the National Advisory Environmental Health Sciences Council for the U.S. National Institutes of Health.

**Prof.dr. M.H.T. Troedsson**
Mats H.T. Troedsson received his veterinary degree from the Royal College of Veterinary Medicine in Stockholm, Sweden 1975. He practiced veterinary medicine in Sweden before entering graduate school at the University of California, Davis in 1987. He received his PhD in reproductive immunology in 1991. He became board certified in the American College of Theriogenologists in 1993, he is a funding member of the European College of Animal Reproduction, and he has served on the Certifying Exam Committee for both Colleges. He was
appointed as assistant professor (1993) and associate professor with tenure (1998) at the Department of Clinical and Population Sciences, College of Veterinary Medicine, University of Minnesota, and also served as the Director of Minnesota Equine Research Center and Director of the Large Animal Hospital. In 2002, he was appointed Professor and Head of Reproduction at the College of Veterinary Medicine, University of Florida, where he also serves as Director of Equine Research Programmes. His research interest has focused on the role of seminal proteins on uterine inflammation and fertility. He is the author or co-author of over 150 scientific and professional publications, and several book chapters.

Prof.dr. J.W. Wilesmith

John W. Wilesmith graduated from the University of Bristol in veterinary science in 1971, and received his post-graduate training in epidemiology and medical statistics at the London School of Hygiene and Tropical Medicine, University, where he is a Visiting Professor. From 1986 to 2003 he was Head of the Epidemiology Department at the Veterinary Laboratories Agency (VLA), Weybridge. Since 1987, his research has been concentrated on the epidemiology of BSE and other transmissible spongiform encephalopathies (TSE) of animals and until 2000 was Programme Manager for the whole research and surveillance programme on TSEs at the VLA. Research in this area continues together with epidemiological research on exotic diseases such as foot-and-mouth disease and avian influenza. He is currently based in the Animal Health and Welfare Directorate of the Department for the Environment, Food and Rural Affairs and is responsible for the National Emergency Epidemiology Group for Great Britain. He has published over 150 scientific papers in peer reviewed journals and is a member of a number of advisory scientific expert groups nationally and internationally.

Prof.dr. Linda S. Birnbaum

Linda S. Birnbaum is the Division Director of the Experimental Toxicology Division (ETD), of the United States Environmental Protection Agency in Research Triangle Park, North Carolina. She received her Ph.D. in Microbiology from the University of Illinois – Urbana, and is a diplomat of the American Board of Toxicology. She held several different positions with NIEHS before joining the EPA. ETD conducts research to determine the health effects of environmental pollutants, as well as their “cause and effects.” She is the author of over 600 peer-reviewed publications, book chapters, abstracts, and reports. She is an Adjunct Professor at the University of North Carolina, Chapel Hill and at Duke University, the former Vice President of the American Aging Association, the former Chairperson of the Division of Toxicology of the American Society of Pharmacology and Experimental Therapeutics, and is the immediate Past-President of the Society of Toxicology.

Prof.dr. R.E. Peterson

Richard E. Peterson received his Ph.D. in pharmacology from Marquette University School of Medicine in 1972. He joined the faculty of the pharmacology department at the same institution in 1973 before accepting a position as assistant professor in the School of Pharmacy at the University of Wisconsin-Madison in 1975. He was subsequently promoted to associate professor and professor at the University of Wisconsin and currently chairs the Pharmaceutical Sciences Division. His research is focused on the toxicology of dioxin and PCBs. He has more than 200 scientific publications in the peer-reviewed literature and is recognized globally as an expert on halogenated aromatic hydrocarbon toxicity.

Dr. B.J. Blaauboer – secretary of the Committee

Bas J. Blaauboer is associate professor of toxicology at the Institute for Risk Assessment Sciences at Utrecht University, co-ordinator of the Postgraduate Education in Toxicology programme of six Universities in the Netherlands, editor of Toxicology in Vitro and a member of the Dutch Board for the Accreditation of Pesticides. During the years 1997–2000 he was seconded to the Dutch Association of Universities (VSNU), where he was co-ordinating the system of quality assessment of research.
## Appendix 2  List of Programmes

List of reviewed Programmes and summary of scores, input/output data

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<th>code</th>
<th>programme</th>
<th>fte/yr</th>
<th>p/fte/y</th>
<th>th/fte/y</th>
<th>q</th>
<th>p</th>
<th>r</th>
<th>v</th>
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<td>IVR1</td>
<td>Biochemistry and Cell Biology</td>
<td>7.64</td>
<td>4.8</td>
<td>0.39</td>
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<td>3-4</td>
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<td>IVR4</td>
<td>Public Health and Food Safety</td>
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<td>IVR4A</td>
<td>Intestinal Ecology</td>
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<td>4.0</td>
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<td>IVR4B</td>
<td>Epidemiology and Control</td>
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<td>3.5</td>
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<td>IVR5</td>
<td>Animal Science and Society(^6)</td>
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<td>Equine Sciences</td>
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<td>IVR7B</td>
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<td>IVR8A</td>
<td>Oncogenesis/Genetics</td>
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<td>Epidemiology of animal diseases</td>
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<td>7.3</td>
<td>1.37</td>
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<td>IVR9C</td>
<td>Maturation and interaction of gametes</td>
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<td>6.3</td>
<td>0.80</td>
<td>4-5</td>
<td>4</td>
<td>4-5</td>
<td>5</td>
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</table>

