The Research Council of Norway

Classifying health-related research using the Health Research Classification System (HRCS)

Pilot project under the Research Council of Norway

Division for Science

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This publication can be ordered at:
www.forskningsradet.no/publikasjoner

or green number telefax: +47 800 83 001

Oslo, November 2011

ISBN 978-82-12-03011-4 (pdf)

English translation: Darren McKellep/Carol B. Eckmann

Foreword

Health as a topic of research is a large and prioritised area in the Norwegian as well as the international research landscape. Norway has a diverse funding system for health research that consists of public as well as private sources of funding. At the Research Council of Norway, health research is a key area that encompasses activities throughout the entire organisation.

The Health Research Classification System (HRCS) is a tool that can provide better knowledge about the research being funded. The number of users that have already implemented HRCS or are considering doing so is on the rise. The emergence of a common classification language will open up new and improved opportunities for cooperation and coordination between players in the research system at the national and international levels.

The purpose of this pilot study, coordinated by Senior Adviser Ingrid Roxrud, has been to assess the HRCS system in relation to a set of defined issues. The report will provide a useful basis for the future incorporation of the HRCS into the Research Council's portfolio analysis toolbox.

We hope the report also will be of value to other stakeholders in the health research field.

Oslo, September 2011

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Contents

Summary

The Health Research Classification System (HRCS) is a tool for classifying and analysing funding of health-related research. The Research Council of Norway has carried out a pilot study involving classification of selected projects with an eye to incorporating this system into its portfolio analysis toolbox. The objective was to assess the potential and implementability of the HRCS for classifying Research Council projects, and to assess alternative methods for operationalising the classification process. The pilot study included 50 projects awarded funding in 2010, whose allocations totalled NOK 246 million.

The results of the pilot study exemplify how classification with the HRCS can be used for portfolio analysis. In addition to providing an overview of the Research Council's health research portfolio as a whole, the data can be easily sorted into relevant sub-groups, such as the portfolios funded by individual ministries or under funding activities such as the Research Council's programmes or its funding scheme for independent projects (FRIPRO). Even with the limited number of projects included in the pilot study, clearly different profiles emerge, e.g. for the individual health research programmes.

In order to assess alternative ways of performing the classification, in relation to factors such as feasibility and reproducibility of results, the task was performed independently by four groups of coders: advisers at the Research Council, project managers of the selected research projects, members of the programme board or expert committee responsible for approving funding to the projects included, and an external consultant with experience using the system.

Time used for classifying was typically 10-20 minutes per project, although there was large variation between participants. Feasibility is considered good for all four groups of coders, and the cost incurred for the participants was not large.

A comparison of project classification performed by the four groups of coders showed substantial variation in choice of categories at the project level. Much of this variation evened out when the results were cumulated for the different groups of coders, particularly for the HRCS main category level. The comparison indicates that investing in standardisation of classification has a positive effect on comparability of results. The choice of method can be assessed based on the desired degree of reproducibility and comparability, at the level of the classification system under focus.

Participants generally considered the system easy to use, but a large proportion felt it was important to refer to the instructional material for categories when classifying projects.

Introduction

1. Background

The Research Council of Norway fulfils three important functions in the Norwegian research system: as a funder of research activity, as a provider of strategic input on research policy, and as a meeting place for researchers and stakeholders. A sound knowledge foundation is needed to carry out these tasks. The Research Council therefore works systematically to develop and maintain a comprehensive, cohesive ***knowledge base*** in the form of statistics and analyses. Analysis of the research funded by the Research Council comprises a vital component of this.

A major portion of the funding allocated to health-related research by the Research Council comes from the Ministry of Health and Care Services, which has indicated a need for more in-depth, comprehensive information about the research activities in the field of health on a national level. In this context, the Health Research Classification System (HRCS) has been introduced to stakeholders in Norwegian research. The Research Council views this system as a potentially useful tool for further developing the organisation's knowledge base in medicine and health. It is also well-suited as a tool for providing information to the funding ministry, as requested. Against this backdrop the Research Council has carried out a pilot study using the HRCS to classify selected projects from its portfolio.

2. The Health Research Classification System (HRCS)

The HRCS – background and development

The Health Research Classification System (HRCS) was developed in the United Kingdom by the UK Clinical Research Collaboration (UKCRC), a national partnership of key players in the field of clinical research. As part of the effort to develop a cohesive strategic approach to research, the UKCRC sought to analyse the national research portfolio related to health in a broad sense (including research in biomedicine, clinical medicine, social medicine, and other health-related research). An analysis of this kind required the introduction of a common language among the research funders, leading to the development of the HRCS. The system was used as the basis for two major health research reports: *UK Health Research Analysis*, which analysed the portfolios of the 11 largest research funders in the UK in 2004-2005, and *From Donation to Innovation*, which analysed the portfolios of 29 small and medium-sized research funders in 2004-2005.

The HRCS - system structure

The HRCS is a tool for classifying and analysing health-related research in the broadest sense. The system links research funding to research objectives, structured around the topic of health. The basic unit of analysis is research projects, which are classified in two dimensions: Research Activity Codes and Health Categories.

Research Activity Codes

The first dimension in the HRCS identifies the type of research, placed on an axis from basic to applied. The system is not limited to the field of medicine; it is designed to encompass research related to the **topic of health** within all fields and disciplines.

The Research Activity Codes-dimension consists of the following eight main categories:

1. Underpinning Research
2. Aetiology
3. Prevention of Disease and Conditions, and Promotion of Well-Being
4. Detection, Screening and Diagnosis
5. Development of Treatments and Therapeutic Interventions
6. Evaluation of Treatments and Therapeutic Interventions
7. Management of Diseases and Conditions
8. Health and Social Care Services Research

These categories are further divided into a total of 48 sub-codes (see Appendix 1).

Health Categories

The second dimension assigns the relevance of research for disease and health, and consists of 21 categories based on the World Health Organization's International Classification of Diseases.

The Health Categories dimension comprises the following 21 categories:

1. Blood
2. Cancer
3. Cardiovascular
4. Congenital Disorders
5. Ear
6. Eye
7. Infection
8. Inflammatory and Immune System
9. Injuries and Accidents
10. Mental Health
11. Metabolic and Endocrine
12. Musculoskeletal
13. Neurological
14. Oral and Gastrointestinal
15. Renal and Urogenital
16. Reproductive Health and Childbirth
17. Respiratory
18. Skin
19. Stroke
20. Generic Health Relevance
21. Other

The system and instructional materials are freely available at www.hrcsonline.net.

The instructions for the system prescribe selecting one to two Research Activity Codes and one to five Health Categories per project. When a project is classified with multiple categories for a dimension, defined percentages of resources used in the project should be assigned, preferably with equal percentages, e.g. 50% Cancer and 50% Infection. This makes sure there is no double counting.

Implementation of the HRCS internationally

In the UK, many organisations that participated in the national analysis in 2004-2005 still use the HRCS for portfolio analysis. A new study using a template similar to *UK Health Research Analysis* is underway, targeted towards generating a new national overview of the health research portfolio, five years after the first such study.

