THE CAPITAL REGION OF DENMARK’S STRATEGY FOR HEALTH RESEARCH 2018-2022
FOREWORD

In the Capital Region of Denmark we have a robust health service that works every day to ensure that patients and citizens in the region can enjoy first-rate quality and access to new, advanced treatments. In these changing times, however, our health service is constantly being confronted with new challenges and opportunities. Our society depends on health research to open the door to the latest knowledge and findings and the best methods and technologies that guarantee patients excellent healthcare and quality of life. Research must be treated as a core activity in the health service and must therefore be promoted.

The aim of our new Strategy for Health Research 2018-2022 is to focus our research efforts on four priority research fields, each of which plays a vital role in the development of the health service as a whole.

The purpose of the research strategy is to bolster research in the region by enhancing research environments and increasing funding. Research in health prevention and health system organisation can play a part in resolving specific societal challenges. At the same time research fosters innovation and leads to a high level of training and education, ensuring that healthcare staff can continuously improve their skills in core areas.

Research lays the foundation for strong and meaningful cooperation with external partners across sectors: the health service, universities, knowledge institutions, municipalities, practitioners and business and industry. Health research in the Capital Region is already thriving and has numerous research environments of a high international calibre. With the research strategy we want to consolidate existing, frontrunner international research environments as well as new, burgeoning environments; at the same time we are eager to support the personalised medicine and life science initiatives.

By closely linking clinical practice, research and education and training, we want to ensure that we can provide a well-functioning, integrated health service in the future.

We on the Regional Council look forward to following the progress of this research endeavour in the coming years.

Sincerely

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The Capital Region of Denmark's Strategy for Health Research
2018-2022
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INTRODUCTION

The objective of health research\(^1\) in the Capital Region of Denmark is to help continually ensure that patients and the population at large are provided with health services and treatments of superior international standard and that new treatment opportunities and technologies are implemented in clinical practice. Health research also plays a decisive role in powering growth in the biomedical healthcare industry. At the same time health research is essential for education and training of doctors and other healthcare professionals and is vital for job recruitment and competence development. Thus health research plays a pivotal role in determining the efficacy and excellence of the health system as a whole and in ensuring that the region’s biomedical clusters can rival the best in the world. Along with treatment and education and training, research is a core activity for the Capital Region of Denmark (henceforth Capital Region).

Health research in the Capital Region is closely aligned with clinical treatment, the premise being that newly acquired knowledge will be implemented, leading the way to new treatment options and technologies in clinical practice. The Capital Region has a large number of research environments that feature among those leading internationally. In recent years the Capital Region has focused on boosting and coordinating research activities via an overarching strategy spanning the spectrum of hospitals and the health service. The intention of this focused approach is to ensure that our clinical research remains world class in the future.

The Capital Region comprises seven hospitals – Rigshospitalet, Bispebjerg-Frederiksberg Hospital, Amager-Hvidovre Hospital, Herlev-Gentofte Hospital, Bornholms Hospital, Nordsjællands Hospital and the mental health services in the Capital Region – plus three entities, including the Capital Region’s emergency medical services, and a number of other smaller units.\(^2\) Research is carried out at all hospitals in the region. As the largest specialised hospital, Rigshospitalet is the research flagship of the Capital Region.

\(^1\) Health research includes research on patients and people – in our case starting with the health service. The research is carried out by diverse expert groups. Health research covers the whole spectrum, including: basic research, translational research, clinical research, research in disease prevention and health promotion, implementation research, health technology research, health services research, health economics research and epidemiological research.

\(^2\) Among others, good clinical practice units, the Centre for Clinical Research and Prevention and the University Hospitals’ Centre for Health Research.
Building projects under the aegis of the Capital Region, worth approximately DKK 20 bn, are under way at the hospitals and mental health services. Our central philosophy is to put the patients at the centre. Our goal is to build innovative, productive and safe structures for future healthcare that will benefit patients, relatives and staff.
HEALTH RESEARCH IN THE CAPITAL REGION:
KEY FIGURES

- In 2016 DKK 2.2 billion were used in the Capital Region, approximately half of which were funded by, e.g. external parties, private Danish funds and the EU.

- Researchers in the Capital Region are active in 33 Horizon 2020 projects (number of approvals granted in 2014 to 2016). Together these projects account for DKK 1.9 billion in funding, of which DKK 150 million is given directly to researchers in the Capital Region.

- In 2016 there were almost 3,900 active researchers and just over 800 technical and administrative staff employed in research and development in the Capital Region. In 2016 researchers in the Capital Region published 4,200 scientific publications; the tally in 2015 was almost 4,000.

