

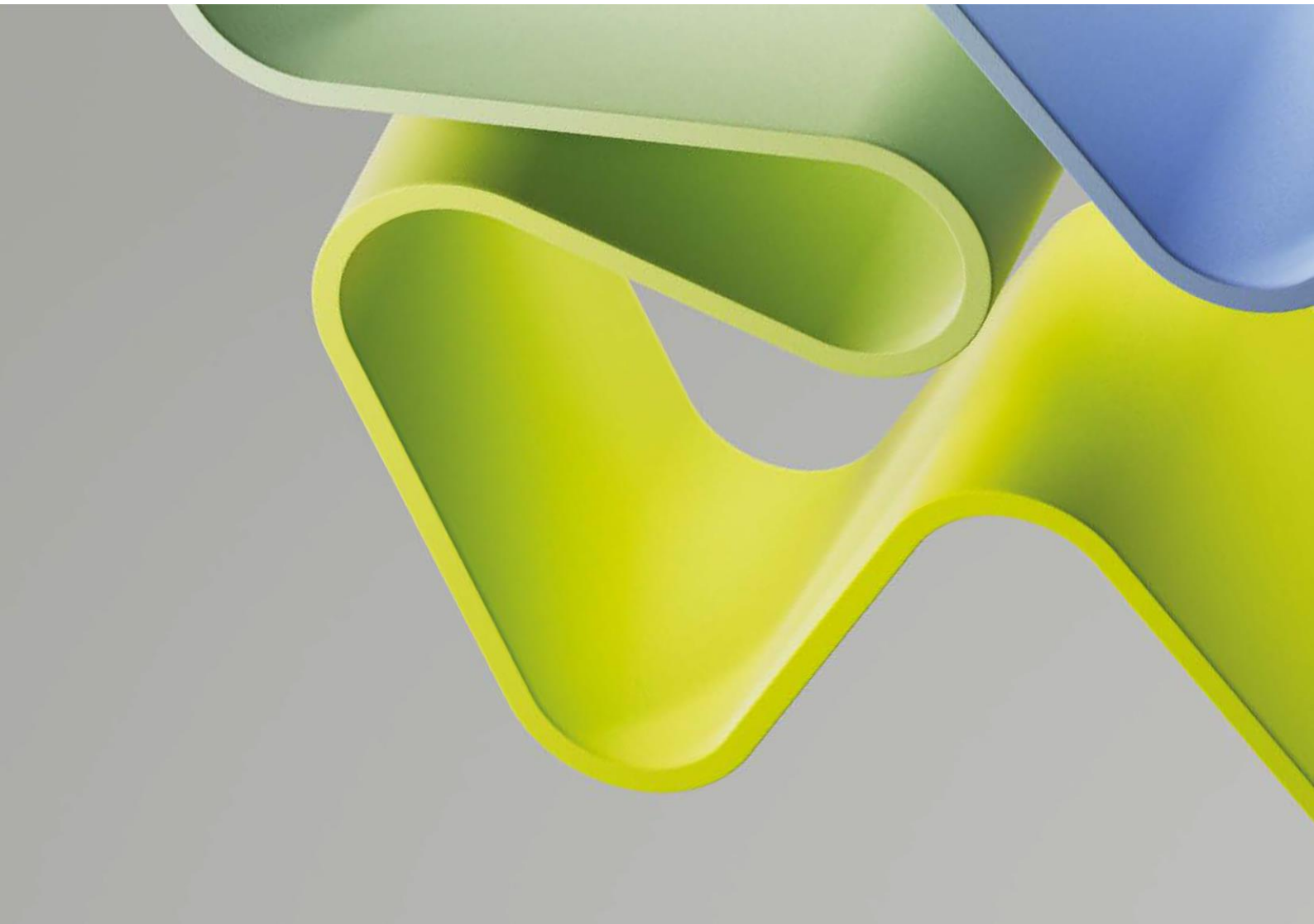
Evaluation of Medicine and Health 2023-2024

Evaluation report – Panel 4b

Research Group: Centre for Antimicrobial Resistance (AMR Centre)