Outside the UK, the system has thus far been implemented in Ireland, Sweden, Canada, Singapore, Hong Kong and Norway. In 2009 the Swedish Research Council carried out a pilot study classifying projects awarded funding under the Scientific Council for Medicine and Health. In 2010 the Swedish Research Council performed a new analysis to classify all the grant proposals submitted for that year.

The European Science Foundation (ESF) is comprised of research-funding and research-performing organisations. The HRCS is an area of focus in the ESF member organisation forum "Evaluation of Publicly Funded Research", where members can share their experience regarding portfolio analysis. The HRCS is also a topic of focus in other parts of the international arena: the European Medical Research Council (EMRC) is drawing up a "Science Policy Briefing" in 2011 which addresses health research classification and the HRCS.

Implementation of the HRCS in Norway

Parts of the research carried out under the auspices of the health authorities in Norway are classified using the HRCS. The regional health authorities have been applying the HRCS since 2009 to classify projects awarded funding under regional cooperation schemes, as part of their online system for progress reports. The regional health authorities' strategy group for research also appointed a working group to further develop the system for measuring the use of resources for R&D in the health authorities. One of the working group's tasks was to assess the possibility of including the HRCS in the annual measuring of expenditure on research and development. The working group did not recommend implementing the HRCS into the current resource measurement system.

The Current Research Information System in Norway (Cristin), which is designed to include a national database for scientific publications, incorporates the HRCS for classifying health-related scientific publications. Under the auspices of Cristin, a Norwegian translation of the HRCS categories has been prepared. The use of the HRCS for classifying projects in the project database for the Regional Committees for Medical Research Ethics is currently under consideration. The Norwegian Cancer Society recently implemented the system for classifying proposals for research funding.

3. *Pilot study using the HRCS at the Research Council of Norway*

Purpose and methods

This pilot study has used the HRCS to classify an assortment of project proposals awarded funding from the Research Council in 2010 under the then[1] Department for Biology and Biomedicine and the Department for Clinical Medicine and Public Health under the Division for Science.

The objective has been to assess the potential and implementability of the HRCS to classify Research Council projects, and to consider alternative methods for operationalising the classification process. The aim of this is to build insight and expertise for the possible implementation of the HRCS in the Research Council's portfolio analysis toolbox, in addition to facilitating the efforts of other interested parties with regard to the HRCS.

The pilot study includes 50 projects awarded funding in 2010 under the following activities, with a total allocation of NOK 246 million:

Research Programme on Environmental Exposures and Health Outcomes	*(8 projects)*
Research Programme on Public Health	*(5 projects)*
Programme on Clinical Research	*(5 projects)*
Research Programme on Health and Care Services	*(10 projects)*
Funding scheme for independent projects in clinical medicine and public health	*(8 projects)*
Funding scheme for independent projects in biology and biomedicine	*(14 projects)*

The classification encompassed only a limited portion of the project portfolios under the various activities. From a scientific standpoint the research funded under these activities should cover the breadth of the HRCS.

The UK national HRCS analysis emphasised the importance of ensuring quality and reproducibility in classification efforts. This entailed classification (or "coding") of the projects by a group of external coders – individuals with a background in research who received training in the use of the system and were given guidance as they worked. Other Norwegian and international organisations that have implemented the system have chosen various methods of performing the classification. The extent to which alternative methods affect the results is unknown. Key questions regarding reproducibility revolve around who is hired to carry out the coding, and what instruction is provided. To determine the extent to which this affects the resulting data and to assess the advantages and drawbacks of alternative methods, the 50 projects in the pilot study were coded independently by four groups of coders:

[1] Since the reorganisation of the Research Council as from 1 January 2011, health-related research is addressed under the Department for Health (under the Division for Society and Health) and the Department for Medicine and the Natural Sciences and Technology (under the Division for Science).

1. Advisers at the Research Council with responsibilities under the selected activities (4 persons)
2. Members of the programme board or expert committee (6 persons)
3. Project managers of the relevant projects (50 persons)
4. External consultant with research background and experience using the HRCS (1 person)

The external participants received information materials via email and had the opportunity to pose questions to the project manager of the pilot study. The advisers at the Research Council collaborated closely on their project coding activities. The advisers, programme board/expert committee members and hired consultant used the project summaries as their basis for coding.

Results of the pilot study

1. *Classification results – Analysis of portfolios*

Presented below are selected results from the classification of the 50 projects included in the pilot study. It is important to view these results as illustrative only, as they exemplify the **possibilities** the HRCS provides for portfolio analysis. Only a limited portion of the Research Council's projects within the field were included, and the analyses do not necessarily present a representative picture of the Research Council's health research portfolio.

In the pilot study, the projects were coded by four groups working independently; the results below are based on the classification performed by the external consultant.

Figure 1. Research Activity Codes, distribution of the pilot study's 50 projects – percentage of resource investment (NOK 246 million in total)