- In 2015 publications within the 50 largest fields (Web of Science) achieved a higher impact than the world average (measured in terms of number of quotations per publication).

- In 2015 the Capital Region had a higher-than-average proportion of exceptionally outstanding publications in as many as 47 out of 50 of these fields.

- The three largest research fields in terms of the number of scientific publications in 2015 were:
  - oncology
  - cardiovascular diseases
  - endocrinology and metabolism

Figure 1
Percent distribution of resources spent on R&D and number of research publications
Figure 1 shows the amount of resources used on research, with external funding subtracted from the accounts, and where internal resources are converted into Danish kroner in terms of number and hours. It also shows the number of scientific publications.

Health research in the Capital Region provides the basis for significant major collaborations with external partners across the sectors (the health service, universities, knowledge institutions, local authorities, practices and private industry). These are collaborations which secure the continued development of the entire health service, as well as Denmark’s welfare society.

**GOALS AND AMBITION**

**Strategic ambition for research in the Capital Region:** Outstanding research closely interwoven with clinical practice and education and training will ensure a healthier population and internationally first-rate patient treatment within an integrated and effective health service.

The health service is under pressure when it comes to use of resources, the demand for quality and treatment and care within an integrated health service. It is predicted that in the coming years the health service will continue to be affected by various megatrends,\(^3\) which will call for development and innovative thinking in all key areas. Top quality research is essential for the Capital Region to be able to accommodate these demands in the future and to develop an integrated health service of top international calibre.

The aim of the research strategy is to boost research and secure its relationship with clinical practice and education and training by placing future strategic orientation and research ambitions on solid expert footing. The research strategy should ensure the transparent prioritisation of research by organisations and should create the right framework for ensuring optimum yield from research, in combination with clinical practice and education and training.

One central element of the strategy is to increase focus on the rapid clinical implementation of new, relevant knowledge gleaned from research in diagnostics, forms of treatment and health solutions, bringing benefit and value to the patients and the entire health service. Interdisciplinary approaches and interdisciplinary competences will contribute to excellent research and to education and training that mirrors the needs of the future.

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\(^3\)From “Five megatrends that pose a challenge to the health service in the future [Fem megatrends, der udfordrer fremtidens sundhedsvaesen]”: The increasing significance of chronic diseases, the new healthcare consumer, clinical technology as a blessing and curse, the ageing population and the information revolution: https://www.kora.dk/media/6844202/11325_fem-megatrends-der-udfordrer-fremtidens-sundhedsvaesen.pdf
Achieving this ambitious goal requires different types of strategic measures. Thus the research strategy not only encompasses prioritisation of research issues/areas but also addresses research structures, such as incentive structures, career paths, support functions and funding, which in tandem with analysis of the research portfolio and plans for boosting implementation processes, should ensure fulfilment of the strategic research goals. Only a coherent effort across the different areas and organisations will give research a boost and thus contribute enormously to growth and prosperity in the Capital Region.

It is a strategic research goal to create a culture that will ensure common goals in the Capital Region and an understanding of the role of research in the development of hospitals and education and training.

Whether or not research takes place and is nurtured and developed is a matter of the culture within an organisation. This is true of all levels of an organisation. Today the health service’s incentive structure is geared mainly towards treatment. This means that a culture needs to be created to ensure common regional goals and an understanding of the role of research in the development of clinical practice and education and training. To achieve this, every organisational level and support functions such as finance departments and the Centre for IT, Medical Technology and Telephony Services must be involved.

Outstanding research is vital for improved health and growth and prosperity in the region. With this in mind the aim of the research strategy should be to involve all departments and entities in the Capital Region’s hospitals in research. The departments can participate in research by, for example selecting patients for research projects, and joining in discussions on what research is necessary based on clinical needs, or by setting out and conducting research projects by themselves.

The research strategy has a four-year time span and is underpinned by yearly action plans for implementing concrete activities to fulfil the overall ambition and achieve the strategic research goals

1. PRIORITISED STRATEGIC AREAS

The prioritised strategic research areas encompass solid, well-known research environments that are active either within or outside of hospitals. These strong environments, which are anchored in hospitals, typically focus on research specific to specialisations or research relating to medicine or surgery that needs to be consolidated and as far as possible further bolstered by increased cooperation on regional, national and international levels.