Administrative Unit: Division of Infection Control

Institution: Norwegian Institute of Public Health



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Preface

The Research Council of Norway (RCN) is given the task by the Ministry of Education and Research to perform subject-specific evaluations. The primary aim of the evaluation of medicine and health (EVALMEDHELSE) 2023-2024 is to reveal and confirm the quality and relevance of research performed at Norwegian Higher Education institutions, research institutions (the institute sector) and the health trusts, in an international perspective. Such knowledge is useful for the institutions that participate in the evaluation, for the Research Council who advise the authorities on how research should be developed further, and for the authorities, who set targets and frameworks for research and higher education. Research groups submitted by their administrative unit will be assessed by 18 expert panels organised by research subjects or themes. The expert panels will assess research groups across institutions and sectors based on research group's self-assessments and examples of scholarly output. These research reports will be part of the evaluation of their belonging administrative units.

Abstract

The NIPH AMR centre has been set up in 2020 within the Division of Infections as a cross-cutting structure, bringing together AMR experts based in different Departments. This is a unique structure within the NIPH, resulting from a strategic choice to prioritise AMR. It thereby provides some protection of having to compete for resources with operational needs in this field, although it is not clear if AMR experts connected to the Centre might still be reallocated by their regular Departments in case of needs. Expertise in the centre is comprehensive, and its strategic central location ensures excellent access to relevant national databases. Research output and external funding, is still modest.

Overall assessment

The panel considers the increasing global threat of AMR, and the complex biological, environmental, behavioural and social dynamics driving transmission and control, as clear justification for strong public health prioritisation. In Norway, clinical AMR prevalence is still relatively low, which can provide opportunities to test specific hypothesis and interventions. The independent set up of this Centre, with its excellent access to national registries and laboratories, has great potential to develop innovative research, although the recent downsizing of staff, the matrix structure with all staff also belonging to another formal Department, and the current lack of external funding are somewhat of a concern. As this is a young Centre, it may still be a bit early to evaluate output, as acquisition of competitive funding and leading high-impact publications can be expected from a dedicated research centre. There are many strong collaborations, in particular with institutes, agencies and authorities involved in all kinds of policies related to AMR control, and good connections with international networks.

Grading:

Dimensions	Score
Organisational dimension (How adequate the organisational environment is in supporting the production of excellent research).	4
Quality dimension (Research and publication quality/Research group's contribution)	3/3
Societal impact dimension (Research group's societal contribution/User involvement)	4/3

Recommendations

- Address challenges of working outside the regular structure; develop solutions to circumvent some of the limitations of the current floating embedment in SM, in collaboration with internal and external stakeholders.
- Clarify how funding and output regarding AMR is allocated to AMR centre and/or regular Departments. Now it is unclear what the autonomy of the centre entails, as no budget seems to be allocated. Also, AMR is cross-cutting into all the groups the members belong to, making it hard to assess added value.
- Make explicit to what extent (and how) a One Health approach is present in research and national action plan. Little mention is made of this, while it is internationally well recognised that this is a key approach for AMR control.
- Maintain and expand productive collaborations with (international) academic networks and partners.

1. Strategy, resources and organisation

1.1 Research group's organisation and strategy

The AMR Centre within the Division of Infection Control was formed in 2020, and is positioned as a collaborative hub within the Division. Therefore it operates rather independently from the administrative unit. The Centre brings together AMR expertise from the regular departments within the Division. Administrative support, registry and modelling expertise, laboratory infrastructure and expertise, and access to national registries was already present in the department before the establishment of the Centre, and provided a solid basis to build a dedicated Centre. The Centre has a clear mandate and autonomy, and a modest core budget. This reflects high level priority and long term strategic vision awarded to the AMR threat, although currently there appears to be a downsizing of resources (the reason not explained). The Centre has an active role in education, including contributing to create a MOOC, and has mentored 7 PhD and 6 MSc candidates over the evaluation period. They are well embedded internationally. Benchmarks are ambitious and comprehensive but could be more concrete, so that progress towards reaching them can be assessed and used to prioritise.