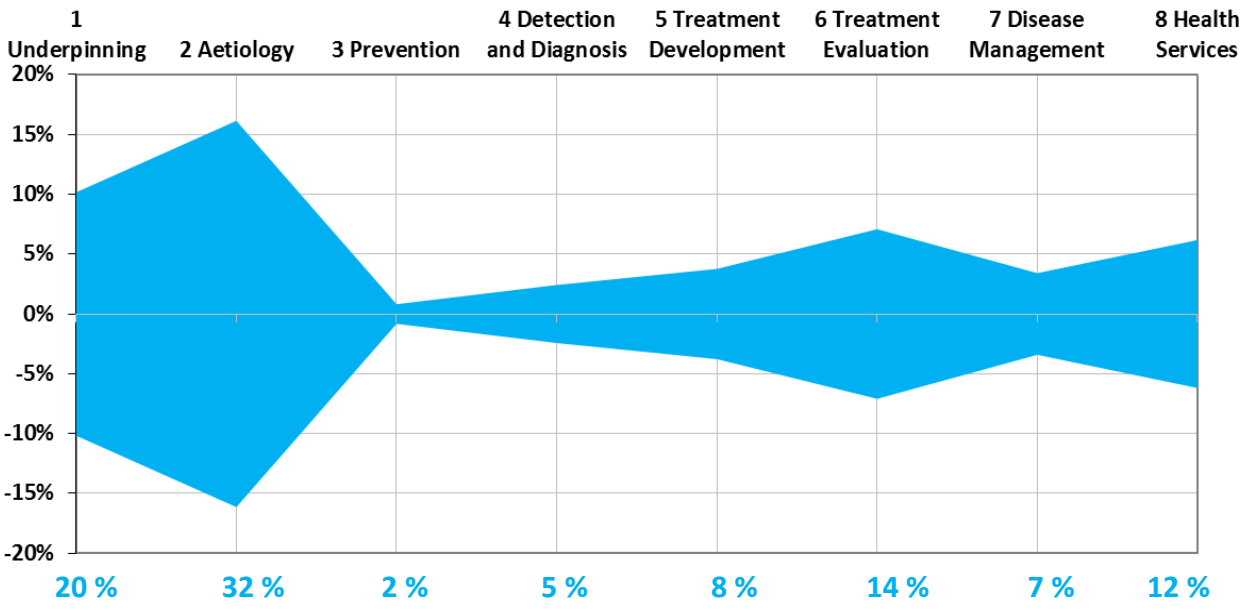
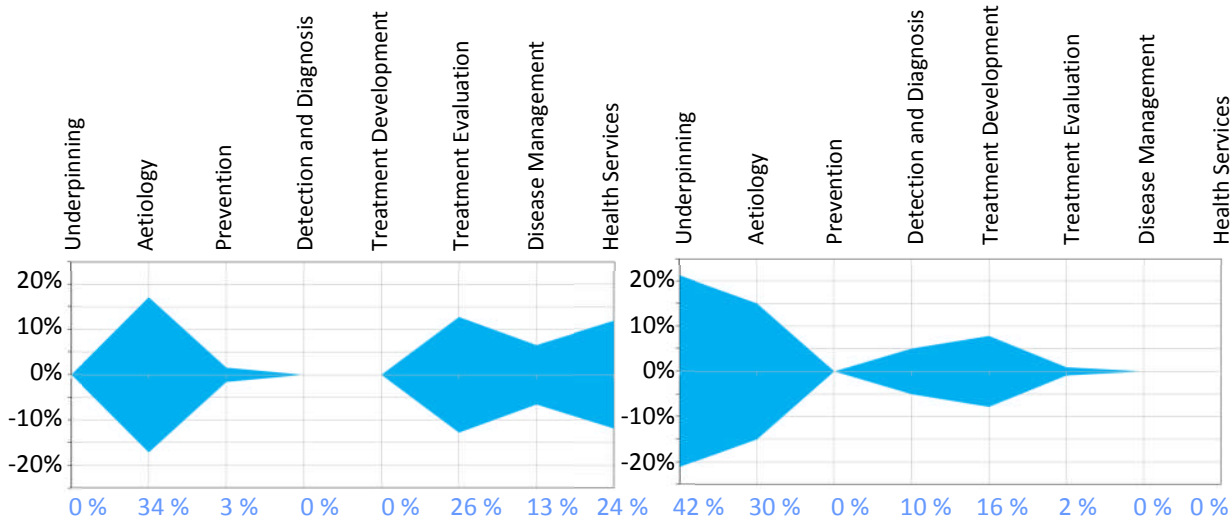


Figure 1 presents a kite diagram to illustrate the distribution of project funding across the eight main categories of the Research Activity Codes dimension. The sum of the area above and below the 0% line along each of the eight vertical axes represents the respective category's share, in per cent, of the total spend. Funding for the 50 projects included in the pilot study is distributed across all eight categories, with the greatest percentage in category 2, Aetiology, at 32% of the allocated funding.

Figure 2. Research Activity Codes, by funding ministry – percentage of resource investment



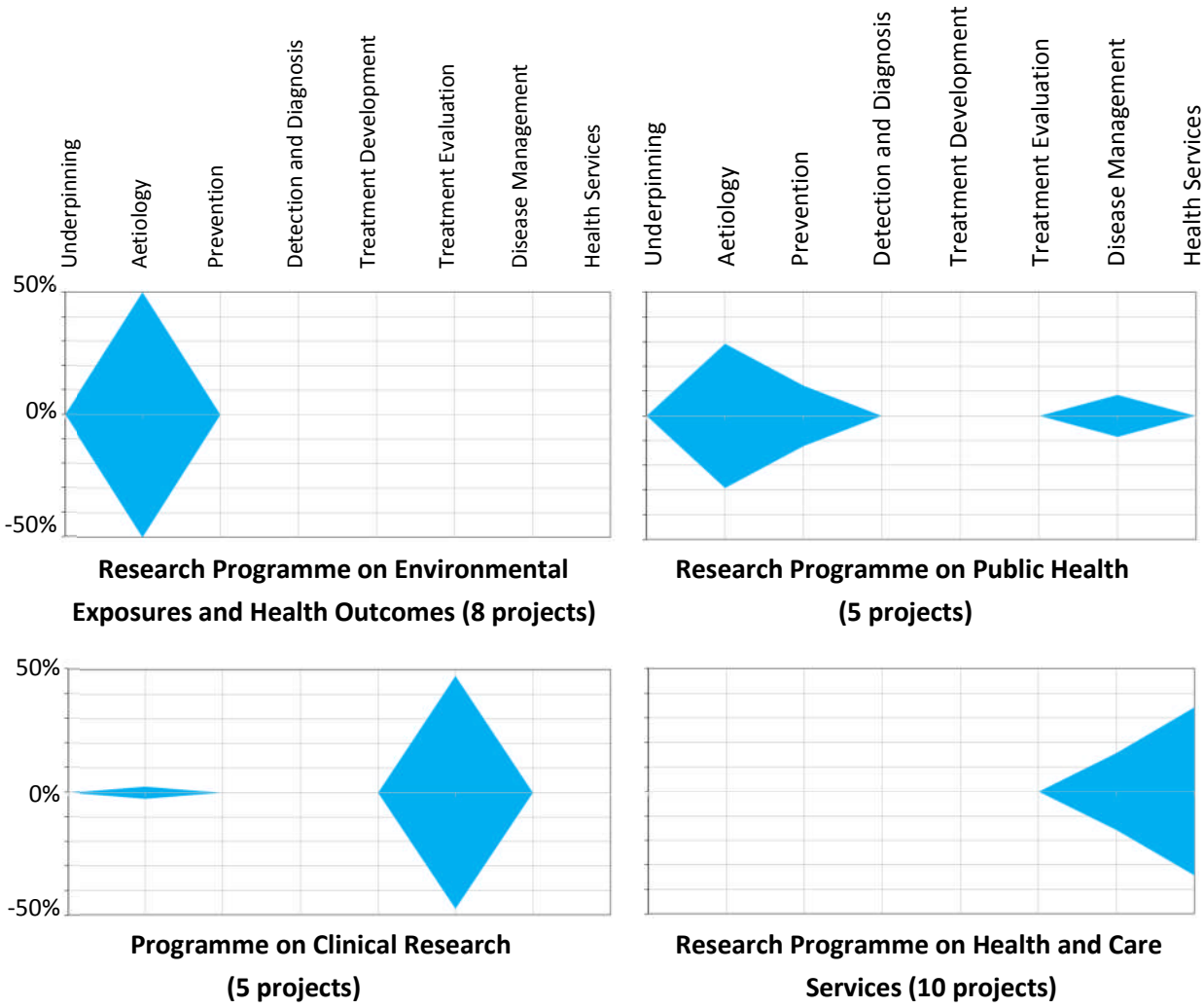
Projects primarily funded by the Ministry of Health and Care Services (28 projects)

Projects primarily funded by the Ministry of Education and Research (22 projects)

Figure 2 shows the distribution of projects funded by allocations from the Ministry of Health and Care Services (HOD), and projects funded by allocations from the Ministry of Education and Research (KD). Activities funded by HOD included the Research Programme on Environmental Exposures and Health Outcomes, the Research Programme on Public Health, the Programme on Clinical Research, and the Research Programme on Health and Care Services. The funding scheme for independent projects in clinical medicine and public health and the funding scheme for independent projects in biology and biomedicine are funded by KD.

