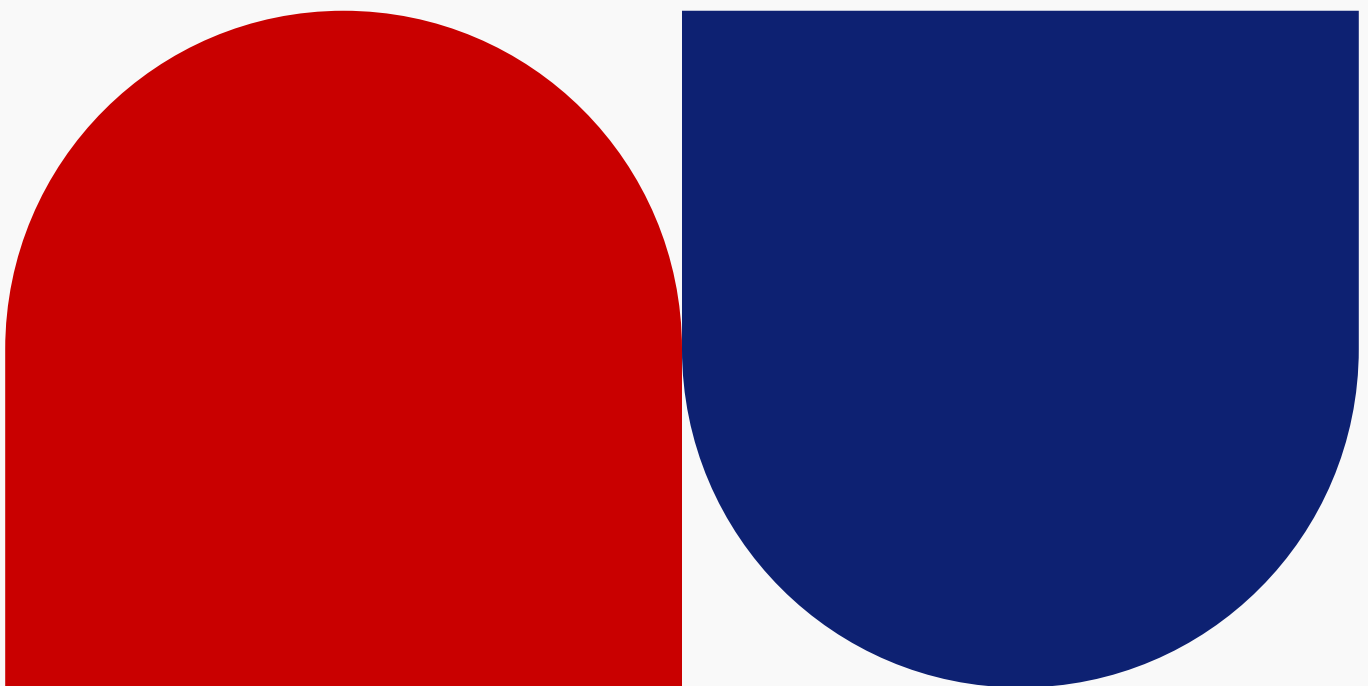


Appendix to evaluation of the quality of the clinical research at the regions included in the ALF agreement

*(Appendix till Utvärdering av den kliniska
forskningens kvalitet vid de regioner som omfattas
av ALF-avtalet)*

Panel reports



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Panel reports

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1 Evaluation of the quality of the clinical research at the regions included in the ALF agreement

The Swedish Research Council is a government agency within the Ministry of Education and Research. The Swedish Research Council funds research and research infrastructure in all scientific disciplines, advises the Government on research policy issues, and works to increase understanding of the long-term societal benefits of research.

The Swedish Government has commissioned the Swedish Research Council to evaluate the quality of the clinical research conducted by the regions that are part of the ALF agreement.

The evaluation report consists of two parts. The first part, the report, is written in Swedish and describes the background and starting points, followed by a summary of the overall results and the Swedish Research Council's decision on the quality of clinical research in the seven ALF regions.

Part two, the appendix, is written in English and begins with a brief description of the ALF agreement and the evaluations in general. This is followed by the three expert panels' reports, as well as a reflection on Swedish clinical research from a national perspective, made by the three expert panel chairs. The panel reports show the justifications for the categorisation of the ALF regions and good examples are highlighted. In addition, the panel reports contain identified areas of development as well as recommendations for improvements.

1.1 The ALF agreement

ALF is the Swedish acronym for an agreement between the Swedish Government and seven regions¹. Through the ALF agreement, the parties have agreed to jointly promote the development of healthcare through cooperation in education, research and development ([U2014/07551/F National ALF agreement \(pdf, swedish\)](#)). The ALF agreement is complemented by regional agreements between the regions and the seven Swedish universities with a medical faculty. The regional agreements regulate the shared commitment and responsibilities of the regions and the universities regarding education, clinical research activities and development of health and medical care.

According to the ALF agreement, each region and affiliated university shall form a joint ALF management body, where the region and university are represented and operate on equal terms. The joint ALF management body shall address issues of principal importance to both university healthcare and the

¹ Sweden has 21 self-governing regional authorities known as "regions" (Swedish: region). Until 2019, they were known as "county councils" (Swedish: landsting).

training of physicians and clinical research. The region and the affiliated university are jointly referred to as an ALF region (see table 9).

The ALF agreement was renewed in 2015, when Region Örebro County was included. Before 2015, there were only six regions included in the agreement. The seven regions included in the current ALF agreement and the affiliated universities are listed in Table 9.

Table 9. The seven ALF regions

ALF region	Region	University
Stockholm	Region Stockholm	Karolinska Institutet
Västra Götaland	Region Västra Götaland	University of Gothenburg
Skåne	Region Skåne	Lund University
Uppsala	Region Uppsala	Uppsala University
Västerbotten	Region Västerbotten	Umeå University
Östergötland	Region Östergötland	Linköping University
Örebro	Region Örebro County	Örebro University

The ALF agreement also regulates the financial compensation, known as "ALF funding", from the Government to the regions for participating in the education of physicians/medical doctors, for conducting clinical research and for developing health and medical care. In 2021, the total amount of ALF funding was approximately 2.6 billion Swedish Krona of which ALF funding for clinical research was 1.9 billion Swedish Krona (approximately 180 million EURO) (source: Swedish Higher Education Authority, UKÄ). Table 10 shows the total amount of ALF funding for clinical research during the evaluation period 2017-2020.

In addition to the ALF funding, clinical research is financed by several other sources, such as direct government funding, funding from government agencies (including research councils), private non-profit organisations and EU funding. The regions also invest part of their budgets in clinical research. This includes financing of equipment and other facilities that are used for both clinical and research purposes, as well as financing of different research projects, including salaries for research staff.

Table 10. Total ALF funding for clinical research during the evaluation period 2017-2020 per university (million Swedish Krona)

University	Total funding (million Krona)	Share (%)
Karolinska Institutet	2 084	27
University of Gothenburg	1 623	21
Lund University	1 397	18
Uppsala University	858	11
Umeå University	831	11
Linköping University	597	8
Örebro University	236	3

Note: The compensation is paid to the regions via the universities, therefore, the universities are listed in the statistics. ALF funding is presented as constant prices (2020). Source: Swedish Higher Education Authority (UKÄ).

1.2 Evaluation of clinical research

The current ALF agreement, which came into effect in 2015, includes a new quality-based model for allocating the ALF funding for clinical research. This model entails that as from 2019, 20% of the ALF funding will be allocated based on the results of an evaluation of the quality of the clinical research. Accordingly, the results of the evaluations will be used for allocating 20% of the ALF funding (the "allocation pool").

Another purpose of the evaluation is to identify and promote ALF regions that may serve as role models for the other ALF regions, in order to enhance the overall quality of clinical research in Sweden.

According to the ALF agreement, clinical research is defined as research that requires access to the structures and resources of the health services, and for which the aim is to solve a health problem, or identify factors that lead to improved health.

The region and the affiliated university in each ALF region have shared responsibility for the clinical research and are therefore jointly evaluated. The evaluation does not differentiate between ALF funded clinical research and clinical research funded in other ways, as it is very difficult to identify and distinguish research that is fully or partially funded with ALF funds. In addition, the ALF regions can use ALF funds for joint strategic investments in infrastructures and services, for example, which makes it difficult to link the ALF funds to specific research projects. All clinical research conducted by one

or both parties in an ALF region, regardless of funding, has therefore been included in the evaluation.

This is the second time that the Swedish Government has commissioned the Swedish Research Council to evaluate the quality of the clinical research conducted by the regions that are part of the ALF agreement. The first evaluation of the quality of clinical research was carried out in 2017-2018. The results of the first evaluation, which can be read in the report from 2018 ([VR1804 \(pdf\)](#)), showed that Swedish clinical research was generally of high quality. All ALF regions demonstrated strengths in various research areas, and the quality registers and biobanks were highlighted by the expert panels as important prerequisites for clinical research in Sweden. The panels also noted that some areas of research were strong in several ALF regions, and that these ALF regions appeared to compete rather than collaborate. The panels' conclusion was that Swedish clinical research would benefit from more and greater national collaborations.

The content of the ALF evaluation is decided by the Swedish Research Council, based on guiding principles formulated by the National ALF Steering Committee². Accordingly, three international expert panels were appointed to perform the evaluations:

- ALF Panel 1: evaluation of the quality of the scientific output
- ALF Panel 2: evaluation of the clinical significance and societal impact of the clinical research
- ALF Panel 3: evaluation of the prerequisites for clinical research.

According to the National ALF Steering Committee, the results of the evaluations should be weighted, so that the results from ALF Panel 1 accounts for the distribution of 50% of the allocation pool, and the results from ALF Panels 2 and 3 each account for the allocation of 25% of the allocation pool. Each panel should provide an overall assessment and group each ALF region into one of three categories.

Inferior quality

ALF regions are only expected to be placed in this category in exceptional cases. This category is used if the evaluation of the collected documentation indicates an inferior performance in relation to the share of allocated ALF funding, and/or the ALF region in question has failed to fully contribute to the evaluation (for example by producing an inferior/non-assessable self-evaluation or otherwise delivering incomplete data, etc.). Any ALF region that ends up in this category will not be included in the panel's allocation pool.

² According to the ALF agreement, Section 15, a national ALF steering committee shall be formed. The steering committee shall consist of a maximum of 14 members, of which the regions shall appoint a maximum of seven and the Swedish Government shall appoint a maximum of seven. The chairmanship shall alternate between the regions and the state. The steering committee shall monitor the application of the ALF agreement and, if necessary, propose adjustments to the agreement.

Good–high quality

A majority of the ALF regions are expected to be placed in this category. This category is used if the evaluation of the collected documentation indicates a performance at a level that is to be expected based on the share of allocated ALF funding. The ALF regions in this category are guaranteed allocation of funds from the panel's allocation pool.

Very high quality

This category is used for the ALF regions that have performed better than expected, based on the share of allocated ALF funding. According to the National ALF Steering Committee, this category should consist of the 1–3 ALF regions that excel and set a national example within each panel's area. These ALF regions receive a premium of a larger share of the allocation pool than the ALF regions placed in category 2.

2 Chairs' report

After the expert panels had completed their respective reports, the three panel chairmen made a joint reflection on Swedish clinical research and the national development since the last evaluation. In this reflection, their observations of both good examples and areas of development, from a national perspective, are highlighted. Below is the chairs' report followed by executive summaries of the three panel reports.

2.1 Assessment of the overall Swedish clinical research landscape

The chairs of all three panels were unanimous in their view that Sweden has a highly productive clinical research environment, which supports the production of internationally excellent outputs and creates impact of both national and international relevance. This was evident both in terms of the resultant public health benefits and through knowledge exchange activities.

The majority of internationally excellent clinical research was either undertaken directly by, or through collaboration with, medically qualified professionals, but there was also very high quality pre-clinical research and research of a high standard arising from other healthcare professionals. Within the medically qualified group, the majority of the best research came from academic hospital centres. There was a relative lack of excellent population-based primary care research, and this is an area that could be further developed.

2.2 Use of ALF funding within the regions

Whilst there are multiple funding sources which support the research environment, all the regions considered ALF funding to be extremely important in facilitating the creation of the regional research environment. Funding was used to support different needs, including core physical infrastructure, researcher salaries, support services such as Biobanking and cohort development, teaching of clinical research methods and for specific research projects. The chairs believe that without the ALF funding, there would be significantly less clinical research undertaken in Sweden.

Although the views of all three panels were very positive in terms of the overall strengths of Swedish clinical research supported at least in part by ALF funding, there appeared to be quite a lot of variability in the ways in which regions used ALF funding. We have therefore identified some areas where additional focus might strengthen even further the research environment. These are considered in more detail in the individual panel reports, but are briefly summarised here.

Collaboration

All three panels examined the extent to which collaborative working, both within the ALF region and more widely, contributed to clinical research delivery. Whilst there were excellent examples of both national and international collaboration evident to all three panels, a substantial proportion of research was organised at a regional or local level. Better national coordination of research would be expected to result in faster delivery of clinical trials and other research initiatives. Examples were presented where national collaboration had been successful, for example in biobanking and in Genomic Medicine Sweden, but the panels thought more could be done to support collaborative working of this nature. The extent to which ALF regions exploit the data from the outstanding Swedish National Quality Registries varies by ALF region. As demonstrated by some of the research reviewed by the panels, these registries can work alongside randomised trials and provide a robust context to facilitate registry-based randomisation into clinical trials. ALF Panel 1 also noted that there were areas of research strength, as evidenced by the bibliometric data, that were not represented among the submitted manuscripts. One example was the relative lack of submitted research work in preventive medicine. ALF Panel 3 also noted the relative lack of national and international mobility amongst researchers.

One specific issue for research participants, as opposed to researchers themselves, is the lack of ALF funding (or equivalent funding streams) in some regions in Sweden. Whilst collaborations exist with other ALF-funded regions in some of these regions, there are parts of the country where research support is not funded to the same extent. The consequence of this is that patients in these regions are potentially less able to participate in clinical research. There is reasonable evidence that participation in clinical research improves clinical outcomes, and increasing the extent of collaborations between ALF-funded and non-funded regions would be worth exploring further.

The ALF Panels did not have access to the extent of additional non-ALF funding, including peer-reviewed research funding, by ALF region. The total of peer-reviewed funding is an indicator of research strength. In the future, the ALF Panels call for presentation of total research funding to each ALF region. Without this denominator, caution must be applied to the evaluation of research publications and citations relative to ALF funding, as non-ALF funding is likely to make a substantial contribution to overall research activity in ALF regions.

Finance and governance

One issue raised by ALF Panel 3 is that it is difficult to follow how ALF funding is used within the regions. Whilst at national level the panels had no concerns that ALF funding provides anything other than excellent value for money in terms of the investments made, at regional level little detail was available. There were different allocation models within each ALF region, varying from centralised to highly devolved, and the proportion of funding used to support different aspects of research infrastructure (e.g. support for maintenance of core facilities, support for healthcare professionals in PhD programmes, support for mid-career or senior investigators) appeared to vary between ALF regions. This

created a challenge in fully assessing the ‘value for money’ aspect of the funding allocation. However, the panels felt any monitoring of allocation of funding within the ALF regions should be high at level, to ensure funding and staff time is not diverted away from research delivery.

Equality and diversity

The ALF regions all paid close attention to trying to achieve gender balance in the support for positions funded by ALF. In general, this has been achieved except for the most senior group of investigators. Far less attention has been paid to ensuring cultural diversity is fully supported within research environments, or to encourage participation by those with other protected characteristics, and this is an area deserving attention. This is required not only for researchers but also for research participants to ensure findings from clinical research are truly representative for the general population in Sweden. As an example, research material should be made available in a range of languages relevant to a region rather than just in Swedish to encourage broad participation.

2.3 COVID-19 reflection

Since 2020 the COVID-19 pandemic has obviously created challenges in delivering clinical research, but the panels were pleased to observe that most non-COVID research had rapidly recovered to pre-pandemic levels. Based on a review of the bibliometric data and the share of the world top 10% and 1% citations, these metrics were only slightly below those of the last ALF report, despite the COVID pandemic. The ALF regions commented that the increased flexibility in the way in which ALF funding could be used during the pandemic was particularly helpful to facilitate continued activity. Sweden also produced internationally important research on COVID-19 itself, in part because of the existence of a strong clinical research environment, which could rapidly be refocussed to address the challenges of the pandemic.

2.4 Panel chairs’ reflections on the evaluation process

The method and content of the ALF evaluation are based on principles formulated by the National ALF Steering Committee. The panels were provided with guidance regarding how each panel should operate by the Swedish Research Council. Support for the panels from the Swedish Research Council was excellent. The ALF regions engaged constructively in the process, and the self-evaluations provided by the regions were of generally higher standard than those provided in 2018.

The use of a 3-grade scoring system, with restrictions on the number of ALF regions to be placed in the top grade, made the work of grading by the panels quite challenging. There had been significant improvements made to the clinical research environment since the last evaluation, and the panels would have found it easier to grade differences between ALF regions if there had been more granularity in the scoring system. As a consequence, all panels noted there was a wide spread of competency in the good–high grade, with some regions being on

the brink of very high quality and others being substantially lower in the grade in each panel domain. One potential solution would be to use a 4-grade scoring system.

The panels worked entirely independently during the assessment phase, which could have created a challenge in producing a high-level overview. One specific issue is that one would expect excellent research infrastructure to underpin excellent outputs and impact. However, there is a time lag between creating the research environment and delivery of outputs and impact, and hence one would not necessarily expect the ALF region making the best use of available research infrastructure to produce the highest impact or best research outputs before these innovations have had sufficient time to enhance the research environment. In addition, because the panels were evaluating the way in which the available ALF funding was utilised, rather than the extent of the research portfolio, ALF regions with larger allocations of ALF funding would not automatically be expected to score highest in all domains.

2.5 Summary

Overall, the chairs were impressed by the strength of clinical research in Sweden based on evaluation of outputs, impact and the underpinning research infrastructure.

2.6 Panel executive summaries

2.6.1 ALF Panel 1

The evaluations from panel 1 show that Swedish clinical research is generally of high quality and in some areas the research can be classified as internationally competitive or internationally leading. All ALF regions show strengths in research areas reflecting scientific and clinical expertise in those ALF regions, and the strengths are demonstrated in the publications selected for submission to panel 1 and in general, in the bibliometric analyses. Panel 1 employed volume-independent indices to analyse the bibliometric data so that smaller regions would not be disadvantaged.

Three ALF regions, Stockholm, Västra Götaland and Uppsala, were judged by panel 1 to be in the very high quality category based on the submitted publications and the bibliometric analysis. The remaining four regions were judged to be of good–high quality and none were graded inferior quality. However, the current grading system did not allow differentiation of those ALF regions in the upper half of the good–high classification from those in the lower half. In the future, a 4-grade system (splitting good–high) might allow more accurate representation of the evaluations.

Importantly, there were research publications from all ALF regions judged to be nationally or internationally leading. Research strengths focussed around different topic areas by ALF regions and there is the potential for further

enhancement and greater impact of the research outputs through appropriate collaborations with leading research groups nationally and internationally.

In the future ALF evaluations, consideration needs to be given to recording all research funding to each ALF region so that the scientific outputs can be judged in relation to total funding.

Consideration also needs to be given to ensure that research publications reflect research conducted in the region. ALF Panel 1 noted that for some of the publications it was not clear that the research activity was conducted within the ALF region. For example, in several publications the only connection between the research work and the ALF region was that the lead author had one of several affiliations to an institution in the ALF region but he/she was not located in that ALF region.

In summary, ALF Panel 1 identified outstanding research among the publications from the seven ALF regions. There is the potential to further enhance the world leading research expertise in specific areas and to further raise Sweden's clinical research profile more widely.

2.6.2 ALF Panel 2

Overall, panel 2 noted that Sweden is efficiently using results from high quality clinical research. All ALF regions presented explicit strategies towards clinical and public health impact and the regional strategies were linked to national strategies as well as infrastructures, such as the national system for knowledge management, Genomic Medicine Sweden (GMS), Biobank Sweden, the national organisation of the quality registries and the national organisation Clinical Studies Sweden. ALF region Uppsala was judged to be in the very high quality category, whereas all the six remaining ALF regions were deemed to be of good-high quality.

Regional health technology assessment (HTA) units and Cochrane collaboration units had been implemented largely by all ALF regions and they served best evidence to clinical practice. All regional health technology units were members of the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU), which contributes to national guidelines of clinical practice.

Panel 2 noted that all ALF regions reported comprehensive clinical research methods training in medical programmes, but diversity in other health programmes prevailed. Student projects were considered as a pathway for further research interests and entry to a doctoral programme. ALF funds were commonly used to support student projects and supervision, which was considered an investment for future clinical research.

All the ALF regions presented a strategic, structured and planned pathway towards innovation and life science development, but the innovation and business environments differed greatly between ALF regions. For example, ALF regions Stockholm and Uppsala presented fast growth in the area of innovation

and life science based on dynamic companies and start-ups. In ALF region Skåne, the cross-border collaboration with the Greater Copenhagen region creates the largest life science cluster in northern Europe.

Finally, there was a wealth of excellent case studies demonstrating the link between high quality clinical research and its impacts on healthcare and public health.

In summary, ALF Panel 2 found that ALF regions applied the high quality clinical research results and the presence of national quality registries for the benefit of healthcare and public health in Sweden.

2.6.3 ALF Panel 3

In 2018, the evaluation panel noted there were many key strengths in research infrastructures in Sweden. These included excellent physical infrastructure, a generally collaborative working environment within each ALF region, internationally important cohorts, and the added value from the ALF funding stream in maintaining infrastructure and building capacity through academic training.

Some areas of weakness were also identified in 2018, including variation at regional level in the way in which ALF funding was used, the need for better national coordination (as opposed to regional coordination), the need to drive up research in the primary care sector, and the relative lack of international mobility of researchers.

In 2022, the panel considered that, despite the COVID-19 pandemic, the areas of strength continued to be present. Significant progress had been made to address the areas of weakness noted in 2018, but some further progress on these is required to fully take advantage of Sweden's otherwise excellent infrastructure. Nonetheless, the panel was impressed by the overall standard of the research infrastructure in Sweden, and also by the significant improvements which had been made in many regions based on the feedback from the 2018 evaluation. The overall extent of improvement in the regions therefore created a challenge for the panel in scoring regions in the current evaluation. The panel were unanimous in rating the ALF regions Västra Götaland and Västerbotten as very high quality. The other regions were all scored as good–high quality. ALF region Skåne was awarded a lower grade compared to the previous evaluation. This should not, however, be interpreted as a decline in the research environment within the region. The main reason for this decision was that even though ALF region Skåne still performs at a very high level, other regions had improved to such an extent that it was not possible to distinguish between them and Skåne in the level of performance, based on evaluating the use made of the allocated ALF funding to support research infrastructure.

3 Evaluation of the quality of the scientific output - Panel 1

The starting points for the evaluation of the scientific output have been formulated by the National ALF Steering Committee. In accordance with these, the evaluation was conducted by a panel of international experts. Accordingly, the international expert panel shall assess the overarching quality and extent of the scientific output, and the scientific profile in terms of clinical relevance and quality, of the ALF regions. More specifically, the scientific profile, in terms of clinical relevance and quality, shall be assessed by means of peer review of a sample of the top scientific publications provided by each ALF region. The assessment of the overarching quality and extent of scientific output shall be based on bibliometrics. The two components shall be equally weighted (50/50) in the joint overall assessment of each ALF region

Based on these assessments, the panel was asked to sort the ALF regions into one of three categories (inferior quality, good–high quality, or very high quality).

3.1 The expert panel

An international expert panel and external reviewers were appointed by the Swedish Research Council, based on nominations from the ALF regions and from councils and committees within the Swedish Research Council. The following criteria were taken into consideration for the compilation of panel members and external reviewers: experience of evaluation work; a broad range of clinical research disciplines; gender balance; and geographical spread.

Professor Keith Fox from the University of Edinburgh was appointed panel chair, and, in total, the panel consisted of 11 internationally renowned experts in relevant areas of research (Table 11). For the peer review process of assessing publications, an additional 45 external reviewers were involved. All panel members and external reviewers have ensured that they have no conflict of interest when participating in the evaluation.

Table 11. The expert panel.

Name	Organisation	Country	Main area of expertise
Keith Fox (chair)	University of Edinburgh	UK	Cardiac & Cardiovascular Systems

Name	Organisation	Country	Main area of expertise
Peter Tyrer	Imperial College London	UK	Psychiatry
Per Ole Iversen	University of Oslo	Norway	Haematology & Nutrition
Jan Frystyk	Odense University Hospital	Denmark	Endocrinology
Per Bakke	University of Bergen	Norway	Respiratory System
Gerd Burmester	Charité University Hospital	Germany	Rheumatology
Helle Prætorius Øhrwald	Aarhus University	Denmark	Urology & Nephrology
Mary O'Brien	Royal Marsden NHS Foundation Trust	UK	Oncology
Tone Tønjum	University of Oslo	Norway	Infectious Diseases
Inga Zerr	University Medicine Goettingen	Germany	Neurology
Karin Rose Sipido	Katholieke Universiteit Leuven	Belgium	Cardiac & Cardiovascular Systems

3.2 Assessment criteria

3.2.1 The scientific profile in terms of clinical relevance and quality

For the assessment of the scientific profile with regard to clinical relevance and quality, the ALF regions were asked to select a number of their top publications published in 2016-2020. In total, 390 publications were included in the evaluation, corresponding to 1% of all health science publications from all the ALF regions published in the time span 2016 to 2020. The number of publications selected by each ALF region was proportional to their share of ALF funding for research for the years 2017-2020 (Table 12). To permit size-independent assessments, the ALF regions were required to demonstrate high quality publications with clinical relevance, in proportion to their share of ALF funding.