\(^3\) Average tenured staff number in full time equivalents (fte) per year  
\(^4\) Average number of peer-reviewed publications per fte tenured staff per year  
\(^5\) Number of PhD theses per fte tenured staff per year  
\(^6\) Evaluation is concerning subprogrammes A and C.
Appendix 3 Discipline Protocol

Protocol for the review of the Institute of Veterinary Research

Introduction
The research assessment will cover the various disciplines of Veterinary Sciences, performed at the Faculty of Veterinary Medicine of Utrecht University (FVM-UU). The Institute of Veterinary Research (IVR) is responsible for research management within the FVM-UU and, therefore, Utrecht University will participate in this research assessment through this research institute.

The following clusters of disciplines/fields of Veterinary Sciences will be assessed: Biochemistry, Cell Biology, Pharmacology and Pharmacy; Pathology, Anatomy and Physiology; Microbiology and Immunology; Public & Environmental Health and Risk Assessment (including Toxicology); Animal Behavior, Animal Husbandry and Animal Genetics; Internal Medicine/Companion Animal Medicine; Reproduction/ Equine Sciences; Epidemiology/Population Medicine/Farm Animal Health.

The objectives of this assessment are to enhance the quality of the research programs and to contribute to the accountability of the research carried out at the FVM-UU during the period under review. In addition to an evaluation and assessment of past performance, also future research plans with anticipated results are to be considered. So, the evaluation is a combination of retrospective and prospective analysis. The emphasis will be on the prospective analysis.

The research management at the institutional level will also be evaluated. This will include leadership and management of processes, research policy and strategies, management of people, human resources policy, available means and appreciation by peers. Proper attention will be given to postgraduate education and training programs. The evaluation should be carried out in view of the multidisciplinary context of veterinary research.

For the current assessment the ‘Standard Evaluation Protocol (SEP) 2003-2009 for public research organizations’ will be used. The three main Dutch organizations responsible for publicly funded research in The Netherlands – the universities, the Royal Netherlands Academy of Arts and Sciences (KNAW) and the Netherlands Organization for Scientific Research (NWO) – defined this protocol for practical use in all research evaluations conducted under their auspices. The SEP stipulates the general requirements for the research assessments. Specific information for the assessment of the IVR research program will be described below.

Delineation and required expertise of committee members
The members of the review committee should have a positive attitude towards fundamental and applied aspects of veterinary research, and the multidisciplinary character of the discipline of Veterinary Sciences.

The following expertise is required of the members of the review committee:

Excellent expertise in at least one discipline of the following clusters of disciplines/fields of Veterinary Sciences: Biochemistry, Cell Biology, Pharmacology and Pharmacy; Pathology, Anatomy and Physiology; Microbiology and Immunology; Public & Environmental Health and Risk Assessment (including Toxicology); Animal Behavior, Animal Husbandry and Animal Genetics; Internal Medicine/Companion Animal Medicine; Reproduction/ Equine Sciences; Epidemiology/Population Medicine/Farm Animal Health.

Reasonable expertise in, and overview of the other disciplines of the cluster, in which his/her own specialization is classed.
The international review committee will consist of eight members, including the chair, in order to cover all fields mentioned above. The chairman should have a helicopter view of the entire research area.

**Information for the committee and procedures**

The research assessment of the IVR will cover the research published in the period 2000 up to and including 2004. The review committee is independent and will determine its own method of working within the framework of the SEP. The assessment will be performed on the basis of a self-evaluation report provided by the research program leaders and the management of the IVR. The self-evaluation report will include information about the scientific achievements (including their valorization), the graduate programs and the current restructuring of the IVR research program. The committee, or individual committee members, will have meetings with the program leaders and - if desired by the committee - other participants in the research programs (e.g. PhD students or post-docs) and will visit research facilities. The committee will announce the topics and the goal of its discussions with the faculty board and with the separate groups during the site visit.

In order to provide supportive information on the research quality and relevance, citation analysis will be part of the procedure. The Centre for Science and Technology Studies of Leiden University will be asked to perform such an analysis. In addition, the results of internal audits of past performance performed by the IVR will be included in the self-evaluation report. The committee is kindly asked, however, to put emphasis on the perspectives of the future IVR research program, its interdisciplinary mission and its embedding in the Academic Biomedical Centre Utrecht.

**Level of aggregation**

In the SEP, a research program is defined as ‘a coherent set of research activities having a common mission and being the work of a group of people who more or less work together’. In the current assessment, departmental research programs will be reviewed. Each program encompasses several full-time professors and their staff. The results within the framework of the entire IVR research program will be provided on the level of individual departmental program leaders. This will allow an evaluation on the level of the entire IVR research program as well as on the separate participating research groups.