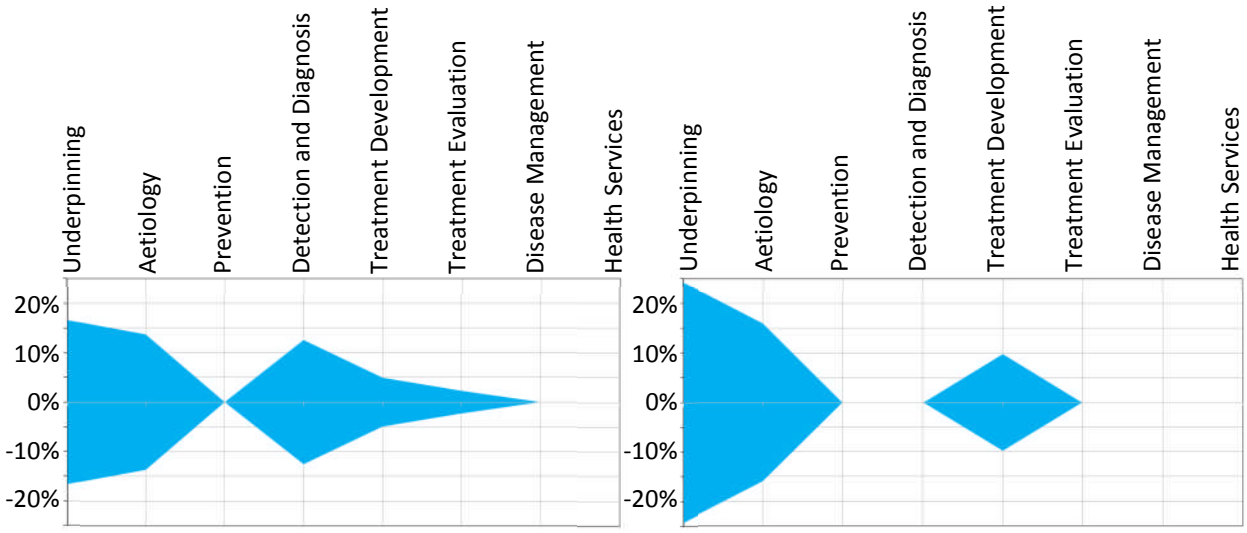
The two kite diagrams reveal different profiles. The HOD-funding is primarily concentrated in the categories Aetiology, Treatment Evaluation, Disease Management and Health Services. The projects funded by KD are concentrated on Underpinning and Aetiology, plus a substancial percentage of funding (26%) on Detection and Diagnosis and Treatment Development. Again, it must be emphasised that these diagrams do not necessarily typify the two ministries' overall allocations to health-related research via the Research Council.

Figure 3. Research Activity Codes, by programme – percentage of resource investment



In Figure 3 the classification of projects among the four health research programmes included in the pilot study clearly illustrates the programmes' differing profiles with regard to project funding awarded in 2010.

Figure 4. Research Activity Codes, funding scheme for independent projects (FRIPRO) – percentage of resource investment

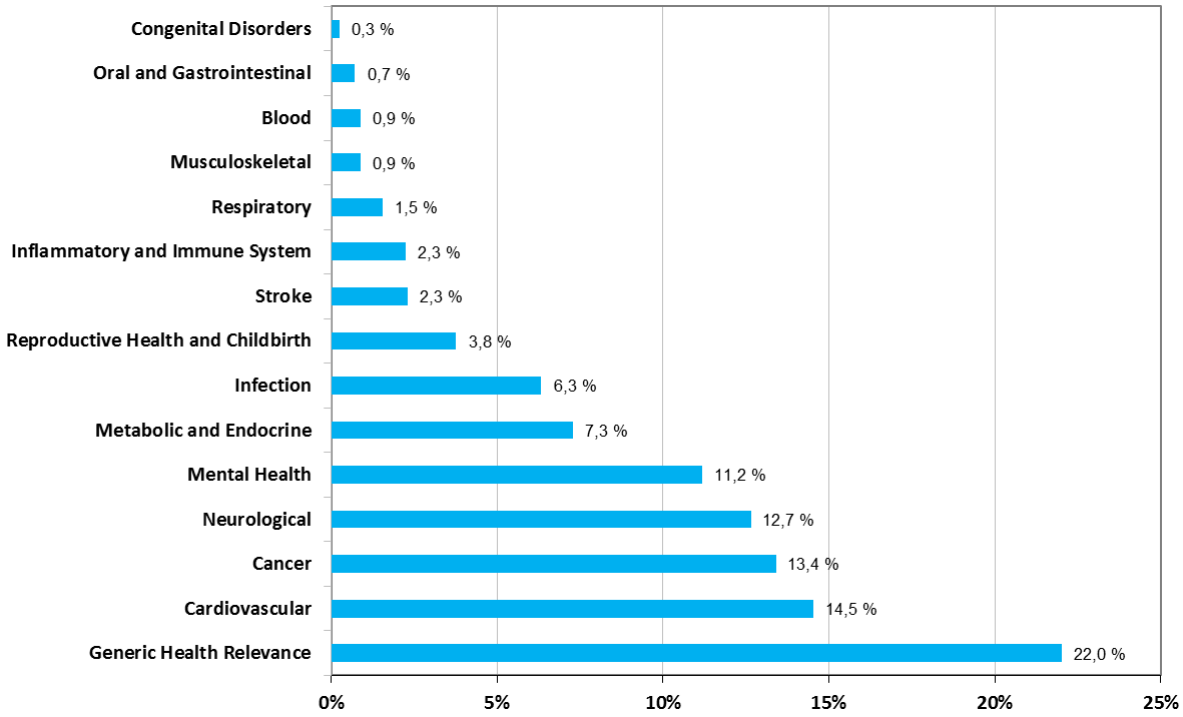


Funding scheme for independent projects in clinical medicine and public health (FRIMED) (8 projects)

Funding scheme for independent projects in biology and biomedicine (FRIBIO) (14 projects)

