



# SELF-ASSESSMENT REPORT

DEPARTMENT OF CLINICAL MEDICINE 2017-2021

# **SELF-ASSESSMENT REPORT**

**DEPARTMENT OF CLINICAL MEDICINE 2017-2021**

Faculty of Health and Medical Sciences,  
University of Copenhagen

**2023**

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# SUMMARY

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This self-assessment report is part of a large research assessment process undertaken at all departments at the University of Copenhagen initiated by the Rector's Office. It is now the second time we have a research assessment of the Department of Clinical Medicine (IKM, Institut for Klinisk Medicin) during the department's 10-year history. In this self-assessment report, we will describe the frameworks for the research environments and illustrate the research activity for the whole department as well as for the individual specialities at the department.

Based on number of employees, IKM is the largest department at the University of Copenhagen (UCPH) and is an integrated part of the Faculty of Health and Medical Sciences (SUND). The Department is led by the Head of Department with reference to the Dean. Our academic staff of 965 persons, including 263 clinical professors, serve as principal supervisors for around 800 PhD students, and generate an increasing number of research papers, totalling almost 4,000 in 2021. The research is based on a high degree of international and interdisciplinary collaboration and covers a wide range of topics, spanning from basic research to randomized clinical trials

produced by 35 specialities. The field-weighted impact factor for the publications varies among specialities ranging from an average of 1.09 to 5.07 (data from 2020). The field-weighted citation impact for publications from IKM is higher than the corresponding values for both SUND and all UCPH.

The staff in IKM have their academic position at the University but are employed as clinicians at hospitals owned by the Capital Region of Denmark or Region Zealand. These shared positions guarantee that medical students and other students receive a high-quality, practice-based clinical education that is highly relevant for the health system. The close collaboration between SUND and the hospitals ensures high-quality health research embedded in clinical practice.

With respect to gender balance, we are improving and moving in the right direction: today 39% of our staff are women and 61% are men. We expect this ratio will improve further in the coming years as 66% of our PhD students are women; however, we are aware of the fact that work-life balance may challenge this assumption.

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The present self-assessment shows that most specialities have high-impact research productions and a small minority of specialities have a research production below average. Most specialities have increased both their number of publications and their average journal impact. Each speciality presents a SWOT analysis that highlights the main findings from their area. We have included a SWOT analysis from our coordinating professors as well as an overall SWOT for IKM.

In summary, IKM is a strong department with a large and high-impact scientific production that contributes to research-based teaching of our students, and it makes major contributions to the scientific education of PhD students at SUND. Our vision is to maintain our role as a leading research institution at an international level within the clinical field, and future strategic collaboration with the Dean's Office and Copenhagen University Hospital (KUH) will further develop this vision.

# INTRODUCTION TO THE DEPARTMENT

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The Department of Clinical Medicine (IKM, Institut for Klinisk Medicin) is an integrated part of the Faculty of Health and Medical Sciences at the University of Copenhagen (SUND). IKM is one of 13 departments at SUND at the University of Copenhagen, and it is the largest department at the University in terms of personnel. The department is led by the Head of Department with reference to the Dean. We employ approximately 965 staff members, of whom more than 250 are clinical professors, and we oversee a budget of DKK131 million (~EUR17.6 million). Most of the academic and educational staff have their academic position at the University and are employed as clinicians at hospitals owned by the Capital Region of Denmark or Region Zealand. This ensures that medical students and other students receive research-based, internationally recognized top-quality, feedback-driven and practice-based clinical education that is of immediate relevance to the health system and society in general. It also secures highly relevant health research embedded in clinical practice. The research produced by the academic staff is characterized by both its excellence with respect to publication impact as well as the broad range of scientific areas covered.

Through teaching, research and knowledge dissemination, IKM contributes to undergraduate education of medical students and other pre-graduate students, and PhD students in Eastern Denmark in particular, as well as postgraduate research-based development of the medical specialities in Denmark.

The department administration and management are situated at the Panum Building in Copenhagen, whereas academic staff are located at the various hospitals in the Capital Region of Denmark and Region Zealand. We have employees working at ~20 different hospital locations in the Capital Region of Denmark and Region Zealand. The psychiatric hospitals in both regions are organized separately from the somatic hospitals. Our department covers 35 of 39 medical specialities.<sup>1</sup>

## A BRIEF HISTORY OF THE DEPARTMENT

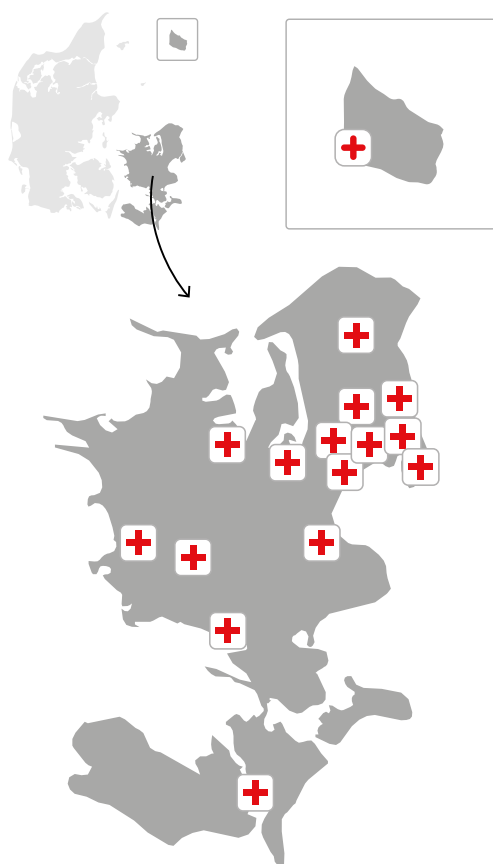
IKM was founded on 1 November 2012, after a merger between the five previous clinical departments: the Department of Surgery and Internal Medicine, the Department of Orthopaedics and Internal Medicine, the Department of Diagnostic Sciences, the

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<sup>1</sup> Occupational Medicine, General Medicine and Social Medicine are located at the Department of Public Health, University of Copenhagen. Forensic Medicine is located at the Department of Forensic Medicine, University of Copenhagen.

Department of Gynaecology, Obstetrics and Paediatrics and the Department of Neurology, Psychiatry and Sensory Sciences.

**Figure A:** The figure shows where IKM contributes to undergraduate and postgraduate education in the Capital Region of Denmark and Region Zealand, comprising the eastern part of Denmark.



### COPENHAGEN UNIVERSITY HOSPITAL

The organizational framework for the university-based collaboration between SUND at the University of Copenhagen and the health services in the Capital Region of Denmark and Region Zealand is called Copenhagen University Hospital (KUH, Københavns Universitetshospital).

According to the Danish Health Authority<sup>2</sup>, the Danish regions are obliged to guarantee research at departments that have been given specialized function. As part of KUH, the hospitals in the Capital Region of Denmark and Region Zealand are also obliged to conduct research, with a plan for research and teaching and a plan for professorships. Accordingly, many hospital departments are obliged to do research as part of their national and regional speciality function or as highly specialized departments in accordance with the national plan and demands from the Danish Health Authority for these functions. There is a signed bilateral agreement between university and hospital management stating that our professors should devote 50% of their working hours to university-related work (such as research, teaching, assessments and exams) and 50% to clinical work. With this agreement, the professors have a guarantee that they will have time allocated to research, and the hospitals are guaranteed highly qualified employees for patient care. Our staff is expected to produce original research that gives value to patients and society and that supports the teaching of our students. Even though we are a clinical department, the research performed by IKM staff covers a full spectrum, from basic research, animal experiments, registry studies and translational research, to randomized clinical trials. All funding for the research performed by the staff at the department is administrated at the hospitals.

### STRATEGIC INITIATIVES BASED ON THE FIRST RESEARCH EVALUATION

IKM had our first comprehensive research evaluation in 2017 covering the period 2014-2016. The conclusion of the evaluation pointed to areas that called for action to strengthen the overall research even further. The department management has since then worked specifically with a range of these areas as focus points when setting out strategic goals and action plans.

<sup>2</sup> [https://www.sst.dk/-/media/Udgivelser/2015/Specialeplanl%C3%A6gning-begreber-principper-og-krav.ashx?sc\\_lang=da&hash=8D5C8C1A5D9249255315AA62FAC41CB6](https://www.sst.dk/-/media/Udgivelser/2015/Specialeplanl%C3%A6gning-begreber-principper-og-krav.ashx?sc_lang=da&hash=8D5C8C1A5D9249255315AA62FAC41CB6)



- 
- Development of CAG concept
  - International aspects and international recruitment
  - Strengthening of specific research areas
  - Integration between basic science and clinical medicine
  - Career paths

This report will highlight some of the steps made within these areas as well as the plans going forward. However, some of the focus points from the first evaluation panel (specific positions as chief executive officers for research at the hospitals; conversion of funding for a significant number of PhD students into post doc positions; specific IKM funding for research) were beyond

our scope of action. The department action plan for the next four years has three specific objectives that ensure the continuation of the initiatives already started.

There are three goals:

- A.** We will contribute to the coordination of the processes for new curriculum and the establishment of a full medical degree programme in Region Zealand.
- B.** We will focus on career paths and talent management in a clinical context to strengthen research and innovation.
- C.** We will support the development of new digital skills among our teaching staff.

# SELF-ASSESSMENT PROCESS

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The self-assessment report has been drawn up by the department management (the head of the department, the two deputy heads of department, and the head of administration) supported by the department administration.

The representing professors from all 35 specialties have contributed with information about their respective speciality. Using a specific template, they forwarded

- a description of the speciality
- a SWOT (Strengths, Weaknesses, Opportunities & Threats) analysis for the speciality
- a list of three selected articles published in print or online in 2021 in the highest ranked journals

The material submitted from the representing professors was supplemented by statistical data on academic staff and data on scientific production in the speciality.

In the same way, the coordinating professors have contributed with a description of their role. Using a specific template, they forwarded

- a description of their collaboration with both IKM and hospital managements, their role in retention and recruitment of academic staff and in the hospital research strategy.
- a SWOT analysis for the role of the coordinating professor – in general and for them specifically.

Statistical data on the department's staff, educational activities, and PhD students are presented in Appendix A – Facts and Figures. A few selected figures and tables also appear in the main self-assessment report.

A bibliometric analysis is presented in Appendix B – Bibliometric Analysis. This appendix presents data on IKM's scientific production. All the statistical work in this appendix has been produced in collaboration with KUB-Nord (the University Library).

A draft version of this report and appendixes has been through a hearing process with the representing professors, the coordinating (associate) professors, the IKM council, and the GCHSP and BRIDGE leaderships.

# QUALITY, INTERNATIONAL IMPACT AND INTERDISCIPLINARITY OF THE RESEARCH

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## **IKM'S GOAL AND ACTION PLAN**

In IKM's most recent goal and action plan (covering the period 2023-2026), we state that we will support the well-established, strong research groups and ensure they receive the necessary support and recognition to maintain their world-class status. In addition, we want to help less recognized and emerging research fields become stronger by establishing a number of strategic research associate professorships. We will work on simplifying (and shortening) the process of achieving legal approval of research projects and research collaborations. We will facilitate interdisciplinary and translational research.

## **OUR ACADEMIC STAFF**

By the end of 2021, the total number of staff members was 965 (in early 2017 this number was 673), of whom 60 were clinical professors (chair)<sup>3</sup> (in 2017: 61) and 193 were clinical professors (in 2017: 133). We now employ 596 clinical associate professors (in 2017: 387). This significant rise in the number of clinical associate professors is the result of a strategic decision made by the department leadership. Put simply, we prefer to have a larger number of persons with a limited workload employed than a lower number with a greater workload, and the sum of teaching tasks remains the same. This is possible because we operate with three categories of clinical associate professors: A, B, and C, where employees in

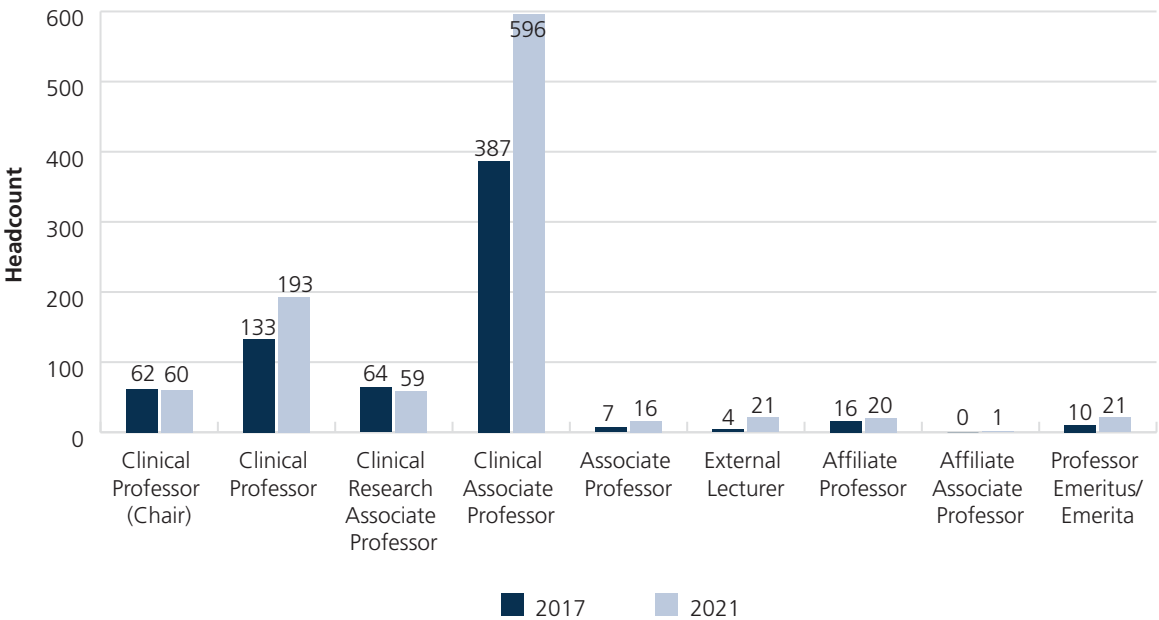
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<sup>3</sup> Clinical professor (chair) equals the Danish term 'lærestolsprofessor'. The clinical professor acts as chair of the speciality and takes the lead in the general development of the speciality's academic identity. Also, the clinical professor is the guarantor of the academic quality and relevance in the content of exam assignments.

Group A deliver the highest number of teaching hours and receive the highest salary, and employees in Group C deliver the lowest number of teaching hours and receive the lowest salary. The salary cost for one Group A clinical associate professor equals the salary for two Group B clinical associate professors or four Group C clinical

associate professors. This allows more persons the possibility to act as a principal PhD supervisor. Furthermore, our teaching obligations become less vulnerable to unexpected situations, for example during holiday periods, periods of sick leave or job changes.

**Figure B:**  
**IKM Academic staff (faculty) consist of all Clinical Professors, Clinical Research Associate Professors, Clinical Associate Professors, Associate Professors, External Lecturers, Affiliate Professors/Associate Professors, Professor Emeritus/Emerita. Headcount 2017 & 2021.**



The large increase in the number of clinical professors financed from the hospital departments is a consequence of a strong wish primarily from the hospitals and research environments to strengthen a specific research field. The hospitals also have a strong wish to establish university affiliation to non-MD academics working at the hospitals. In 2021, we employed 15 clinical professors, of whom seven had a background as a registered nurse, six had a background as a physiotherapist, one as a biochemist and one as a psychologist. Accordingly, we have grown significantly in

total number of employees (Fig 1 – 3, Appendix A). Table 1 (Appendix A) shows the number of employees in IKM when numbers are presented as full-time employment equivalents.

Gender and age distribution among our different types of employees comparing year 2021 and year 2017 are shown in Table 2 and Figure 4 (Appendix A). Among our staff, 39% were women in 2021 compared with 35% in 2017 (Table 3, Appendix A). The mean age in IKM was 54 in 2017, at the end of 2021 it was still 54.

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Our emeritus professors are senior professors who have retired from their university and hospital appointments (a few are still working as consultants at their hospital). Their emeritus status allows them to maintain an academic identity and connection to IKM and to the University without receiving any salary.

Most of our clinical professors have five-year fixed-term appointments with a possibility of extension. All our fixed-term appointments have a maximum of three employment periods, primarily because Danish legislation for public servants dictates that a fourth employment period automatically becomes a life-time employment. This is a potential challenge when a fixed-term professorship is externally funded.

In the establishment of professorships and recruitment for these professorships, the scientific basis for the professorship is thoroughly evaluated by the coordinating professor, the representing professor, the head of IKM, the hospital management and the regional chief operations officers, who provide a guarantee for a specific need for research and development in the described topic within the speciality. Applications for a professorship or clinical research associate professorship, as well as applications for an extension of such positions, must include a specific description of the planned

research for the coming five years ("the research plan") in addition to a full CV, a publication list, a teaching portfolio, teaching plan, information about funding, information about supervision of pre-graduate and postgraduate students as well as a short resume that includes bibliometric information. The qualifications and the geography of recruitment of candidates for clinical professors (chair) and clinical professors for the period 2017 – 2019 are shown in Table 4, Appendix A. The Table shows a male predominance both in applicants and among those who receive the position; the rate of successful female applicants is highest among clinical professors compared with clinical professors (chair). Most positions are filled with Danish applicants and for chair professors, 63% (10 of 16) were recruited from the same hospital, whereas for clinical professors, only 41% were in-house recruitments.

## RESEARCH PRODUCTION

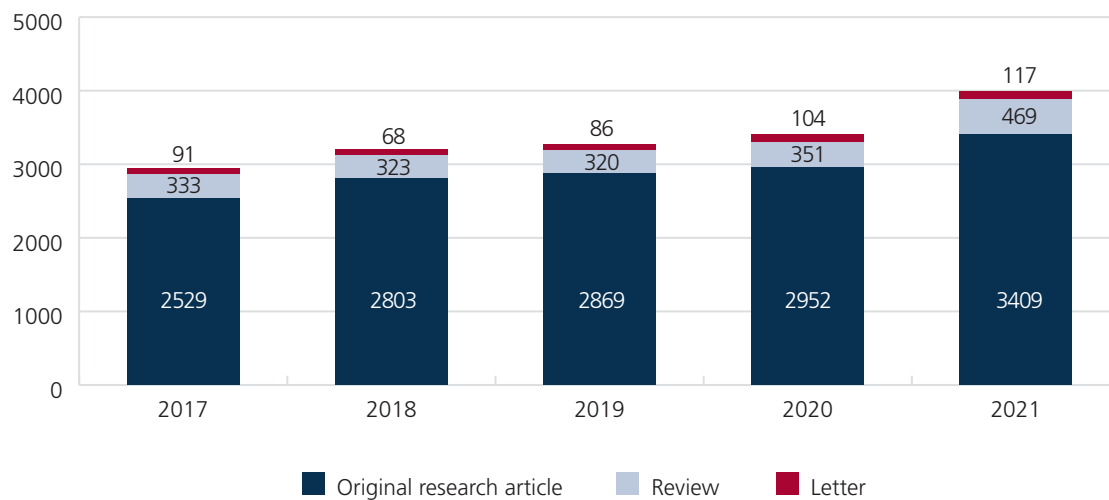
During the five-year period of 2017 to 2021, IKM's academic staff published a total of 16,824 scientific research papers in international peer-reviewed journals (on average 3,365 publications per year)<sup>4</sup> with a clear ascending slope (Table 1 – 2, Appendix B). For comparison, the production in period 2014-2016 was an average of 2,384 publications per year; however, it should be noted that our academic staff increased since then.

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4 The total number of publications for IKM has been corrected for duplicates as some publications have authors from more specialities.

**Figure C.**

**The total peer-reviewed scientific production by IKM staff in the period 2017-2021 described as number of publications broken down into different types of research publications**



Source: CURIS.