**List of program members**

In the self-evaluation report, the list of program members of each program will include the following ranks: full professors, associate professors, assistant professors, fellows (e.g. KNAW fellows, EU-fellows), others with a PhD degree involved in research such as post-docs and all staff members at the postgraduate level who have not (yet) obtained a PhD-degree. The list will include all members involved in the program during the assessment period, and will state during which period of time the members were involved. Only the period during which the program members were appointed by or paid for research at FVM-UU - either through direct or indirect governmental funding or through industrial, European Union or other funding - will be taken into account.

**Contents of the documentation**

To prepare for the external evaluation, the IVR has been asked to provide a set of documents containing all the relevant information such as the self-evaluation report. The SEP describes the required data and formats. This documentation will reflect both the level of the IVR as a whole and the research programs or research groups that work within the jurisdiction of the institute. Both the level of the institute and the level of the programs or groups will be specified comprehensively in annual units meaning that the factual data of the research programs and other research add up to the institute’s data.
Terms of reference

The review committee is kindly asked to assess against international standards the quality, productivity, relevance and viability of the Institute of Veterinary Research, its research and graduate programs, in the period 2000 up to and including 2004, on the basis of the Standard Evaluation Protocol (SEP) and taking into account the additional information provided in this document.
Appendix 4 General Outline of the Scoring System

This is the general outline of the scoring system as given by the Standard Evaluation Protocol. See also the remarks make by the Committee in the report.

Quality
The ratings on the five-points scale for quality are defined as follows:

Excellent (5) The research group belongs to the international elite within its field of research. It works at the frontiers of international progress in its field and contributes effectively to that progress by means of substantial publications in highly rated scientific journals.

Very good (4) The group meets the international standards in its field of research and it makes worthwhile and recognised contributions to the international research community.

Good (3) The group meets the international standards in its field of research at an acceptable level and its contributions to knowledge are of satisfactory quality.

Satisfactory (2) The group does not meet the international standards in its field; it needs some improvement to contribute significantly.

Unsatisfactory (1) The group is far from meeting international standards of its field and has no influence upon its development. A reorientation is needed before the group can be expected to contribute.

Scientific Productivity
The Committee’s assessments are based on a general impression of the production of each research group with reference to its size. The result therefore is a peer review about productivity, which reflects the Committee’s perception of the productivity over the past five-year period. Productivity is rated taking into account all four elements, with particular emphasis on publications in international refereed journals. Taking into account the size of the group, the categories of the rating scale of scientific productivity are:

- Excellent (5)
- Very good (4)
- Good (3)
- Satisfactory (2)
- Unsatisfactory (1)

Relevance
The Review Committee has considered the following aspects as part of its integrated assessment of relevance:

- academic relevance;
- professional and applied relevance;
- societal relevance.

Taking into account the programme’s mission, the categories of the rating scale of relevance are:

- Excellent (5)
- Very good (4)
- Good (3)
- Satisfactory (2)
- Unsatisfactory (1)

Viability
The following aspects are taken into account:

- past achievements of the group as an indication of likely future achievements;
- the group’s ideas and plans for the future (scientific prospects);
- prospects of future funding of personnel and facilities;
- the likely stability of the group;
- university, faculty, and departmental support for the group.

The categories of the rating scale of viability are:
- Excellent (5)
- Very good (4)
- Good (3)
- Satisfactory (2)
- Unsatisfactory (1)
Appendix 5  Preliminary Assessment Form

Programme title:  
Reviewer:  
5 = excellent, 4 = very good, 3 = good, 2 = satisfactory, 1 = unsatisfactory

Quality
How do you evaluate quality with respect to:  
1. originality of the approach and ideas  
2. significance of its contribution to the field  
3. coherence of the programme  
4. publication strategy in view of the stated mission  
5. prominence of the programme director  
6. prominence of the other members of the research group  
7. distribution of published output over the team members  
8. scientific publications (scientific impact)  
9. professional publications  
10. designs and software  
Overall assessment of quality

Productivity
Considering the number of staff, how do you evaluate the productivity with respect to the:  
1. number of PhD-theses  
2. number of scientific publications  
3. number of professional publications  
Overall assessment of productivity

Relevance
Considering the stated mission of this programme, how do you evaluate the relevance of the research with respect to:  
1. the advancement of knowledge  
2. the dissemination of knowledge  
3. the implementation of knowledge  
Overall assessment of relevance

Long-term viability
Considering the present status and future developments (if known) of staff and facilities, how do you evaluate the long-term viability of the programme:  
1. in view of the past scientific performance  
2. in view of future plans and ideas  
3. in view of staff age and mobility  
Overall assessment of long-term viability

7 Start from the assumption that all university research should normally conform to a certain standard. Consider if each aspect of this programme is above/on/below that standard. The committee report will have to specify where and why deviation of the standard is perceived. Your preliminary assessment is only for use in the Committee meeting and will not be published in the committee report.
Points of attention

Questions (to the research/programme director or the faculty board)