The panel considers the vertical embedding in the organisation as beneficial and strong for targeted long-term strategic planning and production of excellent research, as there are likely to be less expectations to prioritise operational activities over research in times of need. However, while a matrix structure gives flexibility, the panel considers this also has the risk that the Centre can operate somewhat isolated, as also indicated as a risk in the self-assessment. The panel also wonders to what extent this special structure could create tensions with researchers working on other topics than AMR, which are not given the same freedom to develop in depth expertise; or with departments from which the Centre's expertise is drawn if responsibilities and credits are not well clarified. A careful internal evaluation regarding the impact of the formation of this Centre on the Division and Institute as a whole can be useful, both to support this Centre, and to give input on the institutional challenge to optimize synergy across Departments. While access to national reference laboratories is considered a great asset, the panel feels it is also highly relevant to maintain strong collaborations with local laboratories, clinicians, pharmacies, and in a One Health context veterinarians also.

Recommendations

- Evaluate the overall impact of the formation of a dedicated Centre outside the established management structure on the overall institute and towards other NIPH challenges and priorities. Other public health priorities, eg vaccination or preparedness, are also cross-cutting across Departments, but do not benefit from the same autonomy:
- Formulate benchmarks more SMART. Currently formulated benchmarks are ambitious but not specific. As such, they may not be very helpful to assess progress towards achieving them.

1.2 Research group's resources

At the moment of the self-evaluation, there were 20 staff connected to the Centre, including 6 medical officers, 12 scientists (academic grades not clarified), one advisor and one director. They are all members of one of the regular departments as well, and all only part-time allocated to the Centre. Many different disciplines are present, in line with the need for and added value of a multidisciplinary approach. It is mentioned that due to budget constraints, there has been a down-sizing of the group, rather than growth. Over the past years, external funding has been quite limited, and only from NRC, but in 2024 the Centre was a co-applicant in a successful large EU-JPI grant. Also core funding is limited albeit very stable, whereby salaries of core staff are presumably taken care of by their regular departments. Core funding is intended for the recruitment of external professors and to co-finance post-docs where project funding is insufficient (as it often is); there is also mentioned of co-financing a chief medical officer.

The panel finds the current absence of external funding reported to be a bit surprising, although it is possible that some external funding has been registered under the regular departments of the investigators linked to the AMR Centre. The downsizing of the group from core funding further stresses the need to acquire project funding to realise research ambitions. The strategic decision not to aim for private funding ensures the Centre (and Institute) may not have to be concerned that they are perceived to have conflicts of interest with e.g. pharmaceutical or diagnostic companies, and is in line with the position of other European PHIs. However, it is mentioned that there are regular exchanges with industry, which can provide relevant knowledge exchanges, but may also need clear policies to ensure (perceived) independence is maintained. It is not clear how many external professors have been recruited, what their expertise is, and how they have been positioned in this detached Centre. It is not clear to what extent social scientists, health economists, and pharmacists are involved either in the Centre or in collaborations.

Recommendations:

- Ensure independence, and the perception of such independence, from private partner influence is maintained. Public trust is key for the impact the research of the institute aims to have.
- Clarify how core funding has/can leverage competitiveness of the Centre. It is not clear now what funding is dedicated to the Centre or to the different Departments

1.3 Relevance to the institution

The Centre has a rather free and independent role within the administrative unit, but is closely linked to its core surveillance activities. This, linked to independent research, enables a strong contribution to the National Action Plan, in which the Institute holds a central and influential position. Activities of the Centre are also very much in line with core tasks of the Institute, such as providing evidence-based advice and recommendations, and preparedness against this silent pandemic. The ability to bridge a gap between research and practical implementation is a key strength.

The panel considers the independency from the central administrative unit as an interesting model to evaluate, and assess to what extent other major PH challenges would also benefit from a similar cross-cutting structure within the Institute. It would be relevant to understand if such an approach may be less affected by shifting short term priorities than the regular organisation in hierarchical departments, and thereby enables the institute and Centre to develop and deliver long-term strategic scientific aims. The panel feels that extent to which the Centre can contribute to translating knowledge into action, would strengthen the public health profile and societal credibility of the Institute. As the Institute also has a national role as vaccine provider, it would be highly relevant if cross fertilisation between expertise on AMR and vaccines/vaccinations could be realised.