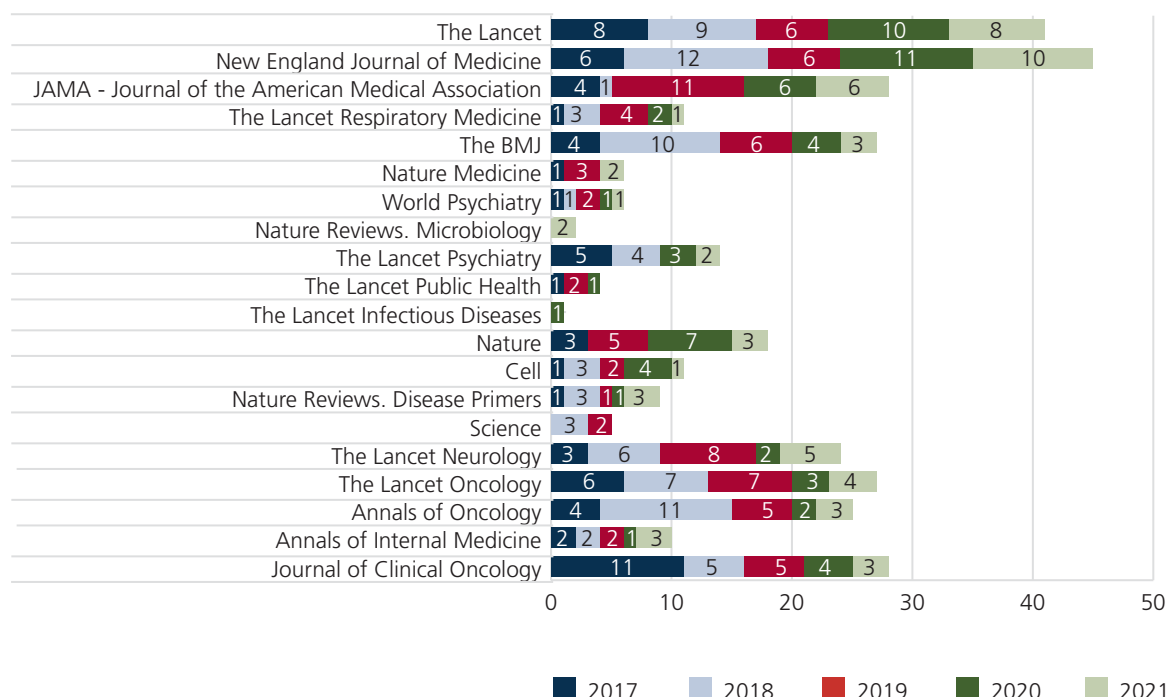
## THE DEPARTMENT'S SCIENTIFIC PUBLICATIONS AND ITS IMPACT

The largest increase in absolute number of publications comparing 2017 and 2021 was

seen in the three specialities: Internal Medicine: Cardiology, Neurology and Psychiatry (Figure 2, Appendix B).

**Figure D.**

**IKM scientific production (peer-reviewed) in top 20 journals 2017-2021 (Impact factor 2021)**



Source: CURIS

In 2021, researchers from IKM published a total of 30 original papers in the world's top five general medical journals: *The Lancet* 8 papers (total number for 2017-2021: 41 papers; mean for the 5-year period: 8.2; in comparison, the figure for 2016 was 1), *New England Journal of Medicine* 10 papers (total number for 2017-2021: 45 papers; mean for the 5-year period: 9.0; in comparison, the figure for 2016 was 6), *Journal of the American Medical Association* 6 papers (total number for 2017-2021: 28 papers; mean for the 5-year period: 5.6; in comparison, the figure for 2016 was 3), *British Medical Journal* 3 papers (total number for 2017-2021: 27 papers;

mean for the 5-year period: 5.4; in comparison, the figure for 2016 was 1) and *Annals of Internal Medicine* 3 papers (total number for 2017-2021: 10 papers; mean for the 5-year period: 2; in comparison, the figure for 2016 was 2). Furthermore, a number of papers were published in highly prestigious journals, such as *Nature*, *Nature Genetics*, *Nature Biotechnology*, *Science Translational Medicine*, *Lancet HIV and Lancet Infectious Diseases*.

The spread of publications among the 35 specialities, both measured numerically and on average impact (Figure 4, Appendix B), is – at

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least partly – explained by large differences in the number of academic staff within each speciality. For example, Neurosurgery has an academic staff of eight, including two clinical professors, compared to Neurology with a total academic staff of 49 including 20 professors (Table 3, Appendix B; Fig 4b Appendix A).

With a few exceptions, the number of published papers per speciality has increased over time (Figure 2, Appendix B).

In general, IKM researchers focus their efforts on topics with ambitious potential for publication and impact that benefit the patients. Only a small proportion of the research is published in Danish-language papers (Table 1 – 2, Appendix B). Original research papers published in peer-reviewed international journals comprise around 85% of all publications, which was also the case in our last research evaluation.

IKM researchers have a broad international collaboration network, and they are significant contributors to international research. Only around one third of all publications represent national collaborative publications where the group of authors all have affiliations from Danish universities including UCPH or Danish hospitals.

During the Covid-19 pandemic, our researchers demonstrated their agility and visionary strategy by directing at least some of their efforts into research that both resulted in a speedy and significant societal and scientific value and was able to reach the top scientific journals. In parallel with this, the researchers continued their research in their usual field of science. In the evaluation of research projects that received government funding during the pandemic, IKM staff had an important role. During the pandemic, several of the major journals showed a substantial increase in their journal impact factor. The scientific journals have a sharp focus on novelty in their publication strategy. Therefore, the journal impact factor (IF) as a proxy for research level is a reasonably valid indicator of new scientific areas and important research challenges. At the aggregated university level, a field-weighted metric ensures the comparability between fields with different potential for citations.

In the SWOT analyses presented below, a substantial number of specialities mention the unique Danish registries and genetic/DNA analyses and excellent research collaborations/networks as an opportunity or a strength. The publication analysis from each speciality gives the overall indication that IKM researchers are involved in relevant scientific focus areas and their research papers have been published in speciality-relevant high-ranked research journals. Many specialities mention complex workflow with ethical committees and data authorities as a threat to research.

In 2017-2020, the mean field-weighted impact factor for IKM's original international research publications was 2.29 (Table 4, Appendix B). The top three field-weighted impact factors among the specialities were Internal Medicine: Geriatrics: 5.07 based on 184 publications; Internal Medicine: Cardiology 2.82 based on 1513 publications; and Internal Medicine: Endocrinology 2.77 based on 935 publications (Table 5 and Figure 4, Appendix B).

To counter for the fact that research production is of course influenced by the number of employees, we calculated the number of publications per employee. The three top specialities with the highest research production (measured as number of publications) per employee were: Clinical Biochemistry: 11.5; Clinical Immunology: 11.4 and Clinical Microbiology: 9,0 (Table 3, Appendix B).

## **FIRST- AND LAST-AUTHORSHIP PUBLICATIONS**

In the period 2017-2021 our staff produced a total of 1,124 first-authorship papers (6,7%) and a total of 7,503 last-authorship papers (44,6%) among the total of 16,824 papers produced in the period (Table 6-10, Appendix B). The predominance of last-authorship papers demonstrates the seniority of our research staff. A total of 786 of our employees (57%) had a first- or last-authorship publication in the period, and among these 710 (51%) had a last-authorship publication and 445 (38%) had a first-authorship publication.



Among the 99 clinical professors (chair) who had this type of position during the 5-year period, a total of 78 published 138 first-authorship and 1,757 last-authorship research papers. Among the 227 clinical professors who had this position during the 5-year period, 397 first authorships and 3,585 last-authorship publications were published. The corresponding production from 116 clinical research professors was 184 first-authorship and 947 last-authorship publications. Finally, our clinical associate professors (408) produced 397 first authorships and 1,174 last authorships. These numbers demonstrate that our professors have a majority of senior authorships in their production and that the clinical research professors are still on an ascending slope in their research development with a lower mean number of last authorships (8.2) compared with the clinical professors (chair) (mean number of last authorships 22.5), despite that their production is impressive. Our clinical associate professors have a lower average number of last-authorship publications (mean 2.9).

Our clinical research associate professors are typically consultants, and they are expected to qualify for professorships within a few years if they are given adequate time for research. These positions are considered 'mini-professorships' and have working conditions similar to that of professors with 50% of their time allocated to clinical work and 50% to university work (primarily research), but without funding for a part-time secretary. By the end of 2021, a total of 59 were employed as clinical research associate professors. Thirtythree (20 men, 13 women) of the 116 clinical research associate professors, who had this type of position during the five-year period, were appointed to clinical professor.

#### **THE ABILITY OF SCIENTIFIC STAFF TO WIN PRIZES, PRESTIGIOUS GRANTS AND AWARDS**

During the period 2017-2021, a number of professors from IKM were recognized for their individual outstanding research through international and national prizes and awards. A number of these are highlighted in the box below.

##### **Selected prizes received by clinical professors in IKM 2017-2021**

- **Brain Prize:** 2021 Jes Olesen
- **The Marie and August Krogh Prize:** 2021 Inger Marie Svane, 2020 Børge Nordestgaard, 2019 Gunhild Waldemar, 2017 Merete Nordentoft
- **The Hagedorn Prize:** 2021 Hans Hasselbalch, 2020 Michael Kjær, 2017 Jens Lundgren
- **The Novo Nordisk Prize:** 2020 Merete Nordentoft, 2019 Hans Bisgaard†
- **KFJ Prize:** 2021 Anders Perner, 2020 Susanne Krüger Kjær, 2019 Michael Kjær, 2018 Anne Tybjærg-Hansen, 2017 Bente Klarlund Pedersen
- **Jorcks forskningspris:** 2020 Andreas Røder
- **Prize for Clinical Research<sup>5</sup>:** 2021 Jacob Rosenberg, 2020 Rigmor Højland Jensen, 2019 Peter Bytzer, 2018 Jens Lundgren
- **Danmarks bedste kliniske forsøg (Best Danish Clinical Trials):**  
Several of our staff members received this prize in different categories.

5 Det Medicinske Selskab i København <https://dmsk.dk/pris-for-klinisk-forskning/>

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### **Projects carried out in collaboration with other institutions, including international researchers**

In the period 2017-2021, 48.8% of all publications from IKM staff represented international collaboration work (scholarly output: 7,956; citations per publication: 31.9; FWCI<sup>6</sup>: 3.21). A total of 28.1% of publications represented national research collaborations (scholarly output: 4,578; citations per publication: 11.9; FWCI: 1.36), 22.3% represented in-house UCPH only institutional/hospital collaborative work (scholarly output: 3633; citations per publication: 10.4; FWCI: 1.12) and 0.7% represented single authorship papers without collaboration (scholarly output: 118; citations per publication: 27.8; FWCI: 1.99) (Table 12, Appendix B). The top 10 national and international research institutions with which our researchers collaborate are mentioned in Table 13, Appendix B. The top 3 institutions are the three other universities in Denmark: University of Southern Denmark, Aarhus University and Aalborg University; number 4 is Harvard University and number 5 is Karolinska Institute. These data indicate that our international collaborative papers have the highest research impact, followed by national collaborative work, whereas in-house collaboration has the lowest impact. Collaborations between our department and industry (academic corporate collaboration) represent 13.9% of all publications (scholarly output 2,265 papers; citations per publication: 43.6; FWCI: 4.50) compared with papers without academic corporate collaboration that represent 86.1% of our publications (scholarly output 14,020; citations per publication: 17.9; FWCI: 1.85). Among corporate collaborators, the two Danish companies Novo Nordisk A/S and H. Lundbeck A/S are at the top of the list (Table 14, Appendix B). Accordingly, academic corporate collaborations seem to have a higher impact than non-corporate collaborations.

### **OPEN ACCESS PUBLICATIONS**

UCPH has a strategic goal to increase its Open Access (OA) publications. Currently 55% of IKM's publications are OA compared with 33% in 2017 (Table 15, Appendix B). Since IKM publications represent a large part of all UCPH publications, it is a strategic goal to increase our OA percentage as this will impact the total OA percentage at UCPH. We have had meetings with representatives from the University Library and met with the governance from KUH to facilitate implementation of OA in the two regions.

### **Interdisciplinary research**

We define interdisciplinary research as research with two or more disciplines integrated in a specific research project or collaboration. When IKM staff perform interdisciplinary research, this may be implemented by use of other research methods or with focus on research subjects which are not usually covered by the speciality. In around 20% of all IKM publications, more than one of our specialities are involved in the same research paper.

Two initiatives have been fully launched since our last research evaluation: GCHSP and BRIDGE.

### **GREATER COPENHAGEN HEALTH SCIENCE PARTNERS – GCHSP**

Greater Copenhagen Health Science Partners (GCHSP) is a partnership between the University of Copenhagen, the Technical University of Copenhagen (DTU), Region Zealand and the Capital Region of Denmark. The partnership was established to strengthen the collaboration between researchers in basic laboratories and clinical researchers at the hospitals. The concept of establishing a strong formalized collaboration between university and hospital was inspired by Kings College, UK. University researchers and clinical researchers can use GCHSP to learn from each other and develop new ideas; such an approach holds the potential to lead to both

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<sup>6</sup> The Field-Weighted Citation Impact indicator (FWCI) in SciVal indicates how the number of citations received by an entity's publications compares with the average number of citations received by all other similar publications in the data universe. The term is further described in Appendix B.

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faster scientific results and better treatment of patients. A strong collaboration between university and hospitals is expected to create breakthroughs within near-patient health research and to facilitate increased cooperation with the business community, creating more jobs in the healthcare industry. Moreover, the research results will increase the level of education among university graduates employed in the healthcare system.

### **Clinical Academic Groups (CAGs)**

A CAG is a clinical academic research group that consists of researchers and clinicians from the universities and hospitals. A CAG contributes to the health sector with new research and increased quality within the field of clinical practice. This will be achieved through a strong professional network with a joint strategic aim across healthcare settings from the universities and the regions.

#### Current CAGs – titles and leadership:

- CAG Allergy - **Chair Jeanne Duus Johansen** (Herlev-Gentofte Hospital, IKM), Vice chair: Charlotte Menné Bonefeld (Department of Immunology and Microbiology, SUND)
- CAG Physical Activity and Sport in Clinical Medicine (imPAct) - **Chair Michael Kjær** (Bispebjerg-Frederiksberg Hospital, IKM), Vice chair: Flemming Dela (Department of Biomedical Sciences, SUND)
- CAG Precision Diagnostics in Cardiology - **Chair Henning Bundgaard** (Rigshospitalet, IKM), Vice chair Søren Brunak (Novo Nordisk Foundation Center for Protein Research, SUND)
- CAG Translational Haematology - **Chair Kirsten Grønbæk** (Rigshospitalet, IKM), Vice chair Krister Wennerberg (BRIC, SUND)
- CAG Host Infections Laboratory Research Drugs (CHILD) – **Chair Ulrikka Nygaard** (Rigshospitalet, IKM), Vice Chair Søren Buus (Department of Immunology and Microbiology, SUND)
- CAG Research OsteoArthritis Denmark (ROAD) – **Chair Anders Troelsen** (Amager-Hvidovre Hospital, IKM), Vice chair Stine Jacobsen (Department of Veterinary Clinical Sciences, SUND)
- CAG in Cancer Immunotherapy (CAGci) – **Chair Inge Marie Svane** (Herlev-Gentofte Hospital, IKM), Vice chair Morten Andersen (Department of Drug Design and Pharmacology, SUND)
- CAG Modulating the Infant Microbiome for Disease Prevention – **Chair Klaus Bønnelykke** (Herlev-Gentofte Hospital, IKM), Vice Chair Søren Johannes Sørensen (Department of Biology, Faculty of Science, UCPH)
- CAG Systemic Low-Grade Inflammation (LOGINFLAM) – **Chair Peter Riis Hansen** (Herlev-Gentofte Hospital, IKM), Vice chair Palle Holmstrup (Department of Odontology, SUND)
- CAG Personalised Oncological Surgery (POS) – **Chair Ismail Gögenur** (Zealand University Hospital, IKM), Vice chair Ali Salanti (Department of Immunology and Microbiology, SUND)
- Skin Cancer Innovation Clinical Academic Group (SCIN) – **Chair Merete Hædersdal** (Bispebjerg-Frederiksberg Hospital, IKM), Vice chair Lars Kai Hansen (DTU)
- CAG Acute Recovery Capacity – in an Aging Population (ACUTE) – **Chair Ove Andersen** (Amager-Hvidovre Hospital, IKM), Vice chair Lene Juel Rasmussen (Center for Healthy Ageing, SUND)
- CAG The Zealand Inflammation Research Initiative (ZIRI) – **Chair Hans Carl Hasselbalch** (Zealand University Hospital, IKM), Vice chair Lars Rønn Olsen (DTU)
- CAG Novel Strategies to Diagnose and Treat Bacterial Infections (BACINFECT) – **Chair Helle Krogh Johansen** (Rigshospitalet, IKM), Vice chair Søren Molin (DTU)
- CAG Center for Endotheliomics – **Chair Pär Ingemar Johansson** (Rigshospitalet, IKM), Vice Chair Bernhard Palsson (DTU)
- CAG Imaging-guided Cancer Surgery (IGCS) – **Chair Christian von Buchwald** (Rigshospitalet, IKM), Vice chair Andreas Kjær (Department of Biomedical Sciences, SUND)
- CAG Brain and Technology (BAT), **Chair Martin Ballegaard** (Zealand University Hospital, IKM), Vice chair Henriette Langstrup (Department of Public Health, SUND)
- CAG Regenerative Medicine for Urogenital Surgery and Fertility (SURF) – **Chair Magdalena Fossum** (Rigshospitalet, IKM), Vice chair Eva Hoffmann (Department of Cellular and Molecular Medicine, SUND)

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Each CAG has a chair and a co-chair who represent either UCPH, the Capital Region of Denmark, Region Zealand or the Technical University of Denmark. All CAG chairmen are IKM employees but within the GCHSP framework, they represent the hospital at which they hold their consultancy position. Other organisations may also be a partner in a CAG and a part of GCHSP. Currently, a total of 18 CAGs have been established, some of which were established more than 5 years ago, whereas others have only recently been established.

### **GCHSP governance**

The Board of Partners has the final decision-making power over the development of the GCHSP partnership. The Heads of Board are represented by the Regional Chief Operations Officer of Region Zealand, the Rector of the University of Copenhagen, the Regional Chief Operations Officer of the Capital Region of Denmark and the Rector of the Technical University of Denmark.

The Executive Board is responsible for ensuring decision-making and management power in the GCHSP cooperation. The chair of the Executive Board is the Director of the Center for Regional Development in the Capital Region of Denmark, and the vice-chair is the Dean at the Faculty of Health and Medical Sciences, University of Copenhagen. They are both regular members of the Executive Board and ensure the link to the Board of Partners.

The leaderships of all CAGs work together with the director of GCHSP as an Advisory Board for the Executive Board. The GCHSP secretariat supports the Advisory Board. The purpose is to ensure that the Executive Board can obtain professional sparring and advice in the development of GCHSP.

### **Financing**

GCHSP is financed by the Capital Region of Denmark, Region Zealand, the Technical University of Denmark and the University of Copenhagen. Together the organisations have granted a total of DKK 41.4 million from 2019 to 2023. During the first two years, each CAG is allocated DKK 0.5

million a year and can apply for further DKK 0.5 million for a third year.

In addition, the CAG receives DKK 450,000 annually for a three-year period covering one-year grants for the enrolment of three PhD students. The CAG itself must raise funding to cover the remaining two thirds of the expenses for the three PhD fellowships. The CAG construction is expected to attract external funding.

### **BRIDGE TRANSLATIONAL EXCELLENCE PROGRAMME (BRIDGE)**

The BRIDGE programme aims at training and educating postdoctoral fellows in the area of translational medicine, and is mentored by fully committed and top-level professionals from basic biomedical research, a clinical environment and the life science industry.

The programme constitutes a clear career path for candidates whose ambition is to bridge the gap between basic research, clinical research and the life science industry, as well as for those wishing to become pioneering leaders in the field of translational medicine.

The overall goal is to facilitate strengthened collaboration between all three sectors, i.e. health care, academia and life science industry, and thus enhance the mobility of talented researchers to conduct excellent translational research within all sectors.

To enable trans-sectoral knowledge exchange and acquisition of skills in translational medicine, each postdoctoral fellow will be mentored by two and potentially three mentors: one from basic science at SUND, one from clinical science at university hospitals in the greater Copenhagen area and ideally one from the life science industry in Denmark. The fellows spend 80% of their time pursuing a translational research project and 20% on an academic curriculum covering basic, clinical and life science topics. The academic curriculum consists of 15 uniquely developed courses (59 course days).

The BRIDGE – Translational Excellence Programme aims to appoint seven fellows with an MD, PhD

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background and seven fellows with an MSc, PhD background per fellow cohort.

### **BRIDGE Governance**

The Office for Research and Innovation, SUND anchors BRIDGE, which is led by the committed and research-active Programme Chair Peter Garred and Educational Programme Co-Chair Marianne Benn – both clinical professors at IKM and consultants at Rigshospitalet – together with a programme coordinator, course coordinator and programme administrator based at the Research and Innovation unit at SUND.