The Capital Region, in parallel with the hospitals’ traditional focus on diagnostics and treatment, is noticeably highly active in research on health promotion and disease prevention. Given our ageing population and rising expenditure on diagnostics and treatment, it is crucial to boost these activities and to rapidly translate relevant findings into practice.
A further priority is to strengthen research environments through closer integration with research administration and infrastructure, partly to strengthen these research beacons, and partly so that they can more easily and effectively function as sources of inspiration and support for the less active research areas that do not possess the necessary knowhow within these areas or the necessary resources to build up their own effective research support functions. Another priority is for the Capital Region’s many major research environments to continue and build up their basic biological research, translational research, epidemiological research and health technology research, which form the basis for more targeted clinical research and new treatment options.

In addition to the research fields mentioned, two specific fields in the Capital Region need to be developed:

Precision medicine research, or personalised medicine as it is called in Europe, is a new field that concerns customising prevention, diagnostics and treatment to make them more precise and effective. The Capital Region is prioritising the propagation of this new mindset, which is relevant across the spectrum of medical specialisations, clinical and translational research, disease prevention and health promotion.

The Capital Region is also prioritising health service research, which is the study of the health service as an organisation, i.e. its tasks, use of resources, activities and findings. The field also includes research on the interplay between the needs of the population and the health service’s functions and services. In this time of growing pressure on the health service and important technological development, evidence-based knowledge about the health service as an organisation is crucial for providing integrated health services across the sectors.

Health research spans the following:

- Clinical research is the practice-oriented facet of health science research that involves the description and analysis of patients’ illnesses and the course of their illnesses, the assessment of diagnostic methods and the testing of different forms of treatment, care, rehabilitation and palliation.

- Translational research seeks, on the basis of pre-clinical basic research, to develop better principles and methods for prevention, diagnostics and treatment. In the course of the last five to ten years the term big data research has become the designation for new, data-driven strategies to identify patterns in everything from genetic makeup, lifestyle, family predisposition, the course of illnesses and the effect of treatment, all with one single aim in mind: for the region to optimally match its health services to the individual user. This development is essential for realising precision medicine, where it is common for several data sources to be combined.

- Basic biological research investigates the underlying mechanisms that control the function of the cells and the organism, both in health and
in sickness. It covers disciplines which primarily aim to increase our understanding of how basic biological and physiological processes in humans can lead to disease or, conversely, can be influenced to counteract or treat disease. Basic biological research, an important part of the groundwork that will lead to the development of precision medicine and of health promotion and disease prevention, is often carried out in close collaboration between the University of Copenhagen and the Technical University of Denmark.

- Epidemiological research looks into the spread of diseases and their possible determinants in the population and analyses the causes of disease. This field is the point of departure for health promotion and disease prevention.

- Research on disease prevention and health promotion covers intervention research within health-promoting and preventive initiatives looking at both context and the individual citizen.

- Health services research studies the health system as an organisation, i.e. its tasks, use of resources, activities and results; this type of research also covers the interplay between the population’s needs and the functions and services of the health service.

- Implementation research is research on how decisions and research findings can best be implemented.

- Health technology research involves research on new technologies, medical technology, computer science and other technical disciplines.

### 1.1. CLINICAL RESEARCH

It is a strategic research goal to boost clinical research on a broad scale in close cooperation with the relevant partners and closely coordinated with, for example, the initiatives within Copenhagen Health Science Partners and the Growth Plan for Life Science.

Clinical research develops, tests and optimises clinical activities for prevention, diagnostic methods and therapies, with the aim of achieving the best possible health care for the region’s patients and citizens. Clinical research also includes the use of big data to optimise patient programmes and to interpret paraclinical data (e.g. blood tests and scanning images). At the same time clinical research seeks to understand and use this data to pinpoint disease-specific characteristics and interpersonal variation, in order to improve the range of available treatment. Clinical research springs from concrete clinical needs and is essential for moving forward to the other three priority areas.

Clinical research in the region is based to a large degree on national, international and interdisciplinary research and covers a broad spectrum of research fields spread over
clinical medical specialisations. Studies of research activities within clinical research show a wide diversity of research initiatives, with some areas enjoying a high level of well-developed research and others are in need of input to reach the desired level.

By boosting clinical research, the patients are given better access to the latest drugs and technology. Healthcare professionals (both clinicians and researchers) gain faster access to the latest knowledge and research and to education and training based on state-of-the-art know-how, while the region is able to attract research talent, as well as external funding from private funds. Rising global competition, however, places further demands on the region’s clinical research and its parameters.

Interdisciplinarity between complementary research environments from both healthcare and technical knowledge environments is an equally important factor in tackling the challenges of the future.