Recommendations

- Maintain close links with the operational tasks of the Division, to ensure research remains grounded in public health priorities. While it is beneficial for the research that the Centre itself has no operational responsibilities, the unique positioning in a public health institute, compared to an academic environment, can only be leveraged with sufficient regular interactions
- Provide concrete examples of how the Centre (intends to) succeed(s) in sustainable bridging the knowledge gap.

2. Research quality

2.1 Research group's scientific quality

While the threat of AMR in Norway is still relatively low, the Centre perceives this, given its central position, as an opportunity for fundamental research e.g. on the population effect of specific interventions, and to study the global impact of diverse treatment regimens on AMR dynamics. The Centre is also involved in studies on antibiotic use, a key modifiable factor to reduce AMR. There are (only) 5 publications cited, 1 of them a review, the other 4 relate to original research, 2 focused Norway, 2 international. Three of the 5 papers have a first or last author from the Centre. Although health economic expertise is not mentioned as being present in the Centre, a significant role in economic models to incentivize novel antibiotics is mentioned.

The panel considers the publications cited to be of high standards and reflecting the strong modelling and molecular expertise of the group, as well as reflecting a global public health perspective. Of the three publications cited with a global perspective, one had a last authorship from the Centre, which supports international recognition. The panel feels an even more explicit strategic focus, either on specific pathogens or mechanisms or interventions (e.g. antibiotic use, food chain, infection control including vaccinations) could provide added value and enable in-depth specialisation. The inclusion of pharmacology expertise would strengthen research on antibiotics, including rational use and quality control. It is not clear to the panel to what extent research on (rapid) diagnostics is included. The Centre hosts a (methodological) WHO-CC which is recognition of quality and relevance.

Recommendations

- Increase visibility by increasing publication output of original research. The number of cited papers is relatively low after 6 years.
- Include publication ambitions, including as first/last author and specific problem, in the benchmarks. Thus, a more SMART formulation will enable to evaluate progress, and if needed to readjust priorities or resources.
- Clarify to what extent private partners are/were involved in economic modelling of incentivizing innovative antibiotics. For credibility and public trust, transparency on research funding is vital, in particular in relation to the role of pharmaceutical companies
- Consider developing a more focused, specialised, public health research profile. This will help to clarify the unique positioning and strengths compared to a more academic research group.

2.2 Research group's societal contribution

AMR research clearly produces highly societal relevant research, nationally as well as internationally. The Centre is well embedded in national and international networks, with a focus on supporting and evaluating the national action plan (NAP), in which the Institute has a key role. Outcomes of an attempt to stimulate antibiotic innovation were disseminated in a scientific publication, and could have strong societal impact if effective and affordable novel antibiotics could be marketed to replace less effective, more toxic, less affordable antibiotics. Regular contributions to surveillance reports and policy briefs by the Centre are mentioned. An example is cited of a co-arranged symposium which included not only policy makers and scientists, but also representatives of the public, which is excellent societal involvement. User contributions cited in table 7 suggest some dependency on output by a single person. The Centre has contributed to implementation of policies and activities in the NAP, and training for health care professionals on antibiotic use.

The panel considers collaborations with many policy makers and (inter)national institutions as mentioned as an asset, and it is clear that these societal partners have considerable involvement in the research process, from problem formulation to outcomes. What is less clear is how collaborations with local laboratories and clinics are organised, which are highly relevant as well. That is where surveillance data originate, where interventions to reduce acquisition and transmission need to be adhered too, so proactive involvement is key in generation of quality surveillance and in developing and implementing interventions to reduce AMR. While the panel considers the group's contribution to societal development in Norway in line with what is expected from groups in the same research field, the panel also considers that proactive collaborations with environmental and veterinary experts could be strengthened. Societal contributions in papers, reports and websites as reported may not fully capture to what extent the Centre contributes to awareness and behavioural changes among end users (including providers and patients as well as policy makers).