Fellows and their mentors, along with their proposed translational research projects, are assessed, selected and monitored by an Executive Scientific Committee (ESC) to ensure a high standard of excellence. An International Advisory Board (IAB) evaluates the strategy and progress of the programme. An Executive Educational Committee (EEC) closely monitors the academic curriculum.

### **Financing**

Upon application, the initial BRIDGE grant, DKK 46 million for the first grant period from 2018 to 2022, was provided by the Novo Nordisk Foundation to finance two cohorts with 11 fellows each. In 2020, the Novo Nordisk Foundation granted an additional DKK 84.5 million to finance three cohorts consisting of 14 fellows per cohort.

Fellows' salary will be provided by the BRIDGE – Translational Excellence Programme for the two-year fellowship period. In addition to their salary, fellows will also have access to an annual sum of DKK 50.000 during their two-year employment period to cover costs for computer equipment, travel, participation in meetings and conferences, language courses and activities not offered within the programme.

## **LEGAL APPROVALS RELATED TO RESEARCH Ethics Committees**

Approvals from ethics committees are essential in most of the research performed by our staff. The National Scientific Ethical Committees<sup>7</sup> were established as an institution under the Ministry of Health in 2021. With the implementation of the regulations on medical equipment and clinical drug trials, a total of three committees were established, whose task is primarily to process applications for clinical trials with drugs and testing of medical equipment in collaboration with the Danish Medicines Agency. All other scientific applications are dealt with by the two regional ethics committees (as well as a committee that assesses the ethical aspects of university studies conducted outside the clinical environment). In Denmark, studies based on the use of our national registries do not require ethical approval. Researchers, lay people and patient organisations are represented in all the different types of committees.

For a long period of time there has been substantial processing time in the regional committees, which has frustrated our researchers.

### **Collaboration Agreements**

For decades, scientific collaboration between researchers has been based on trust. Now all research collaborations need formalisation in the form of signed documents, including Data Transfer Agreements and Data Processing Agreements. The various legal units in Denmark have not had the same view on legal requirements, which has led to differences in legal practice and frustrations among our staff. During the last couple of years, very long processing times have delayed approval of research projects with severe financial consequences and frustration for our staff. In 2022, initiatives within the Capital Region have substantially improved the processing time.

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7 De Videnskabsetiske Medicinske Komitéer

# THE 35 SPECIALITIES IN IKM

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In the following we will describe each of the 35 specialities and their staff in a more detailed and individualized manner. This individual contribution from each speciality was written by the Representing Professor or Representing Associate Professor with optional contributions from other academic staff in each speciality.

Each medical speciality is presented in the following manner: brief description of the speciality's research area, headcount of academic staff in each category in 2017 and 2021 as well as presentation of age and gender profile in each category. Next, each speciality presents its own SWOT analysis.

The scientific production in the speciality is presented for each consecutive year in the period 2017-2021 with data for original research articles (journal articles), review papers and letters (and other types of research papers). Data is obtained from CURIS<sup>8</sup>.

For each speciality, the 10 most frequently used research journals are given. To give an impression of the level of impact, each speciality is presented with its Field Weighted Citation Impacts and to what degree the publications are in the top 1, 5 and 10 citation percentiles. The Field-Weighted Citation impact indicator (FWCI) in SciVal indicates how the number of citations received by an entity's publications compares with the average number of citations received by all other similar publications in the data universe. A FWCI of more than 1.00 indicates above the global average for similar publications; for example, 2.11 means 111% more than the world average. A FWCI of less than 1.00 indicates below the global average for similar publications; for example, 0.87 means 13% less than the world average.

Outputs in Top Citation Percentiles indicate the extent to which an entity's publications are present in the most-cited percentiles of a data universe (Scopus): how many publications are in the top 1%, 5% and 10% of the most-cited publications?<sup>9</sup>

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8 CURIS: is a local Pure database used for registration of research publications from UCPH. Information specialists from Copenhagen University Library validates all research publications registered in CURIS.

9 When field weighting Outputs in Top Citation Percentiles are selected, the Field-Weighted Citation Impact (FWCI) is used for each publication to calculate the percentile thresholds, instead of the publication's citations. For each year, the global publications are extracted from Scopus and ordered from highest to lowest based on their FWCI values. The publications are then split into 100 even percentiles and the citation thresholds are noted.

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The collaboration of the speciality is presented according to type of geographical collaboration (international, national, local, single author).

These bibliometric analyses are based on data from SciVal<sup>10</sup>. Please note that SciVal only contains certain journals, so the underlying dataset does not contain all publications in the speciality. Publications from 2021 are not included since they have not had the proper amount of time to be cited. The underlying dataset comprises the journal publications IKM's researchers have registered in CURIS, which can be found in Scopus. However, as the publication and citation culture vary across different disciplines, the data would not be comparable across specialities, faculties nor universities. The method also precludes comparison to clinical medicine departments at other universities, where detailed categorization is unavailable to us.

Finally, the three most prominent research papers from the speciality with either first or last authorship by an IKM employee published in 2021 selected by the representing professor or representing associate professor is presented.

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10 SciVal: is an analytic tool based on publication data from Scopus, the world's largest curated abstract and citation database. SciVal uses Scopus data from 1996 to present, covering over 60 million records from more than 7,000 publishers worldwide. Data sets can be exported directly from CURIS into SciVal, enabling creation of new data sets and analysis of e.g., author collaborations and article citations. 96.5% of IKMs journal publications could be retrieved in SciVal.



# ANAESTHESIOLOGY

REPRESENTING PROFESSOR: OLE MATHIESEN

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## RESEARCH AREAS AND TRANSLATIONAL ASPECTS:

- The research areas in clinical anaesthesia include strategies for managing the airway focusing on prediction of difficulties, optimal choice of airway devices, and airway pharmacology.
- Studies are conducted to optimize management of emergency abdominal surgery and patients with sepsis focusing on the surgical stress response and modification of inflammation.
- In neuroanaesthesiology, ongoing studies investigate pathophysiology of severe injury to the brain and spinal cord with multimodal neuromonitoring.
- Interventions for intensive care unit patients are assessed in large international randomized trials, including antipsychotics for delirium and fluid management.
- Follow up after intensive care addressing physical and mental status is also a focus.
- In postoperative pain research, a programme has been designed to assess multimodal analgesia and peripheral nerve blocks.
- Prehospital and emergency medicine research topics include cardiac arrest, critical bleeding and coagulopathy. Another area is hyperbaric medicine.

International collaboration is ongoing, most notable with organizations such as the Scandinavian Society of Anaesthesiology and Intensive Care Medicine; European Society of Intensive Care Medicine, European Society of Anesthesiology and Intensive Care, and subspecialty organizations (obstetric, neuro, cardiovascular, trauma, pediatric intensive care). Specific international collaboration in some parts, e.g. Collaboration for Research in Intensive Care ([www.cric.nu](http://www.cric.nu))

National cross-disciplinary collaborators are Copenhagen Trial Unit, Cochrane Anesthesia; Cochrane critical care group, and a new national network of research in anaesthesiology has been

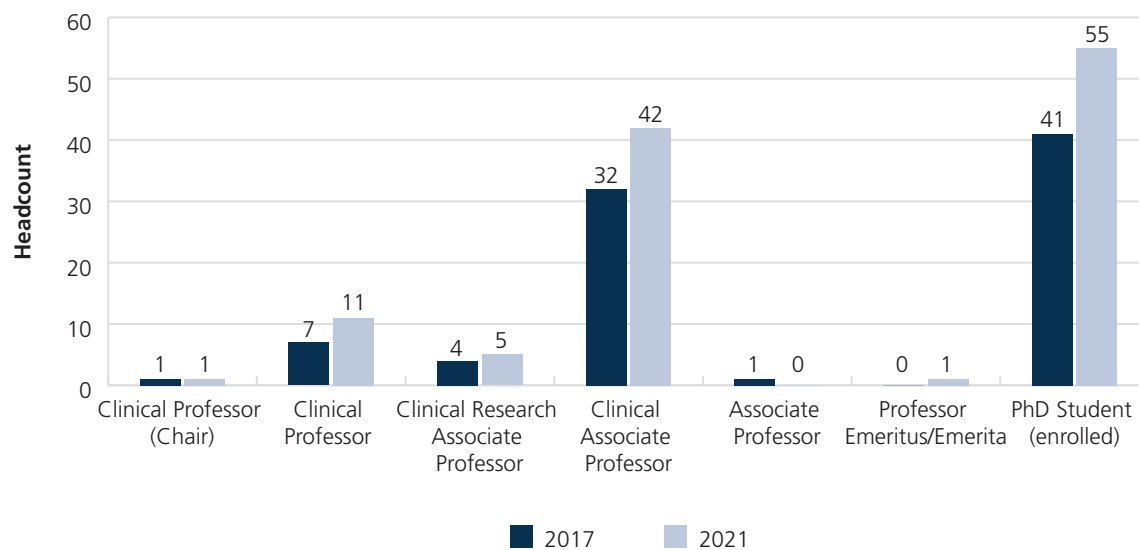
established, Collaboration of Evidence-based Practice and Research in Anaesthesia (CEPRA) ([www.cepra.nu](http://www.cepra.nu))

Research-based teaching is done as Anaesthesiology has co-founded systematic research training during specialty training. Master modules in patient safety are in place at the University of Copenhagen, and a Fellowship programme in neuroanaesthesiology and neurointensive care is currently undergoing accreditation.

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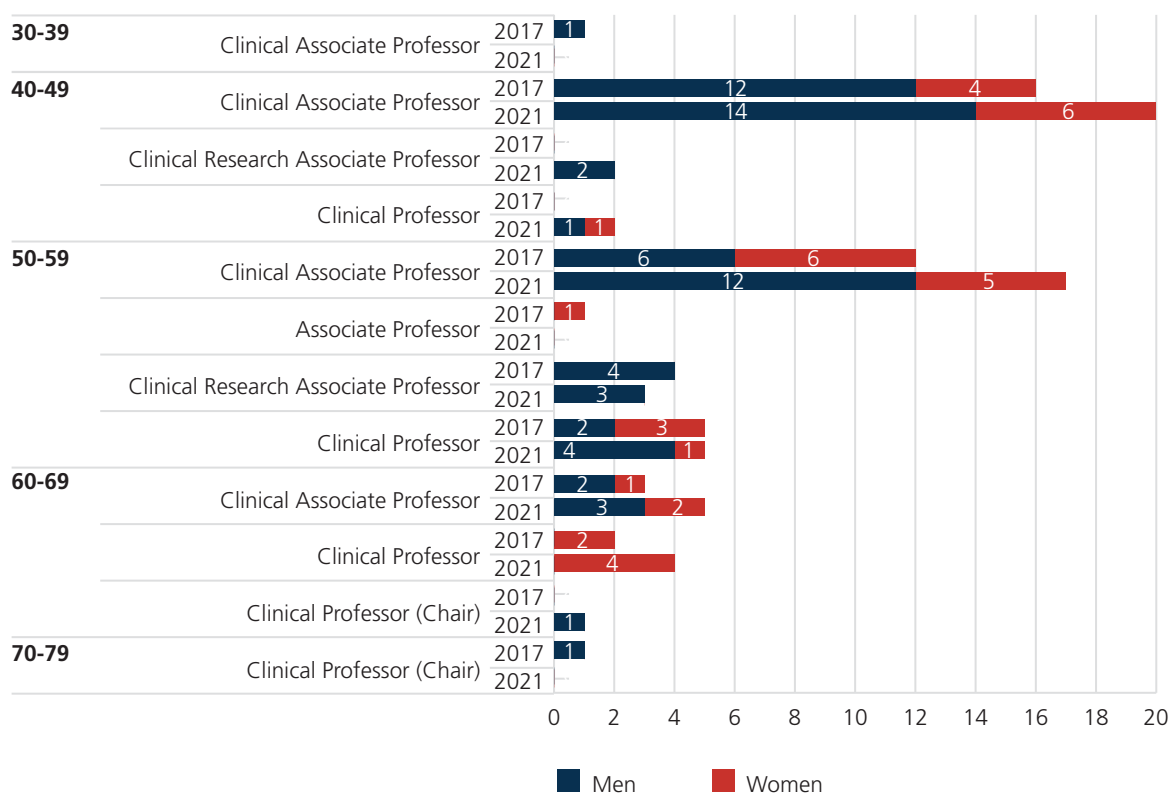
To bring research at the speciality of Anaesthesiology to an even higher level quantitatively would require an increased number of positions as associate professor for young anaesthesiology specialists with PhD background and ambitions to continue research. Grants for post docs and PhDs (initiation grants) specifically dedicated to Anaesthesiology. Grants for international research collaboration (exchange visits, guest researchers). Resources allocation to infrastructure for clinical research, particularly the administrative parts and for data capture. Furthermore, would it qualitatively require positions as researcher allowed throughout anaesthesiology specialist training for researchers with PhD and ambitions to continue research further. Further strengthening of visibility and reputation of the specialty. This will facilitate recruitment and attract funding. Closer and more professional integration of Research Units in Anaesthesiology in the department management and leadership – to facilitate prioritization of clinical research in the busy daily work. Trial networks, research groups collaborating on innovative research projects, more professional collaborative efforts for funding, integration of artificial intelligence and big data in monitoring and prevention of complications.

## Academic Staff in Anaesthesiology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Anaesthesiology 2017 & 2021



Source: KUPA

### STRENGTHS

- Large number of patients and procedures, daily contact with many specialties, valuable registers enabling follow-up
- Collaboration among clinical and methodological sites, interdisciplinary across hospitals, nationally and internationally
- Desire to do research at many hospitals with focus on building evidence through clinical research, RCTs, systematic reviews and guidelines
- Recruitment of many medical students and young doctors into clinical research training and very cost-effective clinical research infrastructure

### WEAKNESSES

- Clinically sub-specialized, very little national coordination and limited collaboration with basic science
- Limited access to research administrative staff, high dependency on external competitive grants, demanding clinical working conditions
- Less resources for research in some hospitals and less hospital support for research outside normal hours
- No patient association to promote interests of the specialty

## SWOT

### OPPORTUNITIES

- Good culture for collaboration around clinical research, excellent track-record
- Many patients not in RCTs and many patients in standardized clinical care protocols
- Potential for cooperation with experts in physiology, surgery, and internal medicine, but also anthropology and psychology
- Expansion of international research further as many Ph.D.'s soon at the post doc level able to continue research

### THREATS

- Administrative burden: contracts, approvals, with delays due to slow approval processes
- Limited interest from industry, patient organizations and society with higher degree of competition for funding
- High clinical work burden and staff shortage and nurse anesthetist shortage, resulting in reduced possibilities to conduct clinical research during daytime
- Publication of studies that do little for improvement of patient care (publish or perish but with high degree of irreproducibility)

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Anaesthesiology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 150        | 170        | 188        | 175        | 186        |
|               | Letter          |            | 5          | 5          | 3          | 8          |
|               | Review          | 24         | 25         | 29         | 23         | 29         |
| Danish        | Journal article | 4          | 7          | 7          | 2          | 1          |
|               | Letter          | 1          |            |            |            |            |
|               | Review          | 1          |            |            | 1          | 3          |
| <b>Total</b>  |                 | <b>180</b> | <b>207</b> | <b>229</b> | <b>204</b> | <b>227</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 38.7%   | 395              | 11,311    | 28.6                      | 3.46                           |
| Only national collaboration          | 31.5%   | 322              | 3,205     | 10                        | 1.3                            |
| Only institutional collaboration     | 29.6%   | 303              | 3,034     | 10                        | 1.13                           |
| Single authorship (no collaboration) | 0.2%    | 2                | 11        | 5.5                       | 0.65                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                              | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|----------------------------------------------------------------------|------------------------------|----------------------------|
| Acta Anaesthesiologica Scandinavica                                  | 199                          | 2.274                      |
| Intensive Care Medicine                                              | 43                           | 41.787                     |
| Resuscitation                                                        | 29                           | 6.251                      |
| BMJ Open                                                             | 28                           | 3.017                      |
| Ugeskrift for Laeger                                                 | 25                           |                            |
| British Journal of Anaesthesia                                       | 24                           | 11.719                     |
| Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine | 23                           | 3.803                      |
| Anaesthesia                                                          | 22                           | 12.893                     |
| Danish Medical Journal                                               | 20                           | 1.865                      |
| Regional Anesthesia and Pain Medicine                                | 17                           | 5.571                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Anaesthesiology          | 789                              | 1.95                           | 2.7                                   | 9.4                                   | 15.6                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. COVID STEROID 2 Trial Group, Munch MW, Myatra SN, Vijayaraghavan BKT, Saseedharan S, Benfield T, Wahlin RR, Rasmussen BS, Andreasen AS, Poulsen LM, Cioccarl L, Khan MS, Kapadia F, Divatia JV, Brøchner AC, Bestle MH, Helleberg M, Michelsen J, Padmanaban A, Bose N, Møller A, Borawake K, Kristiansen KT, Shukla U, Chew MS, Dixit S, Ulrik CS, Amin PR, Chawla R, Wamberg CA, Shah MS, Darfelt IS, Jørgensen VL, Smitt M, Granholm A, Kjær MN, Møller MH, Meyhoff TS, Vesterlund GK, Hammond NE, Micallef S, Bassi A, John O, Jha A, Cronhjort M, Jakob SM, Glud C, Lange T, Kadam V, Marcussen KV, Hollenberg J, Hedman A, Nielsen H, Schjørring OL, Jensen MQ, Leistner JW, Jonassen TB, Kristensen CM, Clapp EC, Hjortsø CJS, Jensen TS, Halstad LS, Bak ERB, Zaabalawi R, Metcalf-Clausen M, Abdi S, Hatley EV, Aksnes TS, Gleipner-Andersen E, Alarcón AF, Yamin G, Heymowski A, Berggren A, La Cour K, Weihe S, Pind AH, Engstrøm J, Jha V, Venkatesh B, Perner A.  
Effect of 12 mg vs 6 mg of Dexamethasone on the Number of Days Alive Without Life Support in Adults With COVID-19 and Severe Hypoxemia: The COVID STEROID 2 Randomized Trial. JAMA, 2021, 326:1807-1817
2. Carlsson CJ, Nørgaard K, Oxbøll AB, Søgaard MIV, Achiam MP, Jørgensen LN, Eiberg JP, Palm H, Sørensen HBD, Meyhoff CS, Aasvang EK. Continuous Glucose Monitoring Reveals Perioperative Hypoglycemia in Most Patients With Diabetes Undergoing Major Surgery: A Prospective Cohort Study. Ann Surg. 2021, Oct 8, Online Ahead of print
3. Agerskov M, Thusholdt ANW, Holm-Sørensen H, Wiberg S, Meyhoff CS, Højlund J, Secher NH, Foss NB. Association of the intraoperative peripheral perfusion index with postoperative morbidity and mortality in acute surgical patients: a retrospective observational multicentre cohort study. Br J Anaesth 2021, 127: 396-404

# CARDIOTHORACIC SURGERY

REPRESENTING PROFESSOR: RENÉ HORSLEBEN PETERSEN

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## RESEARCH AREAS:

- Adult cardiac surgery, pediatric cardiac surgery and thoracic surgery, Cardiac surgery: research is primarily clinical with focus on transplantation, minimal invasive, aortic root and CABG.
- Pediatric cardiac surgery is focused on long term outcome including neurodevelopmental, genetics, the maternal fetal environment and the role of the lymphatic system in congenital heart diseases.
- Thoracic surgery: development of minimal invasive thoracic surgery and learning and simulation, Enhanced recovery after surgery (ERAS), NET center of excellence, immunotherapy and lung cancer surgery

## TRANSLATIONAL ASPECTS:

- PDX-models in neuroendocrine tumors
- Genetics in ASD
- Octreotide and lymphodynamics

## INTERNATIONAL COLLABORATIONS:

The department has started a collaboration with Professor J.W. Gaynor, Children's Hospital of Philadelphia, who was inaugurated as Affiliate Professor at our department and IKM in June 22. Gaynor is already a co-supervisor for several PhD-students with the department and will be a valuable resource for collaboration on future scientific project.

Likewise, a strong collaboration has been established with Dr. Yoav Dori, Children's Hospital of Philadelphia, who visited the department in November 21, for both scientific- and treatment purposes.

Chair of the ESTS guideline group for Surgical management of ground glass opacities and chair of the guideline committee. ESTS Director of Annual meeting.

## NATIONAL CROSS-DISCIPLINARY COLLABORATORS (CAGS, OTHER):

National RCT study on intrapleural fibrinolysis vs VATS decortication for empyema.

National RCT study on stereotactic radiation therapy vs VATS wedge resection for marginal lung cancer. Danish Cancer Society Research Centre: National study on postoperative rehabilitation.