Table 12. Number of publications submitted by each ALF region

ALF region	Share of ALF funding 2017-2020 (%)	Number of submitted publications
Stockholm	27	107
Västra Götaland	21	83
Skåne	18	71
Uppsala	11	44
Västerbotten	11	42
Östergötland	8	31
Örebro	3	12

Assessment criteria:

- Scientific quality
- Clinical relevance
- Author contribution

The ALF regions were also asked to send in a description of the selection process to the panel. The description was only intended to explain the process and the selection of publications and not to influence the assessment/grading. The panel could, however, give constructive feedback to the ALF regions on the process.

The ALF regions were provided with guidelines from the Swedish Research Council and were allowed a time period of four months for the selection of publications.

3.2.2 Overarching quality and extent of the scientific output

The overarching quality and extent of the scientific output were assessed based on bibliometric analyses of publications from 2016 to 2020, compiled by the Swedish Research Council. The bibliometric information was based on data from Web of Science (WoS) (Clarivate Analytics), in accordance with the principles of data capture, as decided by the National ALF Steering Committee.

The panel was instructed to consider the following bibliometric indicators for the assessment of each ALF region:

- Volume of publication output
- Number of citations and highly cited publications
- Mean citation rate and share of highly cited publications
- Progress since last evaluation period

All volume indicators were considered in relation to the amount of ALF funding received by each ALF region. Based on each ALF region's bibliometrics, the panel was also expected to comment on how each ALF region prioritises between breadth and cutting-edge research (excellence). However, this should not influence the grading.

3.3 The evaluation process

The documents provided to the expert panel were:

- assessment criteria (also sent to the ALF regions)
- instructions to reviewers
- instructions to the panel
- bibliometrical statistics for the ALF regions.

Additional statistics on collaboration and subject profiles were included in the material as background information. All documents are available upon request from the registry (Swe: registratur) at the Swedish Research Council.

The peer review of the 390 publications was performed by the panel members and the external reviewers. Each publication was assessed by three reviewers with expertise within the field of the publication. The reviewers were instructed to assess and score the publications and to provide explanatory comments on two assessment criteria; scientific quality and clinical relevance. Where the three reviews showed variance in their grading, additional reviews were undertaken by members of ALF Panel 1.

The assessments of the publications, compiled for each ALF region, and the bibliometrics were distributed to the panel in early October 2022.

A video meeting was held on 30 June 2022 to discuss the evaluation process and to prepare for the review tasks of the panel. A face-to-face panel meeting was then held in Stockholm on 25–26 October 2022. During this meeting, the assessment results from reviewers were discussed and the bibliometric data were reported. The categorisation of the ALF regions was completed and a draft of the

panel report was written. The panel members are jointly responsible for the final assessment and the panel report. The discussions and the writing process were led by the chair and guided by representatives of the Swedish Research Council.

The panel report provides explanations for the categorisations and points out the ALF regions that excel, and those from which other ALF regions can learn. In addition, identified areas of development as well as recommendations for improvements are provided for all regions.

3.4 Evaluation results

The evaluation from panel 1 shows that Swedish clinical research is generally of high quality and in some areas the research can be classified as internationally competitive or internationally leading. All ALF regions show strengths in research areas reflecting scientific and clinical expertise in those ALF regions, and the strengths are reflected in the publications selected for submission to panel 1 and in general, in the bibliometric analyses.

In most instances, there was very good agreement in the assessment of publications among the external reviewers and panel members. The reports from panel 1 on individual ALF regions identify subject areas of strength and of excellence, but also potential areas for improvement.

The results show that none of the seven ALF regions was judged to be in the inferior quality-category. The panel maintains that this reflects the quality of publications that were submitted for this ALF evaluation, and the bibliometric analyses, and signifies the strength that exists in Swedish research.

Three ALF regions, Stockholm, Västra Götaland and Uppsala, were judged by the panel to be in the very high quality category. Stockholm and Västra Götaland were judged, based on all publications and bibliometric analyses, to be the leading research regions. Uppsala also met the criteria for very high quality, and Skåne was judged to be only slightly lower in the overall evaluation. The instructions for the evaluation required that no more than three ALF regions be allocated to the top category. The other ALF regions were assessed as being in the good–high quality category.

While they shared the same category, these four ALF regions contained specialist or sub-specialist publications that were assessed to be of very high quality.

However, the current grading system did not allow differentiation of the ALF regions in the upper half of the good–high category from those in the lower half. In the future, a 4-grade system (splitting good–high) may allow more accurate representation of the evaluations.

Table 13. Overall assessment results for the ALF regions

ALF region	Inferior quality	Good–high quality	Very high quality
Stockholm			x
Västra Götaland			x
Skåne		x	
Uppsala			x
Västerbotten		x	
Östergötland		x	
Örebro		x	

3.4.1 Evaluations in context and general comments

The evaluations do show that there is room for further strengthening in all ALF regions and the need for a stronger focus in some regions. From the analyses of the publications, it is clear that the extent of collaborative research among Swedish ALF regions, and internationally, varies substantially by topic area and by ALF region. Across the ALF regions, the publications with international involvement were consistently much more likely to have citations within the top 10% of the world average. The impact of national collaborations does not appear to have a clear impact on this metric, but the panel feels there is the potential to further enhance the scientific outputs through appropriate collaborations with centres of excellence, both nationally and internationally.

The ALF regions were asked to submit publications for evaluation that reflected research within their region. The guidance stated that each publication should have a lead or corresponding author from that ALF region on that publication. If this was not the case, the ALF region was asked to provide comments to justify the inclusion of the paper. In a very small number of publications these criteria were not met, and the panel concluded that the scientific quality score should be downgraded, and this was done. In some publications, the only connection between the paper and the region was a joint appointment of one author. For example, a first author reported four affiliations on their manuscript, but three of these, including the corresponding address, were outside Sweden. Nevertheless, for the purposes of this report, a publication where the main body of the research was conducted outside the ALF region was not downgraded if the first or last or corresponding author had stated a connection with the region (as in the example above). However, for future reports the ALF committee may wish to reflect on the extent to which a partial affiliation of one author to the region appropriately reflects ALF funding, and qualifies a paper for submission as research from that ALF region.

After the first round of panel and external reviews of all the publications, Panel 1 undertook face-to-face discussions on all the publications where there was variance among the scores of the reviewers for some of the publications. This detailed review revealed that, in some instances, the original reviewers had given lower scores where they had concerns about the extent to which the research was conducted by researchers within the ALF region.

Panel 1 also examined the extent of change in bibliometric indices by ALF region compared with the assessment performed for the period 2012-2015. Importantly, the panel did not simply examine volume-dependent indices, but it carefully examined volume-independent indices (independent of the amount of ALF funding and the total number of publications) and indices by subject area and date. The extent of change between that 2012-2015 report and the present report with respect to mean citation rate, top 10% and top 1% of publications (referenced to the world mean) is only modest. However, it is apparent that some regions consistently have a higher proportion of the top 10% and top 1% of publications than the Swedish average (specifically, Stockholm and Västra Götaland). Considering all ALF regions, and using volume independent indices, the mean citation rate and share of the top 10% of publications was slightly lower in 2016-2020 compared to 2012-2015. Internationally, the COVID pandemic has impacted on clinical research and this may account for the slight decline in the indices.

An analysis of the share of citations and top citations was provided to the panel, and these metrics have been indexed to the amount of ALF funding. From this table the Stockholm region, in particular, appears to be over-represented in publications and citations relative to the amount of ALF funding. However, the panel urges caution in over-interpretation of outputs relative to ALF funding, because there are probably unreported and potentially substantial contributions from other funding sources. Ideally, a report of the outputs in relation to the total of independent funding to the region should be made available in future ALF assessments. However, this information was not available for the current panel to evaluate.

Some specific points and recommendations for future ALF evaluations:

- Having reviewed the submitted manuscripts and the bibliometric data, it was apparent that some areas of active and potentially higher impact research did not appear among the submitted manuscripts.
- Some areas of research, including public health and preventative medicine, were not presented by some ALF regions, even though the bibliometric analysis shows active research of high quality in these areas.
- There are potential hazards in simply relating the volume of outputs of a region to the amount of ALF funding. Other funding to an ALF region, beyond ALF funding, is likely to have had a major influence, and if possible should be reported. The extent to which an ALF region is able to leverage additional peer reviewed funding is a marker of high-quality scientific endeavour.

- As indicated in the general comments, for some of the publications, the research work was undertaken outside the ALF region and, in some instances, outside the country. From the guidance provided to panel 1, such papers were not excluded, but for future evaluations exclusion of such papers could be considered if they do not reflect research work conducted in the ALF region.
- Panel 1 discussed manuscripts that were "position papers" or reviews. These do not necessarily reflect research work conducted in the ALF region. There are similar issues with guideline contributions. Clearly, academic work contributed to these papers, but for future evaluations one could consider whether such papers are measures of the research conducted in the ALF region.
- In the selection of papers for submission to ALF Panel 1, a number of ALF regions appear to have prioritised multi-author papers published in high-impact international journals over the publications of high-impact clinical science from their ALF region published in a high-tier specialty journal. In the future, the ALF regions may wish to ensure that such innovative clinical science, with potentially high clinical impact, would be reflected among the papers submitted. Specifically, an excellent innovative clinical science publication could rank very highly, even though published in a speciality journal.
- ALF Panel 1 identified some highly innovative and highly important publications that have impacted on the direction of clinical research or on clinical management internationally. Perhaps for future ALF Panels, such papers could be scored 3* to reflect "internationally leading" clinical science.
- During the COVID pandemic, many journals prioritised COVID research, and for a number of research groups this presented clinical and scientific opportunities. Some research groups showed flexibility of researchers to apply key research principles and techniques to address the new health crisis. These features were evident in some papers submitted to ALF Panel 1.

3.4.2 Overall conclusions

The panel noted that there were substantial research strengths, but these were clustered in specific subject areas and not distributed similarly across all seven ALF regions. Some specific pre-clinical and clinical areas demonstrate high degrees of collaboration and had publications of high impact and clinical significance. From the bibliometric analyses, publications classified in some fields achieved citations well above the top 10% relative to the world average. These included general and internal medicine, clinical neurology, surgery, obstetrics and gynaecology, orthopaedics, cardiovascular disease, and dental research. A number of other areas were close to or slightly above the top 10% world average. The number of publications by subject area did not correlate well with those achieving well above the top 10% world average.

There is the potential to further enhance the world-leading research expertise in specific areas, and to further raise Sweden's clinical research profile more widely.

In summary, the panel identified outstanding research in the publications from the seven ALF regions. A greater focus on developing existing strengths, combined with high-impact national and international collaborations, could further enhance and build upon the leading reputation of Swedish research groups internationally.

3.5 Assessment of ALF region Stockholm

3.5.1 Overall assessment

Very high quality

The Stockholm ALF region is the largest ALF region in terms of ALF funding. It received 27% of the overall funding and this led to the submission of 107 publications for this assessment.

The peer review of the submitted publications showed excellent quality in terms of rigor, significance and originality/novelty. In addition, the panel considers that this ALF region continues to perform exceptionally well in terms of its bibliometric profile, and Stockholm performs very well in relation to the level of ALF funding.

The analysis of the performance of the Stockholm ALF region shows an impressive strength and depth across a range of subject areas. There are very strong areas with examples in general medicine, cardiology, surgery, paediatrics, rheumatology, nephrology and urology as well as translational research in medicine. Overall, the profile of the Stockholm region ranges from very strong to exceptionally strong. Therefore, ALF region Stockholm was assessed overall as being of very high quality.

3.5.2 Assessment of scientific profile in terms of clinical relevance and quality

The submitted publications were on a range of topics and the researchers employed a variety of robust methodologies. Reviewers consistently assessed the publications highly for scientific quality. In particular, the panel commended those publications that demonstrated high originality/novelty, rigour and significance. There was a strong focus on translational studies and these often demonstrated good links between basic biology and applied science.

The overall scientific quality of the papers was very high in terms of methodology and innovation, and a proportion of the evaluated papers related to clinical trials showed novelty and potential for clinical relevance and impact. In particular, data from health registries provided very informative and original insights. The panel noted the enormous potential of employing these data in conjunction with original research and randomised clinical trials.

There were two of the submitted publications that were downgraded by the panel due to insufficient evidence of an author contribution. None of the authors from the ALF region were either lead or corresponding authors, and no comment had been supplied to justify these two publications for submission.

3.5.3 Assessment of overarching quality and extent of the scientific output – bibliometrics

The Stockholm ALF region is the largest ALF region in terms of volume, with over 9 600 publications (fractional counting) during the evaluation period. The region's share of ALF funding is 27%, but its share of publications is 34% and

its share of the field-normalised citations is 37%. In addition, Stockholm represents 40% of the top 10% publications and 40.8% of the top 1% publications. Therefore, Stockholm continues to perform very well in relation to ALF funding, in terms of both number of publications and citation impact.

Regarding volume-independent indicators, Stockholm also scored highly. The average field-normalised citation rate of 1.15 is well above the world average and above other ALF regions. ALF region Stockholm is also the best among all the ALF regions submitted in this exercise regarding the share of top 10% publications (12.5%). Stockholm is also above average with regard to its share of top 1% publications. The share is 1.17% compared to 0.98% across all the ALF regions.

Based on the review of the bibliometric data, there are particular strengths that are worthy of comment. Examples include excellence in general medicine, cardiology, surgery, paediatrics, rheumatology, nephrology and urology.

The bibliometric data also provide information on collaborations between Stockholm and other ALF regions and international scientists and centres. This information provided useful contextual background. Stockholm continued to have a very high proportion of international collaborations. A substantial proportion of the submitted papers included national and international collaborators. The panel considers this to be a key strength of the Stockholm ALF region.

3.6 Assessment of ALF region Västra Götaland

3.6.1 Overall assessment

Very high quality

The ALF region received 21% of ALF funding and this was reflected in the number of publications submitted for assessment. Västra Götaland submitted 83 papers for evaluation, addressing a broad range of topics and exhibiting very high quality in observational and cohort studies with notable basic science and randomised controlled trials. A robust use of the Swedish registries is reflected in the high quality and validity of the scientific outputs.

The expert panel members rated this ALF region highly in all categories of scientific quality, clinical relevance and in bibliometric indices. Outputs were frequently internationally competitive, and there was evidence of high-quality research across a range of scientific topics. Therefore, ALF region Västra Götaland was assessed overall as being of very high quality.

3.6.2 Assessment of scientific profile in terms of clinical relevance and quality

The panel was impressed with the quality of the publications that were submitted from Västra Götaland, reflecting the quality and the strength of science that exists in ALF region Västra Götaland.

A very broad scope of specialties scored highly with several high-impact papers from each. The ALF region is particularly strong across the areas of diabetes, obesity and its surgical treatment, associated depression and the role of the microbiota. In addition, there is also evidence of very strong performance across many other disciplines. A substantial number of studies are particularly impressive for the following reasons: they address an important problem with a very well-sized population and good length of follow-up; they address a therapeutic question with a well-designed large study with collaboration across many sites; or they identify novel and important biological mechanisms. The early scientific response to the COVID pandemic, reflected in early publications, is exceptional.

However, there is a clear potential to perform even better in a future exercise by taking into account the following: some prospective randomised or open cohort studies were from single centres, making results less reliable due to a small number of participants or incomplete data.

The publications submitted by Västra Götaland were assessed as having high clinical relevance, placing this ALF region at the upper range among the seven ALF regions. There were particularly strong clinical implications for studies across a range of fields. Important insights have been achieved in relevant diseases, such as the cardiovascular diseases, diabetes, depression, cancer, and obesity.

3.6.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

The Västra Götaland ALF region has produced over 4 600 publications (fractional counting) during the evaluation period. The ALF region represents 17% of all publications and citations and 22% of all top 1% publications. Compared to its share of ALF-funding of 21%, the region has performed commensurately.

Based on volume-independent indicators of citation impact, the ALF region is top among all the ALF regions for the share of top 1% publications (1.31%) and also the second highest for the share of top 10% publications (11.2%).

The subject profiles show high proportions of top 10% publications in a broad range of subject areas, including dentistry (oral surgery and oral medicine), general and internal medicine, obstetrics and gynaecology, clinical neurology, orthopaedics, gastroenterology and hepatology, endocrinology and metabolism, and surgery. All of the five largest subject areas have a share of top 10% above or well above the world average.

The bibliometric data also provided information on collaborations between the Västra Götaland ALF region and other ALF regions and elsewhere. The panel did not score this, but used the information as contextual background. The ALF region had a very high proportion of international collaborations. The panel considers this to be a strength of Västra Götaland, and one which could be further enhanced by pursuing even more targeted collaborations with international large research groups.

Overall, the bibliometric output provides evidence of maintenance of the strong position of Västra Götaland as one of the leading scientific environments in Sweden.

3.7 Assessment of ALF region Skåne

3.7.1 Overall assessment

Good–high quality

The Skåne ALF region received 18% of the overall funding, and this led to the submission of 71 publications for this assessment.

The panel rated the quality overall as good–high, on the basis of reviewing the submitted papers from ALF region Skåne. These papers spanned many research areas, with the highest impact contributions in oncology, cardiac physiology, haematology and cell biology. Moreover, the rating of good–high quality was also reflected in the various bibliometric indices. In line with this, and despite a modest relative reduction in ALF funding from the previous period (20%) to the current period (18.3%), most bibliometric indices remained stable or showed a slight improvement.

Of the 71 submitted publications, almost all had a corresponding author named from the Skåne ALF region and the calculated average author contribution was the highest among all seven ALF regions.

Overall, the profile of the ALF region was strong and therefore, ALF region Skåne was assessed as being of good–high quality.

3.7.2 Assessment of scientific profile in terms of clinical relevance and quality

For this ALF evaluation, 71 publications were submitted from Skåne. These publications demonstrated a strong translational research approach across several important areas, e.g. pediatrics (childhood cancers), endocrinology (diabetes), neurology (Alzheimer's disease) and oncology (neuroendocrine tumours). At least four large randomised trials have been included in the selected publications, and registries were interrogated and analysed by a number of disciplines.

Among the cutting edge-publications, a comparison of 1 versus 2 view mammography is novel research. It is well conducted, widely cited and, when widely adopted in a number of countries, will result in healthcare improvements. This ALF region is also to be commended for producing COVID research in a difficult area (obstetrics) at the start of the pandemic.

Skåne presented many papers with a strong biological science perspective. Such studies may or may not translate into clinically relevant applications, but some have the potential to do so. Thus, the scores on clinical relevance tended to be lower than the top ALF regions.

The ALF region is now producing good, relevant work using Swedish registry data, as recommended in the previous ALF evaluation report (2012-2015).

3.7.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

According to the bibliometric data, Skåne published 5 096 publications (fractional counting) during the time period reviewed. This constitutes 18.2% of the total publications from the seven ALF regions. Given the share of ALF funding of 18.3%, the Skåne ALF region's share of publications (18.2%) is commensurate using the various parameters for description, with 16.7% share of citations, 16.5% share of top 10% publications and 14.9% share of top 1% publications.

The mean citation rate for Skåne of 0.98 is almost equivalent to the world average of 1. The share of top 10% publications at 9.7% is slightly below the world average, and the share of top 1% publications is at 0.80%.

In the bibliometric subject profile of Skåne, three areas scored above or at the world average. These were particularly strong in terms of citations: neurology, general and internal medicine and surgery.

As reflected in the bibliometric tables, Skåne is performing well and to a similar standard as before.

3.8 Assessment of ALF region Uppsala

3.8.1 Overall assessment

Very high quality

The panel considered the achievements of the ALF region Uppsala to be of very high quality, taking into account the scientific quality of the submitted publications, their clinical relevance and the quality of the overall publication output.

The ALF region Uppsala excels in clinical research in major disease areas, such as oncology and cardiovascular diseases, in line with their strategic aim to prioritise these areas, but also in diabetes, mental health and infectious diseases. The strategy includes development of the necessary methodology and infrastructures. These choices are reflected well in the publications presented for evaluation.

A particular strength of the clinical research from Uppsala lies in leading and participating in randomised clinical trials that provide data for evidenced-based patient care and management.

Of note, Uppsala has put less emphasis on clinical translational research, yet the ALF region supports and facilitates future translational and mechanistic research. Clinical samples are available through its biobank, and the Science for Life Laboratory supports clinically relevant basic research. Hypotheses for mechanistic research are generated through studies in population-based cohorts and data extracted from large registries. Indeed, the ALF region Uppsala makes excellent use of the unique registries available in Sweden.

The panel concluded that the ALF region Uppsala, whilst being of medium size as an ALF region and in relation to ALF funding, performs clinical research at a very high level. Therefore, ALF region Uppsala was assessed overall as being of very high quality.

3.8.2 Assessment of scientific profile in terms of clinical relevance and quality

Uppsala submitted 44 publications for evaluation. The publications that were most valued by the reviewers were reports from randomised clinical trials in the areas of oncology and cardiovascular disease, but also in metabolic disease and surgery. Also, highly rated were publications that supported risk management and prognosis in cardiovascular disease and also in rheumatic disease.

The ALF region Uppsala also performs highly valued research addressing the global health challenge of antimicrobial resistance. A report on global use of antibiotics in children provided valuable insights for public health policies. Another study described novel technology for rapid testing of antibiotic therapy. This study illustrates the potential of the multidisciplinary collaboration in the Science for Life Laboratory.

Only very few publications were considered of somewhat less clinical relevance, mostly because the studies concerned small population groups or because the data required further confirmation. The majority of papers was found to be of high clinical relevance.

3.8.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

The ALF region Uppsala has a large output in relation to its size as an ALF region and its ALF funding. In whole publication counts, it is close to the ALF regions Skåne and Västra Götaland. In terms of fractional counting, the ALF region performs well in relation to its share of ALF funding (11.3%). Its share of total publications is 12.7%, share of total citations is 12.1%, and share of total top 10% publications is 10.8%. However, the share of all top 1% publications is only 9.1%.

In terms of mean citation rate, Uppsala performs around the average of the seven regions at the world average. Its share of highly cited publications (top 10% and 1%) is lower than the best regions for these indicators. Compared to the previous evaluation period, the changes are minor.

When looking at the subject profile of Uppsala, it has a high volume in the areas of strategic priority, and scores well above average in terms of citations for cardiovascular diseases and surgery. Despite a lower output, it scored also very well in experimental medicine and urology/nephrology.

These numbers indicate that the ALF region Uppsala is successful in its strategic priorities, but also that some areas, though currently less visible, are of high quality.

3.9 Assessment of ALF region Västerbotten

3.9.1 Overall assessment

Good–high quality

The ALF region Västerbotten was assessed to be in the category good–high quality. The assessment was based on the outcome of the peer review panel and the bibliometric analysis, and these two components were similarly graded. There were 42 peer-evaluated individual publications, and Västerbotten did not receive as high scores as most other regions. The large majority of the selected papers was assessed to be of sufficient to high clinical relevance, similar to other regions, but there were also some very high-quality publications (randomised controlled trials of asymptomatic atherosclerotic disease, urinary incontinence and amyloidosis).

The Västerbotten ALF region was assessed as making a solid contribution to the quality of clinical research in Sweden. Around 9% of the clinical research papers from the region were in the top 10% most cited papers in terms of overall citations. For 36 of the 42 submitted papers, the corresponding author was from this ALF region. The calculated average of author contributions from the ALF region was 61%, which is higher than most other ALF regions. Västerbotten has a lower share of international collaborations compared to the other ALF regions. For the papers that did have international collaborations, the share of top 10% most cited increased to 12%, emphasising the importance for Västerbotten of encouraging collaborations with strong groups outside the ALF region and internationally. Therefore, ALF region Västerbotten was assessed overall as being of good–high quality.

3.9.2 Assessment of scientific profile in terms of clinical relevance and quality

Västerbotten has received 10.9% of the total ALF funding and, correspondingly, was asked to submit a total of 42 publications for assessment of scientific quality and clinical relevance.

The submitted publications covered a broad scope of areas. Overall, in terms of scientific quality, Västerbotten did not score as high as most other ALF regions. However, the panel noted particularly strong publications in terms of scientific quality in a number of areas. These included the proteomics of prostate cancer, a randomised trial of therapy for amyloidosis, a study of amyotrophic lateral sclerosis, atherosclerotic disease and a study of non-vitamin K anticoagulation. In addition, the VIPVIZA study and the trial of a mobile app for treatment of stress urinary incontinence showed results of high quality work within the ALF-region.

The vast majority of the publications submitted for evaluation were rated as clinically relevant or partly clinically relevant. This is an improvement from the last assessment, and the Västerbotten region has to be commended.

3.9.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

Västerbotten received 10.9% of the ALF funding and, according to the bibliometric report, it has produced over 2 000 publications (fractional counting) which corresponds to 7.4% of all publications. In terms of number of citations and highly cited publications, the region is below that anticipated based on share of ALF funding.