1.2. RESEARCH ON HEALTH PROMOTION AND DISEASE PREVENTION

It is a strategic research goal to generate greater knowledge about prevention and health promotion by researching the effect of initiatives and their implementation, in order to achieve a healthier population in the region.

Viewed over an extended period, expenditure on the health service has increased at a higher rate than expenditure on other public services. It is becoming increasingly clear that the only way to ease pressure on the health service is to reduce the incidence of disease. The Capital Region recommends stepping up research on disease prevention.4

The outcome of many treatments depends on the lifestyle and state of health of the patients, which is why a generally healthier population could be expected to bring an improvement to treatment outcomes, e.g. by reducing complications and re-hospitalisations. A healthy (working) population will also become a significant competitive parameter for regional development in a future in which the lack of an educated workforce could become a reality.

Research in prevention and health promotion should to a large degree be based on interdisciplinarity and applying scientific methods from several research traditions, in order to evaluate and implement the effects of initiatives. To review initiatives and goals for the health of the population, there should be systematic research-based public health monitoring, for example through regional health profiles. Initiatives at municipal level need to be supported through evidence-based prevention measures, such as tobacco control, reduction of alcohol abuse among young people and initiatives to increase mental health and wellbeing among children and adolescents.

Focal areas include research on structural prevention measures, which involves shaping environments to promote a healthier lifestyle among the general population, e.g. through policies and structures at regional level and in the workplace, schools and nursery schools, and through the physical design of urban and rural areas. Structural prevention is seen as having particular potential for reducing the social inequality which exists today in the health sector. Another new approach involves so-called complex interventions that ensure an effective, coherent and coordinated effort on multiple levels and across sectors, the business community, voluntary organisations and research environments. There should also be a focus on patient-based studies of different rehabilitation initiatives (tertiary prevention), including improvement of the transition between hospitals and the primary sector and development of socially differentiated services.

1.3. PERSONALISED MEDICINE / PRECISION MEDICINE

It is a strategic research goal to develop clinical tools for earlier and more differentiated diagnosis and more precise prevention and treatment – specifically targeted at the situation and needs of the individual person.

Personalised medicine/precision medicine\(^5\) is relevant for all areas of disease and treatment. The point of departure for precision medicine is that everyone is unique and that determining the best and most effective course of treatment varies from patient to patient. At the same time a disease often has different clinical manifestations, depending on individual differences in the factors which trigger it. Thus the same disease can vary from patient to patient. A greater understanding of the individual person’s biology, lifestyle and disease progression, coupled with more targeted, diagnostic methods and better medication, will make it possible to offer individualised prevention and treatment.

Precision medicine has become possible through a combination of new molecular laboratory methods and super computers that can analyse a person’s entire genetic material, metabolism, protein profile or the circumstances of their upbringing, environmental factors and their life situation. Precision medicine will thus speed up the progression, from a one-size-fits-all approach within prevention, diagnostics and treatment, to an increasingly more precise approach that is designed to fit the individual person’s situation and their particular needs.

The hope is that by better understanding the genetic background to complex diseases it will be possible to advance towards a more personalised health service. A common misunderstanding is that precision medicine is limited to genetic studies or individual pharmaceutical drugs. The concept encompasses many other technological and research phenomena as well, such as smart wearables and smart textiles, a broader spectrum of molecular omics technologies, the integration of diverse clinical, demographic and register-based data, and, not least, the enormous advances in data science and possibilities for clinical decision support in real time based on analyses of hugely complex sets of data.

\(^5\) Thus, precision medicine includes personalised medicine that involves molecular omics research on the human genome, on metabolomics or proteomics for early diagnosis.
More targeted prevention and treatment will ideally lead to more differentiated, and thus effective, measures towards health promotion and pharmaceutical drugs that work with accuracy, achieve better results without subjecting patients to any unnecessary treatment and have fewer side effects. Furthermore rehabilitation (tertiary prevention) is also an essential component of more targeted and patient-centred treatment programmes.

Pushing ahead with precision medicine calls for a new mindset, where the challenge is to take new technologies for collecting and analysing large volumes of data from social services, hospital and pharmaceutical drug registers, as well as larger and more comprehensive molecular analyses, and to integrate them across basic, translational and clinical research in all medical specialisations, as described above.

Thus it is the Capital Region’s ambition to foster and promote precision medicine. The action plan will therefore set out priorities for concrete activities within precision medicine.

1.4. HEALTH SERVICES RESEARCH

It is a strategic research goal to use research to improve our knowledge of the organisation of the health service and thus of patient programmes, in order to optimise structures so that patients are seen by the relevant specialists at the right level of expertise with minimum delay periods and appointments, and with efficient use of technological possibilities and the health service’s resources.