Study on neurodevelopmental outcomes of congenital heart patients with psychologists and neuropsychologists at AUH.

## COLLABORATION WITHIN THE SPECIALITY

- RCT-study with AUH regarding the omission of chest drains.
- Lung metastasis – a prediction model. Milan, IT.
- VATS lobectomy and AI. Bern, CH

## RESEARCH-BASED TEACHING

- PhD-courses in Surgical Pathophysiology
- PhD-course: The Talented Researcher

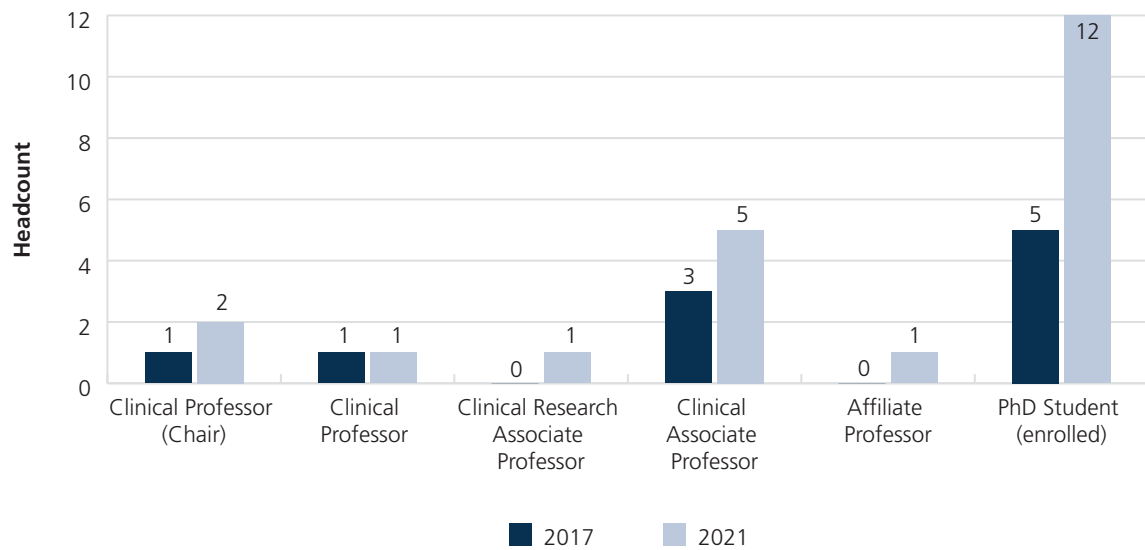
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To bring research at the Department of Cardiothoracic Surgery to an even higher level would require improved office and meeting accommodations for both senior researchers and PhD-students. Most importantly we need to have all offices physically close to each other, to achieve the physical impression of a research unit.

Furthermore, we need better economic support for the various projects conducted at the department.

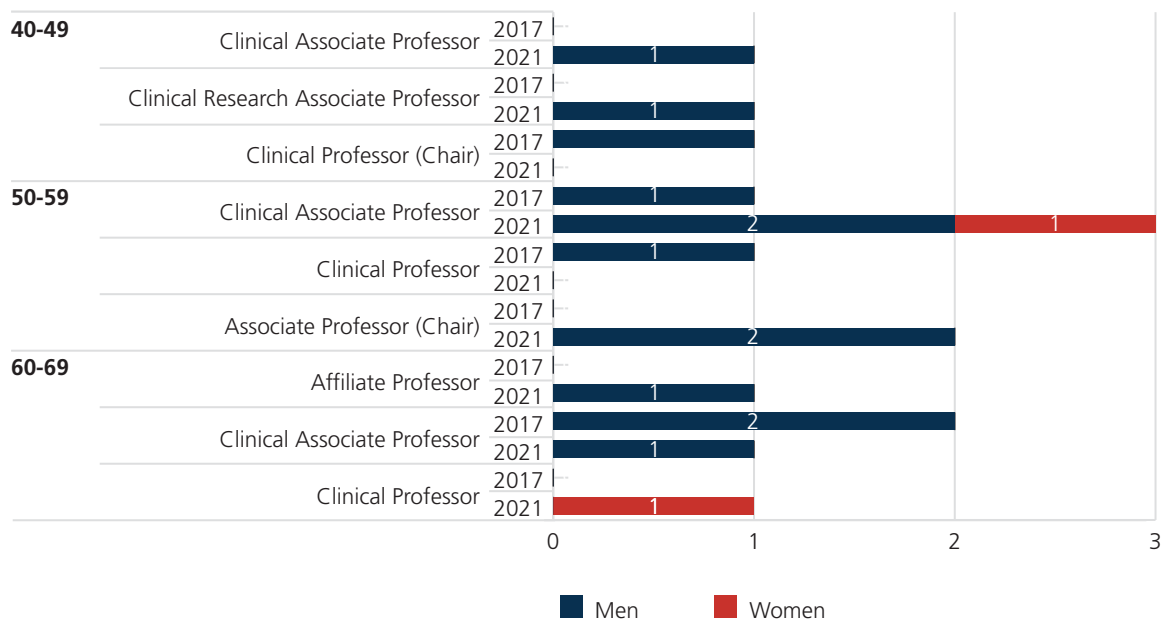
The research culture in the department in general needs to be strengthened.

### Academic Staff in Cardiothoracic Surgery 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Cardiothoracic Surgery 2017 & 2021



Source: KUPA

**STRENGTHS**

- Talented researchers
- Large unit with many patients
- Highly specialized unit
- Clinical research has low costs

**WEAKNESSES**

- Busy clinicians
- Clinical duties have highest priority
- Office and meeting space at the department is sparse
- Weak research culture

**SWOT****OPPORTUNITIES**

- A specialty in constant development and advancement
- Great international attention and interest
- A growing research unit with much energy and ambition

**THREATS**

- Constant cutbacks
- Long waits for processing of applications in PACTIUS, the Legal Department and VEK
- Lack of funding

**SCIENTIFIC PRODUCTION IN THE SPECIALITY****Number of articles in Cardiothoracic Surgery – Peer-reviewed**

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 25        | 38        | 45        | 33        | 54        |
|               | Letter          | 1         | 1         |           |           | 1         |
|               | Review          | 8         | 8         | 5         | 4         | 6         |
| Danish        | Journal article |           | 1         | 1         | 1         |           |
| <b>Total</b>  |                 | <b>34</b> | <b>48</b> | <b>51</b> | <b>38</b> | <b>61</b> |

Source: CURIS

**COLLABORATION 2017-2021****Includes: Articles, Letters, Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 42.7%   | 94               | 1,868     | 19.9                      | 1.97                           |
| Only national collaboration          | 43.6%   | 96               | 899       | 9.4                       | 1.19                           |
| Only institutional collaboration     | 13.6%   | 30               | 279       | 9.3                       | 1.45                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                                                | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|--------------------------------------------------------|---------------------------------|-------------------------------|
| Journal of Thoracic Disease                            | 13                              | 3.005                         |
| Respiration                                            | 9                               | 3.966                         |
| Surgical Endoscopy and Other Interventional Techniques | 9                               | 3.453                         |
| European Journal of Cardio-thoracic Surgery            | 9                               | 4.534                         |
| European Journal of Vascular and Endovascular Surgery  | 9                               | 6.427                         |
| Acta Ophthalmologica                                   | 7                               | 3.988                         |
| European Radiology                                     | 6                               | 7.034                         |
| Acta Anaesthesiologica Scandinavica                    | 6                               | 2.274                         |
| Journal of Thoracic and Cardiovascular Surgery         | 5                               | 6.439                         |
| Journal of the American Heart Association              | 5                               | 6.106                         |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Cardiothoracic Surgery   | 164                                         | 1.7                                      | 1.8                                         | 7.3                                         | 18.3                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Soldath P, Binderup T, Kjaer A, Federspiel B, Langer SW, Knigge U, Petersen RH. Long-Term Survival and Recurrence After Resection of Bronchopulmonary Carcinoids: A Single-Center Cohort Study of 236 patients. *Lung Cancer*. 2021 Apr 26;156:109-116.
  2. Maagaard M, Eckerström F, Hjortdal VE. Cardiac arrhythmias and impaired heart rate variability in older patients with ventricular septal defects. *Journal of the American Heart Association*. Epub 2021 Sep 1.
  3. Haidari TA, Bjerrum F, Hansen HJ, Konge L, Petersen RH, Simulation-based VATS resection of the five lung lobes: A technical skills test. *Surgical Endoscopy* 2021 Mar 3. doi: 10.1007/s00464-021-08392-3. Online ahead of print.
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# CHILD AND ADOLESCENT PSYCHIATRY

REPRESENTING PROFESSOR: SØREN DALSGAARD

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## RESEARCH AREAS AND TRANSLATIONAL ASPECTS

**RCTs:** TEENS: Online self-harm therapy; TEA: Antipsychotics; TECTO: OCD Psychotherapy; OPUS YOUNG: Early psychosis intervention; DAN-PACT: Parent-mediated ASD-treatment; GOAL: Effects of GLP-1 agonist on obesity in antipsychotics.

**Clinical observational studies:** GENDER DYSPHORIA: Psychosocial and somatic factors; PROSA: Prolactin effects of antipsychotics; VIBUS: Family-based anorexia treatment; EMCAP: Emotion regulation in ADHD; SSRIs and suicidality; Via Family: Multidisciplinary parental mental illness intervention. Mind My Mind: Effectiveness of Transdiagnostic CBT. INDICES: 12-week Stimulant Treatment Outcomes in ADHD. The Copenhagen Child Cohort 2000.

**Register studies:** ASEP: Antipsychotics and Somatic diseases. VIA: High-risk studies.

**Translational studies:** TECTO Neural underpinnings of OCD/treatment; MIPAD: Neurobiology of maternal affective disorders and infants; BIO-YOUNG: Biomarkers in affective disorders; WRIST ANGEL: Wearable AI Feedback for OCD.

## INTERNATIONAL COLLABORATIONS

Yale, USA; University of Lausanne, CH; Cambridge University, UK; UCLA, USA; Vrije University, NL; Karolinska Inst., SE; University of Warwick, UK; University of Melbourne, AUS; Charité Universitätsmedizin, GE; Zucker School of Medicine, USA; Oslo University, NO; King's College, London, UK; University of Basel, CH. University of Marburg, University of Rotterdam, University of Dalhousie, Halifax

## NATIONAL COLLABORATORS

**Cross-disciplinary:** DTU, KU, SDU, AU, AAU, CTU, Danish Research Center for MR, Khora, Psychological Institute, KOMBU

**In specialty:** CAP centers at OUH, AUH, AAUH

## RESEARCH-BASED TEACHING

CAP-textbook chapters. Complete pedagogy course. Develop evidence-based pedagogical teaching, specialty focused courses, and examinations with precise and intended learning goals. Apply problem-based clinical training. Obtain evaluations of our teaching and exams. We aim to educate future MDs at a basic doctor level and stimulate interest in CAP. We supervise a large number of master theses and bachelor projects at IKM.

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To bring research at the speciality of Child and Adolescent Psychiatry to an even higher level would require an increase in the possibilities for recruitment of MDs to research, the number of PhDs who continue to Post Doc and senior scientist carriers, the number of applications to larger funding bodies (including EU).

There is need for a develop of a universal data-platform for register-based research.

Furthermore, we need to expand faculty with bioinformaticians.

We also need to enhance possibilities for guidance of PhDs on advanced statistical analyses and epidemiology.

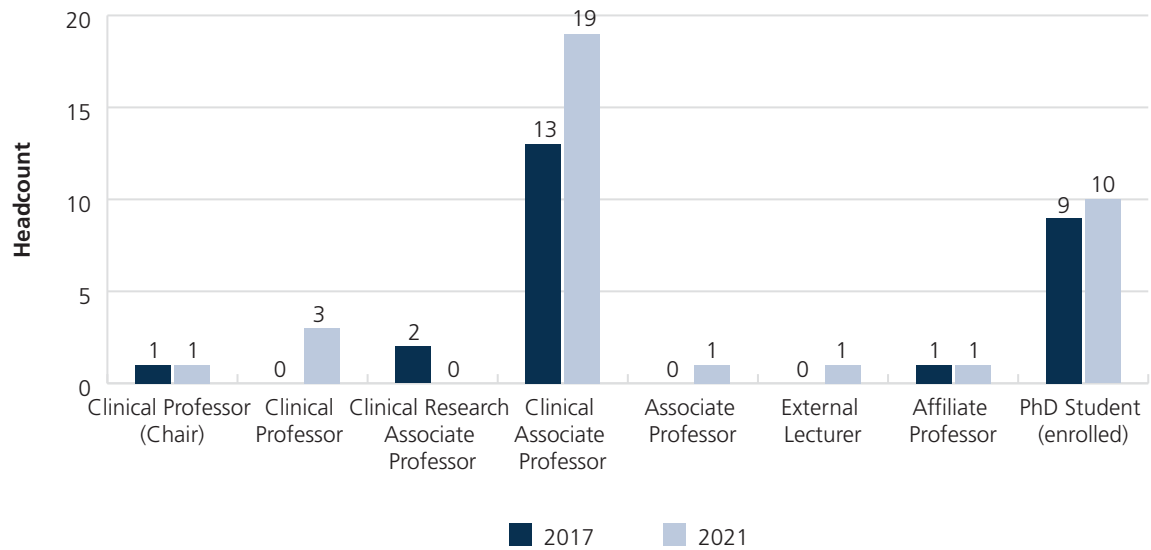
We need to increase international networking.

There is also need for a formulation of an updated research strategy.

Moreover, there is a requirement for an increase in initiatives in computer science (AI, machine learning), technical methods, and genetics, and an increase in number of clinical trials and ease the way for patients to participate in clinical studies.

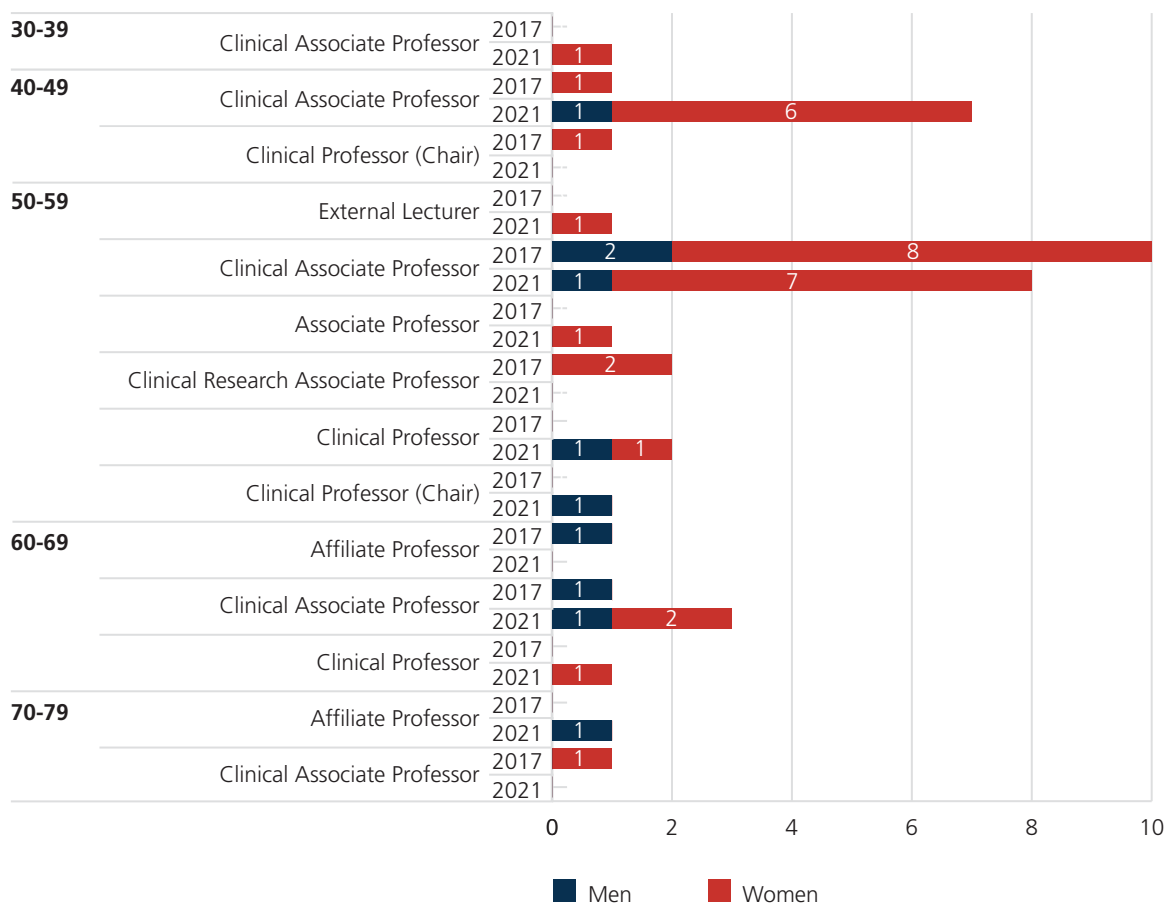
Lastly, there should be more focus on funding for clinical interventions and preventive strategies.

### Academic Staff in Child and Adolescent Psychiatry 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Child and Adolescent Psychiatry 2017 & 2021



Source: KUPA

### STRENGTHS

- Expertise in clinical, register-based, and cohort studies, translational research
- Good collaboration with clinical units
- Competent research staff
- Administrative team for support

### WEAKNESSES

- Resources from external funding too low and demanding
- Our new professor collegium is under establishment
- Too few MDs recruited to research
- Shortage of offices and statistical support

## SWOT

### OPPORTUNITIES

- All five professors should work closer together and synergy between projects can be evolved
- We should stimulate post docs and senior scientists more
- Recruit more MDs to research
- Develop an ambitious new research strategy
- Build even stronger research collaborations, also internationally

### THREATS

- Difficult to raise external funding
- Clinical departments are overwhelmed by referrals of more patients (+10-15% extra each year) – limits the clinic's possibilities to collaborate and contribute
- We have broad portfolio of activities – might delute outcomes?
- Funds have their own agenda

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Child and Adolescent Psychiatry – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 26        | 23        | 28        | 31        | 39        |
|               | Letter          |           |           | 1         |           |           |
|               | Review          | 2         | 3         | 2         | 1         | 2         |
| Danish        | Journal article | 2         | 2         |           | 1         |           |
|               | Letter          |           |           | 1         |           |           |
|               | Review          |           | 1         |           |           | 2         |
| <b>Total</b>  |                 | <b>30</b> | <b>29</b> | <b>32</b> | <b>33</b> | <b>43</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 64.6%   | 104              | 2,654     | 25.5                      | 2.21                           |
| Only national collaboration          | 28.6%   | 46               | 493       | 10.7                      | 1.32                           |
| Only institutional collaboration     | 5.6%    | 9                | 12        | 1.3                       | 0.3                            |
| Single authorship (no collaboration) | 1.2%    | 2                | 8         | 4                         | 0.28                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                            | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------------------------------------|------------------------------|----------------------------|
| Psychological Medicine                                             | 11                           | 10.592                     |
| Ugeskrift for Laeger                                               | 8                            |                            |
| European Child and Adolescent Psychiatry                           | 7                            | 5.349                      |
| PLoS ONE                                                           | 7                            | 3.752                      |
| Schizophrenia Research                                             | 6                            | 4.662                      |
| Journal of the American Academy of Child and Adolescent Psychiatry | 5                            | 13.113                     |
| European Eating Disorders Review                                   | 4                            | 5.360                      |
| Journal of Child Psychology and Psychiatry and Allied Disciplines  | 4                            | 2.743                      |
| Journal of Affective Disorders                                     | 4                            | 6.533                      |
| Acta Psychiatrica Scandinavica                                     | 4                            | 7.734                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                                 | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|---------------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Child and Adolescent Psychiatry | 118                              | 1.9                            | 2.5                                   | 9.3                                   | 18.6                                   |
| IKM                             | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                            | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen        | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Gregersen, M, Søndergaard, A, Brandt, JM, Ellersgaard, D, Rohd, SB, Hjorthøj, C, Ohland, J, Krantz, MF, Wilms M, Andreassen, AK, Knudsen, CB, Veddem, L, Greve, A, Bliksted, V, Mors, O, Clemmensen, L, Møllegaard Jepsen, JR, Nordentoft, M, Hemager, N, Thorup AAE. *Mental disorders in preadolescent children at familial high-risk of schizophrenia or bipolar disorder - a four-year follow-up study: The Danish High Risk and Resilience Study, VIA 11: Journal of Child Psychol Psychiatry*. 2022 Sep;63(9):1046-1056. doi: 10.1111/jcpp.13548. Epub 2021 Dec 16. PMID: 34918345.
2. Jeppesen P, Wolf RT, Nielsen SM, Christensen R, Plessen KJ, Bilenberg N, Thomsen PH, Thastum M, Neumer SP, Puggaard LB, Agner Pedersen MM, Pagsberg AK, Silverman WK, Correll CU. Effectiveness of Transdiagnostic Cognitive-Behavioral Psychotherapy Compared With Management as Usual for Youth With Common Mental Health Problems: A Randomized Clinical Trial. *JAMA Psychiatry*. 2021 Mar 1;78(3):250-260. doi: 10.1001/jamapsychiatry.2020.4045.
3. Sørensen JØ; Rasmussen A; Roesbjerg T; Verhulst, F; Pagsberg AK. Suicidality and non-suicidal self-injury during treatment with selective serotonin reuptake inhibitors in children and adolescents: Occurrence, predictors and weekly risk in a clinical sample. *Acta Psychiatr Scand*; 2021 Aug 9. doi: 10.1111/acps.13360.