Regarding volume-independent indicators, the ALF region has a mean citation rate at the world average (0.97) and is similar to the other ALF regions in this category. Västerbotten's share of highly cited publications is below the world average. The share of the top 10% publications is 9.0%, and the share of the top 1% publications is 0.64%.

In assessing the contribution to clinical research in Sweden, the panel recognises that Västerbotten has a distinctive scientific profile and specific strengths (see below). When standardised to the field, it is clear that the Västerbotten ALF region has a large scientific output in the field of public, environmental and occupational health sciences. For these areas, their contribution to the top 10% is very close to an international average. Therefore, it is surprising that only three of the papers selected for evaluation fall into that category, particularly because public health was also emphasised as one of the strengths of the Västerbotten ALF region at the last evaluation.

The panel has noted that the topic areas of clinical neurology, nursing, internal and general medicine, surgery, dentistry and oral surgery, urology and nephrology and rehabilitation enhance the scientific profile of the ALF region. Specifically, all these areas have a fraction of publications in the top 10% of most cited papers, and this metric exceeds the world average.

The panel also noted that the publications from Västerbotten with international collaborators had a higher proportion among the top 10% of most cited papers. This finding reinforces the recommendation from the previous ALF report for Västerbotten to encourage international collaborations with strong research groups, particularly for their areas with the strongest clinical scientific activity.

The majority of the submitted papers appear to have been selected based on the journal profile. However, the submitted papers may not sufficiently reflect the profile of the higher impact topic areas that distinguish Västerbotten from the other ALF regions.

3.10 Assessment of ALF region Östergötland

3.10.1 Overall assessment

Good–high quality

The panel rated the quality overall as good–high quality in ALF region Östergötland. Östergötland is one of the smaller ALF regions in terms of ALF funding, and it submitted 31 publications for this evaluation. The submitted publications covered a broad profile of subjects. Papers in neuroscience were particularly strong. Overall, the clinical relevance of the submitted papers was high, and similar to the other ALF regions. In terms of bibliometrics, the number of citations is low in relation to ALF funding, but using the volume-independent indicators, these are comparable with the other ALF regions in this category.

There is a broad subject profile of the submitted papers and in the bibliometric data. However, there is a lower proportion of those involving international collaborations, and the citation impact for Östergötland was lower than for the other ALF regions. This suggests that more focused attention on key subjects with international involvement would help to strengthen the clinical research of this ALF region and its impact. Therefore, ALF region Östergötland was assessed overall as being of good–high quality.

3.10.2 Assessment of scientific profile in terms of clinical relevance and quality

For this ALF evaluation, 31 publications were submitted from the ALF region Östergötland. Eight of the publications were in neuroscience and these achieved the highest rating of scientific quality compared to the others submitted. There were many good papers within groups based at Linköping, with particular merit being attached to the group examining factors influencing GABA clearance in alcohol addiction and related pathologies.

There is reasonably good international and national collaboration for many studies, and the focus tends to be on Linköping authors. Greater international collaboration might be encouraged. For 27 of the 31 submitted papers, the corresponding author was from this ALF region. The calculated average of author contributions was 60%, which is higher than some other ALF regions.

The journals chosen by this group for publication are often those that have the advantage of rapid acceptance and open access. Although these have attractions, there are other journals with more robust peer review systems and impact. More of the latter might have been chosen, with consequent improvements in clinical scientific impact.

There is a wide variety of subjects covered in the 31 publications. A greater focus on research strengths may assist this ALF region's research impact and improve its performance.

A number of the subjects chosen have high clinical relevance (e.g. the improvement of anticoagulant therapy, positive biomarkers in multiple sclerosis,

successful treatments for collagenous colitis, and randomised trials of different surgical procedures). The clinical relevance score for Östergötland is similar to that of other ALF regions.

3.10.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

Although the 31 publications reviewed by the ALF Panel contained many of good quality, the overall performance of the region based on the bibliometric analysis is below that anticipated from the 7.8% of total ALF funding for Östergötland. Taking the ALF region as a whole, the number of citations and highly cited publications has decreased compared with the previous ALF evaluation.

In terms of volume independent indicators, the mean citation rate of 0.94 is slightly below the world average. The share of the top 10% publications is 8.8%, and the share of the top 1% publications at 0.68%. These findings are slightly below those of the previous evaluation period.

The bibliometric subject profile of Östergötland shows a broad range of research areas, but very few clearly above the world average (top 10%). Sport science is particularly strong in terms of citation impact, whereas most of other areas are scoring below the world average. Moreover, the panel noted that Östergötland had the lowest share of publications with international collaborations (52% whole counting) among all the ALF regions. The publications with international collaboration show a much higher citation impact in terms of share of top 10% publications.

3.11 Assessment of ALF region Örebro

3.11.1 Overall assessment

Good–high quality

As one of the newer and smaller ALF regions, Örebro was assessed as performing good–high quality research. The evaluation panel found that the submitted papers contained sound and clinically highly relevant research. Consequently, Örebro was considered to be an ALF region with a strong focus on clinically applicable research suitable for translation into clinical practice. It was also noted that there was a broad range of topics in the submitted papers, some of which were of very high quality.

The evaluation panel acknowledges the challenge for this, the smallest ALF region, to match the other ALF regions in many respects. However, the evaluation panel recommends that the Örebro ALF region should focus on papers where the research was predominantly conducted in the ALF region with corresponding authors from the Örebro ALF region, and with a higher degree of regional author contribution. The ALF region may consider high quality papers from the paediatric research area. Therefore, ALF region Örebro was assessed overall as being of good–high quality.

3.11.2 Assessment of scientific profile in terms of clinical relevance and quality

Of the 12 papers submitted from Örebro, four were within the area general and internal medicine, and there were two papers each from surgery, infectious disease and microbiology. The evaluation committee observed that only five of 12 publications had corresponding authors from the Örebro ALF region. This is a smaller proportion than seen in other ALF regions. Örebro had the lowest average author contribution among the ALF regions: 28% (other ALF regions ranged from 43 to 65%).

Considering the 12 papers submitted by the Örebro ALF region, these were judged to have high scientific value. As regards the clinical value of these 12 publications, the region scored overall highly, and in line with the other ALF regions.

3.11.3 Assessment of overarching quality and extent of the scientific output - bibliometrics

Örebro received 3.1% of the ALF funding and it published 3.3% of all the publications originating from the ALF regions. In terms of citations and number of highly cited publications (top 10% and 1%) the ALF region also performs well. Örebro represents 3.5% of all citations, 3.0% of all top 10% publications and 3.2% of all top 1% publications.

As regards volume-independent indicators, the average citation rate is above the world average (1.1), and the share of the top 10% and top 1% publications is just

below the world average (9.8% and 0.95% respectively). This share of world citations was rated as good, but slightly below, the best performing ALF regions.

The evaluation panel noticed that for a number of subject areas the Örebro ALF region had a high share of publications in the top 10% category: For pediatrics this was 15% when the citations were field normalised. There were seven areas with a share of top 10% publications above or at the world average; surgery, general and internal medicine, psychiatry, developmental psychology, paediatrics, infectious diseases, and endocrinology and metabolism. The largest subject area (surgery) is cited well above the world average.

Sixty per cent of all publications by the Örebro ALF region had international collaborations, and this proportion is similar to that seen in the high performing regions.

4 Evaluation of clinical significance and societal impact of clinical research - Panel 2

The starting point for the evaluation of the prerequisites for clinical research have been formulated by the National ALF Steering Committee. In accordance with these, the evaluation was conducted by a panel of international experts and based on assessments of self-evaluations and hearings.

According to the starting points formulated by the National ALF Steering Committee, the clinical significance and societal impact of clinical research should be evaluated with regard to

- clinical research and its impact on healthcare and public health
- clinical research and education
- innovation and life science.

The overall goal is to increase the quality of clinical research in Sweden. The main objective of the evaluation was to provide assessments and place the ALF regions into one of three categories (inferior quality, good–high quality, very high quality).

4.1 The expert panel

The evaluation was performed by an international expert panel (Table 14), appointed by the Swedish Research Council based on nominations from the ALF regions, and from the project team. Together, the members of the panel comprised competences and experiences relating to clinical significance and societal impact of clinical research. All panel members were asked to affirm that they had no conflict of interest.

Table 14. The expert panel

Name	Organisation	Country
Jouni Jaakkola	University of Oulu	Finland
Avril Drummond (vice chair)	University of Nottingham	United Kingdom

Name	Organisation	Country
Karolina Antonov	The research-based pharmaceutical industry (LIF)	Sweden
Cai Grau	Aarhus University	Denmark
Kåre Birger Hagen	Norwegian institute of public health	Norway
Ian Viney	Medical Research Council (MRC)	United Kingdom
Kirsi Virtanen	University of Turku	Finland

4.2 Assessment criteria

The assessment consists of four assessment scopes. Each scope is associated with one or two objectives. The questions in the self-evaluation are evaluated against the objectives. The overall assessment is a joint consideration of the four scopes.

Table 15. Scope and objective

Scope	Objectives
1. Clinical research and its impact on healthcare and public health	<p>1.1 The ALF region works in a strategic, structured and planned way with clinical research to achieve an impact on healthcare and public health</p> <p>1.2 The ALF region has appropriate and sufficient practices and strategies for keeping its clinical practice in line with the best evidence</p>

Scope	Objectives
2. Clinical research and education	2.1 The ALF region's clinical research is an integrated part of the education of healthcare professionals
3. Innovation and life science	3.1 The ALF region works in a strategic, structured and planned way towards innovation and life science development
4. Impact case studies	4.1 The ALF region is able to provide examples of the clinical and/or societal impact of clinical research conducted by researchers in the ALF region

4.3 The evaluation process

The assessment was carried out by a panel of experts. The expert panel was requested to make its assessment based on self-evaluations completed by the ALF regions, as well as from information provided at hearings. At the hearings, the expert panel had the opportunity to ask supplementary questions to representatives from the ALF regions regarding the descriptions and accounts given in their self-evaluations.

The self-evaluations and the hearings were also complemented by a background report, in which the regional context was presented. The background report also contains a glossary and explanation of definitions.

The documents provided to the expert panel were

- the self-evaluations (provided by the ALF regions)
- the background report
- the expert panel handbook.

All documents are available upon request from the registry (Swe: registratur) at the Swedish Research Council.

4.4 Evaluation results

The panel's overall assessments for the ALF region for the clinical significance and societal impact of clinical research are shown in the table below.

Table 16. Overall assessment results for the ALF regions

ALF region	Inferior quality	Good–high quality	Very high quality
Stockholm		x	
Västra Götaland		x	
Skåne		x	
Uppsala			x
Västerbotten		x	
Östergötland		x	
Örebro		x	

The panel noted that the quality of the submissions from the ALF regions was high and had improved across all areas since the last evaluation. This made the panel's task much more challenging, as there was much less variation overall between the regions.

The grades given also take into consideration the fact that there are only three possible grades, and that the highest grade has to be given to at least one, and at most three, ALF regions. With all other factors being equal between the top rated regions, the panel considered the issue of value for money in their deliberations. Consequently, as ALF region Uppsala was agreed to have delivered exceptional value for money, it was therefore distinguished by the panel by being the only ALF region to be graded as of very high quality.

4.4.1 Reflections and general comments

The expert panel was satisfied with the high quality and thoroughness of the written self-evaluation reports. The background documents, provided by the Swedish Research Council, were carefully prepared and extensive and provided interesting and important insights for each ALF region. At the hearings, the ALF regions included key experts from both the regions and the universities. All participants were well prepared for the hearings. This enabled lively, intense, and interesting discussions, which provided further insights to the expert panel. All the hearings were conducted in a positive and convivial manner. The Swedish Research Council provided systematic well thought-out guidelines for the evaluation.

Overall, it was noted that Sweden has an internationally envied system for maintaining national quality registries, and the use of these to deliver clinical impact was evident in all regions. ALF region Uppsala showed some ways in which these assets could be further leveraged (registry-based trials and linkage between datasets), and ALF Region Stockholm showed how e-health for research approaches were beginning to join up regional health data and the establishment of a centralised organisation for requests of health data. In the future, there will be increasing value from more national-level health data, and from linking registries into this national data. This gave the panel a view of very exciting prospects for Sweden to utilise health data for research, which were not so apparent at the last ALF review.

With regard to specific reflections:

- It was evident that the national infrastructures – for example, the national system for knowledge management, Genomic Medicine Sweden (GMS), Biobank Sweden, the national organisation of the quality registries and the national organisation Clinical Studies Sweden – have been largely implemented by all the regions. These are viewed by the ALF regions as important tools for the implementation of clinical research for achieving clinical and societal impact.
- There was an increase in patient and public engagement across strategic and operational levels of research, and this was welcomed by the panel. The ALF regions which did particularly well in this respect had engagement at strategic as well as operational levels in their organisations.
- All ALF regions reported comprehensive clinical research method-training in medical programmes, but there was diversity in the format and presentation of these programmes. However, research training typically included student project(s), which was considered as a venue for further research interests and entry to a doctoral programme.
- Overall, there was a clear increase in the overall involvement, engagement, and training of non-medical professionals in research, although this was to differing levels between regions.
- There were issues with providing data on the number of trials across the regions. Some regions simply did not know how many trials they had within their region. Specific trial details (for example ‘registered’, ‘trial finished recruiting’, etc.) need to be operationalised more carefully and improved.
- The panel were extremely impressed at the overall quality and range of the impact case studies.
- The panel were pleased to note that several regions commented in the hearings that they felt the previous evaluation had been important in shaping their strategies. The ALF regions also felt that this year’s process for self-evaluation and the opportunity to discuss their submissions at the hearing was positive and was appreciated by them.

4.4.2 Examples of good practice

The panel noted the following specific examples of good practice in the review.

Clinical research and its impact on healthcare and public health

ALF region Skåne presented a comprehensive structure for systematic implementation of results from clinical research. This knowledge implementation is based on the activities of Health and Technology Assessment South (HTA South), Cochrane Sweden, and region Skåne's Method and Prioritisation Board.

The Patient Council from ALF region Stockholm was a strong example of using patients and the public in a strategic way, as well as using them in research collaborations and in patient led education. There was also an excellent example from ALF region Östergötland, where there was key patient and public involvement at all levels and dissemination of knowledge to public and health-care providers, exemplified by Barnafriid, National Centre for Priority Setting in Healthcare and Status Östergötland.

The panel agreed that ALF region Uppsala had a strong focus on the development, hosting, and exploitation of national quality clinical registers. ALF region Uppsala hosts more than 20 national registers, the Regional Comprehensive Cancer Centre for the Uppsala-Örebro healthcare region hosts another 20 cancer-focused registries, and Uppsala-based researchers help steer the development of many others throughout Sweden. Given that registers are a national asset for use by all researchers, the panel felt that this contribution by the Uppsala ALF region was critical in enhancing research results.

ALF region Östergötland's practice of inviting senior research leaders from other ALF regions to evaluate grant applications in their open calls for ALF research funding was considered a good example of a practice for improving the quality of research in the ALF region.

The collaboration in ALF region Västerbotten between the research, development, and innovation hub in South Lapland - the Centre for Rural Medicine - and WHO regarding rural health and e-health was a strong example of engaging with sparsely populated areas.

ALF region Västra Götaland presented a clinical research project database with one platform for online submission and for processing applications for ALF and research funding. All research projects must be registered in this database and updates can be made during the study, including brief results and publications. The panel especially appreciated that the database is linked to an innovative way to disseminate research results to the public and patients using information screens.

Clinical research and education

There were good examples of where clinical research was an integrated part of the education of healthcare professionals across the regions, particularly where research was embedded into medical, allied health professions and nursing educational programmes and where students undertook research project in clinical settings. For example, in the medical programme in ALF region Stockholm, at least half of the degree projects are part of larger ongoing clinical

projects. This means that students are part of the teams and the research community. There were also several examples of regions making certain staff appointments specifically to insure there were solid links between clinical practice and education, or of researchers presenting their work to students. ALF region Stockholm felt that having a senior lecturer/professor (employed in a combined healthcare and academic position) in each healthcare unit was important for encouraging and maintaining links. The panel saw this as a concrete example of linking research, education and clinical practice.

In ALF region Skåne, all students during medical, nursing and rehabilitation programmes receive education in scientific research methods. Medical students are introduced to research methods in several semesters, serving also as recruitment for potential doctoral projects. In a 2020 survey by the Swedish Medical Association, a comparatively high number of medical students at Lund University believed their education left them well equipped in terms of skills needed to conduct research. In ALF region Skåne, the bachelor's degree programmes in nursing underlines the importance of research in day-to-day clinical practice. At the advanced (masters) level, presentations are made by active researchers, often employed at Lund University and engaged in the respective study programmes.

In the medical programme at the School of Medicine in Örebro, all tutors are active researchers, and training of students in Evidence Based Practice (EBP) related themes (such as literature searching, and critical assessment of research articles with a problem based learning approach) is emphasised. Medical students in Örebro have rated the quality of their education very highly in the Swedish Medical Association's survey. Evidence Based Practice-related issues, such as literature search and critical appraisal in particular, have been highly rated over several years, and this success may reflect the strategies and efforts employed to include clinical research in the educational programme.

The amanuensis programme in ALF region Västra Götaland was regarded by the panel as an excellent example of how to identify and support research talent at the pre-graduate level. Students in the programme participate in research seminars and teaching in basic education and will often proceed to become doctoral students.

There were robust examples of innovation in the research conducted across interdisciplinary and multidisciplinary collaborations and across technology (e.g. ALF regions Skåne, Stockholm, and Västra Götaland).

Innovation and life science

There were good examples of having clear strategic oversight of activities in several regions, evidenced by overarching strategy documents.

ALF region Stockholm showed fast growth with a 48% increase in the number of life science companies in the region in the last decade. They presented an innovation strategy, which is monitored closely with indicators reviewed regularly. These are published in the annual innovation report. Action plans are

developed for specific areas and are overseen by “appointed work groups”. There is also a regional life science office, which supports co-creation with industry and improves the consistency of agreements.

ALF region Skåne presented benefits from cross-border collaboration with the Greater Copenhagen region. ALF region Skåne represents a leading region for innovation and life science development in Europe, ranking 9th out of 240, and employing approximately 7 000 people.

The progress in ALF region Östergötland, with their expertise in artificial intelligence, shows great potential to provide benefits for the whole country. The Regional Life Science strategy and the open collaboration with life science companies (i.e. Sectra) have facilitated the region’s success. The leading Center for Medical Image Science and Visualization (CMIV), and the National Supercomputer Centre (NSC), are examples of developments which could lead to further clinical research and take life science innovations to the next level.

In ALF region Västra Götaland, a Research and Development Advisory Committee consists of the regional political presidencies from the Regional Executive Board, Healthcare Board, Regional Development Committee, and Sahlgrenska University Hospital. The panel noted that the composition of expertise in this committee is a strength when fulfilling their remit to prepare and decide upon strategic work in research, innovation, and life science relevant to their joint commitment. The committee also receives continuous feedback on strategic investments in research, healthcare operations and support functions, as well as in major projects.

Impact case studies

There were several good examples of impact case studies where randomised controlled trials were used to address important clinical research questions with implications for prevention or treatment. Typically, these studies were published in high-impact journals, and the results were used as a basis for changes to national and international guidelines.

Overall, the panel felt that the following case studies merited highlighting specifically.

Time matters – saving lives before arrival at the hospital, from ALF region Stockholm. The panel agreed that this was an exceptional case study with high-quality translation of a study which was underpinned with robust health economic data and real-world impact.

The Determination of the Role of Oxygen in Suspected Acute Myocardial Infarction (DETO2X-AMI) trial). This was an excellent example of a case study demonstrating disinvestment and both ALF region Stockholm and ALF region Uppsala benefited equally by submitting this collaboration. A randomised controlled trial published in a top journal showed that prevailing oxygen treatment is not useful. This led to a change in guidelines globally, and societal

impact was demonstrated by a reduction in healthcare costs and ultimately the removal of administering an additional procedure for patients and staff.

RNA interference – a new, innovative treatment for transthyretin amyloidosis, from ALF region Västerbotten, was an excellent case study demonstrating top-quality research and associated with a Nobel Prize. The research shows both clinical and societal impact in the form of an approved medical product rated by ‘Science’ as one of the top ten breakthroughs in 2021.

ALF region Västra Götaland presented a global impact of a research programme on reducing antibiotic pollution from manufacturing globally to protect the efficacy of antibiotics in the clinics. The programme was initiated after the original finding in 2007 that the largest environmental emission of antibiotics comes from drug manufacturing, leading to population-level resistance to antibiotics. Results from the programme have had impact on national and international policy to control antibiotics pollution, in collaboration with the World Health Organization, the United Nations Environment Program, the Food and Agriculture Organization of the United Nations, the World Organisation for Animal Health, industry, governments, non-governmental organisations and others.

4.5 Assessment of ALF region Stockholm

4.5.1 Overall assessment

Good–high quality

ALF region Stockholm was considered a highly rated ALF region with negligible criticisms concerning its strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

Stockholm is the largest ALF region, with an existing strong research culture and a top-ranked university. There is awareness of conducting high-quality research and providing appropriate research training. There are strong and active links with life science development. The size of the region was recognised by both the ALF region and by the panel as both a strength for research – given the scale and number of ongoing research studies – and as providing additional challenges for the region in terms of communication, and additional resources needed for implementation. There is good integration in ALF region Stockholm across healthcare, research, and education.

Considering the ALF resources available to the region, ALF region Stockholm was graded as of good–high quality.

4.5.2 Assessment of clinical research and its impact on healthcare and public health

ALF region Stockholm has overarching, strategic collaboration across hospitals and universities with key stakeholders to identify areas requiring coordinated implementation. The panel agreed that the ALF region has all the components necessary in place for an effective learning healthcare system.

Clinical quality registers are a national asset for Sweden. ALF region Stockholm supports 13 national registries, and is responsible for data management for 12 of these. The panel thought that the work with the development, monitoring and use of these registries was impressive. Efforts underway to automate the extraction and linkage of data from registries is an initiative that could potentially have significant benefits for Sweden as a whole. The panel noted the examples provided related to clear, improved patient outcomes.

The ALF region places emphasis on the contribution of patients and the public at all levels of research. The panel recognised the Patient Council as an excellent example of practise for using patients and the public in a strategic way, as well as using them in research collaborations and in advising on healthcare education.

As well as its strength as a region in its own right, ALF region Stockholm is an active national player: as an example, almost 60% of its publications include a co-author from outside the region. The panel recognised and applauded this. In addition, the ALF region has several specific high-quality characteristics of engagement including key contributions to Biobank Sweden, Genomics Medicine Sweden, and the European Reference Research Networks, and it is the

lead for the data node for national healthcare. The Centre for Health Data functions as a single point of contact for access to health data within the region.

4.5.3 Assessment of clinical research and education

The panel noted key strategy documents underlining the connections between research and education. There is a focus on research-based education for all disciplines. The panel considered that the five named aspects of the evaluation were all addressed, and that clinical research is well integrated into the education of healthcare professionals.

The panel noted that there was a clear scientific track in all education programmes across all medical, nursing and allied health professional programmes. The panel were pleased to note that, in the medical programme, at least half of the degree projects are part of larger ongoing clinical projects. This means that students are part of the teams and the research community. Student feedback from current students has improved, and evaluations from current students showed that they self-graded their critical research skills as 5.3 out of a possible score of 6 at the end of their studies.

ALF region Stockholm creates opportunities for students to attend summer schools as well as more formal educational research opportunities, and the panel welcomed these initiatives. The panel was pleased to observe that allied health professionals and nurses are actively encouraged to pursue research careers and are supported by ring-fenced funding for research. The panel considered the requirement that a senior lecturer/professor must be employed (in a combined position) in each healthcare unit as an important policy, and a concrete example of linking research, education and clinical practice.

4.5.4 Assessment of innovation and life science

ALF region Stockholm has a high concentration of life science companies and has an excellent supportive infrastructure, for example, incubators and applied research centres, testbeds, and provision of legal support. The panel noted the 48% increase in the number of life science companies in the Stockholm-Uppsala region in the last decade. These figures are impressive.

ALF region Stockholm demonstrated a clear strategic oversight of innovation activity, including an innovation strategy that is monitored closely with indicators reviewed regularly and published in the annual innovation report. At the hearing, it was noted that action plans are developed for specific areas and are overseen by “appointed work groups”. There is also a regional life science office, which supports co-creation with industry and improves the consistency of agreements. The ALF region has reported that ethics are now better managed and issues such as data access has improved, now that better planning is possible.

A ‘clinical studies action plan’ was launched in 2022, to facilitate and coordinate large clinical trials in the ALF region and to increase the number of clinical trials with industry. There has been investment in an external engagement support

office to promote a central overview. The ALF region is striving to have a system-wide perspective and to take evidence-based decisions about investment. The panel was supportive of all these initiatives.

4.5.5 Assessment of impact case studies

The panel agreed that ALF region Stockholm had selected a very strong set of new impact cases.

Impact case study 1: Phasing out oxygen support during myocardial infarction -DETO2X-AMI

The panel agreed that this was an exceptional case study demonstrating disinvestment. ALF regions Stockholm and Uppsala benefited equally by submitting this case study, which was a strong national collaboration. The study resulted in clear scientific output (trial results), clinical outcome (implemented in guidelines globally), and societal impact (a reduction in healthcare costs and ultimately the removal of administering an additional procedure for patients and staff).