We have very little knowledge of the programmes for patients with different diseases within the hospital services and particularly across sectors. There is a need for health services research to improve the use of resources and to create optimum patient programmes across sectors and institutions. New insights into disease mechanisms, new treatments and new technologies can create the need for new structures and a new division of labour between various entities. Different patient groups need different treatments and they also require different programmes. Thus we very much need to secure knowledge of the assorted programmes.

There should be a greater focus on creating knowledge to facilitate the transitions between the various sections of the health service – from GPs, to specialists, to the hospitals and between the different hospital departments. There is an increasing need for research dealing with the coordination and development of the organisation of the health service and its importance for outcome, such as in connection with the altered structure and organisation of the emergency medical services.
2. METHODS AND TOOLS FOR ACHIEVING THE GOALS

To fulfil the Capital Region’s strategic ambition for research, it is necessary to take a closer look at the structures and conditions for research in the region and for development of this research. The framework for research involves a large number of aspects, such as incentive structures for research, career paths, support functions and financing. Therefore realising this strategic ambition requires a common effort across the entire organisation to achieve the desired goal and boost research – both when it comes to development of the health service as a whole and to contribute to growth and prosperity in the Capital Region.

2.1. RESEARCH MAP (RESEARCH PORTFOLIO)

It is a strategic research goal to define the size of the individual research areas and the extent of their support by further developing the Capital Region’s process of charting all research areas and activities at hospital, specialisation and unit level.

It is important to understand where the strategic endeavour should be launched from, especially when dealing with such complex fields and interactions as with research. Understanding this would also make it possible to set concrete goals for development and to monitor achievement of these goals in the future.

If we look, for example, at the number of publications for the individual departments, we can see large variations – also between the different hospitals (see Table 1). That is why it is important to take these differences into account when devising a focused approach to the different research environments.

<table>
<thead>
<tr>
<th>Hospital</th>
<th>No. of publications for departments with the most publications</th>
<th>No. of publications for departments with the least publications</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amager-Hvidovre Hospital</td>
<td>108</td>
<td>0</td>
</tr>
<tr>
<td>Bispebjerg-Frederiksbergs Hospital</td>
<td>172</td>
<td>0</td>
</tr>
<tr>
<td>Herlev-Gentofte Hospital</td>
<td>186</td>
<td>0</td>
</tr>
<tr>
<td>Nordsjællands Hospital</td>
<td>30</td>
<td>0</td>
</tr>
<tr>
<td>Mental Health Services in the Capital Region</td>
<td>165</td>
<td>2</td>
</tr>
<tr>
<td>Rigshospitalet</td>
<td>287</td>
<td>0</td>
</tr>
</tbody>
</table>

Table 1. Number of peer-reviewed research publications issued in 2017 in departments with the most and least number of publications in the different hospitals – publication data obtained from research.regionh.dk, 8 May 2018.
Expansive knowledge environments

It is a strategic research goal to support and help both the large and smaller, burgeoning research environments to unfold their full potential.

The Capital Region has an extremely high level of research activity and a highly composite research portfolio within the health sector. The big contributors to the high level of research activity are the expansive knowledge environments, represented by the major research groups that are often formed across hospitals, institutions and sectors, and with a powerful international network. They are frequently the result of several years’ effort and significant investment of public and private funding. An important part of the strategy is to ensure that the large, established research environments continue to be nurtured to maintain their impact and value. At the same time it is important to support burgeoning environments that have significant potential for patients and the health service.

The needs of the different groups can vary and can also change over time. An open, continuous dialogue with the leading researchers on optimum support is important with a view to maintaining and developing these strongholds, which include, e.g.: clinical academic groups (CAGs) under the auspices of Copenhagen Health Science Partners (CHSP), Copenhagen Center for Health Technology (CACHET) and National Experimental Therapy Partnership (NEXT+), a public-private partnership on clinical research. Development and maintenance of both excellent, established research environments and those which are emerging, with a view to ensuring that relevant research findings are assessed and implemented, should involve a concerted effort involving CHSP and its CAGs. This concerted effort should support the connections across the research continuum, which extends from basic research to translational research, to clinical research and implementation research, right up to implementation in clinical practice.

At the same time it is important to ensure that this effort is straightforward, allowing each environment to benefit from the others, for example by using each other’s knowledge on research methods.

Environments with limited research activity

It is a strategic research goal for all large entities in all specialisations to be active in research in the future.