# CLINICAL BIOCHEMISTRY

REPRESENTING PROFESSOR: BØRGE G. NORDESTGAARD

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## RESEARCH AREAS AND TRANSLATIONAL ASPECTS:

Clinical Biochemistry has research areas within all major groups of diseases, including diagnostic, medical and surgical aspects of cardiovascular disease, cancer, lung disease, infectious disease, gastrointestinal disease, rheumatology, neurological disease, endocrinology, gynecology, and obstetrics. Types of studies include human studies, many with translational aspects, like epidemiology, Mendelian randomization studies, and randomized intervention trials, animal studies including transgenic models, cell studies and in vitro work.

Research questions include understanding of disease pathogenesis, improved diagnostic tests, improved use of diagnostic tests, and improved disease prevention and treatment. In other words, as Clinical Biochemistry provides biochemical and genetic diagnostic tests to all medical specialties, the research within Clinical Biochemistry also covers most medical fields and research methods.

This results in widespread collaboration with medical doctors and other researchers in essentially all medical fields as well as in all areas of basic research of relevance for human health and disease, cross-disciplinary within our own specialty, nationally as well as internationally. Several research leaders in the specialty are members of Clinical Academic Groups collaborating closely with clinicians and basic scientists on focused scientific areas.

Staff within Clinical Biochemistry are heavily involved in research-based teaching, spanning from population-based teaching, university teaching, teaching of medical doctors of all relevant specialties, and finally international teaching worldwide for scientific and clinical courses as well as international scientific congresses.

To bring research at the speciality of Clinical Biochemistry to an even higher level would require employment of more clinical professors as well as clinical research associate professors, which will allow supervision of even more medical students, other university students, Ph.D. students, and post. doc.'s – ultimately leading to more high-quality research.

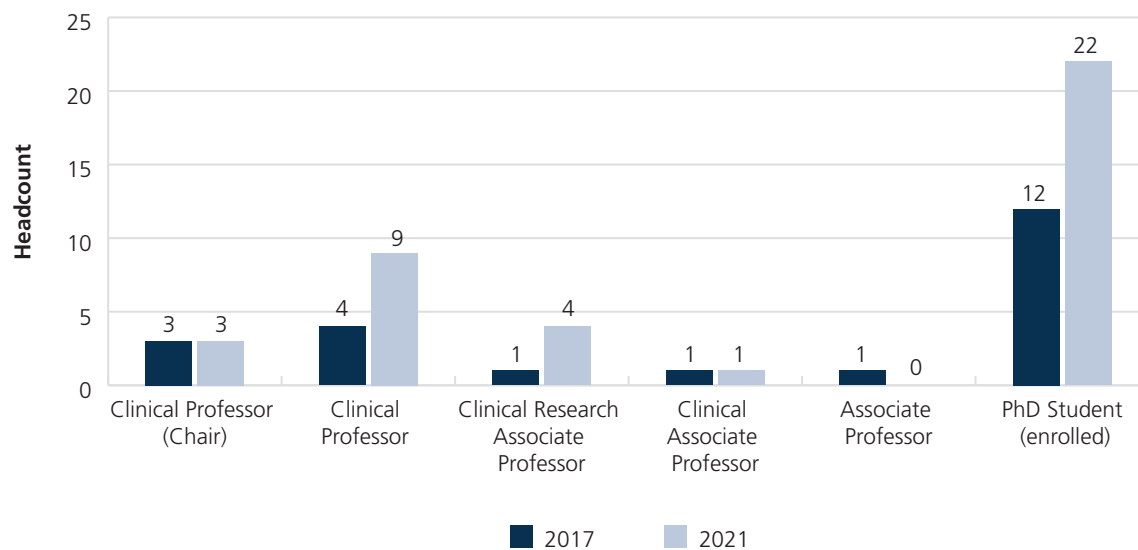
There is also need for more focus on high-quality research, including publishing in high-impact peer-reviewed scientific journals. After securing high-quality research, a high number of research papers is the 2<sup>nd</sup> objective. A 3<sup>rd</sup> objective is presentations at international scientific meetings while a 4<sup>th</sup> objective is dissemination of research findings though standard as well as social media.

Unfortunately, research administrators at numerous levels are these days over-concerned with procedure at the expense of efficiency or common sense. Therefore, we need:

- Faster and less bureaucratic approval by ethical committees
- Faster and less bureaucratic approval by data protection agencies
- Faster and less bureaucratic approval of animal research
- Less rules for how to use and manage research accounts at hospitals and university

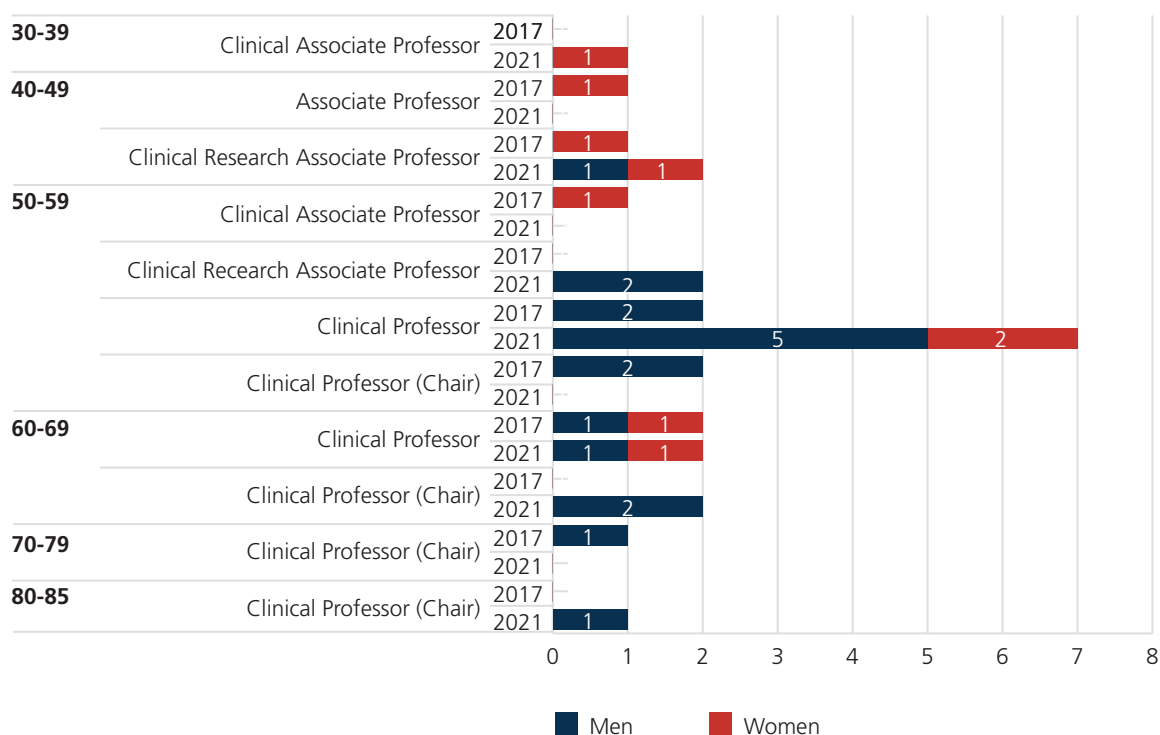
Lastly, there is need for more internal and external funds available for research, including more funds available to pay for open access for published scientific papers and for tuition fee for PhD students.

### Academic Staff in Clinical Biochemistry 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Clinical Biochemistry 2017 & 2021



Source: KUPA

### STRENGTHS

- Long research tradition
- Research quality at high international level - many publications in high-impact journals
- Both human and animal studies
- Routine production, teaching and research symbiosis

### WEAKNESSES

- Relatively few researchers
- Many employees without research insight
- More and more focus on huge routine production

## SWOT

### OPPORTUNITIES

- Access to large-scale analyses of biochemistry and DNA analyses
- Extensive laboratory experience
- Extensive experience with large databases
- More focus on MD-PhD coupling in specialist training

### THREATS

- Domination by routine production
- Difficult to recruit enough top medical doctors into Clinical Biochemistry
- Medical students have less access to research leave
- Slow and bureaucratic approval related to research

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Biochemistry – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 113        | 156        | 152        | 180        | 176        |
|               | Letter          | 7          | 1          | 1          | 3          | 5          |
|               | Review          | 7          | 11         | 16         | 15         | 12         |
| Danish        | Journal article | 1          | 3          | 2          |            |            |
|               | Review          |            |            |            |            | 2          |
| <b>Total</b>  |                 | <b>128</b> | <b>171</b> | <b>171</b> | <b>198</b> | <b>195</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 50.1%   | 422              | 15,966    | 37.8                      | 3.46                           |
| Only national collaboration          | 22.8%   | 192              | 2,383     | 12.4                      | 1.37                           |
| Only institutional collaboration     | 25.2%   | 212              | 3,751     | 17.7                      | 1.91                           |
| Single authorship (no collaboration) | 1.9%    | 16               | 303       | 18.9                      | 1.17                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                            | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|----------------------------------------------------|------------------------------|----------------------------|
| European Heart Journal                             | 26                           | 35.855                     |
| Nature Communications                              | 23                           | 17.694                     |
| Journal of Clinical Endocrinology and Metabolism   | 22                           | 6.134                      |
| Clinical Chemistry                                 | 18                           | 12.167                     |
| Nature Genetics                                    | 17                           | 41.379                     |
| Scientific Reports                                 | 14                           | 4.996                      |
| Journal of the American College of Cardiology      | 13                           | 27.203                     |
| European Respiratory Journal                       | 12                           | 33.809                     |
| Arteriosclerosis, Thrombosis, and Vascular Biology | 11                           | 10.514                     |
| PLoS ONE                                           | 11                           | 3.752                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Clinical Biochemistry    | 650                              | 2.44                           | 5.4                                   | 14.8                                  | 24                                     |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Greve AM, Christoffersen M, Frikke-Schmidt R, Nordestgaard BG, Tybjaerg-Hansen A. Association of low plasma transthyretin concentration with risk of heart failure in the general population. JAMA Cardiol 2021; 6: 258-266.
  2. Varbo A, Nordestgaard BG. Directly measured versus calculated remnant cholesterol identifies additional overlooked individuals in the general population at higher risk of myocardial infarction. Eur Heart J 2021; 42: 4833-4843.
  3. Doi T, Langsted A, Nordestgaard BG. A possible explanation for contrasting results of REDUCE-IT vs. STRENGTH: Cohort study mimicking trial designs. Eur Heart J 2021; 42: 4807-4817.
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# CLINICAL GENETICS

REPRESENTING ASSOCIATE PROFESSOR ELSEBET ØSTERGAARD

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## AIMS AND OBJECTIVES

The aim of the research is to understand the underlying molecular mechanisms in a broad group of genetic disorders to improve diagnostics, genetic counselling and targeted treatment of patients (precision medicine) based on precision diagnostics.

## FOCUS AREAS

The department is carrying out research in both rare genetic disorders and multifactorial diseases. The disease categories include, but are not limited to, cancer, disorders of cardiovascular system, disorders of inborn metabolism, eye disorders, hearing impairment, hematologic disorders, imprinting disorders, mitochondrial disorders, neurodevelopmental disorders, neurological disorders and disorders presenting in the fetus.

The department has a strong research profile both within the molecular aspects such as identification of new genes and interpretation of novel variants and using advanced techniques to improve patient care both within diagnostics, prevention, treatment and prognosis and the ethical and psychosocial aspects of genetic medicine including reproductive genetics, genetic screening and the genetic counselling process.

## DISCIPLINES, METHODS AND TOOLS

The approach is interdisciplinary and includes the relevant medical specialties for different groups of disorders.

A broad spectrum of omics-methods are employed: genomics (exome and whole genome sequencing, long-range sequencing, RNA sequencing), transcriptomics, epigenomics, metabolomics, cytogenomics, and cellular methods such as iPSC studies.

## COLLABORATION

The department has extensive national and international collaborations, including participation in several European Reference Networks (ERN), European Cooperation in Science and Technology (COST) networks, and European Joint Programs on rare diseases (EJP-RD)

## TEACHING

The contents of lectures and group lessons is based on clinical practice, progress in new technologies, and research, which are continuously updated as clinical genetics is a rapidly developing specialty.

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To bring research at the speciality of Clinical Genetics to an even higher level would require time for research, part-time positions combining research and clinical duties. Furthermore, would it require funding and administrative support for grant applications and financial accounting.

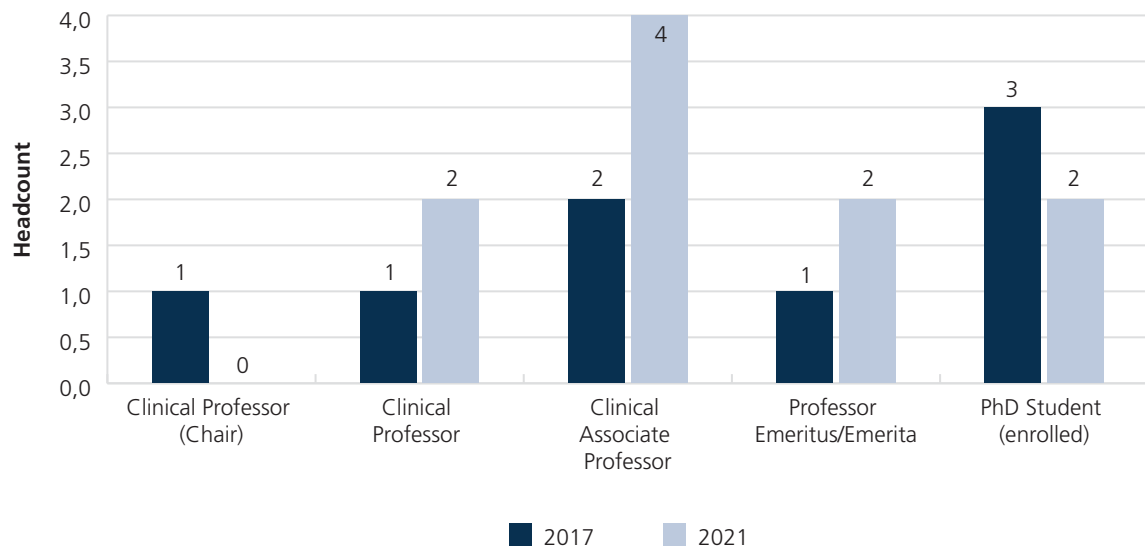
There is a need for space in general, e.g., rooms for scientific meetings and office and lab space research staff, and all activities unites at the same location.

Additionally, would it require the possibility for sabbatical abroad.

We need academic career opportunities for MDs and non-MD scientists and genetic counsellors. We also need Additional professorships.

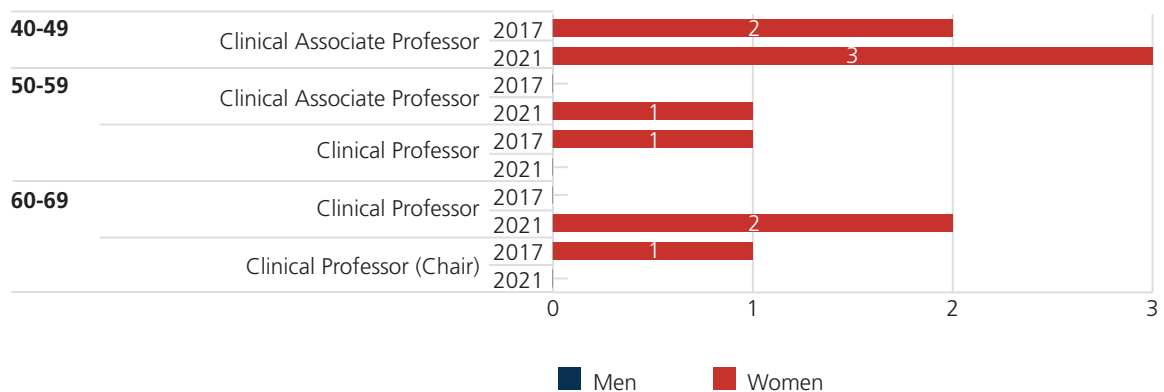
Lastly, would it require a "Start package" for newly appointed professors.

### Academic Staff in Clinical Genetics 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Clinical Genetics 2017 & 2021



Source: KUPA

### STRENGTHS

- Multidisciplinary team (MDs, clinical scientists) including other specialties at Rigshospitalet
- Molecular, metabolic, functional genomics and clinical research tightly integrated
- Laboratory infrastructure
- National and international collaboration with e.g., genetics, pediatric, fetal medicine departments and universities
- Precision diagnostics and precision medicine

### WEAKNESSES

- Large department with many highly specialized functions leading to fragmented research
- The department is located at four different locations
- Lack of administrative support for research

## SWOT

### OPPORTUNITIES

- Biobank with DNA, fibroblasts, muscle and other samples
- Patients with rare diseases and their family members enabling deep phenotyping
- Expertise in variant interpretation and functional studies
- Patient groups that are primarily seen at Rigshospitalet, e.g. preimplantation genetic testing, inborn errors of metabolism
- Clinical and laboratory databases e.g. Raredis

### THREATS

- Lack of space for students and researchers
- High and rising demand for analyses and clinical services leaves limited time for research and grant applications
- Diagnostic testing is outsourced to other specialties/core facilities
- GDPR, legal procedures increasingly tedious

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical genetics – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 20        | 26        | 30        | 31        | 31        |
|               | Letter          | 2         |           | 1         | 1         |           |
|               | Review          | 2         | 3         | 1         | 3         | 4         |
| Danish        | Journal article | 2         | 2         | 1         |           | 1         |
|               | Letter          |           | 1         |           |           |           |
|               | Review          |           |           |           |           | 4         |
| <b>Total</b>  |                 | <b>26</b> | <b>32</b> | <b>33</b> | <b>35</b> | <b>40</b> |

Source: CURIS



## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 61.4%   | 97               | 3,966     | 40.9                      | 3.32                           |
| Only national collaboration          | 20.9%   | 33               | 239       | 7.2                       | 0.81                           |
| Only institutional collaboration     | 17.7%   | 28               | 145       | 5.2                       | 0.57                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                              | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------|------------------------------|----------------------------|
| Clinical Genetics                    | 10                           | 4.296                      |
| Ugeskrift for Laeger                 | 8                            |                            |
| Human Mutation                       | 7                            | 4.700                      |
| European Journal of Medical Genetics | 7                            | 2.465                      |
| Genes                                | 6                            | 4.141                      |
| Genetics in Medicine                 | 5                            | 8.864                      |
| European Journal of Human Genetics   | 4                            | 5.351                      |
| Melanoma Research                    | 3                            | 3.199                      |
| Journal of Medical Genetics          | 3                            | 5.954                      |
| Nature Genetics                      | 3                            | 41.379                     |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Clinical Genetics        | 117                              | 2.77                           | 5.1                                   | 12.8                                  | 21.4                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Rodríguez-Palmero, A., Boerrigter, M. M., Gómez-Andrés, D., Aldinger, K. A., Marcos-Alcalde, Í., Popp, B., Everman, D. B., Lovgren, A. K., Arpin, S., Bahrambeigi, V., Beunders, G., Bisgaard, A-M., Bjerregaard, V. A., Bruel, A-L., Challman, T. D., Cogné, B., Coubes, C., de Man, S. A., Denommé-Pichon, A-S., Dye, T. J., Elmslie, F., Feuk, L., García-Miñaur, S., Gertler, T., Giorgio, E., Gruchy, N., Haack, T. B., Haldeman-Englert, C. R., Haukanes, B. I., Hoyer, J., Hurst, A. C. E., Isidor, B., Soller, M. J., Kushary, S., Kvarnung, M., Landau, Y. E., Leppig, K. A., Lindstrand, A., Kleinendorst, L., MacKenzie, A., Mandrile, G., Mendelsohn, B. A., Moghadasi, S., Morton, J. E., Moutton, S., Müller, A. J., O'Leary, M., Pacio-Míguez, M., Palomares-Bralo, M., Parikh, S., Pfundt, R., Pode-Shakked, B., Rauch, A., Repnikova, E., Revah-Politi, A., Ross, M. J., Ruivenkamp, C. A. L., Sarrazin, E., Savatt, J. M., Schlüter, A., Schönewolf-Greulich, B., Shad, Z., Shaw-Smith, C., Shieh, J. T., Shohat, M., Spranger, S., Thiese, H., Mau-Them, F. T., van Bon, B., van de Burgt, I., van de Laar, I. M. B. H., van Drie, E., van Haelst, M. M., van Ravenswaaij-Arts, C. M., Verdura, E., Vitobello, A., Waldmüller, S., Whiting, S., Zweier, C., Prada, C. E., de Vries, B. B. A., Dobyns, W. B., Reiter, S. F., Gómez-Puertas, P., Pujol, A. & Tümer, Z. DLG4-related synaptopathy: a new rare brain disorder. *Genet Med*. 2021 May;23(5):888-899.
  2. Altaraihi, M., Hansen, T. V. O., Santoni-Rugiu, E., Rossing, M., Rasmussen, Å. K., Gerdes, A-M. & Wadt, K. Prevalence of Pathogenic Germline DICER1 Variants in Young Individuals Thyroidectomised Due to Goitre - A National Danish Cohort. *Front Endocrinol (Lausanne)*. 2021 Sep 6;12:727970.
  3. Nøstvik, M., Kateta, S. M., Schönewolf-Greulich, B., Afenjar, A., Barth, M., Boschann, F., Doummar, D., Haack, T. B., Keren, B., Livshits, L. A., Mei, D., Park, J., Pisano, T., Prouteau, C., Umair, M., Waqas, A., Ziegler, A., Guerrini, R., Møller, R. S. & Tümer, Z. Clinical and molecular delineation of PUS3-associated neurodevelopmental disorders. *Clin Genet* . 2021 Nov;100(5):628-633.
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# CLINICAL IMMUNOLOGY

REPRESENTING PROFESSOR PETER GARRED

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The research at The Clinical Immunology branch associated with the University of Copenhagen is focused on basic and translational studies to understand the genetic and functional mechanisms of immunological diseases. Our research ranges from patient-focused clinical research to molecular biological studies of immunological processes and testing of new technological equipment for diagnostics and treatment. We perform genetic epidemiologic studies on biological material from large population and patient cohorts to unravel variants and biomarkers that may be used to assess predisposition and outcome of disease. These studies are complemented by cell biology-oriented research, gene expression and protein profiling to shed light on molecular processes involved in the pathophysiology of immune diseases.