Impact case study 2: Slowing the course of accelerated ageing through healthy living

The panel felt this was a strong case study which had real potential – although noted that the full impact had not yet been realised, given that this research is evolving. Epidemiological research showed that a proportion of dementia diagnoses were linked to modifiable risk factors, and a dementia risk score (CAIDE) was developed. Importantly, a multimodal preventative approach was proposed, implemented, and assessed, and has shown benefits for elderly people at risk of increased cognitive impairment. The outcomes have been validated by focus group research, and long-term follow-up is under way. Further, the additional benefits of the programme, found in respect of reducing other comorbidities, may also show promise to populations at risk of cardiovascular disease/diabetes.

Impact case study 3: Time matters- saving lives before arrival at the hospital

The panel agreed that this was an exceptional case study. In essence, the implementation of the Stockholm Stroke Triage System has meant that people with ischemic stroke can be brought directly to the appropriate centre to undergo endovascular thrombectomy. The panel considered this a high-quality translational case study, underpinned with robust health economic data and real-world impact.

4.5.6 Progress since previous evaluation

The panel noted that the ALF region has clearly taken steps to address areas identified as needing improvement in the previous evaluation. For example, the ALF region Stockholm has significantly increased its collaboration and engagement with patient organisations. The panel also observed that the ALF region has continued to lead and manage national clinical registries as a research

tool for efficient identification of research gaps and opportunities for investment/disinvestment.

The ALF region has worked hard in recent years to strengthen overall healthcare provision, including the construction of a new hospital building. There are clear contractual arrangements in place to support effective management and maintain current standards, although there are increasing economic pressures. The panel noted that there are plans to update the strategic plan for healthcare ‘Healthcare of the future’ initiated in 2012.

There has been significant work on increasing and strengthening strategic links across the whole ALF region, as evidenced by strategic plans that are carefully monitored and evaluated regularly. The ALF region has continued to develop and expand links with industry.

The panel also recognised that there have been several notable initiatives undertaken since the last review, including the establishment of the following:

- Karolinska Comprehensive Cancer Centre. This is the first such centre in Sweden and was accredited in 2020. It is a regional cancer research hub, and the panel agreed that its cutting-edge basic research combined with cancer care has led to an increase in the number of clinical trials. The panel noted that the centre complies with best practice, for example, by providing a contact nurse, individualised care plan and multidisciplinary team.
- Precision Medicine Centre Karolinska. This centre works laterally between disciplines and ensure integration across healthcare. There is collaboration across teams to handle data and diagnostics. The centre also works closely with Genomics Medicine Sweden.
- The establishment of Academic Specialist Centres. These link specialised care/primary care across education and research and provide academic competencies in relevant healthcare professions.
- Centre for Health Data is a ‘one stop shop’ for health data. In practical terms, this means that a researcher can contact one place instead of several. The centre also supports legal and ethical review. The centre works collaboratively with all partners including industry, for example, with test beds.

4.6 Assessment of ALF region Västra Götaland

4.6.1 Overall assessment

Good–high quality

ALF region Västra Götaland was considered a highly rated ALF region with negligible criticisms concerning their strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

Multi-disciplinary research involving several professions and specialties is actively promoted and there are prominent multidisciplinary research centres in the ALF-region. The panel noted a strong focus on public and patient engagement in clinical studies, for example, in research and development boards, ethics committees, and in the planning of clinical trials.

The submitted impact cases contained highly interesting findings with high scientific value, however, these were evaluated slightly lower in regard to clinical and societal impact than many of the cases submitted from other regions.

Considering the ALF resources available to the region, ALF region Västra Götaland was graded as of good–high quality.

4.6.2 Assessment of clinical research and its impact on healthcare and public health

The panel identified many strengths in the assessment of clinical research impact in ALF region Västra Götaland.

A wide range of stakeholders (including politicians, patients, and patients' organisations) are involved in providing and assessing clinical research, and the range of strategies outlined was impressive. During the hearing, it became clear that there are strong strategic and day-to-day collaborations between the region, the universities (University of Gothenburg, Chalmers University of Technology) and the hospitals.

The panel appreciated the role and responsibilities of the Program and Priority Council, which manages knowledge transfer and priorities of introduction and disinvestment of treatments to the region. This seems an appropriate, effective, and innovative structure.

Multidisciplinary research involving several professions and specialties was appropriately addressed. Multidisciplinary research is actively promoted via the establishment of Research and Competence Centres, of which 17 are located at Sahlgrenska Academy and 15 at Sahlgrenska University Hospital. Prominent examples of multidisciplinary research in practice are provided by the National Centre for Person-Centred care (GPCC), the WCMTM, Sahlgrenska Centre for Cancer Research, and the Transplantation Centre.

The panel noted a strong focus on public and patient engagement in clinical studies, for example in research and development boards, ethics committees, and in the planning of clinical trials.

The long-standing and clear role of the regional Health Technology Assessment Centre was clearly demonstrated during the hearing. The unit started in 2007 and has produced 150 reports, which have supported strategy and guideline development at regional level. The process, from the submission of questions to questions being addressed, was fast, with answers to questions provided in 3-6 months. Academic cross-representation exists in the assessment teams, which also involve patient organisations. The region intends to appoint a professor in health technology assessment, the first in Sweden.

Comparing induction of labour at 41 vs 42 gestational weeks was a powerful example of how research is managed in the region. A recommendation to the Programme and Priority Council, then onto the National Programme Council, led to a key change in guidelines. The ALF region provided funding to implement this resulting in a clear reduction in mortality for the centres achieving the change in practice, as demonstrated by registry data.

ALF region Västra Götaland has strong research collaborations with other regions and operates in close networks. One example is active participation in the network headed by the Swedish Agency for Health Technology Assessment and Assessment of Social Services (SBU), which includes all health technology assessment units in Sweden. The panel also noted that the ALF region is an active partner in national collaborative networks that support clinical research, such as Genomic Medicine Sweden (GMS), Biobank Sweden, AI Sweden, and SWELife.

The ALF region also presented its ongoing work on a clinical research project database “Projektdatabasen FoU” based on the Research web system, which is the same platform used for online submission and the processing of applications for ALF and research funding in Västra Götaland Region. All research projects must be registered in this database, together with updates during the study, and include brief results and publications. The panel also noted that the database is linked to an innovative way to disseminate research results to the general public and patients using information screens. In general, the panel considered the registration of research projects a useful measure for the assessment of potential publication bias caused by selective reporting of results.

4.6.3 Assessment of clinical research and education

In general, ALF region Västra Götaland has implemented several key positive measures for promoting clinical research training.

According to its current strategy, the University of Gothenburg uses ALF funding to recruit student supervisors. There are also possibilities for students to conduct interprofessional essays with support from Chalmers University of Technology. The panel considered this a useful way of promoting research and research training in the region.

The panel noted that a scientific track exists in all educational programmes. All degree programmes include a research project that is peer reviewed, and ALF funding was used to support tutors to review and assess these projects.

The amanuensis programme in ALF region Västra Götaland was appreciated by the panel as an example of a structured way to identify and support research talent at pre-graduate level. It was noted that 165 students have entered the programme to date, and currently 30 medical students in the programme take part in research projects with supervision. Students in the programme participate in research seminars and in teaching in basic education, and can then proceed to become doctoral students.

4.6.4 Assessment of innovation and life science

The ALF region presented an impressive scale of innovation activities ranging from offering seed funding to higher level engagement.

Strategies of innovation and life science are in place both at Region Västra Götaland and the University of Gothenburg, with mutual contributions from both, and a formal collaboration group between senior management from the University of Gothenburg, Chalmers University of Technology, Sahlgrenska University Hospital, and Region Västra Götaland. These collaborations include a joint master's thesis exhibition (with both technical/medical and clinical supervisors) and a joint graduate school, Gothenburg Research School and Health Engineering, the creation of an artificial intelligence competence centre within Sahlgrenska University Hospital, and the construction of the Image and Intervention Centre (BoIC). In response to the national strategy for life sciences, this ALF region has adopted a strategy to support this strategy with a clear governance structure to allocate specific funds for innovation. A tactical group has mapped joint strengths and tools for increased cooperation that will constitute the base for future strategies.

An excellent portfolio of initiatives with incubators and business parks was provided. Structures were presented detailing a successful innovation strategy, which was actively monitored and evaluated. During the hearing, it was clear that the collaboration between the universities and the region is very good and that there is an innovation platform which is important for further developing collaborations.

The panel noted the clear value of the Research and Development Advisory Committee, (consisting of the regional political presidencies from the Regional Executive Board, the Healthcare Board, the Regional Development Committee, and Sahlgrenska University Hospital), with the remit to prepare and decide upon strategic work in research, innovation, and life science relevant to the joint commitment. The committee also receives continuous feedback on strategic investments in research, healthcare operations and support functions, as well as feedback from major projects.

Both Region Västra Götaland and the University of Gothenburg have Research and Innovation/Grants offices supporting the early steps/stages of idea

evaluation. Through an investment fund and a broad network of industrial partners, University of Gothenburg Ventures specifically support projects which have commercial potential. These activities were well regarded by the panel.

4.6.5 Assessment of impact case studies

The panel agreed that ALF region Västra Götaland had selected a strong set of new impact cases.

Impact case study 1: Regional population-based screening for prostate cancer

This case study builds on previous long-term research in this area with many contributors. This study had clear scientific outputs (trial results in high impact journals), and results were used to qualify national and regional strategies for prostate-specific antigen (PSA) screening. A new study is now underway using magnetic resonance imaging (MRI), and the results are expected to have a strong impact.

Impact case study 2: Reducing antibiotic pollution from manufacturing globally to protect the efficacy of antibiotics in the clinics

This case study was excellent, demonstrating strong expertise internationally in the topic area and results which have global impact. Papers are cited from 2007 to 2021 showing a continuing and ongoing programme of research in this area, addressing one of the most important health and healthcare challenges.

Impact case study 3: Uterus transplantation - the first available infertility treatment for women with absolute uterine factor infertility

This case study was challenging to assess. While the case study demonstrated a clear progression from initial animal model research to live birth deliveries (although these were all outside Sweden), the demonstrable greater impact on health could be debated, meaning that long-term impact on healthcare has not yet been fully demonstrated. Aside from this, the case very clearly demonstrated impressive ground-breaking research spanning over 20 years, integrated with clinical care, that has led to a new treatment.

4.6.6 Progress since previous evaluation

The panel noted that the ALF region has clearly taken steps to address areas identified as needing improvement in the previous evaluation, including taking full advantage of the potential of the data registries and placing more focus on recruiting scientific staff.

The steps taken to address these previous comments include strategic work on registry-based research, and several examples of this were discussed during the hearing.

Changes made to address the declining number of physician scientists include both international recruitments and support for young clinical investigators.

Initiatives to further strengthen the interdisciplinary partnerships were also described.

4.7 Assessment of ALF region Skåne

4.7.1 Overall assessment

Good–high quality

ALF region Skåne was considered a highly rated ALF region with negligible criticisms concerning its strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

Region Skåne excelled in well-structured strategic work, education in research methods in medical and health science programs, as well as impressive innovation and life science development. ALF region Skåne presented the capacity to be an agile region to try new solutions, which could, if found useful, be scaled up nationally. ALF region Skåne presented good impact case studies which provided evidence that clinical research conducted in the region has important clinical and societal impact.

Considering the ALF resources available to the region, ALF region Skåne was graded as of good–high quality.

4.7.2 Assessment of clinical research and its impact on healthcare and public health

The panel appreciated the comprehensive structure for systematic implementation of results from clinical research in ALF Region Skåne. This knowledge implementation is based on the activities of Health and Technology Assessment South (HTA South), Cochrane Sweden, and Region Skåne's Method and Prioritisation Board.

HTA South, based at Skåne University Hospital, provides technology assessment for the region, which forms the basis for implementation and disinvestment of clinical methods and treatments. There is a clear process from developing a question to implementation or disinvestment of treatments or technologies. HTA South conducts the analyses and provides a report to Region Skåne's Method and Prioritisation Board. Region Skåne's Board for Knowledge Transfer then makes the decision about the treatment. Monitoring, evaluation, and following up the strategic work to implement clinical research results are integrated into these structures.

Cochrane Sweden, hosted by Lund University, is a Swedish pioneer in the Cochrane Collaboration, providing systematic reviews and meta-analyses which serve the knowledge-based management. This is linked to the national system for knowledge-driven management.

ALF region Skåne's Clinical Research Centres provide a structure that enables academia, healthcare, business, and patients to interact. This brings the clinical research results closer to the clinic. Lund University and Region Skåne are key partners in established national collaborations for clinical studies, biobanking, and precision medicine.

Since 2021, ALF region Skåne has participated in national programme groups in all 26 clinical areas. The Epidemiology and Register Centre South and Regional Cancer Centre South host several national and disease/quality registers and support registry-based research in the region.

ALF region Skåne has extensive international collaborations, which strengthens clinical research and its impact. Of note, there is important cross-border collaboration with Copenhagen within clinical research, as well as in special fields such as reproductive medicine and diabetes. This cooperation increases the critical mass in the region. Cochrane Sweden has also collaborated with researchers from 11 countries and four continents. ALF region Skåne hosts two WHO Collaborating Centres focussing on evidence-based clinical health promotion and on surgery and public health. This indicates the international quality of expertise in these areas,

4.7.3 Assessment of clinical research and education

All students in medical, nursing and rehabilitation programmes receive education in scientific research methods. Medical students are introduced to research methods during several semesters with focus on gradually more advanced topics and application of methods in their own projects. This can therefore be described as a screening or scouting for potential PhD projects. In a 2020 survey by the Swedish Medical Association, a comparatively high number of medical students at Lund University believed their education left them well equipped in terms of skills needed to conduct research.

Of note, the bachelor's degree programmes in nursing aim to convey the purpose and use of science in clinical work. At the advanced (masters) level, presentation sessions are held by active researchers, often employed at Lund University and engaged in the respective study programmes. The subject can be the presenter's own research, or a certain clinical research area needed for illustrative or motivational purposes.

4.7.4 Assessment of innovation and life science

ALF region Skåne is a leading region for innovation and life science development in Europe, ranking 9th out of 240 in the latest evaluation and employing approximately 7000 people. Together with the Greater Copenhagen region, ALF region Skåne forms the largest life science cluster in northern Europe.

The Research and Innovation Council in Skåne (FIRS) is ultimately responsible for the long-term development of life science in Skåne. The strategic innovation cluster organisation, Medicon Valley Alliance, adopted in 2021, is a Danish-Swedish networking organisation in the life science cluster in Greater Copenhagen and Skåne. FIRS has a working group for life sciences and health, which has an action plan and monitors its development. In the hearing, we heard evidence demonstrating that the region was a good place for commercialising research (with an example of establishing a spin-out based on markers for lung cell cancer).

4.7.5 Assessment of impact case studies

The panel agreed that ALF region Skåne had selected a strong set of new impact cases.

Impact case study 1: Improved diagnostics and prognostics of Alzheimer's disease

Alzheimer's disease (AD) biomarkers from cerebrospinal fluids (CSF) are currently used in clinical practice in several European countries. A Lund University group coordinated an international multicentre study, which showed that positron emission tomography tau (tau-PET) can, with very high accuracy, distinguish between mild AD dementia and all other relevant neurodegenerative diseases. The method was better than CSF and amyloid-PET measures at this stage of the disease. These blood-based biomarkers have already started to revolutionise the diagnostic work-up of AD in the clinic and have also influenced the design of clinical trials.

Impact case study 2: Cardiac arrest and post-cardiac arrest care

Lund University investigators led a controlled trial published in *The New England Journal of Medicine* in 2013, showing that hypothermia treatment has little beneficial effects on prognosis after a cardiac arrest. This finding has led to a fast phasing out of hypothermia treatment both nationally and internationally.

Impact case study 3: Sepsis alert and sepsis care chain

ALF region Skåne developed guidelines for early identification and treatment of emerging sepsis entitled the 'Skåne model'. Regional research showed that 90% of the patients identified at the emergency department received antibiotic treatment within 1 hour, compared to 68% before the introduction of the model. Early antibiotic treatment in sepsis is most often a life-saving measure. Regional development led to the introduction of national guidelines in this area.

4.7.6 Progress since previous evaluation

ALF region Skåne has expanded its participation in the national system for knowledge-driven management for evidence-based medicine. ALF region Skåne was a pioneering region in the Cochrane Collaboration, and they established Cochrane Sweden in 2017.

In 2020, the Research and Innovation Council in Skåne (FIRS) published Skåne's innovation strategy, which identifies life science and health as one of the six focus areas. Concrete initiatives include the creation of new research positions and a university-level course for clinical study coordinators, increased dialogue with the life science industry, and investment in a new platform for clinical trials within Alzheimer's disease.

Lund University and Region Skåne are key partners in Sweden's recently established national collaborations for clinical studies, biobanking, and precision medicine. They have also invested substantially in further cross-border collaborations with the Copenhagen region.

ALF region Skåne has promoted the use of clinical relevance and impact in the granting of ALF-funding for research. Region Skåne and Lund University have established a Comprehensive University Hospital Cancer Centre, which consolidates the integration of cancer care with cancer research and with strong patient involvement, to deliver care and research of the highest international quality, based on patient needs, research-based treatment, and innovation.

4.8 Assessment of ALF region Uppsala

4.8.1 Overall assessment

Very high quality

ALF Region Uppsala was considered a highly rated ALF region with negligible criticisms concerning their strategy, processes for implementation of clinical research, education of students, and a very high-quality set of submitted impact cases that exemplified new impacts since the last ALF review.

The panel noted solid evidence for the close working between the region and the university, which was demonstrated in governance structures and in implementation. The panel were particularly impressed by the strong focus that Uppsala had placed strategically on national quality registers, which were used appropriately to enhance research.

Considering the ALF resources available to the region, ALF region Uppsala was agreed to have delivered exceptional value for money, and therefore was distinguished by the panel by being graded as of very high quality.

4.8.2 Assessment of clinical research and its impact on healthcare and public health

Uppsala University and Region Uppsala collaborate closely at the level of the University Medical Board to identify strategic areas that need coordinated implementation in healthcare. Both the Region and the University have jointly designed a governing document to guide this, and the panel was impressed by the clear presentation of, and evidence for, these arrangements. The 23 Research Development and Training (RD&T) councils are a key part of the governance structure. Each RD&T council represents a University Healthcare Unit, connects the University Medical Board executive committee with clinical departments, and is responsible for local allocation of ALF funds and continuous work to develop research and patient care.

Research gaps and opportunities are communicated from representatives in the national knowledge management system to the RD&T councils. Referral to a formal health technology assessment (HTA) could occur within Uppsala's efficient "mini-HTA" process, via a detailed full HTA process in collaboration with the HTA Unit in Region Örebro, or the key elements dealt with within the expertise of the RD&T councils.

The panel agreed that the ALF region has all the components necessary for an effective learning healthcare system, including the capability of the Centre for Health Economy Research, and had thought flexibly about the fastest route to the right answer for patient care. The submission from ALF region Uppsala included several good examples of this implementation system working well for patients.

Clinical quality registers are a national asset for Sweden, open for use by all researchers, which rely on clinical sites throughout the country registering

patient details. The panel noted that ALF region Uppsala has both invested in the development of these registers and use registry data in clinical research to enhance the public health and societal impact of research results.

The panel agreed that ALF region Uppsala has a strong focus on the development, hosting, and exploitation of national quality clinical registers. ALF region Uppsala hosts more than 20 national registers, the Regional Cancer Centre for the Uppsala-Örebro healthcare region hosts additional cancer-focused registries, and Uppsala-based researchers help steer the development of many other quality registers throughout Sweden. The panel was impressed by work in ALF region Uppsala using these registers. Researchers in the ALF region had, to a greater extent than in other ALF regions, exploited clinical registry data as an extremely effective and rapid way of testing areas as worthy of examination for investment and disinvestment. Formally testing these hypotheses, via registry-based clinical trials, and checking that changes in clinical guidelines are having an impact on clinical practice and patient outcomes. The panel commended efforts underway to automate the extraction and linkage of data from registries as another example of maximising these resources, and an initiative that could potentially have significant benefits for Sweden as a whole.

4.8.3 Assessment of clinical research and education

The panel noted that systematic research training is included in all education programmes, although there is some variation in how comprehensive the training is. All degree programmes include a research project that is peer reviewed. ALF funding was used to support tutors to review these projects. There is a clear emphasis on increasing the interest of the students in clinical research. The majority of teachers are involved in scientific research and there is a data base for ongoing research projects which can offer student projects. Many of the projects are ALF-funded. The products of the student projects commonly become part of a scientific publication and may serve as starting points for doctoral studies. There is a special programme for engaging medical students in clinical research. Also, nursing students are exposed to a science café which recruits nursing students to research. ALF-funding is also used to compensate supervisors of student projects.

4.8.4 Assessment of innovation and life science

ALF region Uppsala presented an impressive scale of innovation activities, ranging from offering seed funding to higher level engagement, under clear strategic oversight from the Uppsala Innovation Centre (UIC). The innovator-centred system is based on strong interaction between universities, capital, industry, the public sector, and specialised organisations catalysing different parts of the innovation process. Different parties are consciously encouraged to follow the pay-it-forward culture, i.e. to invest parts of the gains back to the innovation eco-system. The panel thought this was excellent.

ALF region Uppsala provided unambiguous evidence of a successful innovation strategy that was actively monitored and evaluated. Macro-economic studies had estimated a substantial return on investment. Examples provided show how the

ALF region works with the life science industry, including investments made by the UIC (for example the proteomics start-up Olink), and open innovation between the University Hospital, the Ångström Laboratory and a replacement joint manufacturer. The ALF region prioritises the use of research infrastructure for industry/academic collaboration

4.8.5 Assessment of impact case studies

The panel agreed that ALF region Uppsala had selected a very strong set of new impact cases.

Impact case study 1: The Determination of the Role of Oxygen in Suspected Acute Myocardial Infarction (DETO2X-AMI) trial

The panel agreed that this was an exceptional case study demonstrating disinvestment. Stockholm and Uppsala benefited equally by submitting this case study, which was a strong national collaboration. The study resulted in clear scientific output (trial results), clinical outcome (implemented in guidelines globally), and societal impact (a reduction in healthcare costs and ultimately the removal of administering an additional procedure for patients and staff).

Impact case study 2: No benefit from fusion surgery in lumbar spinal stenosis

Research showed decompression without fusion should be the standard treatment in what is a relatively common surgical procedure - with resulting decreases in hospital stay, reduced blood loss and simplified post-operative procedures for the patients. In Sweden, the frequency of concomitant fusion has decreased from 40% before the first publication to 8% in 2019, according to the national registry. The cost of this procedure was estimated at USD 6800. This has directly impacted on care in Sweden and has been replicated in a Norwegian trial.

Impact case study 3: Development of the levodopa-entacapone-carbidopa intestinal gel (LECIG) infusion for the treatment of advanced Parkinson's disease

Enhancement of a treatment for PD to increase levodopa bioavailability, commercialised, and used in early phase clinical trials. The panel considered that this was an extremely high-quality translational case study, but as health economic studies are ongoing, real-world impact was difficult to define. However, the intervention clearly had excellent potential.

4.8.6 Progress since previous evaluation

The panel noted that ALF region Uppsala has introduced RD&T councils, successfully established a precision medicine centre, a new centre for health economic research, and had evidently significantly stepped up its collaboration with patient organisations since the last ALF review. The panel also noted that the region still saw no justification for establishing a full HTA process within the region and commended the inter-regional sharing of HTA capacity to provide this function. Nevertheless, the panel agreed that the most significant development was the extent to which the ALF region had successfully exploited

national clinical registries as a research tool for efficient identification of research gaps and opportunities for investment/disinvestment.

4.9 Assessment of ALF region Västerbotten

4.9.1 Overall assessment

Good–high quality

ALF region Västerbotten was considered a highly rated ALF region with negligible criticisms concerning their strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

ALF region Västerbotten performs at the level that is to be expected based on the amount of allocated ALF funding, the regional context of having a vast and sparsely populated area, and the close collaboration with the other three regions within the northern healthcare region.

The geographical challenges in this region have been handled in a structured and strategic way. Indeed, there are several examples where these challenges have been turned into advantages. A prominent example is the collaboration between the research, development, and innovation hub in South Lapland - the Centre for Rural Medicine - and WHO, which is improving rural health by using eHealth solutions in sparsely populated areas.

The ALF region has a long-term commitment to population-based research. Of note, the Västerbotten Intervention Programme (VIP) – engaging approximately 100 primary care centres – aims to improve public health. This generates unique possibilities in the original area of interest, which was cardiovascular disease, as well as in the new focus areas of precision medicine and advanced therapies. Public commitment has been expanded through the new research infrastructure PREDICT. The panel noted that the strategic use of these investments had potential for further development.

The ALF region does not yet have jointly developed formalised strategies with ownership by both the Region and the University. These are still to be developed along with a system for monitoring progress.

Considering the ALF resources available to the region, ALF region Västerbotten was graded as of good–high quality.

4.9.2 Assessment of clinical research and its impact on healthcare and public health

The panel felt that ALF region Västerbotten had acted on opportunities arising, which had proven to be a successful strategy. The panel noted the common and informal understanding between Umeå University and Region Västerbotten. However, the panel suggests that more formalised strategies with an established system for monitoring progress could be helpful in the further development of the region.