Some fields, hospitals, specialisations and entities have limited or, in some cases, no research activity at all. This may be due to tradition, infrastructure-related barriers or the fact that the area is relatively newly established. All areas within any health service need the development of expert knowledge propelled by their own research. Research experience is also important to be able to assess international research findings being considered for use. One effective way of generating more research could be to offer the possibility of research partnerships between the less active and the highly active environments, or to offer special incentives – possibly financial – research education
programmes, research commitments in employment contracts, etc. Charting research would provide insight into which areas face challenges in the field of research. It would also allow any effective instruments for promoting research within these areas to be identified.

**2.2. IMPLEMENTATION AND DISSEMINATION OF KNOWLEDGE**

- It is a strategic research goal to identify and break down administrative or structural barriers for decisions supporting research to be made more quickly and efficiently.

- It is a strategic research goal to build up and secure a system for assessing research findings with regard to their potential implementation in the regional system for the benefit of patients and the health service as a whole.

- It is a strategic research goal to implement relevant research results (with effect and value) in the hospital regime without unnecessary delay and to back up this process with recommendations.

- It is a strategic research goal to ensure the systematic and integrated dissemination of research-based knowledge within the hospital regime, within research and within (continuing) education and training programmes for healthcare professionals.

Research findings should be disseminated faster and more systematically so that they can be implemented in hospitals and benefit the patients. For this reason implementation should already be taken into account in the design phase of every research project. It is the task of the researchers, working in collaboration with the Danish health councils and committees, to be knowledgeable about the part of the overall research mass in a given field that could and possibly ought to be implemented. It is an organisational challenge and a leadership task to ensure that relevant research findings are implemented.

A more intense dialogue is needed between researchers and leaders on all levels. An interactive and collaborative culture needs to be created throughout the system, so that knowledge is disseminated as quickly as possible and is translated into clinical practice through a good, common understanding of the tasks and the coordination and qualification of staff.

The dissemination of research-based knowledge to education and training is a strategic research goal; the aim is to align the development of hospitals, of research and of
education and training so that they all work towards the same goals. This objective would be furthered by establishing shared positions (in hospitals, research and teaching). Thus it is important for relevant research findings to be widely disseminated to the health service. Projects which span different departments, centres, hospitals, institutions and sectors have the potential to further this aim and should be prioritised accordingly. One example of this are the CAGs, which come under CHSP, and larger networks should be eased into this structure whenever relevant, so that these areas gain from the support offered by CHSP and can unfold their potential.

### 2.3. INCENTIVE STRUCTURES AND DISINTEGRATION OF BARRIERS

It is a strategic research goal to develop incentive structures in departments, hospitals and centres to support and consolidate the link between hospitals, research and education and training.

Incentive structures need to be developed, such as the possibility of buying working time for doing research instead of clinical work or allocating additional funding at department level – with the aim of consolidating the links between hospitals, research and education and training. For this reason implementing incentives in the form of additional operating funds should be considered. Research management should, like hospitals, be goal-based, with an appropriate understanding of research autonomy. The different research environments will have diverging goals, depending on the research field and its size. These goals should be incorporated into the collaborative agreements.

Support for research starts with the senior management of the Capital Region and of the hospitals, centres and departments focusing on this area. Clear leadership and transparency in the decision-making and prioritisation process must be pursued. There must be a continuous dialogue between researchers and management at all levels, in order to ensure continued development, the right conditions and recognition of possible barriers that hinder research. Research is a very competitive business and success can partly hinge on the ability to act fast. Thus leaders must be adaptable, flexible and willing to remove barriers quickly.

### 2.4. DEVELOPMENT OF RESEARCH ENVIRONMENTS AND CAREERS

It is a strategic research goal to create several career paths for researchers in the health service to ensure that the necessary competences can contribute in an integrated manner to the further development of the Capital Region.

All research groups should have a plan setting out projections for development of the research, of the group and of the individual researchers – also describing the interplay between hospitals, research and education and training. Incentives in the form of extra operating assets can therefore be considered. Education and training in research should ensure that those managing and coordinating research have the right competence to
lead and to organise research activities in coordination with hospitals and should also include elements which support a common regional research mindset.

Research environments need to be built around a more permanent employment structure to ensure stability and the ongoing development of a research culture. More career paths should be created for researchers in the health service for all relevant disciplines, e.g. in the form of postdoctoral programmes, senior researcher positions and other positions shared between hospitals and research for more expert groups.