Recommendations

- Ensure bi-directional dialogue with all stakeholders, also locally. This will increase societal ownership of results, and increase opportunities for implementation.
- Consider building collaborations with social scientists and communication experts to increase societal impact and visibility.
- Strengthen the One Health profile of the Centre. This will also provide a broader societal scope.

Appendices

Evaluation of Life Sciences in Norway 2022-2024

Evaluation of Medicine and Health 2023-2024

Mandate Expert panels

The Research Council of Norway (RCN) is given the task by the Ministry of Education and Research to perform subject-specific evaluations. The Portfolio board for Life Sciences in the Research Council of Norway has decided to carry out an evaluation of medicine and health in 2023-2024 as the second of two evaluations within Life Sciences. The evaluation of biosciences takes place in 2022-2023.

1. The objective of the evaluation

The primary aim of the evaluation of Life Sciences is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), by the institute sector and by health trusts.

The results of the evaluation will be used as recommendations to the institutions, the Research Council, and the ministries.

2. Tasks of the expert panels

The panels are requested to:

- evaluate the strategy, resources and organisation of/for the research groups.
- evaluate research production and quality of the research groups.
- grade and write a short evaluation text to the evaluated research groups.

Each of the expert panels will write a brief report with evaluations of the different research groups as well as specific recommendations.

3. Time schedule

Digital panel meetings will take place in the period March 15. - June 15. 2024.

Deadline for submitting panel report to the Research Council: June 15. 2024.

4. Miscellaneous

Other important aspects of Norwegian life sciences research that ought to be given consideration.

EVALMEDHELSE 2023-2024 – Panel group description – January 2024

Panel group	Description	Panel no.
Group 1 PHYSIOLOGY Physiology-related disciplines (human physiology), including corresponding translational research	Anatomy, physiology, embryology, nutritional physiology, pathology, basic odontological research, exercise physiology, neurobiology, toxicology, pharmacology, medicinal chemistry, chemistry, biology, pathology.	Panel 1a Panel 1b
Group 2 MOLECULAR BIOLOGY Molecular Biology, including corresponding translational research	Microbiology, bacteriology, inflammation and infection disease research, forensic medicine, genetics, immunology, vaccine development, microbiological diagnostics, pharmaceutical microbiology, cell biology, molecular medicine and -biophysics, medical biochemistry, omics, organoids, imaging, toxicology, pathology, drug development, cancer research, translational research, systems biology, personalized medicine, biomarkers, oncology, genetics, genomics, epigenetics, proteomics, bioinformatics-/statistics, computational science, AI, biology, virology, radiology, ionisation, molecular biology, microbiology, pharmacology, pharmacogenomics, regenerative medicine and related subjects.	Panel 2a Panel 2b Panel 2c
Group 3a CLINICAL RESEARCH	Clinical Research, including surgery and translational research within: paediatrics, women's health, gynaecology, otorhinolaryngology, head and neck surgery, oncology, haematology, radiology and medical imaging.	Panel 3a_1 Panel 3b_2
Group 3b CLINICAL RESEARCH	Clinical Research, including surgery and translational research within: general medicine, emergency medicine, anaesthesiology, neurology, geriatric medicine, rehabilitation medicine, cardiology, nephrology/urology, endocrinology, pulmonary medicine, orthopaedics, rheumatology, Infection, gastroenterology.	Panel 3b_1 Panel 3b_2 Panel 3b_3
Group 4 PUBLIC HEALTH Public Health and Health-related Research	Public health, community research, epidemiology, preventive medicine, mental health, behavioural research and ethics, medical statistics, environment, nutrition, preventive medicine, physiotherapy, sports medicine, implementation research, public health, health care services research, global health, nursing	Panel 4a Panel 4b Panel 4c

	sciences, rehabilitation sciences, public health systems, digital health care services, ICT, HTA, health competence, genetic and epigenetic epidemiology, non-communicable diseases, pharmacology, nursing research, professional research, occupational medicine.	Panel 4d Panel 4e Panel 4f
Group 5 PSYCHOLOGY Psychology and Psychiatry	Clinical psychology, personality psychology, developmental psychology, cognitive psychology, biological psychology and forensic psychology, psychiatry, including geriatric psychiatry, child and adolescent psychiatry and biological psychiatry, social-, community- and workplace psychology, organizational psychology, developmental psychology, behavioural and health psychology, health promotion and well-being.	Panel 5a Panel 5b