The collaboration within the northern healthcare region is extensive. ALF region Västerbotten collaborates with the other three regions within the immediate healthcare region, as well as with Luleå Technical University and Mid Sweden

University. Furthermore, ALF region Västerbotten hosts national functions such as the national Centre for Advanced Medical Products (supported by Vinnova) and has four areas of highly specialised care. There has been a strategic investment in funding of clinical research to meet the increased research demands associated with this national development of highly specialised healthcare.

Several aspects of the self-evaluation are well developed in the ALF region, such as structures to systematically disseminate research results and best practice. One good example of this is that clinicians are actively encouraged to participate in their national clinical specialist associations. ALF region Västerbotten has had public collaboration through its large population project Västerbotten Intervention Programme (VIP), and the participation of patients and their relatives in research is ensured by the requirement that their involvement is part of all applications for local ALF funding. Multidisciplinary research is encouraged by the fact that all ALF grants and research positions are open for all disciplines to apply. Local research grants are also available for interdisciplinary research, involving several disciplines and professions in translational research, which the panel found an interesting complement to the ALF funding at regional level.

HTA North has been established to facilitate the implementation of results from clinical research. Furthermore, research gaps are reported nationally to SBU and to the regional healthcare executive management boards and the ALF committee in order to encourage and facilitate clinical research to address these particular areas. Another strategy used by the ALF region is to allocate a large fraction of ALF funding directly to the departments for open research calls; this is in response to the number of clinical research gaps found in everyday clinical work. This strategy is believed by the ALF region to increase the likelihood of actual implementation of the research findings. Although the panel found this interesting, evidence to support this strategy was not presented.

ALF region Västerbotten works systematically with disinvestment with a process based on HTA reports where final decisions are made by the executive boards in each healthcare region. Monitoring is conducted within a regional organisation and is based on quality registers supported by Regional Cancer Centre North and Register Centre North. There is also continuous assessment of each healthcare unit by key specialists. The panel felt this was a well thought-through set-up, but felt that the description of the processes to monitor and evaluate implementation and disinvestment could be further developed.

4.9.3 Assessment of clinical research and education

ALF region Västerbotten has established an innovative way to conduct education and clinical research in all four regions within the northern healthcare region, which seems to have inspired similar developments in other ALF regions. After ten years, there are positive developments with regard to the number of publications, dissertations, and associate professors.

Like other ALF regions, the strategy of ALF region Västerbotten clearly shows that clinical research is an integrated part of the education of all healthcare professionals. Of note, there is a special Aspiring Researchers Programme and strong, externally funded, clinical research environments recruit students actively to projects. However, the description on how the ALF region works to engage clinical researchers in education could be further developed.

4.9.4 Assessment of innovation and life science

ALF region Västerbotten presents a broad set of actions and structures to support innovation and life science. This structure also forms the basis for collaboration within life science. Of special importance is the Umeå Biotech Incubator (UBI), rated the best life science incubator in Europe by Global Health and Pharma Magazine.

ALF region Västerbotten stands out in Sweden as having a large part of its innovation and life science work conducted as externally funded innovation projects with consortiums of networking actors. An impressive number of EU Horizon 2020-funded projects for development of eHealth solutions are ongoing and coordinated within this region. These include two pre-commercial procurement projects. The panel especially recognises that the Centre for Rural Medicine has attracted collaboration with the World Health Organisation (WHO).

Region Västerbotten has profiled itself as a “collaborative and innovative partner” on the forefront of early adoption and innovative models of cooperation with global companies. Risk and responsibility sharing is tested at “innovation clinics” together with global companies. The overall focus has recently shifted to precision medicine and advanced medicinal products, including having a coordinating role in the national multi-stakeholder initiative CAMP and writing a white paper on ATMP.

The panel found it interesting how the strategic work of ALF region Västerbotten towards innovation and life science development was exemplified by one of the examples given, on how research performed in the ALF region has been used to develop clinical practice. The example is the development of a supplemented infant formula for improving infant health implemented by the industry with products widely available commercially. This suggests that innovation and life science are truly integrated within the ALF region.

There are several innovation strategies within the Northern healthcare region and a new Life Science strategy in region Västerbotten. All university healthcare units are requested to foster an innovative culture through the ALF agreement. The panel believes a joint life science strategy for ALF region Västerbotten might further strengthen the already extensive work undertaken here.

4.9.5 Assessment of impact case studies

The panel agreed that ALF region Västerbotten had selected a very strong set of new impact cases.

Impact case study 1: RNA interference – a new, innovative treatment for transthyretin amyloidosis

The panel noted this as an excellent case study. Prior strategic investments have made it possible to recruit and take advantage of top-quality research associated with the award of a Nobel Prize. The scientific output has been combined with ongoing research within hereditary metabolic rare diseases and the Amyloidosis Centre. The research shows both clinical and societal impact in the form of an approved medical product rated by science as one of the top ten breakthroughs in 2021. The research has also accelerated the development of other RNAi-based medical treatments for several other diseases.

Impact case study 2: Ultra-hypofractionated radiotherapy – a more resource-efficient prostate cancer treatment

The case shows the further development of hypofractionation of radiology for prostate cancer using even higher doses per fraction and a shorter radiology course. Clinical impact is shown by the fact that all Swedish radiotherapy departments having implemented ultra-hypofractionation. The demonstrated societal impacts include reduced workload and reduced waiting time for patients, which was of special importance during the Covid-pandemic. The societal impact is strong, although no research has been conducted to quantify the degree of impact.

Impact case study 3: An evidence-based mobile app for treatment of urinary incontinence

'Tät.nu' is a mobile app with a programme for pelvic floor muscle training for the treatment of female urinary incontinence. The efficacy has been demonstrated in RCTs. Very strong clinical impact is shown by 20 000 women downloading the app in more than 100 countries, and real-world use has been measured using functionality within the app. Societal impact is shown by published cost-effectivity analysis. The app is undergoing commercialisation.

4.9.6 Progress since previous evaluation

The panel noted that ALF region Västerbotten has established an HTA-unit as part of the regional organisation for knowledge-based management. Other developments specified include improvements in healthcare within ATMP, investments in interdisciplinary translational research, a GCP course for healthcare managers, increased funding of clinical research to support national highly specialised care, and the introduction of novel research infrastructures.

4.10 Assessment of ALF region Östergötland

4.10.1 Overall assessment

Good–high quality

ALF region Östergötland was considered a highly rated ALF region with negligible criticisms concerning their strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

The strengths of the ALF region are its transparent joint strategy within the region and the university, and remarkable patient involvement in all levels of clinical research.

ALF region Östergötland has high-capacity computing facilities and competence in artificial intelligence. The panel recommended that the ALF region should continue their efforts in applying artificial intelligence in healthcare data analyses.

Considering the ALF resources available to the region, ALF region Östergötland was graded as of good–high quality.

4.10.2 Assessment of clinical research and its impact on healthcare and public health

The panel appreciated the clear linkage in joint strategy between Region Östergötland and the University of Linköping. Clinical research and political goals are well aligned, and 14 specific target areas and 39 action points are listed. The joint strategy includes both top-down and bottom-up strategies, and this was noted by the panel as being a strong advancement for ALF region Östergötland. Close collaboration between Linköping, Jönköping and Kalmar also enables close collaboration in the south-east healthcare region.

ALF Region Östergötland identifies research gaps in strategic areas and through using open calls that allow targeted research funding. The panel noted that senior research leaders from other ALF regions were invited to evaluate the grant applications for the open research calls, and felt this was good practice.

Patient involvement at all levels of clinical research is enriching and raising the value of the clinical research in the ALF region. The panel felt that ALF region Östergötland was particularly strong in this respect. Patient involvement includes participation in clinical studies, study planning and opportunities to undergo research training programmes and contribute to overall strategy. Dissemination of knowledge to and from public and private healthcare providers is excellent and exemplified by Barnafrid, and Status Östergötland which represent e-learning and web service.

The panel noted ALF region Östergötland as being the founding member of the Swedish Health Promoting Hospitals network, and notes it still hosts its office. The network is active in knowledge dissemination and in addressing health orientation in all healthcare and health services from a patient, co-worker,

population and management perspective. The ALF region's contributions to national development and national collaboration are clear at many levels, for example Biobank, Genomics Sweden and SciLifeLab. ALF region Östergötland has high-capacity computing facilities, and therefore the panel found that related artificial intelligence could have been emphasised even more in the self-evaluation to promote the region's particular excellence in clinical research and its impact in healthcare. The panel noted examples where research based in the region had utilised artificial intelligence in solving clinical problems, such as the combination of smart phones and implemented sensors, use of magnifying cameras and internet-based treatment programmes. The panel recommended that the ALF region should continue its efforts in applying artificial intelligence in healthcare data analyses using nationwide primary healthcare and hospital data.

4.10.3 Assessment of clinical research and education

ALF region Östergötland integrates clinical research predominantly into the education of medical students, while also aiming to allocate funding to other healthcare professionals. The panel thought it was important that the region should actively include other disciplines (for example physiotherapists) along with medical students. Utilising problem-based learning, identifying talents in the early phase of studies and summer-time grants, as well as introductory courses in medical research are good examples of how medical students are trained and have the opportunity to become interested in research.

In ALF region Östergötland, the number of students undertaking clinical research is used to evaluate and monitor success. Furthermore, research quality is followed up annually. The assessment of education is carried out every 6th year. The panel recommend that a more systematic and qualitative approach to assessment of the education aspects of clinical research should be developed, including the choice of evaluation tools for recognising success in clinical research education.

4.10.4 Assessment of innovation and life science

Education in clinical research is closely integrated with innovation and life science, and this is demonstrated in science parks, MedTech and successful initiatives (e.g. LEAD incubator). ALF region Östergötland has clear linkages and development across the whole sector, which supports both innovation and life sciences development, emphasised by a regional life science strategy. During the hearing, the ALF region reported close collaborations with industry with no major challenges noted.

Success with removing barriers to data sharing is moving slowly, which may be a national problem. ALF region Östergötland has, with its expertise in artificial intelligence, the potential to take a lead role in this area, thereby providing benefits for the whole country. Additionally, the panel noted that ALF region Östergötland has the potential to develop a systematic registry of clinical studies, along with, or in addition to, approval systems and ethical committee databases.

4.10.5 Assessment of impact case studies

The panel agreed that ALF region Östergötland presented a good set of impact cases studies. Both CTCA and digital pathology were examples of research and implementation which has initiated disinvestment of procedures.

Impact case study 1: Computed tomography coronary angiography (CTCA)

The panel found this to be a strong example of the underpinning value and impact of translational and clinical research in collaboration with industrial partners. The study has resulted in clear scientific output and clinical outcome (implemented in guidelines globally), and societal impact (reduced costs) although the long-term impact on healthcare has not yet been demonstrated outside trials. The same case study was submitted in the last evaluation, but now has more research and developments (new technology) to underpin it.

Impact case study 2: Pre-hospital command and control (Emergency)

This impact study started as an idea to assess compliance to guidelines and was developed by a centre with input from other specialties, including computer science. With the COVID-19 pandemic, the application from research to an operational command centre took place overnight. During the hearing, the panel noted that almost all Swedish hospitals had adopted this training, making comparison with other potential approaches difficult. It was thought that international comparisons could elucidate the added value of the approach of the case study.

Impact case study 3: Digital Pathology (DigiPat-AIDA-BigPicture)

This study was considered by the panel as having very high potential, and representing a strong example of clinical innovation. The University of Linköping is an innovative centre for digital pathology in Sweden, and SECTRA has made important contributions. Currently, this application is in worldwide use (e.g. Australia, Korea, Israel). The panel noted the high potential of digital pathology both for clinical research and for clinical practice in removing the “human” bias in image analysis.

4.10.6 Progress since previous evaluation

Remarkable progress in strategy development was noted by the panel. ALF Region Östergötland has allocated funding contributions to their strategic work and the shared strategy described the comprehensive approach by ALF region Östergötland to develop their clinical research. It is evident that progress has also been made in involving patients and the public in decision-making relating to clinical research: the systematic approach, such as launching a council at the intermediate level is an excellent example of this initiative.

4.11 Assessment of ALF region Örebro

4.11.1 Overall assessment

Good–high quality

ALF region Örebro was considered an ALF region with some strengths, but also some weaknesses concerning its strategy, processes for implementation of clinical research, education of students, and submitted impact cases.

The panel was particularly impressed by the evaluation from students in Örebro University in respect of their medical education. The panel recognised that ALF region Örebro was using their advantage of having a representative sample of the whole Swedish population in the region, to exploit their potential as a collaborator in order to test approaches for research into common diseases. While there is an increasing amount of clinical research in the region, the strategy, structure, and plans to achieve an impact on healthcare and public health could still be improved. However, it was noted that, ALF region Örebro has held ALF funding for a shorter period than other regions, and consequently have had less time to develop and evaluate its strategies and approaches.

Considering the ALF resources available to the region, ALF region Örebro was graded as of good–high quality.

4.11.2 Assessment of clinical research and its impact on healthcare and public health

ALF region Örebro has a focus on common diseases, maintaining registry research and conducting elderly care in collaboration with the municipalities. However, it was not clear how the ALF region will monitor and evaluate the results of this and other efforts in terms of the impact on healthcare and public health in the future. A regional strength is the long-established HTA unit, CAMTÖ. The panel agreed that the recently started collaboration between CAMTÖ and the municipalities in the region, with a particular goal to identify gaps concerning the municipality-based healthcare, is an innovative and potentially important step in improving the collaboration between the hospitals and the community-based health services. The panel noted that structured work for involvement of patients and the public started in 2019-20, but was hampered by the pandemic. Although ALF region Örebro currently involves patients in both research and healthcare, future work on strategic and structured patient and public (PPI) involvement will be an important step moving forward. Örebro University and Region Örebro County collaborate closely in many areas, but do not have a joint strategic document on how to work strategically with clinical research to achieve an impact on healthcare and public health.

4.11.3 Assessment of clinical research and education

In the medical program at Örebro University (ÖU), all tutors are active researchers, and training of students in Evidence Based Practice (EBP)-related themes, such as literature searching and critical assessment of research articles with a problem based learning approach is emphasised. All ALF-funded

researchers are required to teach, which has further facilitated integration of clinical research into the curriculum. The panel was impressed by the strong evaluation from medical students, as shown in the Swedish Medical Association's survey on the quality of medical education. EBP-related issues were especially highly rated, and this success may reflect the strategies and efforts relating to including clinical research in the education programme. During the hearings, the "enthusiasm of being new" was seen as a potential comparative advantage for ÖU, but a future challenge might be to offer the clinicians enough time for clinical research. The panel did note, however, that no other professions outside medicine were described in the self-evaluation, and the panel felt this might be an area for improvement.

4.11.4 Assessment of innovation and life science

ALF region Örebro has an ambitious regional life science strategy and relevant structures are already established. Relevant examples of how ALF region Örebro works include having established a specialised unit for clinical trials and courses in Good Clinical Practice. Active collaboration with the life science industry is one goal which merits special attention, since there are few life science companies in ALF region Örebro. Attracting industry-sponsored trials is emphasised. Innovative ways of utilising the comparative advantage of the close collaboration in the region to make it easier and faster for life science companies to collaborate may be explored. ALF region Örebro has a systematic life science strategy, tailored to the regional eco-system, which is very different from the well-developed innovation systems and infrastructures in ALF regions Stockholm, Västra Götaland and Skåne. However, the current volume of innovation and life science development is modest, and the panel recommended increased future collaboration in innovation and life science development with other ALF regions.

4.11.5 Assessment of impact case studies

The panel agreed that ALF region Örebro had selected a good set of impact cases.

Impact case study 1: Evaluation of thrombus aspiration treatment in myocardial infarction

Thrombus aspiration in myocardial infarction has been considered standard treatment for many years. In a nation-wide registry-based randomised clinical trial coordinated from ALF region Örebro, it was demonstrated that thrombus aspiration in myocardial infarction does not improve patients' prognosis, and consequently is a treatment that can be disinvested. The panel agreed that this is a strong example underpinning the value and impact of clinical research in a collaborative setting. Clear scientific output (published trial results), clinical outcome (implemented in guidelines globally), and societal impact (reduce patient burden and costs) were demonstrated. However, the long-term impact on health (no loss of survival by omitting thrombus aspiration) has yet to be demonstrated in a real-world setting.

Impact case study 2: Bariatric surgery in the treatment of obesity

Laparoscopic gastric bypass surgery is safe and effective in the treatment of obesity. However, small bowel obstruction due to internal hernia is a common and potentially serious complication after this procedure. The results from a collaborative national trial, coordinated from ALF region Örebro, demonstrated that closure of mesenteric defects markedly reduces the risk for small bowel obstruction due to internal hernia, and this is now considered routine practice in Sweden and internationally. However, this procedure is associated with an increased risk for early small bowel obstruction and pulmonary complications. Later registry-based trials coordinated from ALF region Örebro has demonstrated that the latter complications can be reduced. The ten-year results of the implementation of this procedure will soon be published and is expected to confirm the favourable outcomes.

Impact case study 3: Sexually Transmitted Infections (STIs)

ALF region Örebro has been hosting a WHO Collaborating Centre for STIs since 2011. Pre-clinical research performed in the region has identified new antimicrobials for gonorrhoea, which is now tested in clinical trials (phase three). Overall, the research performed in the region has impacted on three European guidelines for diagnosis and management and informed one European Position Statement regarding diagnostic testing of STIs. The impact on health has yet to be demonstrated.

4.11.6 Progress since previous evaluation

The panel agreed that ALF region Örebro has made substantial progress with regard to its strategies, structures and its activities with clinical research to achieve an impact on healthcare and public health. The panel further noted that a significant strength is the quality of the medical education, which is integrated into clinical care and that key steps are taken to facilitate integration of clinical research into the medical curriculum. In this regard, ALF region Örebro utilises its comparative advantage of being a relatively small region with close collaboration between the university and the healthcare sector.

5 Evaluation of the prerequisites for clinical research - Panel 3

The starting point for the evaluation of the prerequisites for clinical research have been formulated by the National ALF Steering Committee. In accordance with these, the evaluation was conducted by a panel of international experts and based on assessment of various data, including self-evaluations and hearings.

The overall aim is to increase the quality of clinical research. The panel's mission is to make a balanced assessment of the quality of the prerequisites for clinical research in the ALF regions and group them into one of three categories according to the resource allocation model (poor quality, good–high quality or very high quality).

According to the starting points formulated by the National ALF Steering Committee, the prerequisites for clinical research should be evaluated with regard to critical success factors in order to strengthen clinical research. Based on the instructions of the National ALF Steering Committee, the Swedish Research Council has focused on the following critical success factors, called “components” in the evaluation, to evaluate the quality of the prerequisites for clinical research:

- Research infrastructure
- Time for research
- Career development
- Incentives for clinical research

There was initially an ambition that funding for clinical research should also be included as an evaluation component. Since there are no good methods for obtaining comparable financial statistics from the ALF regions and universities in the ALF regions today, financial information was only provided as background information in this evaluation.

5.1 The expert panel

A panel of international experts, appointed by the Swedish Research Council, carried out the evaluation. The experts were appointed based on proposals from the ALF regions. In order to secure consistency between in the assessments in the current and the previous evaluation, half of the panel members were chosen from the previous ALF 3 panel.

The six members of the panel (see Table 17), have many years of experience of managing and organising clinical research and postgraduate education. Together, the panel members comprised expertise in organisation, leadership, funding of research, prioritisation of research, merit systems, postgraduate education and internship, mentoring, research infrastructures and quality assurance structures.

All panel members were asked to affirm that they had no conflict of interest.

Table 17. The expert panel.

Name	Organisation	Country	Main area of expertise
Ian Hall	University of Nottingham	UK	School of Medicine, Division of Respiratory Medicine
Janna Saarela	University of Oslo	Norway	Translational medicine, research infra-structures/Centre for Molecular Medicine Norway/Director
Rien de Vos	Amsterdam Medical Centre	Netherlands	Centre for evidence-based education
Taina Pihlajaniemi	University of Oulu	Finland	Biomedicine, molecular biology/Vice Rector (research)
Rupert Beale	Francis Crick Institute/ UCL	UK	Cell biology of Infection Laboratory - Consultant Nephrologist
Sirpa Jalkanen	University of Turku	Finland	Immunology/ Institute of Biomedicine/ MediCity Research Laboratory/Director

5.2 Assessment criteria

The table below presents the structure of the self-evaluation regarding the evaluated prerequisites. The prerequisites are described by defining the scope and objectives for successful implementation in the ALF regions. Thus, the objectives for each prerequisite constitute the assessment criteria regarding how the prerequisites should be evaluated.

Table 18. The prerequisites for clinical research in the evaluation

Prerequisite	Scope	Objective
1. Access to research infrastructures	To what extent the ALF region ensures that clinical researchers have access to necessary research infrastructures (RI) to enable clinical research of the highest quality.	<p>1.1 The ALF region has developed strategies for securing short-term and long-term accessibility to relevant and necessary RI for clinical research.</p> <p>1.2 The ALF region has coordinated appropriate management and maintenance of RI, and provides support functions and quality assurance procedures, to enable proper use of RI for clinical research.</p> <p>1.3 The ALF region has implemented strategies for prioritising, coordinating and securing short-term and long-term financing of RI including transparent and cost-effective user fees.</p> <p>1.4 The ALF region has ongoing collaborations with other Swedish universities and ALF regions to secure access to larger and expensive RI (state-of-the-art) with appropriate expertise.</p> <p>1.5 The ALF region actively encourages and supports their clinical researchers to use large national RI, such as SciLifeLab, ESS, and MaxIV.</p>
2. Time for research alongside clinical work	To what extent the ALF region ensures that clinical researchers have been allocated sufficient time to perform clinical research of the highest quality alongside their clinical work, and that allocated time	<p>2.1 The healthcare organisation has the necessary resources and personnel to ensure that clinical research and clinical research education can be carried out alongside clinical work.</p> <p>2.2 The ALF region has enabled an academic career alongside clinical work in collaboration between the healthcare system and the medical faculty in order to ensure time for</p>

Prerequisite	Scope	Objective
	can be used according to plan.	research, which includes combined posts and/or different types of joint positions for clinical research with clinical work.
3. Career development for clinical researchers	To what extent the ALF region has established career development models that enable clinical researchers in all healthcare professions to pursue a clinical research career.	<p>3.1 The ALF region has well-established models for clinical researchers' career development in collaboration between the healthcare system and the medical faculty.</p> <p>3.2 The ALF region has a model for encouraging, enabling and supporting clinical researchers' mobility opportunities to pursue an international or national post doc or a sabbatical period.</p> <p>3.3 Gender balance is actively promoted at all levels, and gender perspectives are addressed to ensure gender equality for clinical researchers in the healthcare organisation and at the medical faculty at the university.</p> <p>3.4 The ALF region provides opportunities and ensures continuous research skills development throughout careers in the ALF region.</p>
4. Incentives for clinical research in the ALF region	To what extent the ALF region has implemented incentive structures to integrate clinical research throughout the healthcare organisation.	<p>4.1 The ALF region has developed and integrated incentives that promote academic competence in clinical research at all levels in the healthcare organisation.</p> <p>4.2 The ALF region has developed specific incentives to encourage healthcare professionals to become PhD students and pursue a clinical research career, where academic merits are rewarded throughout the career.</p>

Prerequisite	Scope	Objective
		4.3 The ALF region actively promotes diversity among clinical researchers at all levels in the healthcare organisation, with incentives and specific support that enable and encourage clinical research careers for people who are at various phases of life during working life and come from different backgrounds.

The components were assessed as to how they were implemented in the seven ALF regions, in terms of creating good prerequisites for clinical research. The focus for the assessment was on how each ALF region has developed the respective component in relation to the objectives, and with regard to structures, processes and results.

5.3 The evaluation process

The objectives for the four prerequisites have been assessed in a four-phase process.

1. Pre-evaluation: the experts' individual assessments of strategies and structures, processes and results for each objective for each ALF region.
2. Calibration of pre-evaluation: calibration of the experts' individual pre-evaluation assessments to a preliminary common score for each objective for each ALF region.
3. Hearings: panel hearings with all ALF regions, followed by discussions as the panel agreed on a preliminary rating for each prerequisite in each ALF region.
4. Final assessment: joint panel meeting in Stockholm, when the panel agreed on a final overall assessment of each ALF region's prerequisites for clinical research.

The pre-evaluation (phase 1) was based on the following data material:

- Self-evaluation made by the ALF regions
- Survey to clinical researchers and clinical PhD-students

In addition, the panel had access to background material that was not part of the assessment. The background material consisted of a background report collated by the Swedish Research Council in collaboration with the ALF regions, in which the regional context was presented, to give the panel an overview of the variation in scope, strength and ability of the different ALF regions. The background report also contained a description of the Swedish healthcare system in general, and in particular how clinical research is organised, including data on clinical researchers and research students in the ALF regions. The panel also had

access to a list of the most important research infrastructures (RI) in each ALF region, describing their use in clinical research and to what extent the RIs were available for clinical research. All documents are available upon request from the registry (Swe: registratur) at the Swedish Research Council.

The calibration of the pre-evaluations (phase two) was carried out at a digital meeting between the panel members, where they discussed discrepancies between their individual pre-evaluations, in order to make sure that they assessed the quality of the prerequisites in each ALF region in a comparable way.