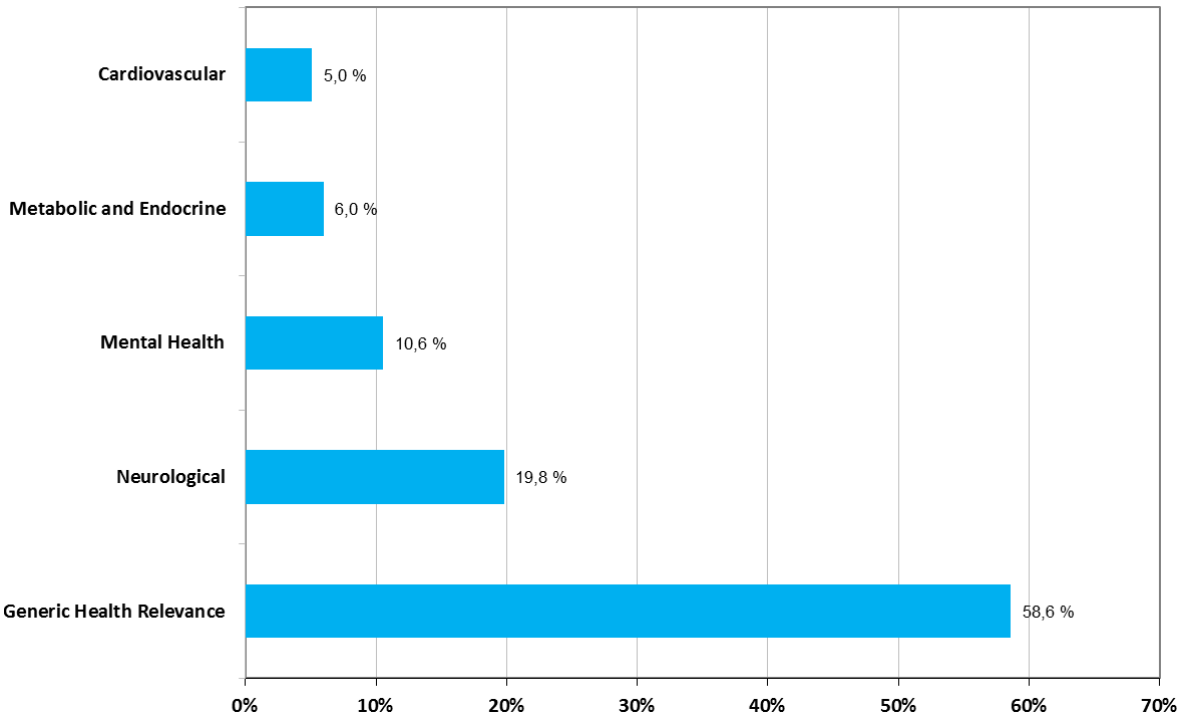
The funding scheme independent projects (FRIPRO) have no thematic priorities. Figure 4 shows that projects in the two fields under the FRIPRO scheme included in the pilot study are both dominated by the categories Underpinning and Aetiology. It is also apparent that a substantial portion of funding for FRIMED projects falls under Detection and Diagnosis, while a substantial portion of funding for FRIBIO projects falls under Treatment Development.

Figure 5. Health Categories, distribution of the pilot study's 50 projects – percentage of resource investment (total NOK 246 million)



The second dimension of the HRCS, Health Categories, assigns the relevance of research in terms of disease and health. Figure 5 shows the distribution of resources allocated to the pilot study's 50 projects across the various Health Categories. The largest category is Generic Health Relevance, with 22% of allocated funding. The other dominant categories encompass research on major disease groups such as cardiovascular disease, cancer, neurological diseases and mental health disorders.

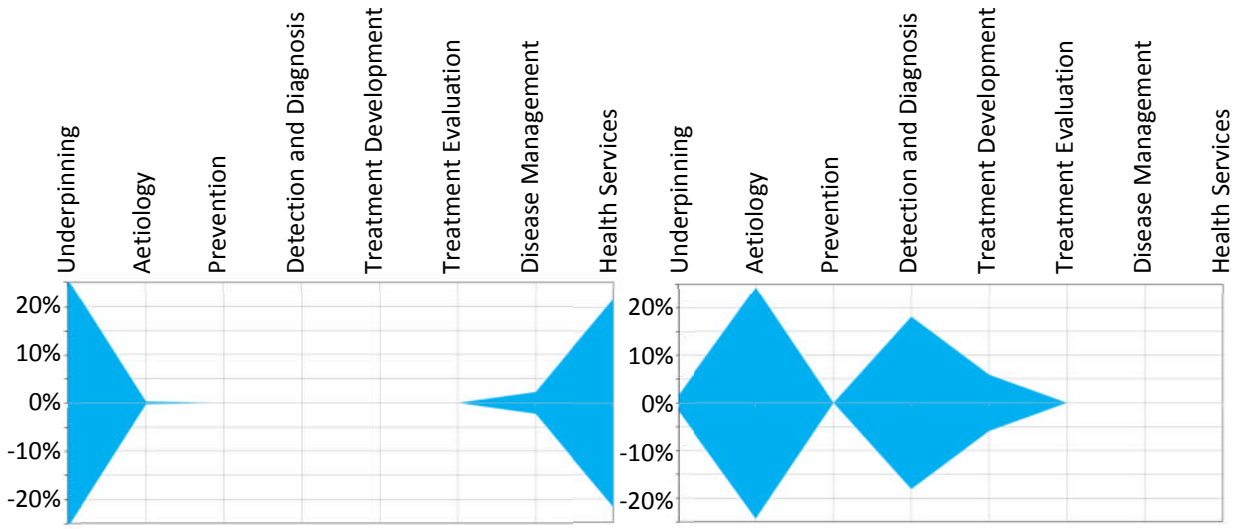
Figure 6. Health Categories, by programme – percentage of resource investment



Research Programme on Health and Care Services (10 projects)

As for Research Activity Codes, the classification in Health Categories can be sorted into e.g. individual programmes, as exemplified in Figure 6 for the Research Programme on Health and Care Services. Nearly 60% of the funding allocated under this programme in autumn 2010 was awarded to research with generic health relevance.

Figure 7. Research Activity Codes, by Health Categories – percentage of resource investment



Projects categorised "Generic Health Relevance" **Projects categorised "Cancer"**

The two dimensions may also be combined in order to analyse how projects within a given Health Category are distributed across the categories under the Research Activity Codes dimension, or vice-versa. For example, the kite diagram (above left) shows that the projects categorised as Generic Health Relevance are distributed primarily between the Research Activity Codes Underpinning Research and Health Services Research. The funding classifised in the Cancer Health Category, as shown in the kite diagram (above right), have their greatest concentration in the Research Activity Codes Aetiology and Detection and Diagnosis.

Potential use of the HRCS at the Research Council of Norway

Classification of research projects using the HRCS and conducting the associated analyses illustrated above would provide more detailed knowledge about the Research Council's project portfolio in health-related research. Such information has a number of potential application areas, one important one being reporting on research activities to the funding authorities (see Figures 1, 2 and 5). Such statistics may also be of use in further developing the Research Council's strategic activities related to health research. In Norway, health research is a major and highly prioritised field of research. One of the main research goals set out in the government white paper on research, *Climate for Research*, is "better health and health services". [2] , and the Research Council introduced a separate Division for Society and Health in 2011. Analyses using the HRCS would generate data about research activities related to health as a thematic area, and this could be incorporated into the basis for the division's strategic planning.

Another potential area of application, in addition to the more overarching analyses, is to use HRCS statistics within individual funding schemes, such as research programmes (see Figures 3 and 6). Most research programmes have defined thematic priority areas and

[2] The white paper Climate for Research (Report No. 30 (2008–09) to the Storting)

objectives, and it could be useful for the programme boards to use portfolio overviews e.g. for tracking progress underway or evaluating the portfolio at the conclusion of the programme period. Also of interest is the Swedish Research Council's 2010 HRCS project, in which all grant applications received were classified, making it possible to compare grant applications that were approved vs. those that were rejected.