Panel group 4 PUBLIC HEALTH

Expert panel 4b

Name	Title	Institution
Marianne van der Sande (chair)	Professor	Institute of Tropical Medicine Antwerp
Baukje de Roos	Professor	University of Aberdeen
Lars Rylander	Professor	Lund University
Anders Stålmán	Docent	Karolinska Institutet

Baukje de Roos had a conflict of interest with the evaluation of the Department of Nutritional epidemiology at the University of Oslo (report 13) and Lars Rylander had a conflict of interest with the Department of Food Safety (KMMT) at the Norwegian Institute of Public Health (report 1). This meant that for those evaluations they did not have access to the self assessments or survey data and they did not participate in the discussion of the research group, nor did they participate in the preparation and completion of the evaluation report.



Evaluation of Medicine and Health (EVALMEDHELSE) 2023-2024

Self-assessment for research groups

Date of dispatch: **15. September 2023**
Deadline for submission: **31. January 2024**

Updated: **13. October 2023**

Institution (name and short name): _____

Administrative unit (name and short name): _____

Research group (name and short name): _____

Date: _____

Contact person: _____

Contact details (email): _____

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Introduction

The primary aim of the evaluation is to reveal and confirm the quality and the relevance of research performed at Norwegian Higher Education Institutions (HEIs), the institute sector and the health trusts. These institutions will henceforth be collectively referred to as research performing organisations (RPOs). The evaluation report(s) will provide a set of recommendations to the RPOs, the Research Council of Norway (RCN) and the responsible and concerned ministries. The results of the evaluation will also be disseminated for the benefit of potential students, users of research and society at large.

You have been invited to complete this self-assessment as a research group. The self-assessment contains questions regarding the group's research- and innovation related activities and developments over the years 2012-2022. All submitted data will be evaluated by expert panels.

Deadline for submitting the self- assessment to your administrative unit – 26 January 2024

The administrative unit will submit the research groups' completed self-assessments and the administrative unit's own completed self-assessment to the Research Council within 31 January 2024. Please submit completed self- assessment to the administrative unit no later than 26 January 2024.

Please use the following format when naming your document: [short name of the institution]_[short name of the administrative unit]_[short name of the research group], e.g. *UiT_DepPsy_Short name of the research group*.

For questions concerning the self-assessment or EVALMEDHELSE in general, please contact RCN at evalmedhelse@forskningsradet.no.

Thank you!

Guidelines for completing the self-assessment

- Please read the entire self-assessment document before answering.
- The evaluation language is English.
- Please link to websites/documents in the self-assessment where relevant.
- Please be sure that all documents linked to in the self- assessment are written in English and are accessible.
- The page format must be A4 with 2 cm margins, single spacing and Calibri and 11-point font.
- The self-assessment follows the same structure as the [evaluation protocol](#). In order to be evaluated on the two evaluation criteria described in the evaluation protocol, the research group must answer all questions.
 - ⇒ Provide information – provide documents and other relevant data or figures about the research group, for example strategy and other planning documents, as well as data on R&D expenditure, sources of income and results and outcomes of research
 - ⇒ Describe – explain and present using contextual information about the research group and inform the reader about the research group.
 - ⇒ Reflect – comment in a reflective and evaluative manner how the research group operates.
- Data on personnel should refer to data reported to DBH on 1 October 2022 for HEIs and to the yearly reporting for 2022 for the institute sector and the health authorities. Other data should refer to 31 December 2022 if not specified otherwise.
- It is possible to extend the textboxes when filling in the form. **NB!** A completed self- assessment form cannot exceed 25 pages (pdf file). Expert panels are not requested to read more than the maximum of 25 pages. Pages exceeding maximum limit of 25 pages **might not** be evaluated.
- Submit the self- assessment as a pdf (max 25 pages) to the administrative unit within **26 January 2024**. Before submission, please be sure that all text are readable after the conversion of the document to pdf. The self- assessment should be sent from the administrative unit to evalmedhelse@forskningsradet.no within **31 January 2024**.