The hearings with the ALF regions were held as digital meetings, making it possible for all panel members to meet with all ALF regions, over a period of three weeks. At each hearing the panel met the overall management of the ALF region (1 hour), the heads of clinics and faculty leadership (1 hour), and during the last hour the ALF region was asked to present 2-3 specific research environments for clinical research to the panel (1 hour). After each hearing the panel met to discuss their views of the presentations and to agree on a joint assessment of the ALF region, regarding the four prerequisites.

During the final phase the panel met in Stockholm for three days, to conclude their assessment and to write the evaluation report.

5.4 Evaluation results

The panel was impressed by the overall standard of the prerequisites for clinical research in Sweden, and also by the significant improvements that had been made in many ALF regions based on the feedback from the 2018 evaluation. The overall extent of improvement in the ALF regions therefore created a challenge for the panel in scoring ALF regions in the current evaluation. The evaluation model only allows for 1-3 ALF regions to be awarded the highest grade. The panel were unanimous in awarding the ALF regions Västra Götaland and Västerbotten the highest grade. ALF region Skåne was awarded a lower grade compared to the previous evaluation. This should not, however, be interpreted as a decline in the research environment within ALF region Skåne. The main reason for this decision was that even though ALF region Skåne still performs at a high level, other ALF regions had improved to such an extent that it was not possible to distinguish between them and Skåne in their level of performance, based on evaluating the use made of the allocated ALF funding to support the prerequisites for clinical research.

Table 19. Overall assessment results for the ALF regions

ALF region	Inferior quality	Good–high quality	Very high quality
Stockholm		x	
Västra Götaland			x

ALF region	Inferior quality	Good–high quality	Very high quality
Skåne		x	
Uppsala		x	
Västerbotten			x
Östergötland		x	
Örebro		x	

5.4.1 Reflections and general comments

Background and changes since 2018

In 2018, the evaluation panel noted the key strengths in research infrastructures in Sweden. These included excellent physical infrastructure, a generally collaborative working environment within each ALF region, internationally important cohorts, and the added value from the ALF funding stream in maintaining infrastructure and building capacity through academic training.

Some areas of weakness were also identified in 2018, including variation at ALF region level in the way in which ALF funding was used, the need for better national coordination (as opposed to ALF regional coordination), the need to drive up research in the primary care sector, and the relative lack of international mobility of researchers.

In 2022, the panel considered that, despite the COVID-19 pandemic, the areas of strength continued to be present. Significant progress has been made to address the areas of weakness noted in 2018, but further progress on these is required to fully take advantage of Sweden's otherwise excellent clinical research infrastructure.

COVID reflection

Whilst the extent of lockdowns due to COVID-19 in Sweden was less than in many other countries, the restrictions imposed during the COVID-19 pandemic undoubtedly affected the ability to make maximum use of some research infrastructure, and also slowed down the rate of changes being made to try and address better coordination between the ALF regions. Many research projects were paused, but it appears that the vast majority of research projects had restarted at the time of the panel hearings in 2022. Some researchers were affected by the increased demands on time caused by managing patients with COVID-19. The disruptive innovation caused by the pandemic has, of course, resulted in major changes in how training and research management is undertaken, with the widespread adoption of virtual meetings being an obvious example.

Sweden undertook internationally important research into the pathophysiology of COVID-19 disease and into diagnostic tests and treatments. The Centre for Infectious Medicine in Stockholm was particularly active in this respect, and we have included in this report an exemplar case study of how the ALF-funded infrastructure helped support this work, but all ALF regions made significant contributions.

One major effect of the pandemic was to reduce researcher mobility, and it will be important, moving forwards, to pick up the pace and to ensure that sufficient incentives are in place to facilitate greater mobility.

The ALF regions valued the increased flexibility that was introduced in the use of ALF funding between years during the pandemic, which was helpful, as this allowed funds to be carried forward at the end of the relevant financial year to ensure paused research could still be supported.

Key messages from the 2022 evaluation

The 2022 ALF Panel identified four key areas which it felt required additional consideration nationally in order to obtain maximum value from the ALF funding in Sweden. These are as follows.

1. Finance and governance

The panel thought that the variation in the way ALF money was managed and flowed within ALF regions complicated judgements on ‘value for money’. There is no central reporting of how ALF money is used, for example by defining and monitoring the spend on different categories, such as salary support for those undertaking PhDs, salary support for senior investigators, core funding to physical infrastructure or in other categories. The self-evaluation reports provided some details, but a ‘soft-touch’ annual return by each ALF region to the Swedish Research Council would allow for public accountability when required. Prior to the hearings with the ALF regions, the panel was initially concerned that ALF funding could potentially be used for purposes other than those for which it had been allocated, but we were reassured in the panel hearings that this is unlikely to be an issue. Indeed, much of the infrastructure supported by ALF funding also depended on significant contributions from other sources, including regional money and external grants. Nonetheless, there is marked variation between ALF regions in governance models, with some ALF regions operating a centralised model and some a highly devolved model. Reporting internally varied from monthly tracking of spend to light-touch reviews at 6-month or 12-month intervals. Whilst the panel would strongly resist too rigorous monitoring, given the additional administrative burden this would inevitably impose, light-touch annual monitoring of how ALF money was used in each ALF region, together with the development of a core set of metrics on spend, would aid future evaluations, and would also allow the Swedish Research Council to provide data at national level on the use of ALF funding.

2. PhD training and capacity building

The panel was impressed by the work undertaken in all ALF regions to encourage medical students to enter a research track. Most ALF regions ran summer schools or had similar incentives, and there were also several MD/PhD programmes.

However, the average age of clinical researchers graduating with a PhD remains high in Sweden, due to the generally long period required to obtain a PhD alongside clinical training. This is hardly surprising when for example only 20% of time is allocated to research which was the case for at least some PhD candidates. Graduating when aged over 40, as frequently happens, slows down progression through an academic career. There is a range of ways in which PhD programmes for clinical researchers are managed in other countries which result in graduation at an early career stage, and the panel thought further review of this issue would be valuable. One option, which operates in some countries, is to use national competitive schemes giving the best candidates the option to undertake a PhD over a much shorter time period with a higher percentage of time allocated for research.

Whilst incentives exist to encourage medical students to consider undertaking a PhD, much less in the way of incentives exist for other healthcare professional groups, and this needs to be addressed. The panel also found that, whilst there has been work in some ALF regions to encourage those from a primary care background to enter research (an example is given in the case studies), this remained an under-represented area in research, and further progress is required.

As noted above, general researchers in Sweden seem relatively less mobile, both within the country and at international level, than would be the case in some other countries. The panel did hear from several researchers who had spent time in overseas research groups, and they were unanimous in their appreciation of the value of this. Clearly, the pandemic has reduced mobility over the 2020-2022 period, but this agenda will need further positive support and incentives moving forwards.

3. Regional and national collaboration

In 2018, the panel noted that, whilst within ALF regions collaboration is often strong, there is less evidence of strong cross-regional collaboration. Early and efficient delivery of clinical trials, recruitment to cohort studies and biobank studies are examples where recruitment coordinated across all ALF regions would result in faster and more efficient research delivery. Whilst there were good examples of all of the above types of cross-regional research presented to the panel, many ALF regions still adopted, as a default, 'within ALF region' study designs. The panel considered that there is still room for much more cross-regional collaboration to address this issue, and it may be necessary to provide incentives to support this. Potential rapid benefits would, for example, come from an efficient, easy-access federated national biobank model.

National infrastructures such as SciLifeLab have expanded in terms of their geographical coverage, but again there is more that can be done to ensure that

excellent national infrastructure for research is available and used by all who would benefit.

4. Equality and diversity

All the ALF regions had paid attention to gender balance through active monitoring and, where necessary, intervention. However, at senior levels, gender imbalance remains across the country, although of course it will take some time and possibly additional incentives to fully address this issue.

The panel asked all the ALF regions about other aspects of diversity, and were surprised that very little attention is paid to issues other than gender. Ensuring research is undertaken in a supportive and inclusive environment is essential. It seems in Sweden, at present, that further actions may be required to ensure that all researchers, regardless of their cultural, ethnic or professional backgrounds, and regardless of disability, are encouraged and facilitated to engage in research careers. In addition, recruitment from all sections of the Swedish population, regardless of cultural background, into research studies should be facilitated to ensure research findings are generalisable to the whole population. This will require positive action, for example by using different recruitment strategies to encourage recruitment of under-represented groups into research, and the wider provision of research material in relevant languages other than Swedish.

5.4.2 Examples of good practice

The panel selected, from presentations made at the hearings, a series of examples of good practice which describe the breadth of research supported by ALF funding across Sweden.

Stockholm

An excellent example of outstanding facilities in ALF region Stockholm as well as research leadership is the Centre for Infectious Medicine, which is one of the leading translational research centres for immunity and infectious diseases in Europe. During the COVID-19 pandemic, it became the leading centre for COVID-19 immunological research in the country, driven by its ability to rapidly re-focus its efforts on COVID-19 research. It made very effective use of patient and clinical meta-data, and experiential data sets, as well as registry-based research. It was very well supported by the underlying ALF-funded research infrastructure, and their research projects involved a large number of students, PhD candidates and post docs. This led to a number of very important scientific papers: bibliographic analyses showed that the Karolinska Institute was placed in the top-10 world leading centres with publications on this topic.

Skåne

The Lund University Centre for Cardiac Arrest Research program was presented to the panel by three scientists at different career levels, exemplifying the benefits of ALF-funded research opportunities. The program hosts almost 60 researchers who are focused on various aspects of cardiac arrest. A major line of research has been the two TTM-trials (Targeted Temperature Management after out-of-hospital cardiac arrest trials 1 and 2). The group is multi-professional,

involving intensive care nurses, occupational therapists, physiotherapists, psychologists, and physicians from various medical specialities including anaesthesiology/intensive care, neurology, cardiology, neurophysiology, and radiology. Based on the group's research, international guidelines on intensive care management, prognostication and follow up have been revised and improved.

Uppsala

Uppsala's long tradition of outstanding research in genetics and genomics is showcased in the field of precision medicine. The panel heard about two highly innovative "bench to bedside and back studies" that illustrated how the research infrastructure environment is used to perform outstanding clinical research. In the first example, a novel method of ultra-sensitive detection of critical cancer mutations is being pioneered. This relies on technology developed at Uppsala University and supported by Vinnova that allows ten-fold higher sensitivity compared to previous technologies. In a further example, the panel heard about the use of CAR T cell therapies that have been successfully used as cancer treatments in Sweden since 2014, when this approach was initiated in the Uppsala ALF region. These CAR T cells are engineered to destroy cancer cells, and the ALF region is now trialling variants with improved efficacy.

Västerbotten

ALF funding in ALF region Västerbotten is used to help support the nationally important NorthPop study. NorthPop is hosted by Umeå University in collaboration with Region Västerbotten. It consists of a database and biobank containing extensive population-based, longitudinal data, collected from 10 000 families, including 30 000 individual children and parents. Extensive data are collected regarding lifestyle, social exposure, biomarkers, genomics, epigenomics, metabolomics, geospatial data, as well as child health data (neurodevelopment, growth, cardiometabolic health, respiratory health) and these are combined with data from national registers and healthcare records. This cohort is unique due to its longitudinal nature, and the results of research using this resource will be invaluable for improving predictive medicine and public health strategy and for developing social healthcare models.

Västra Götaland

The panel found the work leading to successful uterus transplantation in patients an impressive example of translational research that would not have been possible without ALF funding. The work began due to the lead researcher's recognition of the strong desire of women without a uterus to have offspring. After extensive and systematic preclinical research, including the development of various animal models, and finally trials with humans, a protocol was developed by Mats Brännström and his colleagues that has now resulted in babies being born by the treated women. The case highlights the need of access to several types of research infrastructures, including the Experimental Biomedicine's animal facilities, the Transplantation Biology Lab, and the clinical facilities of the Sahlgrenska University Hospital, and the need for a research group with a good mix of clinical and basic science researchers at

different levels. This has led to extensive international collaborations within the field of uterus transplantation with prestigious institutions in the USA, Japan, Germany, and Australia.

Örebro

Researchers in ALF region Örebro have used ALF funding to help create a strong research environment in diabetes, endocrinology and metabolism. The principal investigator for the national stepped wedge trial, RCT-CDC4G- Changing Diagnostic Criteria for GDM (gestational diabetes mellitus), is based in this research group. This project aims to evaluate pregnancy outcomes after a change in diagnostic criteria for GDM in Sweden. During 2018 – 2019, the study was active in 11 clusters involving 63 000 women. Analyses are exploring both medical outcomes and health economic evaluations. Specifically, in Örebro the project has three PhD students involved in follow-up studies of children and women. The project also includes extensive international collaboration. A further outcome is the establishment of cohorts of children and mothers to constitute a long-standing resource for future research. The study has gained substantial national and international interest, and initial results are planned to be published late in 2022/early 2023.

Östergötland

Historically, the number of general practitioners obtaining a PhD degree in Sweden has been low. ALF region Östergötland has used ALF funding to actively increase the number of clinicians with a PhD degree in primary healthcare, and has established a sustainable and growing research environment of high quality to do this. As of summer 2022, there are two professors, five associate professors, and fifteen employees with a PhD degree, along with fifteen PhD-students. The environment has in particular been recognised for its contribution to research on cardiovascular risk factors and type II diabetes, but has also widened its scope substantially as the research environment continues to grow. This expansion will facilitate healthcare developments in primary care by addressing emerging research questions, such as the use of novel technologies and use of self-monitoring in a range of medical conditions. This increases organisational preparedness for the anticipated shift towards a more patient-centred and local healthcare delivery model.

5.5 Assessment of ALF region Stockholm

5.5.1 Overall assessment

Good–high quality

The panel noted that the Stockholm ALF region is internationally recognised for its world-leading physical research infrastructure. This gives not only excellent opportunities for their own clinical researchers, but importantly should form the basis to provide support to the other Swedish ALF regions.

In the 2018 ALF report, the panel noted an element of disconnect between the ALF region management and the departments, as well as a lack of extensive collaboration on a national basis. The ALF region has shown itself to be responsive to the feedback from the previous assessment, and substantial changes have been made after 2018 to address issues within the ALF region.

The ALF region receives the largest share (27%) of the ALF funding. The Karolinska Institute's reputation and the leading infrastructure continues to set a high standard for expectations.

In the 2022 assessment, the panel met an engaged team of department heads and research leaders. Coordination within the ALF region was noted to have improved since 2018. The panel also observed some improvements in national co-operation. However, the panel considered that there is further work to do in this area, and would encourage the Stockholm ALF region to consider further how this is best addressed. Access to the research infrastructures for clinical research within the ALF region was seen in general to operate well by the users. Time for research is well monitored, however the panel found evidence that there are still challenges in ensuring adequate time was provided to facilitate research. Overall access to supervisor support and time for research are comparable to other good–high rated ALF regions, but below the best performing ALF regions, and the panel considered that there was still room for improvement. The ALF region has a well-established model for clinical researchers' career development, similar to that seen in other good–high ranking ALF regions. The overall incentives to follow a research career track are also similar to other ALF regions. Whilst attention to gender balance is good the panel considered that this approach could be expanded towards diversity in general. The ALF region performs very well in terms of internationalisation. In general, whilst noting the excellent profile of the ALF region in terms of reputation, buildings, facilities and academic output, the panel felt additional development was needed to further enhance the research training and career environment.

Therefore, ALF region Stockholm was assessed overall as being of good–high quality, though the panel wished to commend the ALF region for the improvements made after the 2018 report.

5.5.2 Assessment of access to research infrastructures

The ALF region has a broad set of updated strategies, which cover access to infrastructure within the ALF region. The overall quality of the physical research infrastructure is high and internationally competitive. The investments in new buildings for translational research and clinical research are impressive, and the overall strategy was considered to be strong. The current research infrastructure management system has resulted in improved oversight and better access for users. The panel noted that overall use, coordination, and quality of infrastructure is monitored and evaluated according to predetermined schemes, supported by surveys. Survey data mention that nearly all respondents consider the facilities important for their research.

The processes for securing short-term and long-term accessibility to relevant and necessary infrastructure for clinical research include continuing long-term strategic investments, bottom-up funding of infrastructure, with user fees and a structured process to consider suggestions for new infrastructure. A model for life-cycle management and sustainability is in place.

With regard to supporting national collaboration, the panel was pleased to note that there is a strategy to make infrastructure developed within the ALF region available to the broader research community in Sweden, but felt more could be done to facilitate this. Stockholm ALF region is also coordinating and participating in managing national infrastructure, for example through hosting SciLifeLab, together with other universities. Other important examples of national collaboration are the Genomic Medicine Sweden initiative, the ongoing multi-centre clinical studies led from Stockholm, and the responsibilities for national ranked quality registers. Overall, the panel felt there had been an increase in collaboration with the other ALF regions compared to 2018, although this could be extended further with benefit. The ALF region has tried to improve outreach activities to encourage use of resources such as MaxIV and ESS, although external users mentioned to the panel that access sometimes depends on having personal contacts to facilitate access.

5.5.3 Assessment of time for research

Overall, the panel considered that the vision for providing clinical research opportunities, resources and personnel within the healthcare/academic system is good. The ALF region has established a culture that creates, maintains, augments and evaluates research time allocation in a supportive way. There appeared to be quite a large proportion of funding being used to support basic physical infrastructure. This ensures continuity of core physical infrastructure, but inevitably comes at the cost of less resources being available to support staff or students' time for research directly. Research time is co-financed making it less dependent on one source, however this also means it is difficult to track the precise contribution from ALF sources. The panel was told that about half of ALF funding is distributed across the whole healthcare sector, which obviously helps maintain stability, however the panel felt that care should be taken that sufficient money remains to support specific research projects.

Reported accessibility of supervisors to their PhD students is close to average, but a little lower than in some other ALF regions, and the panel considered there was room for improvement in this aspect. The relationship between the reported time actually available for research contributing to PhD studies compared with the contracted time allocated was also similar to that seen in most other ALF regions, but below the best performing ALF region. The panel noted that a significant minority of PhD students did report difficulty in taking research time, and so this is an area where the ALF region will require some further effort.

The strategic investment in clinical research schools helps clinicians combine doctoral education with clinical work. There are good financial programmes available to support clinical research positions. Academic career paths for clinical researchers are also supported through the KI academic career structure, where relevant profiles ('research profile', 'adjunct profile', 'education profile') are in place for clinical researchers. There are a considerable number of clinical researchers with combined posts as senior lecturers or professors, but it was unclear if there was a long-term targeted strategy in place based on needs assessments by the different departments.

5.5.4 Assessment of career development

To further structure career development, an ALF regional action plan "From Student to Docent" has been implemented. The plan includes incentives to start a research career, financial support options for doctoral students and postdoctoral researchers and support for the development of ongoing research skills. This is a good system and comparable to that operating in several other ALF regions. A further strength is that monitoring in this scheme leads to appropriate actions; for example, a programme is in place to increase the number of docent applications and raise the proportion of approvals. Although the panel considers this a good career model, the number of applicants for grants and grant success rate has been static over the past decade. To further improve the model, the ALF region could consider additional targeted incentives for 'vulnerable' periods in the research career, for example in the immediate post PhD period. A more closely supportive strategy for finance, skills training, mentoring and grant support could prove beneficial.

The model in the ALF region for encouraging and enabling clinical researchers' mobility is impressive, and the panel considered this aspect to be excellent. The strategies and structures to promote mobility include strategic international and national collaborations, support for applying for funding and participation in exchange programmes, internationalisation at home, and exchanges during first and second cycle education. The strategic, specialised, and targeted communication, support and expertise regarding the various mobility opportunities available for all researchers was acknowledged by users.

The ALF region has a strategy that emphasises that all activities should have a clear gender perspective, and that gender equality must be integrated into regular operations and into all decisions, and this has proven to be effective. The panel considered there was a clear culture for this: uneven gender balance was picked up by the management, and appropriate action taken. A specific measure taken

to strengthen competence and awareness of diversity perspectives was the on-line training course focusing on unconscious bias in assessment. However, this gender balance strategy and culture could be further widened and improved by considering other issues related to diversity. The increased focus on global health and primary healthcare may help stimulate this. The panel felt that areas of focus could include supporting more research by allied health professions, and an additional focus on ethnic and academic diversity in staff, as well as ethnic diversity in research patient populations.

5.5.5 Assessment of incentives for clinical research

The ALF region provides a series of incentives to encourage academic competence at all levels of healthcare. Recruitment and managerial activities favour those with strong academic credentials. Whilst there is always a risk that heads of departments with limited academic background, or little affinity for research, do not value time for research equally to time allocated to clinical care, the generally supportive environment within the ALF region should mitigate this. With regard to incentives to become a PhD student, and to follow a research career, the importance of a research culture is clearly underlined in the Stockholm ALF region. There is a clear focus on inspiring medical students to enter research, and students are exposed to research at an early stage. There has been a small but steady increase in the number of newly admitted clinical doctoral students over the last few years. The research summer school has more applicants than places, which is also a good sign.

5.5.6 Progress since previous evaluation

The panel noted that the ALF region has shown itself to be responsive to the feedback from the previous assessment, and significant changes have been made since 2018. For example, one comment in the 2018 report was that there was room for improvement to collaborate more extensively on a national basis. In the 2022 assessment, we observed that some improvements on this issue had been made, and the ALF region has put effort into being more inviting, for example by encouraging use of MaxIV and ESS resources. Moreover, this improved willingness to collaborate has also been acknowledged by other ALF regions. However, there is further development needed to ensure the ALF region fully acts to support other ALF regions, and the Stockholm ALF region is encouraged to continue along this path.

In 2018, a disconnect was noted between the strategic and high level of agreements in place and how research was managed at the department level. In 2022, we met a strong and eager team of department heads and research leaders and it appears good progress has been made in this respect. Some good examples of practical improvements since 2018 are the initiation of additional websites, booking systems and the principle of single points of contact for research infrastructure. There is still however a need to ensure that, wherever possible, allocated time for research is actually made available for all researchers.

5.6 Assessment of ALF region Västra Götaland

5.6.1 Overall assessment

Very high quality

In the 2018 ALF report, the panel noted the comprehensive nature of the arrangements to access research infrastructure in the ALF region, the strength of the overall strategy to support researchers at all stages of their careers, and the coordination of the use of allocated research time.

ALF region Västra Götaland receives 21% of the ALF funding. In the 2022 assessment, the panel noted that the ALF region provided evidence of continuing strategic and well-organised operations with respect to supporting clinical research. Excellent access to research infrastructures, an effective model for allocation of time for research, a well-constructed model of career opportunities, and good processes for equality and diversity work were all evident. Since the previous evaluation, the ALF region has further developed its operations, including expanding the support for clinical researchers through the Gothia Forum, establishing new SciLifeLab nodes at the University of Gothenburg (GU), investing in registry-based support, and making important developments in clinically relevant collaborative activities with Chalmers University of Technology (Chalmers) and industry. There is a cross-representative governance structure securing comprehensive and efficient joint development of strategies for clinical research in the ALF region.

While the panel identified some areas for further improvements, most notably in securing the allocated time for research, the prerequisites for clinical research in Västra Götaland were generally considered excellent and the ALF region therefore was assessed as being of very high quality.

5.6.2 Assessment of access to research infrastructures

The panel noted that strategic issues on access to research infrastructures, including funding, is decided by an R&D Advisory Committee consisting of members from the ALF regional board and leaders from the Sahlgrenska University Hospital (SU). Region Västra Götaland and the University of Gothenburg (GU) have several joint boards, including Medi-sam for overseeing the ALF agreement. Moreover, GU, Chalmers and AstraZeneca have jointly established new infrastructure. GU's life science strategy aligns with the region's with 7 core facilities as key enablers. In 2020, a collaborative group was established between the Region, SU, the Medical Faculty (SA) and Chalmers, to support management of an emerging focus area, medical technology. To specifically support clinical research, the Gothia Forum was developed, and there has been a large increase in consultation with the forum. The panel found that there is excellent overall coordination, which includes local, national and international infrastructure, much of which is enhanced through joint efforts with industry, especially through AstraZeneca, and through the Wallenberg programmes.

Processes for monitoring infrastructure include Key Performance Indicators (KPIs), annual reporting, long-term strategy and budget planning, and horizon scanning for possible new RIs. All clinical studies are registered in an R&D database. Support with legal expertise has been strengthened and the GU's core facilities were strengthened by 2 full-time heads. Results appear excellent; the project database now lists >2000 clinical projects, Biobank West has been accepted into the European BBMRI-ERIC (and is now under quality review), and connections have been built to >30 other registers. Within the Gothia Forum at the Clinical Trial Centre, there were 28 international clinical studies in 2021. SA's Council of Ethics launched a website, available since 2021 to all researchers in the ALF region. Altogether, the ALF region has a very extensive research infrastructure set-up that is coordinated jointly and produces results.

The panel identified that clear processes have been established within the ALF region for funding infrastructure, including use of user fees, and in addition there were clear financial strategies to support new infrastructure development. A particularly large investment is the Image and Intervention Centre (BoIC). A further example is represented by the OligoNova Centre, created in 2021 as a SciLifeLab unit.