More specifically we focus our research on:

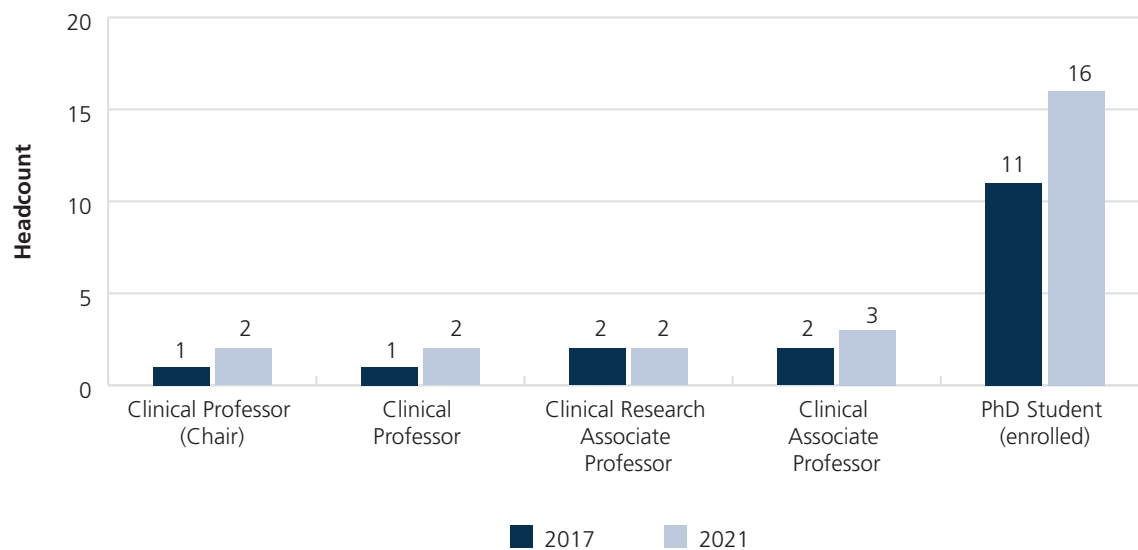
1. the structure and function of innate immunity with special focus on the complement system
2. the role of cytokines and cytokine autoantibodies
3. foetomaternal immunology
4. large scale genetic-epidemiologic studies as a means to develop tailored care
5. Immunophenotyping of patients undergoing immunomodulating interventions as a means to develop tailored care
6. Genetic predisposition to immune diseases
7. Using machine learning and deep phenotyping on single cell level of leukemic cells during therapy to achieve improved risk stratification and survival among children with acute leukemia
8. Unravelling immune responses to SARS-CoV-2 and vaccine responses
9. Tailoring better organ match and monitoring in relationship with organ transplantation
10. Improved transfusion strategies and algorithms
11. Endothelial function and metabolism

Research groups within the specialty are partners in several EU grants and have formalized research collaborations within Europe and the US. The specialty is housing one CAG (CAG Center for Endotheliomics) and has established collaborations with most universities in Denmark.

Teachers and head of studies from the specialty is responsible for pre and post graduate education in clinical immunology in the Copenhagen area and are running several research-based teaching programs including Master program in personalized medicine and BRIDGE post doc excellence program for KU.

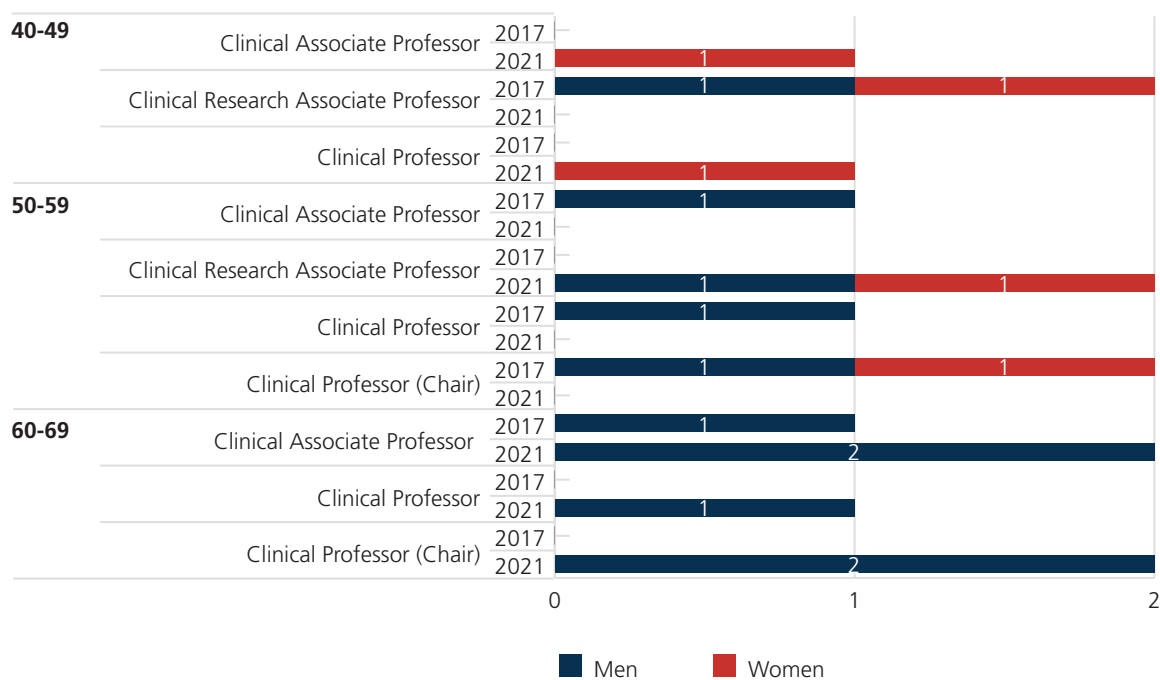
In order to promote further translational research, there is need for improved access to collaboration and core facilities at UCPH. Furthermore, there is need for resources and legislation that support a (big)data infrastructure allowing for use of real-time patient data to develop and implement data-driven tailored care through algorithms/models/decision support tools. There is also need for a closer contact with students, who want to perform translational research within the field of immunology. Lastly, there need to be an improvement of the grant infrastructure KU, Rigshospitalet and the Capital Region to handle grant applications and ease bureaucratic and time issues in relationship to GDPR and ethical permissions, which will free time to do research.

### Academic Staff in Clinical Genetics 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Clinical Immunology 2017 & 2021



Source: KUPA

### STRENGTHS

- Availability and knowhow about advanced laboratory and diagnostic equipment
- Strong track record for translational research
- Large-scale genetic epidemiologic cohorts and research infrastructure
- Interdisciplinary

### WEAKNESSES

- Hampered that laboratories are spread at different locations
- No overall golden goal or strategy - several research strong "silos" that do not collaborate

## SWOT

### OPPORTUNITIES

- (Interdisciplinary) collaboration – locally/regionally/nationally/internationally
- Diagnostic data/results large-scale integration
- Potential to be front-runners in the cross-field between, basic, clinical and data science research

### THREATS

- Reduced access to advanced diagnostic equipment (common laboratories)
- Small groups, which cannot compete for funding
- Diagnostic data/results in separate/individual silos

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Immunology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021       |
|---------------|-----------------|-----------|-----------|-----------|-----------|------------|
| International | Journal article | 60        | 42        | 56        | 47        | 92         |
|               | Letter          | 1         | 3         | 3         | 2         | 5          |
|               | Review          | 3         | 1         | 3         | 1         | 2          |
| Danish        | Journal article |           | 2         |           | 2         | 1          |
|               | Review          | 1         |           |           |           | 1          |
| <b>Total</b>  |                 | <b>65</b> | <b>48</b> | <b>62</b> | <b>52</b> | <b>101</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 51.9%   | 165              | 2,883     | 17.5                      | 1.86                           |
| Only national collaboration          | 27.7%   | 88               | 1,088     | 12.4                      | 1.89                           |
| Only institutional collaboration     | 20.1%   | 64               | 529       | 8.3                       | 0.85                           |
| Single authorship (no collaboration) | 0.3%    | 1                | 4         | 4                         | 0.38                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                             | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|-------------------------------------|------------------------------|----------------------------|
| Frontiers in Immunology             | 22                           | 8.786                      |
| Scientific Reports                  | 17                           | 4.996                      |
| Transfusion                         | 15                           | 3.337                      |
| Vox Sanguinis                       | 10                           | 2.996                      |
| BMC Infectious Diseases             | 6                            | 3.670                      |
| PLoS ONE                            | 6                            | 3.752                      |
| Shock                               | 5                            | 3.533                      |
| Ugeskrift for Laeger                | 5                            |                            |
| Journal of Immunology               | 5                            | 5.446                      |
| Acta Anaesthesiologica Scandinavica | 5                            | 2.274                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Clinical Immunology      | 214                              | 1.3                            | 1.9                                   | 7.5                                   | 10.7                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Ostrowski SR, Sogaard OS, Tolstrup M, Stærke NB, Lundgren J, Østergaard L, Hvas AM. Inflammation and platelet activation after COVID-19 vaccines – possible mechanisms behind Vaccine-induced Immune Thrombocytopenia and Thrombosis. *Front Immunol* 2021; 12:779453. doi: 10.3389/fimmu.2021.779453. PMID: 34887867.
2. Modvig S, Hallböök H, Siitonen S, Osnes LTN, Rosthøj S, Tierens A, Juvonen V, Vålerhaugen H, Hultdin M, Ehinger M, Porwit A, Matuzeviciene R, Stoskus M, Marincevic M, Lilleorg A, Taskinen M, Toft N, Jónsson OG, Pruunsild K, Vaitkeviciene G, Vettenranta K, Lund B, Abrahamsson J, Schmiegelow K, Marquart HV. Value of flow cytometry for MRD-based relapse prediction in B-cell precursor acute lymphoblastic leukemia in a multi-center setting. *Leukemia* 2021 Jul;35(7):1894-1906. doi: 10.1038/s41375-020-01100-5 PMID: 33318611
3. Garred P, Tenner AJ, Mollnes TE. Therapeutic Targeting of the Complement System: From Rare Diseases to Pandemics. *Pharmacol Rev.* 2021 Apr;73(2):792-827. doi: 10.1124/pharmrev.120.000072. PMID: 33687995

# CLINICAL MICROBIOLOGY

REPRESENTING PROFESSOR HENRIK WESTH

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## DESCRIPTION OF THE SPECIALITY

### Rigshospitalet:

Helle Krogh Johansen, Clinical Professor with special focus on persistent airway infections. Translational biomedical research using the bacterial lung infections in cystic fibrosis patients and organoids as model systems. Research is addressing the globally increasing problem of antibiotic resistance.

Maiken Cavling Arendrup, Clinical Professor with special focus on medical mycology. Focus on the epidemiology and management of fungal infections, globally increasing antifungal resistance in yeast, moulds and dermatophytes and on new diagnostics. Runs the EUCAST development laboratory for fungi.

Kristian Schønning, Clinical Associate Professor has a broad interest in the application of molecular methods in microbiology with a special focus in mechanisms of antimicrobial resistance in viral and bacterial pathogens.

### Hvidovre Hospital:

Henrik Westh, Clinical Professor with special focus on MRSA epidemiology and evolution. Runs a NGS lab with focus on MRSA, VRE, shotgun metagenomics and viral genome sequencing.

Mette Damkjær Bartels, Clinical Associate Professor with focus on MRSA chronic carriage, decolonization, epidemiology and genomic evolution. Head of MRSA Knowledge Center and involved in the NGS.

### Slagelse Hospital:

Jens Jørgen Christensen, Clinical Professor with special focus on applications of molecular methods. Focus on bacterial aetiologies of infective endocarditis and taxonomy/identification

of bacteria, especially non-hemolytic streptococci and related genera.

### Herlev Hospital:

Barbara Juliane Holzknecht, Postgraduate Clinical Associate Professor, focusses on the coordination and development of specialty training in Clinical Microbiology in the Capital Region and Region Zealand. Research focus on susceptibility testing and antimicrobial resistance.

Clinical Academic Group: CAG-Bacinfec.  
Improving diagnosis and treatment of patients with infectious diseases. (HKJ, HW and JJC)

Research based teaching from 6. semester of Medical School

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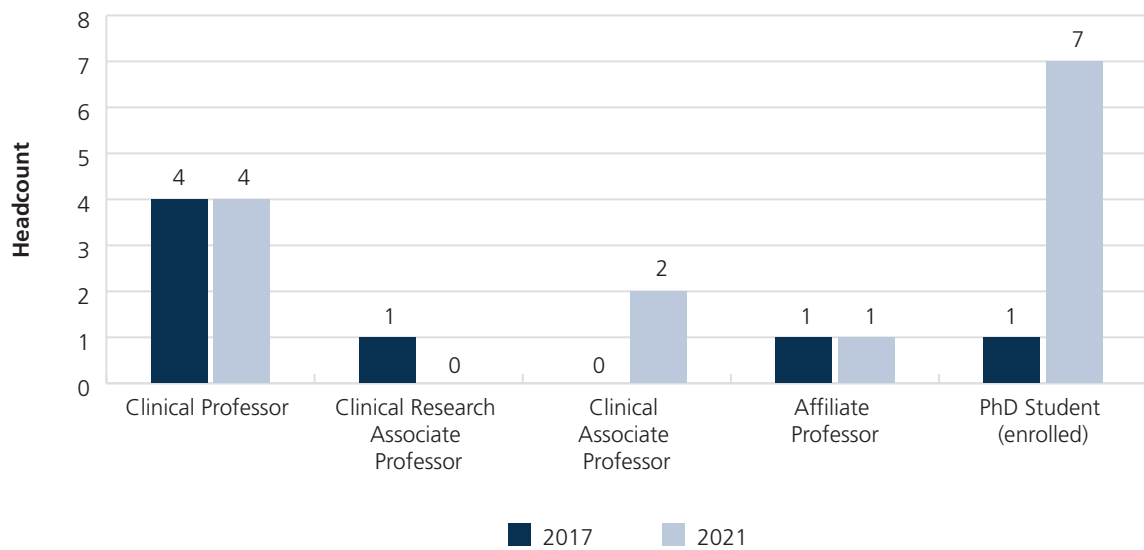
To bring research at the speciality of Clinical Microbiology to an even higher level would require a partial funding for PhD students from University of Copenhagen, as it has totally disappeared making it increasingly difficult to finance PhD projects.

Moreover, many Hospital Board of Directors are financially squeezed so support for research e.g. logistics, office and lab space, funding and even recognition is not there.

Furthermore, we need a smoother and simplified process for study approvals. A joined effort to revise the classification of cultured microorganisms as human biological material, which result in months of delay in approval of even simple microbiology studies, without any use of personal information. Studies are delayed for months and months. This is unacceptable, unreasonable and cannot have been the intention by the laws, and it costs numerous of working hours that could have been spent on science.