Please note that information you write in the self assessment and the links to documents/websites in the self-assessment are the only available information for the expert panel.

In exceptional cases, documents/publications that are not openly available must be submitted as attachment(s) to the self- assessment (pdf file(s)).

1. Organisation and strategy

1.1 Research group's organisation

Describe the establishment and the development of the research group, including its leadership (e.g. centralised or distributed etc.), researcher roles (e.g. technical staff, PhD, post docs, junior positions, senior positions or other researcher positions), the group's role in researcher training, mobility and how research is organised (e.g. core funding organisation versus project based organisation etc.).

Table 1. List of number of personnel by categories

Instructions: Please provide number of your personnel by categories.

For institutions in the higher education sector, please use the categories used in DBH, <https://dbh.hkdir.no/datainnhold/kodeverk/stillingskoder>. Please add new lines or delete lines which are not in use.

	Position by category	No. of researcher per category	Share of women per category (%)	No. of researchers who are part of multiple (other) research groups at the admin unit	No. of temporary positions
No. of Personnel by position	Position A (Fill in)				
	Position B (Fill in)				
	Position C (Fill in)				
	Position D (Fill in)				

1.2 Research group's strategy

a) Describe the research group's main goals, objectives and strategies to obtain these (e.g. funding, plans for recruitment, internationalization etc.) within the period 2012-2022.

b) Please describe the benchmark of the research group. The benchmark for the research group should be written by the administrative unit in collaboration with the research group. The benchmark can be a reference to an academic level of performance (national or international) or to the group's contributions to other institutional or sectoral purposes.

Example: A benchmark for a research group is related to the research groups' aim which again is included in the strategy for the administrative unit. A guidance for the administrative unit to set a benchmark for the research group(s) can e.g. be: What do the administrative unit expect from the research group(s)?

c) Describe the research group's contribution to education (master's degree and/or PhD).

d) Describe the support the host institution provides to the research group (i.e., research infrastructure, access to databases, administrative support etc.).

1.3 Relevance to the institutions

Describe the role of the research group within the administrative unit. Consider the research group's contribution towards the institutional strategies and objectives, and relate the research group's benchmark to these.

1.4 Research group's resources

Describe the funding portfolio of the research group for the last five years (2018-2022).

Table 2. Describe the sources of R&D funding for the research group in the period 2018-2022.

	2018 (NOK)	2019 (NOK)	2020 (NOK)	2021 (NOK)	2022 (NOK)
Basic funding					
Funding from industry and other private sector sources					
Commissioned research for public sector					
Research Council of Norway					
Grant funding from other national sources					
International funding e.g. NIH, NSF, EU framework programmes					
Other					

1.5 Research group's infrastructures

Research infrastructures are facilities that provide resources and services for the research communities to conduct research and foster innovation in their fields. [These](#) include major equipment or sets of instruments, knowledge-related facilities such as collections, archives or scientific data infrastructures, computing systems communication networks. Include both internal and external infrastructures.

- Describe which national infrastructures the research group manages or co-manages.
- Describe the most important research infrastructures used by the research group.

1.6 Research group's cooperations

Table 3. Reflect on the current interactions of the research group with other disciplines, non-academic stakeholders and the potential importance of these for the research (e.g. informing research questions, access to competence, data and infrastructure, broadening the perspectives, short/long-term relations).

Interdisciplinary (within and beyond the group)	About 1/3 page
Collaboration with other research sectors e.g. higher education, research institutes, health trusts and industry.	About 1/3 page
<u>Transdisciplinary</u> (including non academic stakeholders) <i>Transdisciplinary research involves the integration of knowledge from different science disciplines and (non-academic) stakeholder communities with the aim to help address complex societal challenges.</i>	About 1/3 page

2. Research quality

2.1 Research group's scientific quality

Describe the research profile of the research group and the activities that contribute to the research group's scientific quality. Consider how the research group's work contributes to the wider research within the research group's field nationally and internationally.

Please add a link to the research group's website:

Short version

Table 4. List of projects

Instructions: Please select 5-10 projects you consider to be representative/the best of the work in the period 1 January 2012 – 31 December 2022. The list may include projects lead by other institutions nationally or internationally. Please delete tables that are not used.