The opportunity for cooperation with other research funders nationally and internationally is another key consideration, as more organisations start using the HRCS. Major Norwegian funders in the field of health research, such as the regional health authorities and the Norwegian Cancer Society, already use the HRCS for portfolio analysis. The HRCS may also be a useful tool in international research cooperation. The use of mapping analyses, for instance, is widespread, and HRCS data could be a good starting point for such exercises. The ability to extract information about research activities within specific areas such as disease types may also be relevant in other contexts.

The Research Council can employ the results of HRCS-based portfolio analyses in its dialogue with research groups and the public administration. Communicating the Research Council's activities to the general public is another important area where the HRCS may have potential value. Designed around the topic of health, the system's logic is easily grasped and all the categories have been translated into Norwegian. Moreover, the visual display of results using kite diagrams is intuitive, clearly emphasising areas of concentration in funding.

The HRCS can replace the Research Council's health relevance form submitted by project managers when their grant application is approved. The HRCS does not overlap with the Research Council's other types of categorisation to a significant extent and can be a good supplement to the current system.

2. Comparing classifications performed by different groups of coders

In order to assess relevant alternative methods of performing the classification, four groups of coders carried out parallel classification of the projects independently of one another: Research Council advisers, programme board/expert committee members, project managers of each project, and an external consultant. In addition to filling in the classification form, the participants were asked to answer a set of questions about the classification process.

Costs, feasibility and time use

To gain an overview of time required, all participants were asked to provide feedback on how much time they had spent on performing the classification. A comparison shows that the internal advisers spent the least amount of time, an average of 10 minutes per project. Programme board/expert committee members and project managers spent a comparable amount of time on average, and roughly twice as much as the advisers. It should be noted that reported time usage among the external participants varied widely, as project managers reported spending from one minute to two hours on classifying a single project. Use of 10-20 minutes was typical.

The programme board/expert committee members and the external consultant received remuneration for their work. Although the expenditure was not significant, it should be noted that remuneration to the programme board/expert committee members according to the Research Council's established rates amounted to roughly three times the cost of hiring the UK consultant to code the same projects.

Feasibility was good for all groups; 48 of the 50 project managers responded to the survey, although some reminders were needed. Coordinating the tasks of sending, collecting and analysing the classifications of the 50 project managers was considerably more time-consuming than for the other groups. This could be remedied by automating the classification process by, for example, making it part of the mandatory reports to be submitted by the project managers.

One challenge encountered was that nearly 20% of the project managers selected more than the stipulated one to two categories for the Research Activity Codes dimension, so their classifications were not included.

Comparing the four groups' classification results

An area of focus in the activities of the ESF forum Evaluation of Publicly Funded Research involving the use of HRCS for portfolio analysis is how to ensure that classification is sufficiently standardised to generate comparable data. The system consists of many categories and it is possible to use several categories for each dimension to extract the primary objective of a research project. The extent to which the users have a common understanding of the system and use it in a similar manner is not known. Organisations implementing the system have chosen various approaches. The Swedish Research Council asks members of the application review panels to classify grant applications using the HRCS. Norway's regional health authorities use the HRCS to classify proposals in connection with their annual project reports, and ask project managers to select one Research Activity Codes main category and one Health Category for their respective projects. The Norwegian Cancer Society classifies its project proposals by having applicants select one Research Activity Codes main category for the project; the default Health Category is Category 2, Cancer.

The four groups of coders in the Research Council's pilot study represent variations in relevant factors such as: previous experience with or knowledge about the HRCS, quantity of projects to be classified per participant, knowledge about the project(s), scientific background, as well as guidance prior to and during classification.

A key issue in comparing the groups of coders is the extent to which their coding of the projects differs. For each project, it was noted whether the groups coded it either a) 100% identically, or b) not 100% identically. Using the UK consultant, who has a background in research and several years' experience with classifying projects using the HRCS, as the reference, the comparison of the groups showed that the classifications of the project managers deviated most from the consultant's; 11% of the projects were coded identically by the project managers and the consultant. The members of the programme boards/expert committees coded 18% of all projects identically to the consultant, while the figure for the Research Council (internal) advisers was 48%. Further comparison showed that the project

managers as a whole coded projects least identically to the other groups. One difference between the project managers' group and the other groups was the number of coders: 50 individuals, as opposed to one to six persons in the other groups. It should be noted that the internal advisors performed their classifications together at a workshop whose focus was to work out a uniform method of coding based in part on advice and guidance from the UK.

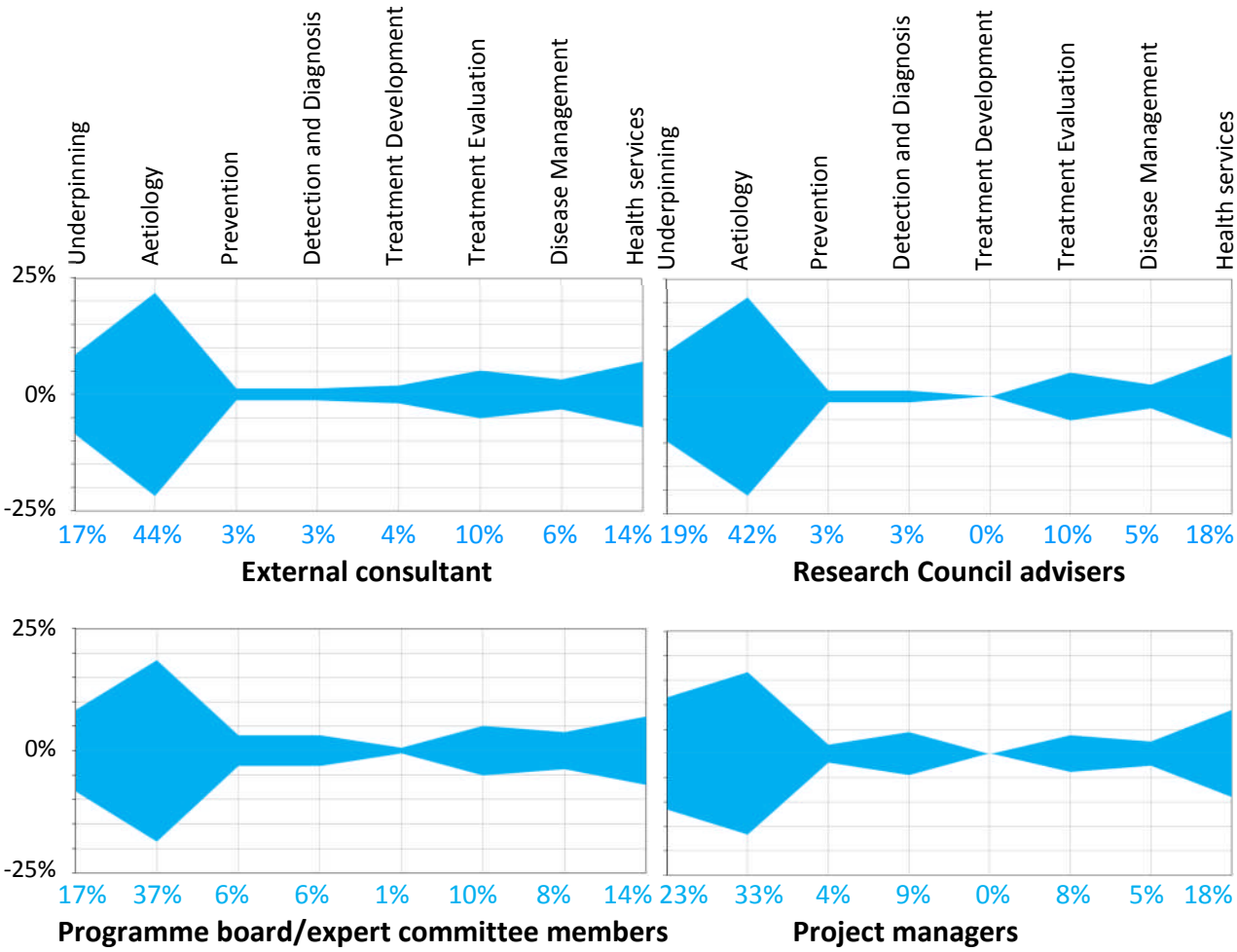
The two groups that performed the classification most similarly were the internal advisers and the UK consultant, indicating that a focus on standardising classification along with extra guidance can result in more uniform coding. On the other hand, the programme board/expert committee members and project managers presumably have the advantage of a stronger scientific background, and the project managers would have the best basis for understanding the project content among the four groups. This could be an argument in favour of the project managers as the best equipped to determine which categories are most appropriate, regardless of how dissimilar their classifications may be from the other groups'. The quality of the project summary upon which classification is based will also be critical to how well the other groups understand the core of the project and perform the classification. In this context it is worthwhile to note that the internal advisers and programme board/expert committee members were informed that if they so wished, they would be provided with the project descriptions in addition to the project summaries. No one made this request.