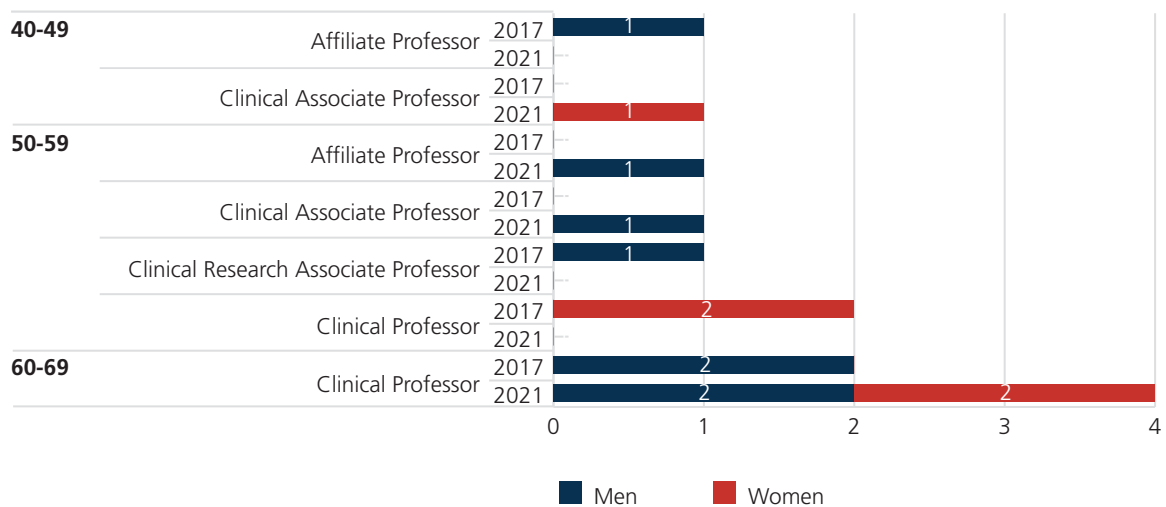


### Academic Staff in Clinical Microbiology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Clinical Microbiology 2017 & 2021



Source: KUPA

### STRENGTHS

- Large departments with medical doctors, molecularbiologists, engineers and bioinformaticians interacting on research
- All information from samples in common database and all samples on Zealand analysed in four laboratories. Easily combined with metadata records.
- Strong collaborations with other Danish universities, Statens Serum Institut and International research groups
- Clinical Academic Group: CAG-Bacinfec. Improving diagnosis and treatment of patients with infectious diseases.
- Very large WGS capacity with +10,000 genomes sequenced every year

### WEAKNESSES

- Research collaboration between clinical microbiology departments should be even better
- Lack of part time research positions after PhD and few senior positions.
- One department does not have Professor affiliation to University of Copenhagen
- Generation Gap between "old" professors and next generation of university researchers
- Research projects often delayed due to admin around study approval
- Lack of laboratory space for research
- Lack of equipment needed for basic research e.g. we only have access to equipment used for routine diagnostics
- Difficult to get access to clinical data

## SWOT

### OPPORTUNITIES

- Next generation sequencing capacity is built up in close collaboration between microbiology departments
- In-house analysis of more than 99,9% of all patient samples
- Well established international research collaborations

### THREATS

- Hospital owners are looking to centralize what they see as common platforms (NGS equipment) into very few centers
- Recruitment of next generation of Professors hampered by lack of research programs and Post doc positions for younger researcher
- Lack of bioinformaticians that understand biology and genomes
- Interesting projects are delayed or not prioritized and even given up due to the practical issues around approval.
- Extremely long waiting time for all kind of research acceptances (VEK, data-tilsynet), it kills the initiatives and makes the first year of a phd project unproductive

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Microbiology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 37        | 49        | 30        | 38        | 51        |
|               | Letter          | 4         |           | 2         | 2         |           |
|               | Review          | 3         | 2         | 4         | 5         | 2         |
| Danish        | Journal article |           | 2         |           | 1         |           |
|               | Review          |           |           |           |           | 1         |
| <b>Total</b>  |                 | <b>44</b> | <b>53</b> | <b>36</b> | <b>46</b> | <b>54</b> |

Source: CURIS

## COLLABORATION 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 44.5%   | 102              | 3,295     | 32.3                      | 2.94                           |
| Only national collaboration          | 41.9%   | 96               | 1,718     | 17.9                      | 2.29                           |
| Only institutional collaboration     | 13.5%   | 31               | 207       | 6.7                       | 0.68                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                              | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|----------------------------------------------------------------------|---------------------------------|-------------------------------|
| Antimicrobial Agents and Chemotherapy                                | 23                              | 5.938                         |
| Journal of Antimicrobial Chemotherapy                                | 20                              | 5.758                         |
| Clinical Microbiology and Infection                                  | 12                              | 13.310                        |
| Frontiers in Microbiology                                            | 10                              | 6.064                         |
| International Journal of Antimicrobial Agents                        | 5                               | 15.441                        |
| Eurosurveillance                                                     | 5                               | 21.286                        |
| Scientific Reports                                                   | 5                               | 4.996                         |
| APMIS                                                                | 4                               | 3.428                         |
| Pediatric Infectious Disease Journal                                 | 4                               | 3.806                         |
| European Journal of Clinical Microbiology and Infectious<br>Diseases | 4                               | 5.103                         |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Clinical Microbiology    | 171                                         | 2.49                                     | 3.5                                         | 10.5                                        | 26.3                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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### 3 most prominent publications from 2021

1. Rossi E, La Rosa R, Bartell JA, Marvig RL, Haagensen JAJ, Sommer LM, Molin S, Johansen HK. *Pseudomonas aeruginosa* adaptation and evolution in patients with cystic fibrosis. *Nat Rev Microbiol*. 2021 May;19(5):331-342. doi: 10.1038/s41579-020-00477-5. Epub 2020 Nov 19. PMID: 33214718. IF 18.3
  2. Bartels MD, Worning P, Andersen LP, Bes M, Enger H, Ås CG, Hansen TA, Holzkecht BJ, Larssen KW, Laurent F, Mäkitalo B, Pichon B, Svartström O, Westh H. Repeated introduction and spread of the MRSA clone t304/ST6 in northern Europe. *Clin Microbiol Infect*. 2021 Feb;27(2):284.e1-284.e5. doi: 10.1016/j.cmi.2020.05.004. Epub 2020 May 18. PMID: 32439595. IF 8,1
  3. Pinholt M, Møllerup S, Boye K, Worning P, Holzkecht BJ, Nygaard S, Nielsen KL, Hasman H, Roer L, Hammerum AM, Westh H, Schønning K. Investigation of the introduction and dissemination of vanB *Enterococcus faecium* in the Capital Region of Denmark and development of a rapid and accurate clone-specific vanB *E. faecium* PCR. *J Antimicrob Chemother*. 2021 Aug 12;76(9):2260-2267. doi: 10.1093/jac/dkab198. PMID: 34151364. IF 5.5
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# CLINICAL ONCOLOGY

## REPRESENTING PROFESSOR DORTE NIELSEN

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The hospital departments of Oncology at Rigshospitalet, Herlev and Gentofte Hospital and Zealand University Hospital are responsible for extensive translational and clinical cancer research comprising phase I, II and III trials in solid tumors.

In total, the clinical research units occupying research nurses, data managers and technicians run >100 ongoing clinical trials. The phase One Unit, Rigshospitalet and Unit for Experimental Cancer Treatment, Herlev and Gentofte Hospital carries out a numerous phase I trials, including first-in-human and early phase II trials. In addition, research laboratories responsible for both clinically related translational research and animal models are associated to the departments of oncology. The focus is translating basic scientific findings into clinical applications for treatment of cancer. The multidisciplinary and interinstitutional research within radiotherapy has been further strengthen with several investigator initiated clinical phase II and III trials.

The Department of Clinical Oncology, Zealand University hospital has made a major progress in cancer research within the last 5 years including epidemiological, translational, and clinical cancer research.

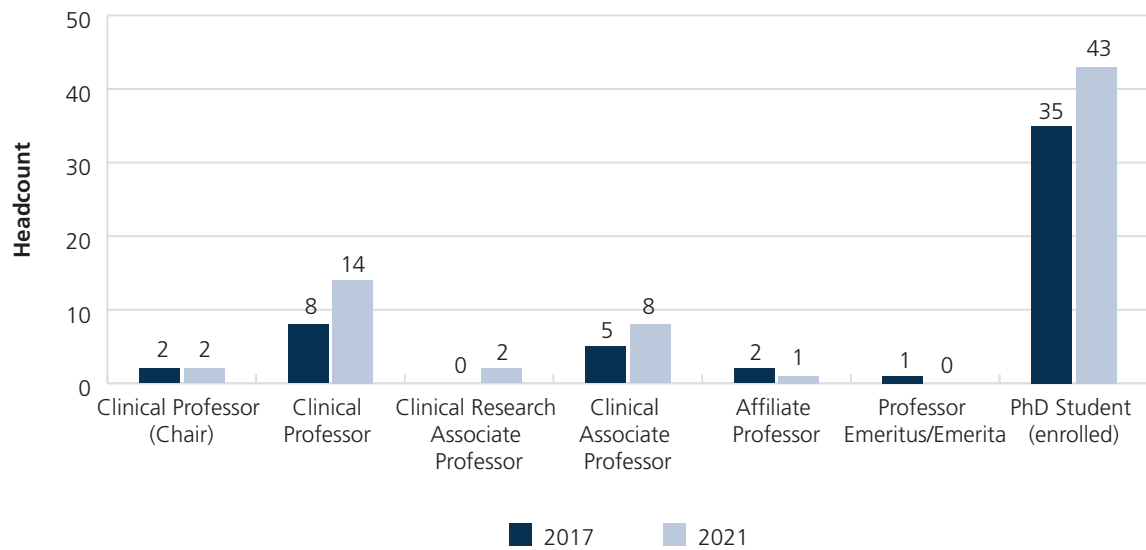
The main research areas are epidemiological research, translational research, personalized medicine, preclinical and clinical immunotherapy, radiotherapy, gene therapy, clinical trials, supportive care including late side effects, palliative medicine and rehabilitation.

Networks: The departments of oncology are affiliated to the University of Copenhagen and are represented in the Danish Comprehensive Cancer Center, DCCC, different Danish Multidisciplinary Cancer Groups (DMCG), Trial Nation and participate in multiple collaborative research assignments at regional, national and international levels.

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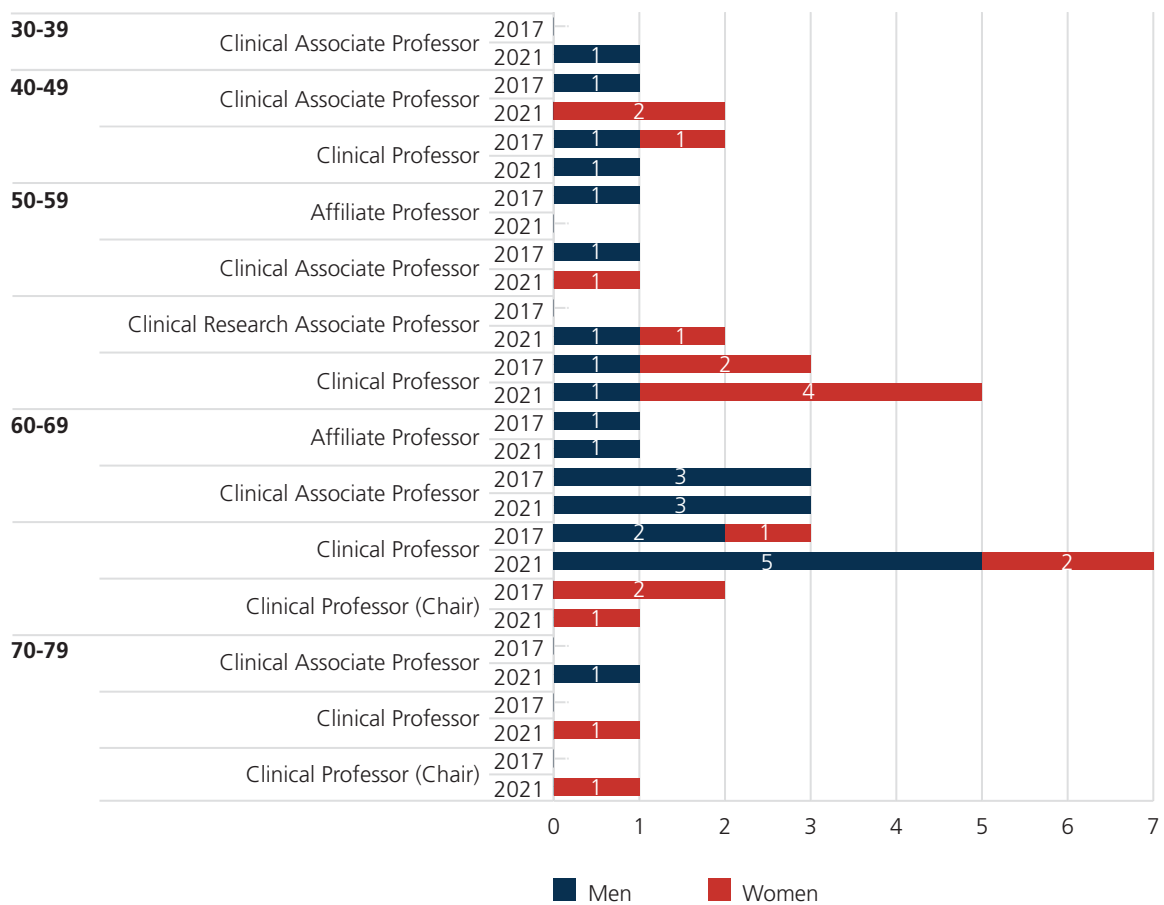
To bring research at the speciality of Clinical Oncology to an even higher level would require sufficient legal support to run research in a timely manner. Furthermore, there is a need for better access to administrative support functions, e.g., academic secretaries. Lastly there should be a possibility for part time positions within research for physicians/other health care professionals

## Academic Staff in Clinical Oncology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Clinical Oncology 2017 & 2021



Source: KUPA

### STRENGTHS

- Long tradition for clinical research (>25 years), large research units (>30 employees at Rigshospitalet and Herlev-Gentofte Hospital, and a younger but fast growing research unit with 10 employees at Zealand University Hospital, respectively)
- Established Multidisciplinary Cancer Groups within all tumor types
- Established national networks and research centers under the auspices of DCCC
- National Center for Cancer Immune Therapy, Dept. of Oncology, HGH (>70 employees)
- National (e.g. Trial Nation) and international collaboration
- Danish Cancer Biobank
- Danish Cancer Registry

### WEAKNESSES

- Insufficient legal support to run research in a timely manner
- Limited research time for most physicians in oncology
- Few applicants for positions as physicians in the area
- Far too little teaching time in oncology for medical students (not an independent discipline like e.g. cardiology) which is a barrier for recruitment of new young physicians and researchers
- Teaching in oncology is spread over different courses and it is difficult for the students to grasp the essence of the specialty.
- "Kræftpakkeforløb" = Limited time for evaluation and start of treatment given short time for screening and inclusion into clinical trials

## SWOT

### OPPORTUNITIES

- To increase integration between research, teaching and patient care
- Rearrangement of the university teaching courses and our suggestion to create a new "multidisciplinary course in cancer diseases"

### THREATS

- Extreme case processing time in the regional legal units delaying research severely
- Increased demand for routine work
- A lack of administrative supportive functions
- A decreased number of clinical trials offered from the industry
- Overhead corresponding to 18% of budgets for clinical research units must be allocated to the region - we previously used our "overhead" to finance investigator-initiated trials.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Oncology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 143        | 146        | 183        | 182        | 164        |
|               | Letter          | 3          |            | 4          | 4          | 1          |
|               | Review          | 8          | 27         | 13         | 16         | 16         |
| Danish        | Journal article | 2          | 3          | 7          | 2          |            |
|               | Review          |            |            |            |            | 2          |
| <b>Total</b>  |                 | <b>156</b> | <b>176</b> | <b>207</b> | <b>204</b> | <b>183</b> |

Source: CURIS



## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 51.2%   | 465              | 16,395    | 35.3                      | 3.09                           |
| Only national collaboration          | 29.7%   | 270              | 4,384     | 16.2                      | 1.6                            |
| Only institutional collaboration     | 18.6%   | 169              | 2,054     | 12.2                      | 1.08                           |
| Single authorship (no collaboration) | 0.6%    | 5                | 38        | 7.6                       | 0.26                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                     | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|-------------------------------------------------------------|------------------------------|----------------------------|
| Acta Oncologica                                             | 91                           | 4.311                      |
| Cancers                                                     | 26                           | 6.575                      |
| British Journal of Cancer                                   | 21                           | 9.089                      |
| International Journal of Radiation Oncology Biology Physics | 20                           | 8.013                      |
| Radiotherapy and Oncology                                   | 20                           | 6.901                      |
| European Journal of Cancer                                  | 20                           | 10.002                     |
| Annals of Oncology                                          | 19                           | 51.769                     |
| Oncotarget                                                  | 15                           |                            |
| Ugeskrift for Laeger                                        | 14                           |                            |
| BMC Cancer                                                  | 14                           | 4.638                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Clinical Oncology        | 718                              | 2.42                           | 3.2                                   | 9.9                                   | 18.5                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Kjeldsen JW, Lorentzen CL, Martinenaite E, Ellebaek E, Donia M, Holmstroem RB, Klausen TW, Madsen CO, Ahmed SM, Weis-Banke SE, Holmström MO, Hendel HW, Ehrnrooth E, Zocca MB, Pedersen AW, Andersen MH, Svane IM. A phase 1/2 trial of an immune-modulatory vaccine against IDO/PD-L1 in combination with nivolumab in metastatic melanoma. Nat Med. 2021 Dec; 27(12):2212-2223. doi: 10.1038/s41591-021-01544-x. Epub 2021 Dec 9.
  2. Chovanec M, Lauritsen J, Bandak M, Oing C, Kier GG, Kreiberg M, Rosenvilde J, Wagner T, Bokemeyer C, Daugaard G. Late adverse effects and quality of life in survivors of testicular germ cell tumour. Nat Rev Urol. 2021 Apr;18(4):227-245. doi: 10.1038/s41585-021-00440-w. Epub 2021 Mar 8. PMID: 33686290
  3. Rossing M, Pedersen CB, Tvedskov T, Vejborg I, Talman ML, Olsen LR, Kroman N, Nielsen FC, Jensen MB, Ejlersen B. Clinical implications of intrinsic molecular subtypes of breast cancer for sentinel node status. Sci Rep. 2021 Jan26;11(1):2259. doi: 10.1038/s41598-021-81538-4. PMID: 33500440
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# CLINICAL PHARMACOLOGY

REPRESENTING PROFESSOR KIM DALHOFF

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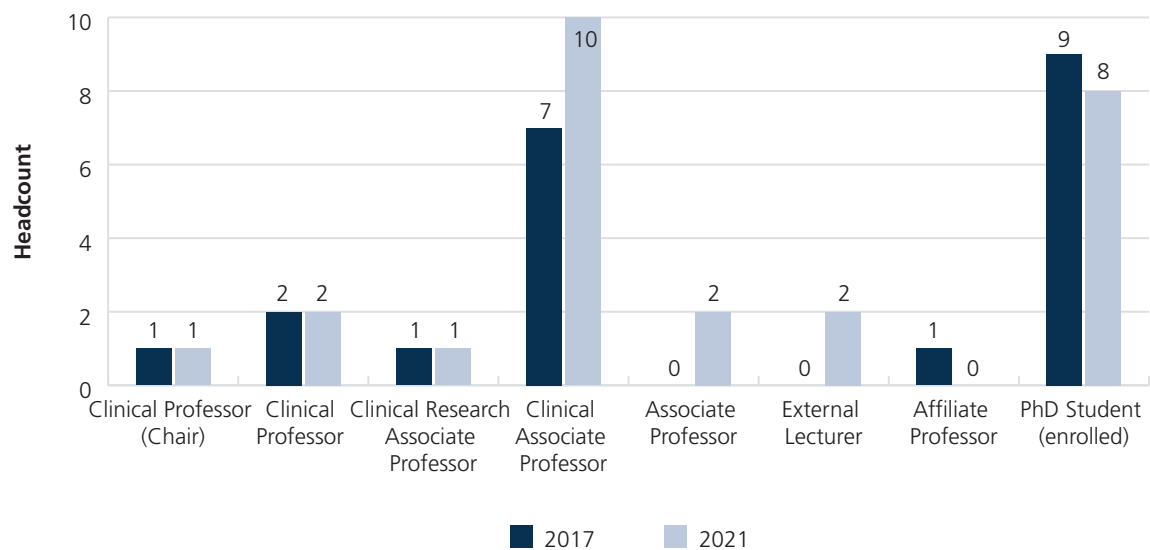
Clinical pharmacology has been a medical specialty since 1996 and has focus on rational pharmacotherapy. Our primary research areas are psychopharmacology, adverse drug reactions (ADRs), pharmacoepidemiology, pharmacotherapy in frail patient groups such as children, pregnant women and elderly subjects receiving polypharmacy. Also, pharmacogenetics, toxicology, therapeutic drug monitoring (personalised medicine) has our special research interest. We have a specialised laboratory with focus on measurements of drugs, illegal substances, or genetic variants of drug metabolising enzymes. The transition of (drug) information between the primary health care sector and the secondary sector is important, and we have several research projects in which general practitioners are involved (e.g. drug lists). We have a substantial number of international collaborators e.g. within toxicology (a Nordic and a European network between various poison centres) and paediatric medicine (Boston). We have also several national cross-disciplinary collaborators [Acute CAG (polypharmacy in elderly patients with an acute hospital admission), various departments of internal medicine in relation to evaluation of polypharmacy]. Denmark has five different clinical pharmacological departments (one in each region of the country), and we have joined scientific meetings with various frequency. Research-based teaching is also an important part of our speciality. We have a 3-week course in clinical pharmacology and therapy at the Copenhagen Medical School (master part), and all our professors and associate professors take part in this course.

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To bring research at the speciality of Clinical Pharmacology to an even higher level would require more administrative support for financial research applications, more legal support in the early preparation of project descriptions (what's legal and what's illegal when the scientist wants e.g., register data). Moreover, there is a need for early pitching of research ideas, and facilitation of visits to research centres abroad.