Project 1 -10: <i>Project title/Project period (year from – year to)</i>	Project owner(s) (project leaders organisation)	
	Total budget and share allocated to research group	
	Objectives and outcomes (planned or actual) and link to website	

Table 5. Research group's contribution to publications

Instructions: Please select 5-15 publications from the last 5 years (2018-2022) with emphasis on recent publications where group members have a significant role. **If the publication is not openly available, it should be submitted as a pdf file attached to the self-assessment.** We invite you to refer to the Contributor Roles Taxonomy in your description: <https://credit.niso.org/>.

Cf. Table 1. List of personell by categories: Research groups up to 15 group members: 5 publications. Research groups up to 30 group members: 10 publications. Research groups above 30 group members: 15 publications.

Please delete tables that are not used.

Publication 1 -15: <i>Project title/Journal/Year/DOI/URL</i>	Authors (Please highlight group members)	
	Short description	
	Research group's contribution	

Table 6. Please add a list with the research group's monographs/scientific books.

Please delete lines which are not used.

1	Title - Authors (Please highlight group members)- link to webpage (if possible)
2	

2.2 Research group's societal contribution

Describe the societal impact of the research group's research. Consider contribution to education, economic, societal and cultural development in Norway and internationally.

Table 7. The research group's societal contribution, including user-oriented publications, products (including patents, software or process innovations

Instructions: Please select 5–10 of your most important user-oriented publications or other products from the last 5–10 years with emphasis on recent publications/products. For each item, please use the following formatting. Please delete lines which are not used.

3. Challenges and opportunities

Information about the strengths and weaknesses of the research group is obtained through the questions above. In this chapter, please reflect on what might be the challenges and opportunities for developing and strengthening the research and the position of the research group.

Short version

Scales for research group assessment

Organisational dimension

Score	Organisational environment
5	An organisational environment that is outstanding for supporting the production of excellent research.
4	An organisational environment that is very strong for supporting the production of excellent research.
3	An organisational environment that is adequate for supporting the production of excellent research.
2	An organisational environment that is modest for supporting the production of excellent research.
1	An organisational environment that is not supportive for the production of excellent research.

Quality dimension

Score	Research and publication quality	Score	Research group's contribution Groups were invited to refer to the Contributor Roles Taxonomy in their description https://credit.niso.org/
5	Quality that is outstanding in terms of originality, significance and rigour.	5	The group has played an outstanding role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
4	Quality that is internationally excellent in terms of originality, significance and rigour but which falls short of the highest standards of excellence.	4	The group has played a very considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
3	Quality that is recognised internationally in terms of originality, significance and rigour.	3	The group has a considerable role in the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
2	Quality that meets the published definition of research for the purposes of this assessment.	2	The group has modest contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.
1	Quality that falls below the published definition of research for the purposes of this assessment.	1	The group or a group member is credited in the publication, but there is little or no evidence of contributions to the research process from the formulation of overarching research goals and aims via research activities to the preparation of the publication.

Societal impact dimension

Score	Research group's societal contribution, taking into consideration the resources available to the group	Score	User involvement
5	The group has contributed extensively to economic, societal and/or cultural development in Norway and/or internationally.	5	Societal partner involvement is outstanding – partners have had an important role in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
4	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is very considerable given what is expected from groups in the same research field.	4	Societal partners have very considerable involvement in all parts of the research process, from problem formulation to the publication and/or process or product innovation.
3	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is on par with what is expected from groups in the same research field.	3	Societal partners have considerable involvement in the research process, from problem formulation to the publication and/or process or product innovation.
2	The group's contribution to economic, societal and/or cultural development in Norway and/or internationally is modest given what is expected from groups in the same research field.	2	Societal partners have a modest part in the research process, from problem formulation to the publication and/or process or product innovation.
1	There is little documentation of contributions from the group to economic, societal and/or cultural development in Norway and/or internationally.	1	There is little documentation of societal partners' participation in the research process, from problem formulation to the publication and/or process or product innovation.

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