There are several ways in which the variation described above may have arisen. It may be a result of the choice of categories for Research Activity Code or for Health Category. Because it was possible to select one or more categories per project, the variation may lie in how many categories a coder selects. Upon closer analysis, it was apparent that in general there was more variation in choices of Research Activity Codes than of Health Categories. Another clear trend was that the project managers, and to some extent the programme board/expert committee members, generally selected more categories per project than did the consultant and internal advisers. There was also substantial variation in that the groups of coders selected different categories.

One important follow-up question is how this variation in the selection of categories is expressed when the final statistics are compared at the aggregate level. Figure 8 below shows kite diagrams for each of the four groups of coders, with distributions of the pilot study projects across the eight main categories of the Research Activity Codes dimension. In all, 11 projects were removed from the comparison, two because the project managers did not answer the questionnaire and nine because the project managers selected more than the maximum two code groups under Research Activity Codes. The four comparative diagrams are therefore based on the remaining 39 projects.

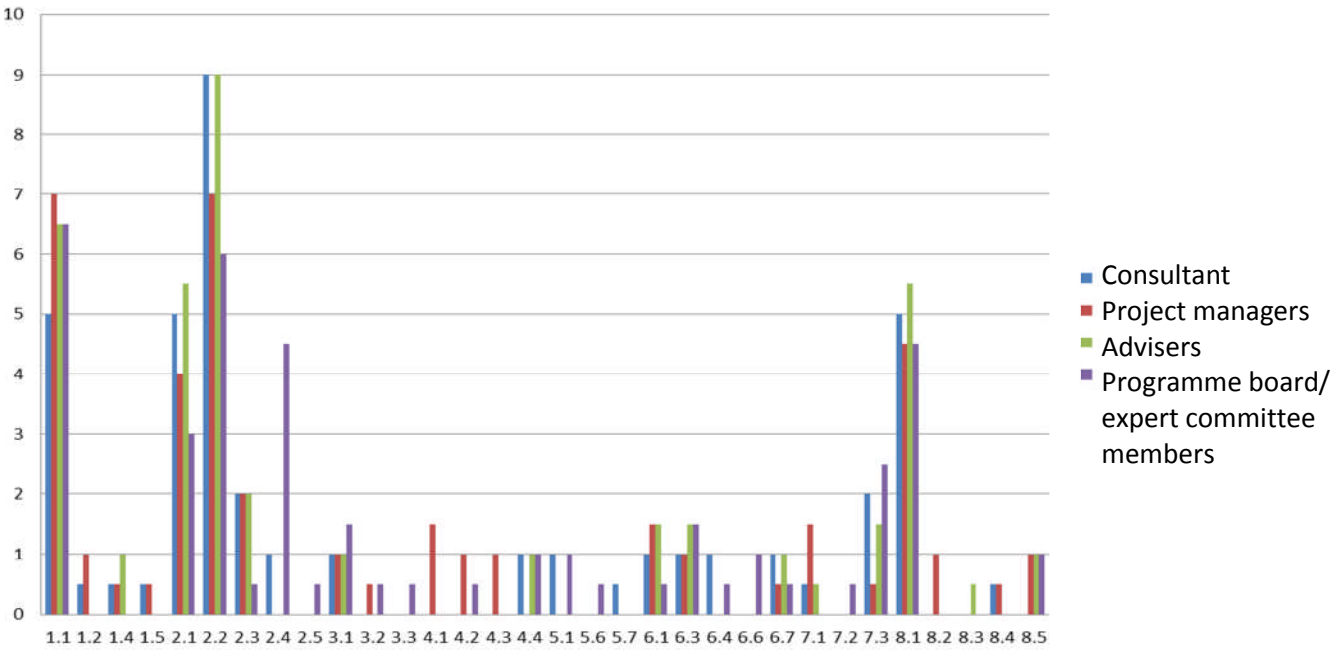
By and large, the same areas of concentration emerge in the four diagrams; the variation in classification observed at the project level is less obvious at the aggregate level for the Research Activity Codes main categories.

Figure 8. Comparison of the four groups of coders, Research Activity Codes – proportion of projects