One major problem at the moment is that a large number of those who complete a PhD do not continue with research, partly due to the fact that career paths for young researchers are not clear and are few in number. Educating a PhD student is a major investment by society. Thus there is currently a good deal of untapped potential for growth and for better evaluation and possible implementation of research findings by those with research qualifications, irrespective of the fact that they might not actively engage in research after qualifying. For this reason too, all large research groups should have a plan for development of the individual environment and of the individual researcher’s career paths.

### 2.5. SUPPORT FUNCTIONS FOR RESEARCH

It is a strategic research goal to ensure adequate support for research with support functions appropriately distributed across local and central levels.

**Support functions for research broadly encompass the topics below**

- Administrative research support: Research contracts, budgeting, travel booking and post awards, including, e.g. budget follow-up and commercialisation of research findings
- Financing: Attracting external funding (pre-award), research funds (central and local) and registration of own funding/time spent
- Legislation: Approval by e.g. the Danish Data Protection Agency, GCP unit and Committees on Health Research Ethics
- Infrastructure: Access to use of e.g. hospital equipment, biobanks and animal facilities; access to clinical data, systems for managing research data, preparation for industry-sponsored clinical research
- Academic research support: Study design, protocol, application, data management, libraries, bibliometrics, research registration, statistics, article writing, health economics, etc.

Furthermore support should be secured for strategic research topics, such as innovation and implementation.
Access to and treatment of health data

It is a strategic research goal to ensure easy and smooth access to health data and the possibility for linking data – with respect for citizens’ integrity and applicable legislation.

It is strategic goal to coordinate technology-heavy centres connected with research, to bolster existing, strong clinical research environments, and to enable research partnerships to be established with fewer research-heavy specialisations.

Health data is a key ingredient of much clinical research. Enhancing both local and shared administrative support functions, such as data reviews and financing, would secure competences and critical mass. It could be especially significant for growth if a central unit was established that could be used for biostatistical assistance, data management and support with writing articles.

The technology-heavy fields of research, such as stem cell and genome research and big data analyses, are typically driven by highly specialised centres, and many internationally leading entities have already been established at regional and university levels.

Legislation on research, registers, ethics and data is highly complex, requiring legal help to be understood, and often entails long processing times. The Capital Region should expose these obstacles and direct the focus to the central administration level on the need for simple and intelligible legislation.

Financing

It is a strategic research goal to increase the volume of external research funding received.

It is a strategic research goal for the Capital Region’s fund for health research to be large enough to allow strategic use of its grants to contribute towards fulfilment of the region’s overall ambition with regard to research.

One important area of support is help in obtaining research funding; gaining access to the large funds and EU programmes often requires particular skills. Regional support should be developed to the relevant level and should be extended to include possibilities for concrete involvement in writing the applications.

A culture must be created that encourages research environments to join forces for major applications, in order to maximise the chances of success.
Another important strategic element in increasing the volume of research funding is to establish continuous, close contact with executive management in major funds.

The Capital Region’s fund for health research should be large enough to provide funding for initiating strategically important research and thus support for achieving the region’s strategic ambitions when it comes to research. Funding from the Capital Region’s central research fund and from the local funds at the hospitals should be awarded according to clear-cut criteria and should be transparent.

2.6. OUTSIDE WORLD

It is a strategic research goal to ensure regional integration of all relevant initiatives within and outside of the Capital Region, in order to support fulfilment of the region’s research ambitions.

The Capital Region’s overriding vision is described thus: “The Capital Region is a green, innovative city with high growth rates and quality of life and an integrated health service of the highest international standard”. This vision frames the region’s overall endeavour and is underpinned by four political goals: the patient’s circumstances determine the treatment; excellent, expert quality; expansive knowledge environments; green, innovative city.

The research strategy should support efforts to develop the Capital Region’s overall portfolio of tasks and should thus work in harmony with the 2020 Hospital Plan and the initiatives Hospital of the Future and Life Science.

The research strategy plays a direct role in these political goals and thus in Focus and Streamlining, as formulated in the executive management level’s strategic approach. Executive management’s strategic endeavour, Working together for Excellent Research, works with four strategic goals, which in 2018 focused on continuation and implementation of ongoing initiatives. The goals include advancement and consolidation of research strategy, increased research support functions, increased research education and training and greater infrastructure to back up research activities.

Collaboration within CHSP and the CAGs aims to foster integration between hospitals, research and education and training and thereby to boost outstanding research throughout the health sciences. CAGs are to have clear clinical outcomes and potential for creating socioeconomic gain. They must have a strong management, a strong common vision and a network, including from an international perspective. A key criterion is for CAGs to have a clear and feasible implementation plan that can help to secure the CHSP goal: to speed up implementation of new findings for the benefit of the health service as a whole.