The panel also commended strategic efforts to build collaboration more widely, including those with Chalmers and several other universities, the regional and national registries, SciLifeLab, biobanks, and extending to new initiatives such as the Advanced Therapy Medicinal Products Centre (ATMP). A European dimension is provided by membership in ESFRI EuroBioImaging. Processes include supporting standardisation, legal support for collaboration agreements, and facilitation of register research. ALF region Västra Götaland hosts the National Genomic Platform. In terms of results, OligoNova has become a national platform, data extractions have doubled, and accreditation was obtained for the Comprehensive Cancer Centre in May 2022. The SCAPIS program involves 6 university hospitals, collaboration with Chalmers appears very successful, and SciLifeLab use has increased substantially since 2018. Chalmers has strong links to MAX IV, and this was considered by the panel to be of potential benefit for the future, but at present engagement with ESS/MAX IV is still nascent and this is an area which could be developed further. In summary, the ALF region has been remarkably active and versatile in developing its research infrastructure, policies and collaborations.

5.6.3 Assessment of time for research

The panel was informed that ALF financed positions at all levels and for all healthcare personnel are awarded through open calls. Since the last evaluation, systems for budgeting and monitoring have been improved. Department heads have a central role in budgeting, and they are expected to ensure time for research matches the requested length of funding. "Over-employment" is used to ensure that, in theory, everyone can use the approved research time. The panel was told that in some cases a lack of support nurses may impede plans for research. Since 2019, processes are in place to strengthen career paths for other personnel than physicians. The "Try-out" research program for those lacking

previous research experience provides excellent support to healthcare personnel interested in getting engaged in research and considering entry into PhD studies.

The panel noted that use of the combined regional + ALF funding is specified in yearly RDE&I budgets of SU's departments, combined with an inventory of requested time for the coming year. The RDE&I Director reviews all budgets and requests corrective measures if the granted research time has not been allocated, and controllers check the budget situations twice a year, allowing for corrective measures. Over 400 employees of SU have at least 20% working time for research. Results-wise, in 2021 the majority of departments granted 80-90% of the requested research time, while the stated goal is to ensure research time to all employees that have requested it. However, the panel learned from the survey material, that while most of the PhD students received the time allocated to them, for about 40% research time was less than allocated. The ALF region was aware of this issue, but the panel felt further improvement is required.

In assessing the ALF region's strategy, the panel found that joint, adjunct, and combined positions are considered a priority, as well as the creation of a culture where research is fully embedded in the organisations. Annual open calls using external peer review are transparent, and there is a clear career ladder from student to professor. Funding is drawn from ALF as well as additional funding from the region and GU. A substantial increase in ALF positions has been seen since 2014. Analyses reveal positive results in gaining external funding and advanced positions for those funded through ALF positions.

5.6.4 Assessment of career development

The panel found that excellent structures and funding (through ALF, GU, Region Västra Götaland, the Wallenberg Centre for Molecular Medicine (WCMTM), and in some cases from competitive hospital funds outside SU) were in place to support all stages of the career path. Entry into research was promoted through initiatives including the amanuensis programme, and 'Try-out research'. The programme "From student to professor" targets all career stages, and an excellent model of six alternative career paths for physicians and other healthcare personnel has been developed. Strategic programmes target junior physician researchers and those seeking to gain associate professorships. Salary incentives are used to support PhD completion and the award of associate professorships. There has been a good increase in adjunct and combined senior lecturers' and professors' positions at the hospital. The number of PhD students is high, and in 2021 there were 1 026 PhD students at SA, of which 657 were clinical.

The panel noted the importance the ALF region attached to promoting internationalisation, and it was clear the ALF region had put a large amount of effort into promoting this. The panel found that the strategies to support mobility have been improved and clarified since the previous evaluation and was impressed by the financial support provided for these activities. Early-phase mobility is encouraged through gaining a certificate for international merits and visiting another university, and stipends are allocated for research abroad during doctoral training. International post-doctoral fellowships are encouraged and

sabbaticals are supported. SU has recently hired a director of studies to facilitate international exchange of resident physicians. The European EUTOPIA network provides good opportunities for international mobility. A recently launched sabbatical programme by SA and Medi-sam provides salary additions for clinical applicants. The panel noted good numbers of outgoing and returning post-docs; for example, in 2020, 46 PhD students went abroad under the programmes. A strategic programme has brought several guest professorships to SA. International recruitments are supported to adapt to the Swedish healthcare system.

The panel heard that open and gender-equal processes were in place, securing positions and career path accessibility to all healthcare professionals, and ensuring that evaluation committees have a 40-60% gender balance. The processes include appropriate reporting and monitoring. Managerial positions are in gender balance in terms of ALF-funded positions, but gender balance is skewed regarding advanced clinical research fellows. The panel considered that the strategy to support gender balance was good, but there is still a relative under-representation of women at professorial level, which needs to be addressed. Other aspects of diversity have attracted attention within the ALF region (see below), but the panel considered more could be done to promote other aspects of diversity to ensure inclusion of all researchers and research participants, regardless of their background.

The panel heard that good research skills development processes were in place for basic and PhD education, and for mid-career positions after PhD. Examples included many courses, seminars, a future faculty programme, Gothia Forum, the Annual Research Day, and support for funding. A good number of the amanuensis programme attendees continued in research, and an increase in new associate professors was noted. Numbers for completion of a PhD is somewhat fluctuating for physicians, but has been stable for dentists and other Health and Care Professions (HCPs) for the last 5 years.

5.6.5 Assessment of incentives for clinical research

Funding in the ALF region targets time for research, salaries, positions and grants, all serving as incentives for engaging in research. The goal has been to have university healthcare units (USVE) in all SU departments. The existing collaboration with private enterprises attracts researchers. Structures for valuing academic merit and the relevant career path models are in place. RDE&I units are in place at all ALF regional hospitals and primary care has R&D nodes. Results show increased numbers of academic positions in the ALF region.

The panel felt that the ALF region has developed a career structure with flexibility, which encourages academic merits. Courses for increasing supervisory skills are provided. In 2021, 142 HCPs obtained a PhD at SA. As described above, a substantial repertoire of clinical research opportunities and funding have been devised. However, in common with other ALF regions, in the survey data it was evident that not all PhD students feel they have sufficient access to supervisory support, and this is an area which the ALF region could try to address.

Since 2017, improved conditions and incentives for all HCPs have been a particular focus. Since 2019, a new coordinating body called Vård-sam has been in place, which addresses professionals other than physicians. An interesting development is the use of a human rights-based approach, putting the UN declaration in place at all levels. In national comparison, combined professor positions for nurses and midwives are at a high level. A more equal managerial gender balance has been achieved, successful education about sexual harassment, promotion to address inequality, and some specific training had commenced on wider diversity issues. The panel was encouraged by these approaches, although considered additional support for promoting diversity would bring further benefits.

5.6.6 Progress since previous evaluation

Overall, the panel noted that the research environment in the ALF region remains excellent. In addition, despite the impact of the COVID-19 pandemic, the panel considered that progress in the ALF region since 2018 had been significant. In particular, the region and GU have diligently addressed the majority of issues highlighted in the 2018 report.

Specific examples of change since 2018 include the increase in support for clinical studies at Gothia Forum. The access to collaborative research infrastructure and networks has been improved, including the establishment of SciLifeLab nodes at the SA Core Facilities. Internationalisation has been strongly promoted through a range of opportunities for students, junior researchers and senior researchers. There have also been significant efforts made in the promotion of academic competence among non-physician healthcare personnel. As described above, some areas remain where further improvements could be made. However, taking all the above into account, the panel considered that continuing development of the already excellent research infrastructure within the ALF region since 2018 had further improved the environment for clinical research within the ALF region.

5.7 Assessment of ALF region Skåne

5.7.1 Overall assessment

Good–high quality

In the 2018 ALF report, the panel noted that the collaboration between Lund University and Region Skåne was long-standing and worked excellently. The processes to govern and distribute ALF resources were found to be transparent and functional, and the infrastructure well developed and accessible to clinical researchers. ALF region Skåne was further complimented on its seven-step career ladder, which has served as a model for other ALF regions in Sweden. The 2018 panel also commented on gender balance being equal for PhD students and postdocs, but noted that there was a clear male bias at associate and full professor levels, combined with uneven gender distribution for larger grants. Encouragingly, the ALF region was actively monitoring developments, giving rise to expectations for change.

The ALF region receives 18% of the ALF funding. In the 2022 assessment, the panel again noted the collegial and collaborative working environment in the ALF region as an area of strength. The panel was impressed by the ALF region's commitment to increase its contribution to national collaborations, and the desire for better integration into the national SciLifeLab infrastructure. The panel also noted the improvements to the programmes enabling time for research and the positive developments in the support structures for clinical research careers. However, issues concerning gender balance at higher career level, uptake of international research opportunities and diversity that were highlighted in the 2018 report remain to be fully addressed.

The panel noted that significant strengths exist in terms of the nature of the arrangements to access research infrastructure, the overall strategy to support researchers at all stages of their career, and the coordination of the use of allocated research time. However, some weaknesses in strategies and structures for ensuring researchers were able to access time allocated to research, gender balance, diversity and internationalisation were identified. Taking into account the progress made since the last evaluation, and assessing the changes which had been made compared with the rate of change in other ALF regions, the panel assessed ALF region Skåne as being of good–high quality. The panel did note that this is a lower grade than that awarded in 2018. As discussed above, this should not be interpreted as an overall decline in the research environment within the ALF region, but is based on the assessment that even though ALF region Skåne still performs at a very high level, other ALF regions had improved to such an extent that it was not possible to distinguish between them and Skåne.

Therefore, ALF region Skåne was assessed as being of good–high quality.

5.7.2 Assessment of access to research infrastructures

The longstanding collaborative working environment between Region Skåne and Lund university has continued since the last evaluation, and relevant joint

processes are in place. This has enabled new investments, such as the ATMP centre at Skåne University Hospital and an accompanying ATMP testbed to be established. Additional research infrastructure grants made from the university enable the development of novel and existing research infrastructure to support clinical research. The panel also noted that ALF region Skåne had been successful in attracting research infrastructure funding from the Swedish Research Council to develop several new infrastructures important for clinical research. Access to the infrastructure appeared to be good in general, and the ALF region had improved awareness of available support by creating an internal database of infrastructure. However, the panel noted that, whilst agreements for the research use of the clinically relevant infrastructure were in place, the time allocation for research (as opposed to routine clinical work) for at least some infrastructure seemed suboptimal.

Good structures for monitoring the maintenance and management of the core facilities were in place, with responsibility resting with the Faculty of Medicine. The relevance and quality of infrastructure was evaluated by external and internal expert panels in addition to user surveys.

The panel noted that there was no clear overarching policy to ensure sustainable funding for infrastructure. Support for the majority of research infrastructure depended on joint investments with the Region and Lund University. The panel noted that the existence of diverse funding streams from the Region, University and Strategic Research Area funding, combined with a user fee approach and central investment, should help ensure financial sustainability for key infrastructure. Despite this, as the number of infrastructures continues to increase, there is a need to further develop the overall management and for ensuring a sustainable funding model. This has been recognised by the Faculty of Medicine, which has recently introduced a new coordinator. In summary, many relevant activities are in place, but some further development, coordination and coherence would maximise the benefits of available infrastructure for clinical research.

The panel was enthusiastic about the strong commitment to national collaborations in genomics, biobanking and clinical studies. It strongly welcomes the active collaboration with SciLifeLab with a new site established in Lund, which is expected to increase the access to and knowledge of all SciLifeLab services to clinical research in the ALF region. This will also enhance national access to the current local SciLifeLab nodes and other local infrastructure of national relevance in the ALF region. The panel also noted the strong development in genomics and the leading role that Clinical Genomics Lund has taken nationally, together with developments in areas including integrated structural proteomics, chemical biology and data visualisation.

The panel noted that, whilst MaxIV and ESS infrastructure currently provide limited opportunities for clinical research, strategies and processes are in place to increase awareness, competence and funding for the use of major infrastructure, including the EU-funded HALOS project and strategic recruitment in biophysics.

5.7.3 Assessment of time for research

Region Skåne and Lund University described to the panel strategic plans highlighting the importance of securing time for research alongside clinical work. Further improvements have been made to the existing good programmes to manage the allocation of time for research, including a new initiative to provide research positions for healthcare professionals other than medical doctors. The allocation of research time is granted centrally by the ALF Management Committee, based on transparent competitive calls, and the oversight and responsibility of the delivery is mainly with the operations managers. In general, whilst the systems in place for monitoring appear to be reasonable, the panel noted that the survey data show this area required further attention, as around one third of the PhD students responding in the survey noted that they had had problems with taking allocated research time. These data are in line with data from other ALF regions assessed as being of good–high quality

The ALF region has an excellent plan and processes for enabling an academic career alongside clinical work. There is strong motivation in the ALF region for promoting academic competence in healthcare. The plan captures different stages and different types of clinical personnel. This has resulted in good numbers of academic activities at different levels.

5.7.4 Assessment of career development

ALF region Skåne has a highly structured model for career development under the concept of "From student to docent". The focus on supporting young researchers at earlier stages of their careers is commendable and should help lower the average age of completing a PhD and becoming an autonomous Principal Investigator (PI). However, as also pointed out in the 2018 evaluation, there are still limited opportunities for those entering research through alternative routes, for example opportunities for consultants with no research experience who have already finished their residency to undertake research degrees.

The self-evaluation report provided a description of some limited support for researcher mobility, in the form of ALF Young Investigator grants available for a two-year international post-doctoral placement, and stipends for living costs from a private foundation. The panel also noted promising individual examples of dual PhDs between the ALF region and Japan, and collaboration agreement for ATMPs with Leiden University. Whilst the panel accepts that the recent pandemic has inhibited researcher mobility, the panel considered that an overall strategy, process and resources for supporting international research visits and overseas post docs seemed mostly lacking, and uptake into the schemes which did exist was limited. The panel would strongly encourage the ALF region to develop additional support and incentives to encourage researcher mobility.

The panel noted the recent action plan for achieving gender equality and promoting equal opportunities at the Faculty of Medicine, as well as the new annual prioritisation scheme of applications for centrally financed adjunct positions, as positive steps towards improved gender balance at professor level.

However, the data provided show no significant improvement has been achieved at senior level during the ten-year period since 2012, and although gender balance at senior lecturer/associate professor level has remained balanced within the time period, this suggests that further active measures need to be taken to reach the goals for gender equality.

The ALF region has a good structure in place to support continuous research skills development from doctoral training to docent school, and further support for clinical research competence from the courses offered by Clinical Studies Sweden Forum South. The value of this career support structure is shown by the high demand for acceptance to Docent school and has already led to an increase in the original 80 places to an intake of 118 in 2022.

5.7.5 Assessment of incentives for clinical research

The panel noted that the ALF region has developed both financial and recruitment incentives for promoting academic competence in clinical research at all levels. These include an ALF region-wide policy document recently introduced, specifying clear incentives for early pursuance of clinical research and an autonomous wage incentive policy. The assessment criteria include academic merits when appointing internships, consultant and managerial positions, and this has recently been extended to non-medical healthcare professionals. There are also good salary incentives in place. The key metrics, such as the percentage of interns having research internships, senior consultants with PhDs, and the number of financed combined and adjunct senior research positions for 2021, appear strong.

ALF region Skåne has historically had a leading position in the development of a career model for clinical research, both for medical doctors and other healthcare personnel. As described above these include initiatives to foster early interest in research for undergraduate students, programmes like 'From Student to Docent', a focus on young researchers targeting PhD students and new PhDs, including funding schemes for projects and research time, salaries and bonuses, as well as courses. Funding for positions and research projects is also available for general practitioners and other non-medical healthcare personnel.

An action plan, policies and boards are in place to enhance equal opportunities and diversity. However, as noted above, little progress has been made on improving gender equality at higher levels, and there are limited initiatives to address diversity beyond gender balance. The panel noted the programmes enabling time for research during regular working hours and special arrangements for postponing or extending research funding and research time for researchers on parental leave supporting young families. However, the panel noted limitations in support for some groups of healthcare professionals, including medical doctors with no previous research experience who wished to attain a PhD. Although the panel considers the early introduction of clinical research opportunities to undergraduates and medical students very important, enabling other career models would increase diversity. The ALF region does try to support healthcare professionals from diverse backgrounds to undertake a research career, although it is unclear how successful this has been. One positive

aspect the panel heard about was that Lund University has been working actively to stimulate under-represented groups to apply to higher education. Other aspects of diversity, including promoting inclusion regardless of cultural background or disability, appeared to have received less attention.

5.7.6 Progress since previous evaluation

In general, the panel considered that progress since 2018 had been generally good in terms of improving availability of research infrastructure, but rather incremental in other areas. The panel was impressed with the ALF region's commitment to national collaborations in genomics, biobanking and clinical studies, as well the better integration into the national SciLifeLab infrastructure. The panel also noted some improvements to the generally well-functioning programmes designed to allocate time for research, and the positive developments in the support structures for clinical research careers. However, the survey data showed that some researchers had not been able to fully access time allocated for research. In addition, some of the issues that were highlighted in the 2018 report remained to be fully addressed. Despite the existing structures and new initiatives towards improved gender balance, very little progress has been made at professor level within the last ten years since 2012. The panel also noted strengthening of national links and individual good examples of international collaboration opportunities, but thought that the ALF region would benefit from more comprehensive strategies and active processes designed to encourage access to support for international research visits for its clinical researchers. In terms of equality and diversity issues, as in most ALF regions, there had been relatively limited focus on other aspects of diversity beyond gender balance. The support for alternative career models, including PhD opportunities for consultants without research experience, could also be strengthened.

5.8 Assessment of ALF region Uppsala

5.8.1 Overall assessment

Good–high quality

ALF region Uppsala has managed to make a largely devolved decision-making framework deliver strategic objectives by ensuring agreed goals and processes. The 2018 ALF report was critical of a lack of coordination between Region Uppsala, Uppsala University Hospital and Uppsala University. The 2018 assessment panel noted that in some areas different policies, priorities and a lack of shared approaches from these bodies worked at cross-purposes, and this was thought to be detrimental to research culture. These problems were exacerbated by the highly devolved nature of decision-making, leading to fragmentation of approaches and a failure to use resources strategically to address problems, such as a lack of utilisation of allocated research time.

The ALF region receives 11% of the ALF funding. In the 2022 assessment the panel was pleased to note that the ALF region had undertaken significant work to try to address this, with strong agreements put in place since 2018 and improved coordination between the different stakeholders, without overly centralising decision-making.

In all domains, ALF region Uppsala is good–high quality, and in some areas exemplary, with particular strengths in access to research infrastructure, opportunities to study abroad, and multiple entry points to medical research during a career, including a well-developed MD/PhD programme. There was still a perceived problem with access to research time for some researchers, and this aspect will need some further attention. Although career pathways were very well thought-through and supported for medical professionals, the panel considered that there was a relative lack in the development of specific incentives for research, which was especially notable for those researchers who are engaged in clinical research but not themselves medically qualified. Although a great deal of attention was paid to gender balance, other aspects of diversity within clinical research could be further addressed, though the panel did note some impressive specific initiatives.

The panel therefore concluded that overall the ALF region should be graded as good–high quality, though the panel wished to commend the substantial improvements made since the 2018 report.

5.8.2 Assessment of access to research infrastructures

The panel noted that there are agreed strategies and goals set out to coordinate activities across a comprehensive set of infrastructures. Oversight of research infrastructures is coordinated by the Research Infrastructure Committee from the Hospital, the University Medical Board Executive Committee, and the SciLifeLab Uppsala Committee. However, the panel noted that much of the decision-making is devolved to 23 RD&T councils based in individual departments, and these departments help set strategy. The panel was informed

that they also receive ALF funding according to previous performance and impact.

The panel was pleased to note that the Research Infrastructure Committee is multi-disciplinary in nature, consisting of physicians, nurses, pharmacists and pre-clinical researchers. The University Medical Board Executive is a joint board with representatives from Region Uppsala and from Uppsala University. Members of these committees are drawn from broadly representative areas. They are responsible for ensuring appropriate management and maintenance of research infrastructures, and the panel heard that they also consider major infrastructure investment on a three-year cycle. Evaluations take place using a multi-stage process. The suggestions for new infrastructures come from a “bottom up” approach. The panel considered this strategy and structure well organised. Stakeholders agree that this is working well, and the timescale is sufficiently responsive to new and emerging technologies, as well as phasing out under-used or obsolete infrastructures. For access to infrastructure, a user fee model has been implemented that was seen to be fair by researchers. Some examples were given to the panel of transparent and cost-effective user fees being in place. Incentives were also in place for those wishing to access infrastructure, but who were unfamiliar with, or too inexperienced to allow them to use relevant infrastructure effectively without support. However, the panel thought that the visibility of some research infrastructure, in particular to more junior researchers, appeared to be less than optimal.

Uppsala actively collaborates with other ALF regions and participates in infrastructure collaborations. It hosts the national infrastructure for computing (SNIC-SENS) and coordinates many national research infrastructures, such as Biobank Sweden. It has excellent access to and support from national research infrastructures. There are efforts to encourage participation in MAX IV and ESS, with the university Centre for Photon Science acting as the main conduit to MAX IV. Since it started in Uppsala and Stockholm, it is not surprising that there are excellent links with SciLifeLab. This is exemplified by research with a precision medicine focus, a notable highlight of the presentations to the panel.

5.8.3 Assessment of time for research

Region Uppsala and Uppsala University have developed strategies to promote clinical research by improving coordination and optimisation of the resources available, with the aim to enable clinical researchers to share their time between clinical work and research, to train the next generation of clinical researchers, and to provide incentives to stimulate clinical research. Ensuring sufficient time for research is largely devolved to departmental level. The panel noted that this creates a potential challenge if individual departments vary substantially in their approaches to ensuring sufficient research time is allocated. The panel considered there were good processes for monitoring research time, to try and ensure they are obtained as agreed, and to ensure that there are no gross disparities between departments.

However, the panel noted that although PhD students have an agreement that in general 50% of their time is allocated for doctoral studies, this was frequently

not obtained according to survey responses. In this respect, ALF region Uppsala performed similarly to other good–high ranking ALF regions in terms of access to sufficient research time, but less well than the best performing ALF region in this metric. The ALF region’s PhD access to supervisors was also similar to other good–high ranking ALF regions.

There is substantial support in place for academic progression combined with clinical work. Uppsala has enabled this at multiple levels, including early career stages with their MD/PhD programme, support for research residents and internships, and doctoral studentships. There was a particular focus on mid-career positions and early postdoctoral positions to try to ensure they have sufficient time to develop their own research programmes.

5.8.4 Assessment of career development

The career track is highly developed and is supported well, with multiple entry points to clinical careers including an MD/PhD program (although this remains relatively small) and research internships. There is support for postdoctoral positions and Gullstrand mid-career positions, which the ALF region sees as an important focus, as this is known to be a vulnerable spot within academic careers. These are competitive, with external review processes. There is a mentoring programme that helps with various challenges including work/life balance.

A panel considered that a notable strength of the ALF region is the encouragement and support for international experience, which seemed better developed than in some ALF regions. There are a number of international networks promoting mobility, for example the Matariki network fellowships. Although these opportunities were curtailed by the pandemic, the panel heard that they appear to be working well again over the last year.

Gender balance is promoted at all levels, though there is still a relative lack of women in senior positions. There are some specific initiatives to help with returning to research after a career break, for example the possibility of receiving three extra months funding for doctoral studies after parental leave. However, as discussed below, the panel felt the efforts put into achieving gender balance could be further expanded towards other diversity issues.

There is a well thought-through series of research development opportunities, appropriate to all career stages. There is a summer research school for those thinking about beginning a research career, courses for PhD students and grant writing support for postdoctoral and mid-career researchers. A mentor programme is open to all early and mid-career researchers.

5.8.5 Assessment of incentives for clinical research

Academic competence is in general valued and incentivised in the ALF region. The panel was told it is necessary to have a doctoral degree to become a senior consultant. There are salary incentives for obtaining a PhD, and a further increase after reaching docent level. There are incentives in place which can

further raise salary, though for adjunct senior lecturers or professors these were temporary, for two years with the possibility of extension. These positions have increased substantially since 2018. The panel felt this model looked good for medically qualified researchers, but benefits for other researchers were less explicit.

The panel heard there are some excellent initiatives in place to encourage medical students to become researchers, including the Summer School and MD/PhD programmes. There is also some attention given to allied health professions, especially nursing and clinical pharmacy, though the proportion of doctoral students from those backgrounds remains low.

Beyond the question of gender balance, the panel was informed that other issues relating to diversity have been addressed to some extent, with some initiatives in place to support people with one or more parents from a non-Swedish background. There is a family policy in place to avoid meetings at times of day likely to disadvantage working parents. The panel also heard that there is a careful external review process for recruitment to crucial mid-career positions that takes into account different forms of diversity to some extent, and processes to support those for whom Swedish is not the first language. Whilst the panel wished to commend the ALF region on the work undertaken to date to address diversity issues, in common with the rest of the ALF regions the panel considered there was room for further approaches towards supporting diversity.

5.8.6 Progress since previous evaluation

Although, in 2018, ALF region Uppsala was assessed by the panel to be of good–high quality there was significant criticism of an apparent lack of agreement over strategy between the Region, the Hospital and the University. Different policies, priorities and a lack of shared approaches from these bodies worked at cross-purposes, and this was noted to be detrimental to research culture. These problems were exacerbated by the highly devolved nature of decision-making, leading to fragmentation of approaches and a failure to use resources strategically to address problems such as a lack of utilisation of allocated research time.