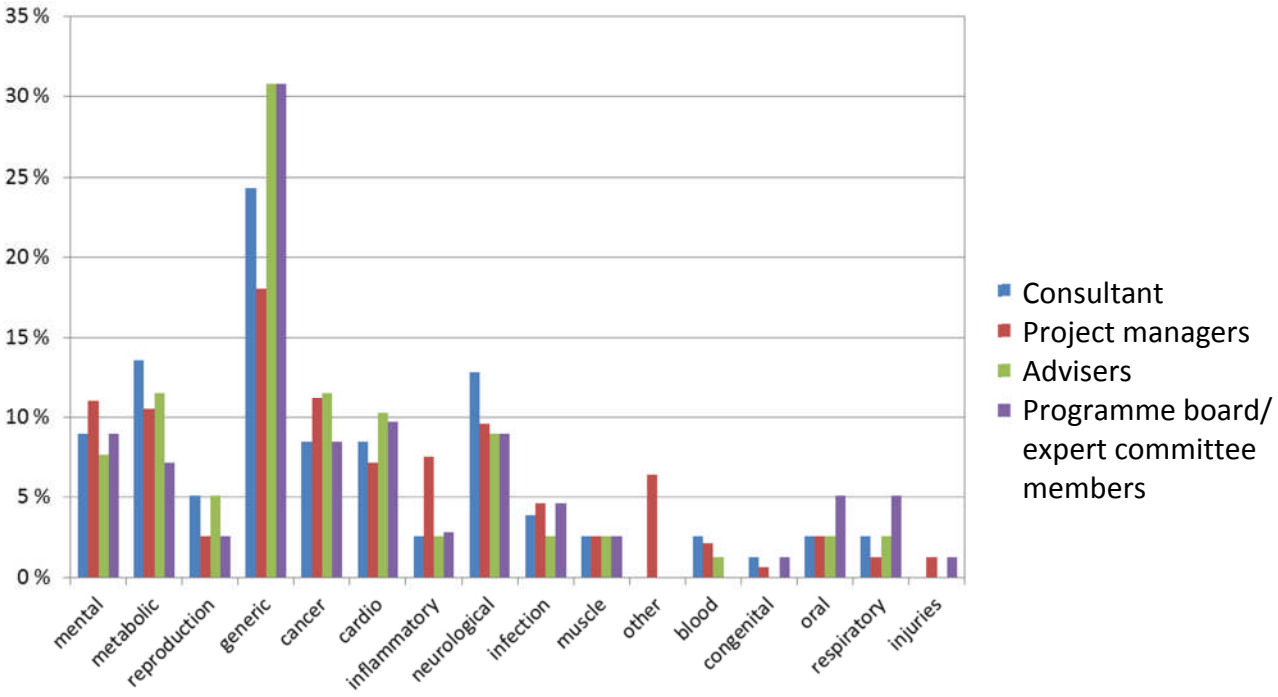
The eight main categories of the Research Activity Codes dimension are further divided into a total of 48 sub-codes. A comparison at this level (Figure 9) shows again that variation among the groups of coders tends to even out at the aggregate level. There is, however, a clearer indication of the variation in classification among the groups of coders than is evident at the main code group level.

Figure 9. Comparison of the four groups of coders, Research Activity Codes – number of projects



For the second HRCS dimension, Health Categories, there was somewhat less variation in classification between the four groups than for the Research Activity Codes dimension. Figure 10 shows that the overall distribution of the 39 classified projects across the categories was for the most part relatively comparable between the groups of coders.

Figure 10. Comparison between the four groups of coders, Health Categories – percentage of projects



These comparisons indicate that the observed differences in classifying projects between the groups of coders are less pronounced when analysing the aggregate statistics. This applies particularly at the main level of the system, while more divergent results appear at the sub-levels. If the results of this limited study reflect a general phenomenon, the choice of method may hinge significantly on the degree of reproducibility desired and at which level. If the aim is overall analysis, such as total resource investment at the main category level, it may be assumed that individual variation in classifying projects have a minor impact on the results. If the aim, however, is also to use data at the sub-code level, a more standardised method may be preferable. Moreover, if the aim is reproducibility at the individual project level, or to work with more detailed portfolio overviews, it may be worthwhile to invest in standardising the classification methods.

3. Evaluations from the pilot study participants

The external participants in the pilot study were asked to answer a set of questions related to the classification. To the question of whether coding the project(s) was experienced as easy or difficult, 73% of project managers responded it was easy to use the HRCS to code their project. The remaining project managers characterised it as medium-difficult or difficult. All the programme board/expert committee members reported it was easy to code projects using the system. It can be drawn from this that the HRCS is generally perceived as unproblematic to use without previous experience with the system.

Additional information has surfaced that adds nuance to this picture. Some project managers reported feeling their project did not “fit into” the system. This concerned several projects on health-related social science research, but there were indications that prevention, multi-disciplinarity, and bioinformatics were also problematic to classify. In addition, several project managers commented that the difficulty lay primarily in choosing the correct Research Activity Codes. This harmonises with the observation that the groups of coders demonstrated greater variation in selecting the Research Activity Code than the Health Category. Furthermore, some feedback explicitly stated that the maximum limit of two Research Activity Codes per project made classifying more difficult. On this point, it is notable that nine of the 50 project managers assigned more than the prescribed 1-2 codes, up to 10 codes to classify a single project. Some comments questioned the value of such classification efforts.

The participants were also asked whether the guidance material accompanying the form (with descriptions of all categories) were important for choosing categories. Nearly 70% responded that the guidance material were indeed important for assigning both Research Activity Codes and Health Categories. All the programme board/expert committee members felt the instructions were important for assigning Research Activity Codes, but somewhat fewer confirmed this for Health Categories. Regarding the question of whether the extra online instructional material available at www.hrcsonline.net was used, just over 10% of project managers responded affirmatively. A larger proportion of the programme board/expert committee members, each of whom classified multiple projects, confirmed using the supplemental online instructional material.

Appendix 1 Sub-codes of the Research Activity Codes

1 Underpinning Research
1.1 Normal biological development and functioning
1.2 Psychological and socioeconomic processes
1.3 Chemical and physical sciences
1.4 Methodologies and measurements
1.5 Resources and infrastructure (underpinning)
2 Aetiology
2.1 Biological and endogenous factors
2.2 Factors relating to physical environment
2.3 Psychological, social and economic factors
2.4 Surveillance and distribution
2.5 Research design and methodologies (aetiology)
2.6 Resources and infrastructure (aetiology)
3 Prevention of Disease and Conditions, and Promotion of Well-Being
3.1 Primary prevention interventions to modify behaviours or promote well-being
3.2 Interventions to alter physical and biological environmental risks
3.3 Nutrition and chemoprevention
3.4 Vaccines
3.5 Resources and infrastructure (prevention)
4 Detection, Screening and Diagnosis
4.1 Discovery and preclinical testing of markers and technologies
4.2 Evaluation of markers and technologies
4.3 Influences and impact
4.4 Population screening
4.5 Resources and infrastructure (detection)
5 Development of Treatments and Therapeutic Interventions
5.1 Pharmaceuticals
5.2 Cellular and gene therapies
5.3 Medical devices
5.4 Surgery
5.5 Radiotherapy
5.6 Psychological and behavioural
5.7 Physical
5.8 Complementary
5.9 Resources and infrastructure (development of treatments)
6 Evaluation of Treatments and Therapeutic Interventions
6.1 Pharmaceuticals
6.2 Cellular and gene therapies
6.3 Medical devices
6.4 Surgery
6.5 Radiotherapy
6.6 Psychological and behavioural
6.7 Physical
6.8 Complementary
6.9 Resources and infrastructure (evaluation of treatments)
7 Management of Diseases and Conditions
7.1 Individual care needs
7.2 End of life care
7.3 Management and decision making
7.4 Resources and infrastructure (disease management)
8 Health and Social Care Services Research
8.1 Organisation and delivery of services
8.2 Health and welfare economics
8.3 Policy, ethics and research governance
8.4 Research design and methodologies
8.5 Resources and infrastructure (health services)