In this way the strategy and the future action plans will support both regional and national research and implementation towards consolidating and improving the interplay between public and national efforts under the Danish regions and towards
ensuring optimum interaction with other knowledge institutions and collaborating organisations, such as University of Copenhagen, for example through CHSP and CAGs, Technical University of Denmark, Region Zealand, CACHET, Copenhagen Health Tech Cluster (CHC), Copenhagen Health Innovation (CHI) and through other public and private institutions and companies. These partnerships also have a focus on ensuring cooperation with other relevant university colleges and business academies.

At the same time, efforts with regard to the strategy should open up greater opportunities for international collaborations at various levels, since pioneering research findings that bring value for patients, the health service and the general population are generated globally. International collaboration occupies a strong position in research in the region, and continued efforts in relation to this strategy and future action plans will focus on further supporting collaboration, also with regard to efforts within EU and Horizon 2020 projects.

2.7. COMMUNICATION

It is a strategic research goal to successfully communicate the region’s infrastructure and governance for research internally within the organisation, thus appropriately supporting the development opportunities of individual departments and employees with regard to research.

It is a strategic research goal to successfully communicate research in the Capital Region to the outside world, so that research cooperation can be established with relevant partners on a regional, national and international levels.

The aim of this initiative is to ensure that there is a common narrative about research in the region, both internally and externally, and to ensure that the current messages can be spread by means of communication to relevant actors and target groups. This common narrative about research in the Capital Region should report on who, what and why. It should also describe where to find support functions in the region and what opportunities they offer, to make sure that the world around us is informed and also to ensure that the actual system itself is aware of opportunities and conditions.

Moreover it is important to ensure that the world around us understands and supports the principle that research is key to solving the major challenges facing society and pivotal for the further development and growth of the Capital Region.
OVERVIEW OF STRATEGIC RESEARCH GOALS

To create a culture that will ensure common goals in the Capital Region and an understanding of the role of research in the development of hospitals and education and training.

To boost clinical research on a broad scale in close cooperation with the relevant partners and closely coordinated with, for example, the initiatives within Copenhagen Health Science Partners and the Growth Plan for Life Science.

To generate greater knowledge about prevention and health promotion by researching the effect of initiatives and their implementation, in order to achieve a healthier population in the region.

To develop clinical tools for earlier and more differentiated diagnosis and more precise prevention and treatment – specifically targeted at the situation and needs of the individual person.

To use research to improve our knowledge of the organisation of the health service and thus of patient programmes, in order to optimise structures so that patients are seen by the relevant specialists at the right level of expertise with minimum delay periods and appointments, and with efficient use of technological possibilities and the health service’s resources.

To define the size of the individual research areas and the extent of their support by further developing the Capital Region’s process of charting all research areas and activities at hospital, specialisation and unit level.

To support and help both the large and smaller, burgeoning research environments to unfold their full potential.

For all large entities in all specialisations to be active in research in the future.

To identify and break down administrative or structural barriers for decisions supporting research to be made more quickly and efficiently.

To build up and secure a system for assessing research findings with regard to their potential implementation in the regional system for the benefit of patients and the health service as a whole.

To implement relevant research results (with effect and value) in the hospital regime without unnecessary delay and to back up this process with recommendations.
To ensure the systematic and integrated dissemination of research-based knowledge within the hospital regime, within research and within (continuing) education and training programmes for healthcare professionals.

To develop incentive structures in departments, hospitals and centres to support and consolidate the link between hospitals, research and education and training.

To create several career paths for researchers in the health service to ensure that the necessary competences can contribute in an integrated manner to the further development of the Capital Region.

To ensure adequate support for research with support functions appropriately distributed across local and central levels.

To ensure easy and smooth access to health data and the possibility for linking data – with respect for citizens' integrity and applicable legislation.

To coordinate technology-heavy centres connected with research, to bolster existing, strong clinical research environments, and to enable research partnerships to be established with fewer research-heavy specialisations.

To increase the volume of external research funding received.

To ensure that the Capital Region’s fund for health research is large enough to allow strategic use of its grants to contribute towards fulfilment of the region’s overall ambition with regard to research.

To ensure regional integration of all relevant initiatives within and outside of the Capital Region, in order to support fulfilment of the region’s research ambitions.

To successfully communicate the region’s infrastructure and governance for research internally within the organisation, thus appropriately supporting the development opportunities of individual departments and employees with regard to research.

To successfully communicate research in the Capital Region to the outside world, so that research cooperation can be established with relevant partners on a regional, national and international levels.