The panel were unanimous in their view that there has been very significant progress since that report, leaving the ALF region close to very high quality in this evaluation. The devolution of responsibilities to departmental level previously resulted in a fragmented approach to managing key strategic questions. The panel's view was that this seems to have been mostly dealt with, without sacrificing the benefits of having a more devolved system. Clearly, this highly devolved approach does create a potential risk, but the panel considered that at present this is being effectively managed.

There is some progress still to be made in incentivising and recognising research competence and excellence. Although there are generally excellent career support structures in place, the accessibility and visibility of key research infrastructures to junior and mid-career researchers could still be improved. In addition, the survey data indicated that not all research students were able to

access research time allocated, and improvements could also be made in ensuring access to supervisor support.

5.9 Assessment of ALF region Västerbotten

5.9.1 Overall assessment

Very high quality

In the 2018 ALF report, the panel noted that the large size, geographical location and the demography of ALF region Västerbotten pose challenges not present in other ALF regions. On the other hand, the ALF region had unique opportunities for research, which the 2018 panel felt had been systematically addressed. There was excellent coordination between the healthcare and academic sectors. The hospitals outside Umeå in Östersund, Sunderby (Luleå) and Sundsvall, were integrated in the overall research strategy and resources were also allocated to these sites.

The ALF region receives 11% of the ALF funding. In the 2022 assessment, the panel again noted that the collegial and collaborative working environment in the ALF region is an area of strength, forming a stimulating atmosphere for research. The potential threat mentioned in the 2018 evaluation, that the best researchers might relocate to other centres and that it might be challenging to attract internationally leading researchers from other ALF regions to Västerbotten, has fortunately not come true. There is excellent ALF regional infrastructure of national and international relevance, including the Biobank Research Unit, a longitudinal mother-child cohort with an extensive collection of health data and biological samples, bioinformatics support, genetics and precision medicine (Genomic Medicine Sweden and GMC North), and the Uppsala-Umeå Comprehensive Cancer Consortium. Clinical trials are supported by the Clinical Trial Unit. Umeå also has an established national site of SciLifeLab. In common with other ALF regions, it was noted that international research training among the researchers is at a rather low level, and therefore an increase in researcher mobility at postdoctoral level and via sabbaticals at the professor level would be beneficial. However, the ALF region has excellent incentives in place to encourage this. In terms of equality and diversity issues, gender balance issues had in general been well addressed, but there has been somewhat less focus on other aspects of diversity.

The panel noted that significant strengths existed in terms of the nature of the arrangements to access research infrastructure, the overall strategy to support researchers at all stages of their careers, and the coordination of the use of allocated research time, which is nationally leading. Survey data supported the view that ALF regional coordination and strategy worked effectively. Only some minor weaknesses were identified, despite the unique geographical challenges the ALF region has to manage.

Hence ALF region Västerbotten was assessed overall as being of very high quality.

5.9.2 Assessment of access to research infrastructures

The panel noted that the longstanding collaborative working environment within Region Västerbotten remains a key area of strength. Significant investments in research infrastructures in terms of setting-up, maintaining and evaluating their performance are jointly made, and have happened in a strategic and collaborative way. Despite the relative remoteness of the ALF region, the researchers have access to an impressive number of modern core facilities functioning with the support of well-trained staff. Besides several regionally important infrastructures, infrastructures of national and international importance are available. Examples include biobanks, various unique cohorts and an international clinical research consortium, 'Gene-Lifestyle Interactions in Dental Endpoint'. Umeå is an official site of SciLifeLab and provides important support for the ALF region with its seven infrastructures (Clinical Genomics, Cryo-electron Microscopy, FIB-SEM Volume Imaging, Swedish Metabolomics Centre, Chemical Biology Consortium, Swedish NMR Centre and Computational Analytics Support Platform). Moreover, new calls are being launched for local infrastructures that have the potential to become nationally important, providing users from the rest of Sweden with access to novel methodologies.

In addition, ALF region Västerbotten has wide collaborative networks with other ALF regions, universities, and organisations to improve healthcare and public health in the region. It is also actively participating on boards and steering groups of large national infrastructures; for example, the university nominates members to boards (e.g. ESS, Max IV and SciLifeLab) and takes part in projects aimed at making infrastructures more widely available to clinical researchers. Use of national infrastructures is encouraged by presentations at regional meetings within the life science community and the open faculty research meetings.

The panel concluded that core facilities were well supported and prioritisation of new infrastructure and coordinated financing were managed in an efficiently structured manner via the decision-making bodies.

5.9.3 Assessment of time for research

The ALF region strongly believes that a central part of building good clinical research is the possibility of combining scientific and clinical work. This requires time allocated for research within a clinical career. Dedicating time for clinical research has been a challenge during the pandemic, as in other ALF regions. Nonetheless, the ALF region has succeeded very well in this respect. The ALF region has a clear strategy that is convincingly described in its Career Programme (discussed in more detail below).

The programme has a large number of positions with allocated time for research and, based on the survey, 80% of the PhD students have been able to use the allocated research time as planned; the highest figure nationally. In addition to the positions in the Career Programme, the local departmental grants offer one-year 'open call' grants, which can be used by the clinical researcher to fund

research working time. Extensive use of external peer review is in place. Overall, therefore, the panel considered that there was a clear strategy to support allocation of research time, with excellent oversight in place, and the results, as judged by national survey data, showed that these mechanisms worked very effectively.

5.9.4 Assessment of career development

ALF region Västerbotten has a clear strategy ensuring that clinical research and clinical research training can be carried out alongside clinical work. The strategy emphasises the importance of strategies to allow the ALF region to be successful in clinical research, to be a centre for highly specialised care, to recruit and keep staff in the healthcare sector, and to be an attractive partner for industry collaborations in clinical trials.

The Career Programme has well-developed tracks for medical doctors as well as for non-medical healthcare professionals. At PhD student level, career development supervisory support appeared well organised, and based on the survey, the vast majority of the researchers are getting mentoring time according to their needs. The panel noted that, from those responding to the survey, the data showed the percentage of satisfied students is the highest of all the ALF regions.

After completing a PhD degree, medical doctors have options for well-defined paths, with differing allocation times for research depending on the position. A comparable system exists for non-medical PhDs. The Career Programme has worked well and has secured the long-term availability of clinical researchers and teachers, which potentially explains why many researchers stay in the ALF region after entering positions in the Career Programme. The Programme has also gained national visibility: Tenure-track assistant professor positions combined with clinical work have been nationally recognised by two organisations, Research Sweden and Young Academy of Sweden. Both have recommended that other Swedish universities should follow the model developed in Umeå.

The percentage of scientists with international research training is relatively low, and more effort has been put into supporting international exchanges and mobility. The support is intended for international postdoctoral fellowships for young researchers and sabbaticals for more senior researchers. The support has been made possible through a co-funding system from the Faculty of Medicine at Umeå University. This funding also covers overhead costs through grants from research councils for international postdoctoral fellows. This co-funding maximises the amount of funding available for living costs for the researchers, and makes it possible for researchers to move to new international research environments in places that often have very high living expenses. The panel considered the support in place to encourage mobility to be well developed. Furthermore, it is possible to use any already awarded ALF research salary grants to cover costs related to international postdoctoral attachments. There are also calls from the Faculty of Medicine for international research sabbaticals and pedagogic sabbaticals for university teachers. Uptake to date has however been

quite low but this is likely to be in part due to the pandemic. The panel strongly supported these efforts.

Gender balance is actively promoted in the ALF region, and it is good at junior and intermediate career levels. In line with other ALF regions, a relative under-representation of women at professorial level was clear. As with other ALF regions, there has been somewhat less focus on other aspects of diversity. Given the different demographic characteristics of the population in the ALF region, this is an area that the panel felt would benefit from specific attention.

5.9.5 Assessment of incentives for clinical research

The panel was informed that the ALF region has a strategy to ensure continuous updating of research skills throughout a researcher's career. The strategy is focused on the local University Healthcare Units and Academic Healthcare Units. The system promotes clinical research for all clinicians at all levels of their careers, regardless of age or seniority. The panel was provided with evidence that this approach has been successful. In this system, academic qualifications are a prerequisite for combined positions at Umeå University, and the process for employing clinical tenured senior lecturers/associated professors and full professors involves external reviewers and a dedicated board.

At the junior researcher level, the ALF system finances PhD student positions, and in the Career Programme all positions are announced in open calls, where scientific excellence guides the evaluation process. To further promote the early stages of a research career, intern physicians with allocated research time positions are provided with a clinicians' full salary, as if the holder would have been working full-time in clinical work. The same salary incentive programme for physicians doing research is used also for junior research clinicians and tenure-track assistant professorships. In addition, the ALF system regularly advertises dedicated senior research clinician positions for applicants with both academic and clinical merits, facilitating the opportunities for persons with high clinical profiles to pursue their clinical research. In all, the panel considers this approach very well developed.

There are salary incentives in place for all professions after PhD dissertation and for attaining associate professorship status. The regions included in the northern ALF region and the university have an agreement stating that research, education and associate professorships should always be given priority in employment processes. Similarly, scientific, pedagogic, and clinical competence must be regarded as merits in university healthcare. Thus, the incentives, consisting of salary increase, status in professional hierarchy and opportunities for doing research at all levels during career development, provide an excellent framework to support research.

5.9.6 Progress since previous evaluation

In evaluating progress since 2018 it is obviously important to bear in mind the impact of the COVID-19 pandemic, which prevented or slowed down the expected progress of certain projects, in this ALF region as elsewhere. However,

at the time of the 2022 evaluation, the situation regarding clinical research in the ALF region appears to be back to normal. Allocated research time has been extended for those not having been able to use it during the pandemic. Encouragingly, the metrics from the survey data on research time and PhD supervision are excellent.

The panel felt that the ALF region has systematically addressed the feedback and suggestions expressed in the 2018 evaluation. Specific actions included implementation of a Laboratory Information Management System, creating new infrastructure assets through Biobank North and an improved process for ALF-funded strategic investments for infrastructure. Benchmarking and interactions with other ALF regions have been enhanced and led to several new and updated strategy and policy documents dealing with research, education and innovation policies. New collaborative agreements have been made, for example Region Västerbotten and Umeå University have now created a portal specifically for research infrastructures. Overall, the panel was pleased to see that progress continues to be strong in the ALF region.

5.10 Assessment of ALF region Östergötland

5.10.1 Overall assessment

Good–high quality

In the 2018 ALF report, the panel noted that a collegial and transparent environment existed in Region Östergötland and Linköping University, and that the ALF region had accessible leadership. The 2018 panel also commented on the revitalised ‘Student to Docent’ programme and noted that opportunities existed for other healthcare professionals to participate in research.

In the 2022 assessment, the panel again noted the collegial and collaborative working environment in the ALF region as an area of strength. However, compared with other ALF regions, the devolved nature of the management structure, with the majority of key decision-making activities and governance activities happening at departmental level, creates a potential weakness for departments with a less established track record in research, and could inhibit changes in overall direction. It was also noted that both stronger national and international links would be of benefit, to support research in the ALF region and to build capacity. In terms of equality and diversity issues, gender balance issues had in general been addressed, but there had been relatively little focus on other aspects of diversity.

The panel noted significant strengths exist in terms of the nature of the arrangements to access research infrastructure and the overall strategy to support researchers. There was good work on promoting PhD programmes early in medical careers in order to facilitate strong scientific progress, and the ALF region had an MD-PhD programme, where the aim was to complete theses before starting clinical specialisation. In common with other ALF regions, access to research time was not always available to all PhD students. Some weaknesses in making the best use of the available resources were identified.

Hence, ALF region Östergötland was assessed overall by the panel as being of good–high quality.

5.10.2 Assessment of access to research infrastructures

The panel considered that the longstanding collaborative working environment between Region Östergötland and Linköping University remains an area of strength. Significant investments in research infrastructure were made in a strategic and collaborative way, with the university providing additional resources to sustain the infrastructure. The panel view was that, overall, there appeared to be good oversight in the ALF region in terms of maintaining physical infrastructure.

The panel noted that core facilities were well supported, and that programmes for replacement of old infrastructure and investment in new infrastructure were in place. Management oversight in terms of infrastructure strategy was performed jointly by the Region and the University.

A transparent and cost-effective strategy was in place to ensure financial sustainability for key infrastructure, including both a user fee approach and central investment. The ALF region has been able to maintain and, in some areas, expand existing infrastructure (for example in the Centre for Medical Imaging and Visualisation, CMIV, and in the Analytic Imaging Diagnostic Centre, AIDA). The Centre for Social and Affective Neuroscience (CSAN), and the Linköping Wallenberg Centre for Molecular Medicine also provide foci of research activity.

The panel were informed about some challenges in maintaining staffing for some infrastructure, for example a shortage of radiographer support for research studies, although this was also noted to be a national issue.

Some collaborations are in place for national studies, and also a small number of international collaborations were described. The panel was presented with some examples of joint ALF regional working on specific research projects, such as SCAPIS. The ALF region also participates in the EU project BIGPICTURE, which aims to develop AI approaches for digital pathology. However, as noted in the 2018 report, the panel considered there still remains potential to expand activity in both national and international collaborations.

The panel noted that, whilst some researchers did access the SciLifeLab and MaxIV infrastructure, the extent to which these national infrastructures was used was low in the ALF region. This is partly due to geographical issues and also a lack of awareness of the opportunities these facilities offer. The ALF region had a plan to appoint a SciLifeLab coordinator to address this, but the position had not commenced at the time of the panel meetings.

5.10.3 Assessment of time for research

The panel were informed that the responsibility for oversight of the delivery of clinical research in the ALF region lies mainly with the department heads. In general, this appears to work well at departmental level, but the panel thought that, without adequate oversight, the decentralised model could potentially be problematic for departments with less involvement in clinical research. Whilst the survey data did not suggest in general that obtaining time for research was a greater problem in this ALF region than in others, >40% of PhD students responding did nonetheless note that they had had problems with taking allocated research time. The panel noted that this was seen as a weakness in the 2018 report, and there appeared to have been little change in the model since 2018.

Support for those wishing to undertake an academic career alongside their clinical work appeared good, although again the majority of planning was at departmental level. Salary incentives were present for those completing a PhD, and funding was available for project support through a range of schemes. In general, ALF region Östergötland finances at least 20% of protected research time for clinicians who are PhD students at Linköping University, including general practitioners. Funding for additional research time could also be applied for, from ALF or other sources.

5.10.4 Assessment of career development

The ALF region has established a career development pathway for those aspiring to become clinical academics, including those with backgrounds in the allied professions, and also for primary care researchers. These appear to function effectively.

Whilst a model existed to encourage and support researcher mobility, uptake was low. The panel heard from researchers who had had international experience and all agreed this had been extremely valuable, both for career development and for helping to generate high-quality research outputs, and the panel would encourage the ALF region to develop additional support to encourage more researcher mobility for those who were not currently accessing these opportunities.

Gender balance is actively promoted in the ALF region, and it appears that gender balance is generally good at junior and intermediate career levels. In line with other ALF regions, however, a relative under-representation of women at professorial level was noted.

Career development was supported effectively at the early-stage career levels by formal courses and training, much of which was run within the University. Support for postdoctoral career development was more limited. The panel view was that, whilst it was possible for postdoctoral researchers to access courses and training and obtain mentorship from colleagues, there was no structured approach to support for this group of researchers, with the result that the responsibility for obtaining career development support was mostly left to the researchers themselves to organise. The panel considered that better coordination of mid-career support would bring benefits, and would encourage the ALF region to address this issue.

5.10.5 Assessment of incentives for clinical research

ALF region Östergötland has developed a number of schemes to encourage healthcare professionals to become researchers. Medical students are able to access a range of research opportunities whilst still students and, for those already committed to a research track, an MDPHD programme is available, with a small number entering this career track each year. One encouraging focus of activity is the primary care research group, which has increased engagement with PhD training from within the primary care sector across the different professional groups.

As discussed in the career development section above, support for developing academic skills and competence was evident at early career levels but less evident for mid-career levels. The panel heard that one positive aspect was that if training for higher medical specialisation was prolonged due to combination with PhD studies, salaries were raised to specialist level after 5 years. As noted above, it was clear that those investigators who had spent time abroad during their research careers felt the experience had been invaluable, and the panel were informed that support was available in the ALF region to undertake a period in a

different research environment, either within Sweden or abroad. However, uptake remains low, suggesting awareness of this support could be improved, although the constraints caused by the COVID-19 pandemic would also have limited access to travel and other training opportunities.

Whilst diversity was acknowledged within the ALF region to be important, there did not appear to be any specific strategy to address diversity issues other than the initiatives being undertaken to address gender balance. Individual departments were keen to promote multicultural working, and to support healthcare professions from diverse backgrounds to undertake research careers, but the panel was not made aware of specific incentives designed to increase diversity within the research community.

5.10.6 Progress since previous evaluation

In evaluating progress since 2018, it is important to bear in mind the impact of the COVID-19 pandemic, which resulted in the closure of some research projects within the ALF region, although these have largely re-opened.

In general, the panel considered that progress since 2018 had been incremental. Many of the issues that were highlighted in the 2018 report remained to be fully addressed. For example, the relative lack of engagement with national and international opportunities continues to be an issue that needs a more strategic approach to resolve. The ALF region has not altered its decentralised management model, and it is possible this inhibits broader strategic changes in direction, although it does seem to encourage effective working at departmental level. It appears that at least some of those completing PhDs do not continue in research, and better incentives to continue in research-oriented careers may be required. Additional support targeted at mid-career level could help with this aspect. Gender and diversity issues still remain to be fully addressed.

Encouragingly, the panel did find good evidence of a continuing collaborative and constructive working environment, which should help foster delivery of high-quality research into the next funding period. Nevertheless, addressing the issues highlighted above in more detail would be expected to bring additional benefits to the clinical research environment within the ALF region.

5.11 Assessment of ALF region Örebro

5.11.1 Overall assessment

Good–high quality

In 2018, the ALF3 panel noted that the infrastructure for clinical research in ALF region Örebro was at a relatively early stage of development. Since 2018, further development has been inhibited to some extent by the COVID-19 pandemic; nevertheless, some expansion of infrastructure has occurred. In the 2022 assessment, compared with reports provided by some other ALF regions, the self-evaluation report was lacking in specific details about the research infrastructure and environment within the ALF region, although the panel was able to complement the report with information obtained during the hearing in order to arrive at an overall grading. Whilst support for researchers was felt in general to be reasonable, especially for the early stages of researcher training, the panel thought the ALF region lacked ambition overall and needed a clearer overall strategy for development. One potential approach could, for example, be to build around developing areas of strength, such as AI and robotics. Compared with some other ALF regions, the extent of change since the 2018 evaluation was also felt to be relatively small, although the panel noted that the amount of ALF funding received by the ALF region is lower than that of other ALF regions.

Overall, the panel considered the grading for research infrastructure in Örebro was good–high quality.

5.11.2 Assessment of access to research infrastructures

There is limited core research infrastructure available locally, and the panel was informed of some new developments since the 2018 evaluation. The main new infrastructure is CEBIO, the Centre for Experimental and Biomedical Imaging, containing an academic imaging unit with 3T MR capability: there are also plans for a regional PET facility, although it was unclear to the panel how much this will be used for research. Research access arrangements for CEBIO appeared robust. The case study presented to the panel on trauma and surgery science highlighted that there is a large animal facility, fully equipped for studies using pigs, including several models for pulmonary hypertension and surgical operations. There were local arrangements in place to improve biobanking, and a specialised motion analysis laboratory based at the Institution of Natural Science and Technology, but uptake for clinical research within the available facilities was at present limited.

Access arrangements for core clinical research infrastructure that was in regular use were in general well-coordinated, although arguably the small scale of the research infrastructure should make this easier to manage than in those ALF regions with more extensive infrastructure.

The panel heard that there is a clear strategy to try to coordinate existing funding arrangements to ensure short-term and long-term financial support for core

infrastructure is enabled, but little external financial support appears to be in place. However, they share with the ALF region Västra Götaland national tasks in developing AI in medicine, and ALF region Örebro will start the first robotic surgery project in Sweden.

In terms of other collaborations within Sweden, ALF region Örebro is keen to collaborate more widely, but the panel was told the ALF region does not have extensive facilities to attract researchers from outside Örebro to the ALF region. The ALF region also noted challenges in providing adequate financial support to collaborate more widely externally, due to the relatively small ALF budget available. There is a regional hub for Genomic Medicine Sweden, although it was unclear to the panel how much activity goes through this at present.

ALF region Örebro has an ambition to access national infrastructure such as SciLifeLab to facilitate research, but currently lacks the financial resources to engage to any significant extent with these facilities. As a result, there is currently a lack of research involving national infrastructure in ALF region Örebro compared to most other ALF regions.

5.11.3 Assessment of time for research

The panel was informed that ALF region Örebro uses the majority of its ALF funding allocation to support research time for healthcare professionals. This appears to be well coordinated within the ALF region, and there is at least some support available across the career spectrum, although the emphasis has been on PhD training up until now. Internal feedback is generally positive. Overall numbers are, however, limited compared to other ALF regions and there has been little growth since the 2018 review.

Calls for support for research positions are made twice yearly. There is some use of external reviewers in making decisions on allocation of resources, although the panel considered that this is less extensive than in some other ALF regions and felt this should be expanded.

Arrangements to ensure academic careers can be combined with clinical work within the ALF region are generally supportive, with clinical departments ensuring protected research time is available for those engaged in research. Planning for this involves input from both the University and the healthcare system and seems to work well.

Although the majority of those undertaking a PhD felt that the time allocated for research was actually available to be used for research, a significant minority, as in all ALF regions, indicated in the survey that they had found it difficult to take all of the time allocated for research. Whilst this may have been in part due to the increased pressures created by the pandemic, further work is required to ensure allocated research time is used for its intended purpose, especially as this is the major use of ALF funding in the ALF region.

5.11.4 Assessment of career development

ALF region Örebro is developing a career model to support researchers across their career paths. The panel felt this seems to be still evolving in the ALF region, partly because of the relatively short time that ALF funding has been available in Örebro. Funding is used across the career pathway and not just for PhD support. At present, appointment to senior positions is often used to attract investigators from outside the ALF region to try and build capacity.

The 2018 evaluation identified lack of researcher mobility, and in particular lack of international collaboration, to be a weakness in ALF region Örebro. The current self-evaluation report gives details of plans to encourage researcher mobility, with this being a clear priority, but actual developments have been limited. This is partly understandable since 2020 because of the pandemic. Some funding has been made available to support internationalisation from within the ALF budget, but awareness of the potential benefits of international experience needs to be raised amongst researchers in the ALF region, as there appears to be less mobility than in most other ALF regions. The panel noted that an application to support mobility had also been submitted through an EU programme as part of the NEOLAiA consortium, but to date this has not had a marked effect on researcher mobility.

With regards to gender balance, this is actively monitored within the ALF region. In many discipline areas, there is an excess of female PhD students and postdoctoral fellows. As in most centres, the reverse is the case for full professorial positions. Encouragingly, the panel heard that in orthopaedic surgery, a traditionally strongly male-dominated area, with active encouragement they now have increased the female PhD student body to 50% of all students.

ALF region Örebro has an ambition to support researchers across their careers, but the panel considered that evidence for continuing research skills training is very limited for those in the post-PhD phase. Specific incentives exist for PhD students, for example financial support for conference attendance. Access to supervisor support appeared to be similar to the national average. However, for those at the post-doctoral stage, there appeared to be little in the way of formal programmes to oversee mentorship, encourage advanced research skill training, or provide leadership skills training. As the number of researchers completing PhDs in the ALF region grows, there will be an increased need for provision of mid-career guidance and support, and this is an obvious area for development within the ALF region.

5.11.5 Assessment of incentives for clinical research

ALF region Örebro is still at a relatively early stage of development and, hence, providing incentives to support research careers and competence in clinical research at all levels in the healthcare organisation is at a fairly basic level and requires further work. The self-evaluation report provided very little evidence of how this is being addressed. There does, however, appear to be a supportive working environment within the ALF region, and the panel received positive

feedback during the panel hearings on this aspect. There appeared to be some variability in support between departments, and for those based in the hospital it was felt there was sometimes a lack of appreciation of the value of clinical research.

In terms of encouraging potential researchers to take up a research career, there is funding for pilot periods of research to encourage potential students to gain experience in a research environment. There is also some support, e.g. for travel bursaries, for other researchers later on in their careers, although it is unclear how much uptake there has been of this support.

There is clearly an ambition to support diversity amongst the research community within the ALF region, and the ALF region was presented as highly diverse - perhaps one of the most diverse in Sweden in terms of non-Swedish backgrounds - but no evidence was presented to help evaluate the success or otherwise of the approach taken. Whilst gender issues have been considered in some detail, as discussed above, in common with other ALF regions, other diversity issues have not been addressed, and the panel thought that further work is required to ensure the involvement of under-represented groups in research careers.

5.11.6 Progress since previous evaluation

Progress in the ALF region since the 2018 evaluation has inevitably been inhibited to some extent by the COVID-19 pandemic and remains incremental at present. However, the ALF region will only grow substantially in its national profile in terms of research capacity, profile and outputs if it adopts a more ambitious approach to development. The 2018 evaluation noted the risk of having a relatively small critical mass of clinically active researchers, and it is reassuring that overall academic numbers have not declined in the ALF region, however the lack of growth remains an issue to be addressed. One positive development is the opening of the CEBIO facility, and there are opportunities for extending strong basic research in AI and robotics to medical areas. Overall, therefore, the panel view was that the ALF region still remains at an early stage in developing its research infrastructure.