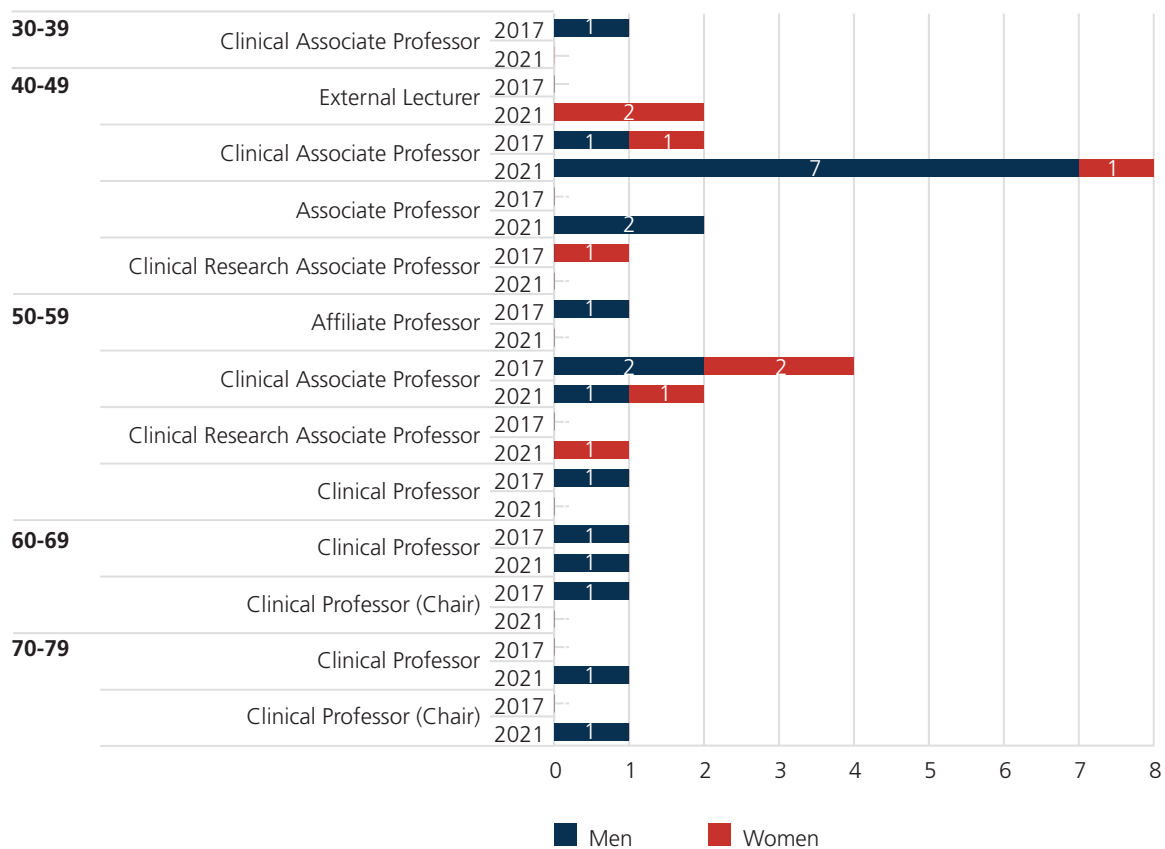
This would also require more research networks – e.g., collaboration with statisticians or biochemical experts

## Academic Staff in Clinical Pharmacology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Clinical Pharmacology 2017 & 2021



Source: KUPA

### STRENGTHS

- Clinical and societal relevant research
- Collaboration with several other fields of expertise
- Research within clinical toxicology
- Research bridging different medical specialities

### WEAKNESSES

- Lack of "own" patients / not a clinical specialty
- A weakly organized research environment
- Risk of conflicts of interests reduces the possibility to collaborate with the drug industry

## SWOT

### OPPORTUNITIES

- Several possibilities for research contracts (e.g. CRO's)
- Phase 4 drug studies – an area of increased interest
- A general increased focus on the rational use of medicines

### THREATS

- Funding is difficult for a paraclinical specialty
- The wide range of research areas may lead to a weak external identity
- The requirement of independency in relation to the drug industry may decrease the possibility of collaboration
- Loss of talent – there are many possibilities for employment of doctors in the drug industry for a higher salary

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Pharmacology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 38        | 49        | 52        | 56        | 51        |
|               | Letter          |           |           |           | 4         | 2         |
|               | Review          | 6         | 6         | 11        | 12        | 9         |
| Danish        | Journal article |           | 4         | 1         | 2         | 2         |
|               | Letter          |           |           |           | 2         |           |
|               | Review          |           |           |           |           | 2         |
| <b>Total</b>  |                 | <b>44</b> | <b>59</b> | <b>64</b> | <b>76</b> | <b>66</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 42.0%   | 125              | 2,477     | 19.8                      | 1.67                           |
| Only national collaboration          | 32.2%   | 96               | 1,178     | 12.3                      | 1.26                           |
| Only institutional collaboration     | 24.8%   | 74               | 482       | 6.5                       | 0.74                           |
| Single authorship (no collaboration) | 1.0%    | 3                | 214       | 71.3                      | 5.06                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                          | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------------------|------------------------------|----------------------------|
| Basic and Clinical Pharmacology and Toxicology   | 17                           | 3.688                      |
| Cephalalgia                                      | 11                           | 6.075                      |
| Free Radical Biology and Medicine                | 11                           | 8.101                      |
| Ugeskrift for Laeger                             | 11                           |                            |
| Journal of Headache and Pain                     | 10                           | 8.592                      |
| Journal of Clinical Endocrinology and Metabolism | 9                            | 6.134                      |
| PLoS ONE                                         | 9                            | 3.752                      |
| Danish Medical Journal                           | 7                            | 1.865                      |
| Peptides                                         | 5                            | 3.867                      |
| European Journal of Pharmacology                 | 5                            | 5.195                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Clinical Pharmacology    | 233                              | 1.36                           | 1.3                                   | 7.3                                   | 16.7                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Andersson, N. W., Olsen, R. H. & Andersen, J. T Association between use of macrolides in pregnancy and risk of major birth defects: nationwide, register based cohort study. 10 feb. 2021, I: BMJ. 372, s. n107.
  2. Windfeld-Mathiasen, J., Dalhoff, K. P., Andersen, J. T., Klemp, M., Horwitz, A. & Horwitz, H., Male fertility before and after androgen abuse. 1 feb. 2021, I: The Journal of clinical endocrinology and metabolism. 106, 2, s. 442-449 8 s.
  3. Skov K, Graudal NA, Jürgens G. The effect of activated charcoal on drug exposure following intravenous administration: A meta-analysis Basic Clin Pharmacol Toxicol. 2021 Apr; 128(4): 568-578.
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# CLINICAL PHYSIOLOGY AND NUCLEAR MEDICINE

REPRESENTING PROFESSOR SØREN MØLLER

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The specialty of Clinical Physiology and Nuclear Medicine (CPNM) offers relevant, patient friendly and contemporary studies of high quality. CPNM initiates and conducts scientific research at the highest international standard in corporation with other departments and research institutions nationally and internationally. Focus research areas are within the fields of pathophysiology of most organ systems using a broad spectrum of classical physiologic methods for functional and diagnostic imaging in addition to measurement of hemodynamics, pressure, flow, and clearance using tracer kinetic principles. Imaging techniques include gamma-camera scintigraphy and multimodal techniques such as single photon emission computerized tomography (SPECT/CT), positron emission tomography (PET/CT), magnetic resonance imaging (MRI and PET/MRI), and Doppler/ultrasound modalities. Treatments of benign and malignant diseases with radioactive isotopes represent another cornerstone of CPNM.

The departments of CPNM cooperate with several leading national and international institutions and universities in Europe and abroad. Among them are leading centers in London (KCL), Amsterdam (VUMC), Vienna (TUM), Nottingham, Barcelona, Mainz, Frankfurt, and Münster.

During the last decade, high priority research programs of CPNM have been within oncology with molecular imaging techniques, neurology with brain imaging, cardiovascular physiology, gastro-hepatology, and lung physiology among others. The continued research in these fields provides new important insight into the pathophysiological mechanisms of these entities for the benefit of the individual patients and our understanding and treatment of the disease processes.

The university-associated professors and associate professors teach pre- and post-graduate medical students and doctors specializing in CPNM and other specialties. The teaching is widely based on a combination of established knowledge and methods and current research programs within the field of the specialty. Medical students who complete a specialty-focused sojourn at the Departments receive a combined teaching in research and practical and theoretical CPNM.

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To bring research at the speciality of Physiology and Nuclear Medicine to an even higher level would require an adjustment of the organization of the department structure with more influence of the professors responsible for research on decision making.

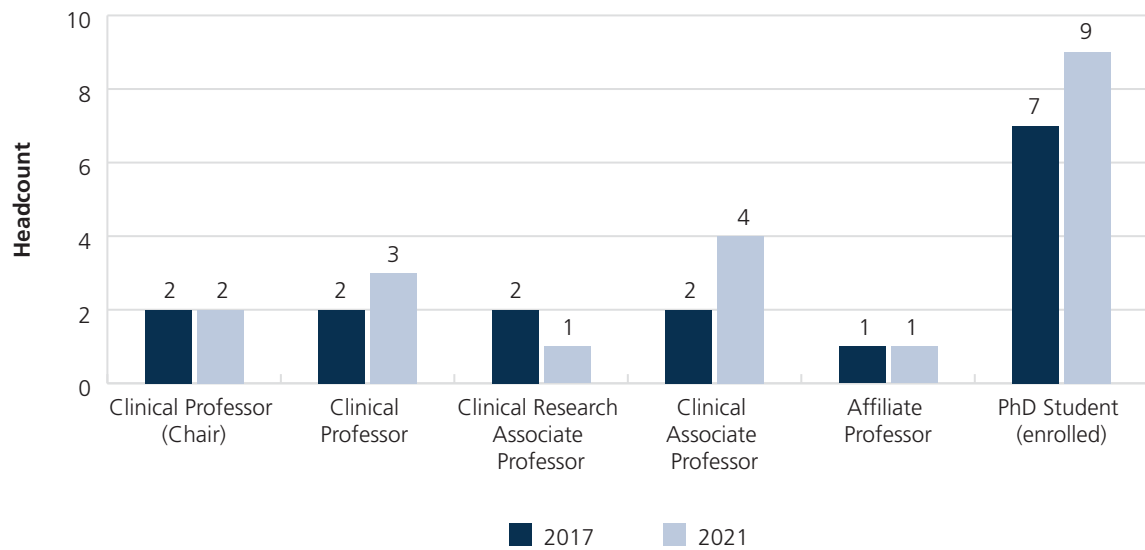
There is a need for clarification and transparency of budgets with reallocation of certain and well-defined amounts for scientific purposes. Moreover, this requires an optimized and accepted equality between research activities and routine tasks.

Furthermore, we need to introduce an incitement structure for young doctors to involve in research combined with more focus on better work environment and support for clinical obligations and research.

There is a need for an increase in visibility of CPNM for improving recruitment of new talents. Lastly, this requires an Adjustment and balance of requirements for scientific positions with recognition of certain employments primarily for scientific tasks.

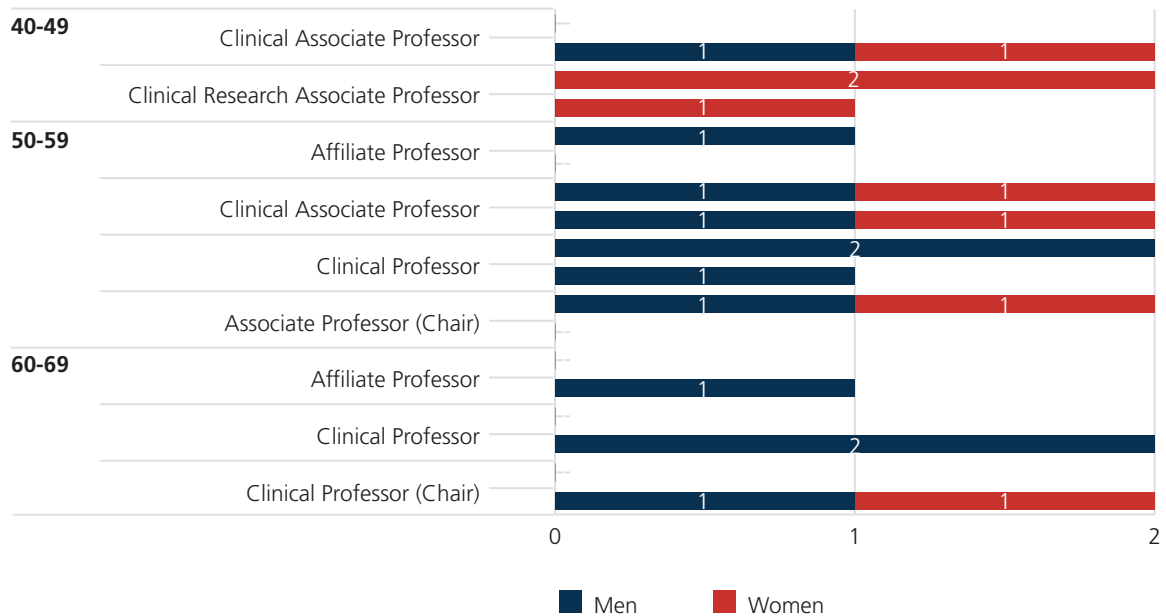


### Academic Staff in Clinical Physiology and Nuclear Medicine 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Clinical Physiology and Nuclear Medicine 2017 & 2021



Source: KUPA

### STRENGTHS

- CPNM has a long tradition for interdisciplinary and high-level scientific research, with great impact on basic physiology and development of new clinical procedures.
- Specialists in CPNM consider research as an integrated part of the professional identity and daily work.
- CPNM is an interdisciplinary, innovative specialty with extensive collaboration with many clinical disciplines.
- Researchers within CPNM have access to and expertise in many advanced state-of-the-art imaging modalities available. CPNM has a long tradition and large experience in developing new techniques and diagnostic modalities.

### WEAKNESSES

- Routine and research activities within CPNM are highly dependent on referrals from the clinical departments and interests of the cooperating partners.
- CPNM is less visible than clinical departments since patients are not directly associated with the department.
- The economy of the departments is directly related to activity, but activity related to different aspects of research are not reimbursed and rarely funded.
- More fragile and less resolute young doctors seem attracted by the speciality.

## SWOT

### OPPORTUNITIES

- CPNM participates in multidisciplinary teams and cooperation across various research areas and specialties and is highly involved in developments in oncology for example with developments of new cyclotron technologies.
- CPNM participates in the development of new and often costly targeted treatment, e.g. immunotherapy, where treatment strategies may be improved by a "companion" imaging diagnostic method/tracer.
- CPNM plays a pivotal role in the introduction and evaluation of new radiotracers for diagnosis, prognostication, treatments prediction, and prognostication in previously uncovered areas, e.g. neuro-inflammation, multiple sclerosis, and bacterial species-labelling.
- Within CPNM Artificial Intelligence attracts increasing attention.

### THREATS

- Fewer highly qualified doctors apply for training in CPNM.
- Production-focused management driven by financial motives increasingly suppresses research activities and initiatives.
- Employer-initiated and dictated research strategies are unrelated to local research tradition, skills, interests, and potentials.
- Increasing bureaucracy suppress activities in all aspects of research: Legal (contractual, data collection, storage and analysis), financial (application for and management of funding) and clinical (RIS/PACS, SP etc.).

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Clinical Physiology and Nuclear Medicine – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 56        | 41        | 41        | 47        | 61        |
|               | Letter          |           |           |           | 2         |           |
|               | Review          | 9         | 3         | 2         | 5         | 7         |
| Danish        | Journal article |           |           | 1         | 1         |           |
|               | Letter          |           | 1         |           |           |           |
|               | Review          |           |           |           |           | 2         |
| <b>Total</b>  |                 | <b>65</b> | <b>45</b> | <b>44</b> | <b>55</b> | <b>70</b> |

Source: CURIS

## COLLABORATION 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 36.5%   | 97               | 1,918     | 19.8                      | 2.04                           |
| Only national collaboration          | 18.4%   | 49               | 657       | 13.4                      | 1.3                            |
| Only institutional collaboration     | 45.1%   | 120              | 1,263     | 10.5                      | 1                              |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                                                    | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|------------------------------------------------------------|---------------------------------|-------------------------------|
| Journal of Nuclear Medicine                                | 15                              | 11.082                        |
| Journal of Cerebral Blood Flow and Metabolism              | 11                              | 6.960                         |
| European Journal of Nuclear Medicine and Molecular Imaging | 10                              | 10.057                        |
| PLoS ONE                                                   | 10                              | 3.752                         |
| Clinical Physiology and Functional Imaging                 | 9                               | 2.121                         |
| Liver International                                        | 8                               | 8.754                         |
| Journal of Applied Physiology                              | 7                               | 3.889                         |
| Diagnostics                                                | 7                               | 3.992                         |
| Acta Oncologica                                            | 6                               | 4.311                         |
| Neuro-Oncology                                             | 5                               | 13.029                        |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                                             | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|---------------------------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Clinical Physiology and<br>Nuclear Medicine | 195                                         | 1.46                                     | 1.5                                         | 8.7                                         | 17.9                                            |
| IKM                                         | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                                        | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen                    | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Marner L, Lundermann M, Sehested A, Nysom K, Borgwardt L, Mathiasen R, Wehner PS, Henriksen OM, Thomsen C, Skjøth-Rasmussen J, Broholm H, Østrup O, Forman JL, Højgaard L, Law I. Diagnostic Accuracy and Clinical Impact of [18F]FET PET in Childhood CNS tumors. *NeuroOncology* 23(12):2107-2116 (2021). doi: 10.1093/neuonc/noab096. IF: 12.3.
  2. Christensen TN, Langer SW, Persson G, Larsen KR, Loft A, Amtoft AG, Berthelsen AK, Johannesen HH, Keller SH, Kjaer A, Fischer BM. 18F-FLT PET/CT Adds Value to 18F-FDG PET/CT for Diagnosing Relapse After Definitive Radiotherapy in Patients with Lung Cancer: Results of a Prospective Clinical Trial. *J Nucl Med*. 2021 May 10;62(5):628-635. IF: 10.1.
  3. Møller S, Kimer N, Kronborg T, Grandt J, Hove J, Barløse M, Gluud LL. Non-alcoholic fatty liver disease and cardiovascular disease: Overlapping mechanisms. *Seminars in Liver Disease* 2021;41:235-247. IF: 6.1.
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# DERMATOVENEROLOGY

REPRESENTING PROFESSOR: JACOB PONTOPPIDAN THYSSEN

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The dermatovenerology speciality at the Department of Clinical Medicine, University of Copenhagen consists of 3 clinical departments: Department of Dermatology and Allergy, Herlev and Gentofte Hospital, Department of Dermato-venerology and Wound Healing, Bispebjerg and Frederiksberg Hospital and Department of Dermatology, Zealand University Hospital. The departments have a long internationally acknowledged academic tradition, doing clinical, translational, but also basic research with a high impact in the field of dermatology.

The main areas of research are: Atopic dermatitis, Skin barrier, Contact dermatitis/eczema, Hand eczema, Basic mechanisms including Immunology and Molecular Biology, Connective tissue disorders, Drug allergy, Genetic Diseases, Bullous diseases, Hidradenitis suppurativa, Rosacea, Skin cancer incl. melanoma, Imaging, , Prurigo, Cutaneous infections, Quality of life, Outcome Measures, Light and laser, Psoriasis and other inflammatory skin diseases, Occupational skin diseases, Wounds, Tattoos, Type 1 allergy / IgE, Anaphylaxis, Urticaria and Sexually transmitted diseases.

Most of the research conducted under the University of Copenhagen umbrella is translational, utilizing registries, clinical cohorts, and birth cohorts. There are several examples of cross-disciplinary research that have been successful as research is being done in collaboration with researchers from e.g., the Technical University (DTU), the Panum Institute especially the LEO Foundation Skin Immunology Research Center, the Globe Institute and Statens Serum Institute. While collaboration with other specialties is common, there is also frequent research collaboration within the specialty, both with centres in Greater Copenhagen area, but also with dermatology departments in the rest of Denmark. Clinical Academic Group (CAG) Allergy (2017) and SCIN-CAG (2019) (Skin

Cancer Innovation-Clinical Academic Group) and Danish Research Center for Skin Cancer represent such dermatological-driven consort, here uniting national and international partners in a translational and multidisciplinary research program across sectors to combat allergy and skin cancer.

Similar, there is wide and deep collaboration with international partners, both in Europe, North America and elsewhere.

Teaching of medical students and residents in dermatology is very research based, many students are participating in dermatological research, and new findings and understandings are rapidly introduced in the teaching. In addition, one of the courses at Master in Immunology is headed by researches from dermatology and allergy.

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The challenge for the specialty is to some degree how to improve quality rather than quantity. To improve the quality of research, as well as the infrastructure and conditions under which we do research, there is a direct need to reduce the administrative burden in multiple areas:

1. The waiting time for approval of data collection is currently far too long, and complicated cases may take years to solve and approve. Many smaller projects that may be scientifically interesting are rejected by the researchers before seeking approval as the research question may have become obsolete once approval is given, or the researcher willing to do the project is no longer available. The structure at the University of Copenhagen is creating an extra barrier, where professors from IKM are treated as external collaborators, with a demand of additional permissions prior to initiating collaborations with basic scientists. This should be solved. More

assistance is needed and waiting times need to be reduced.

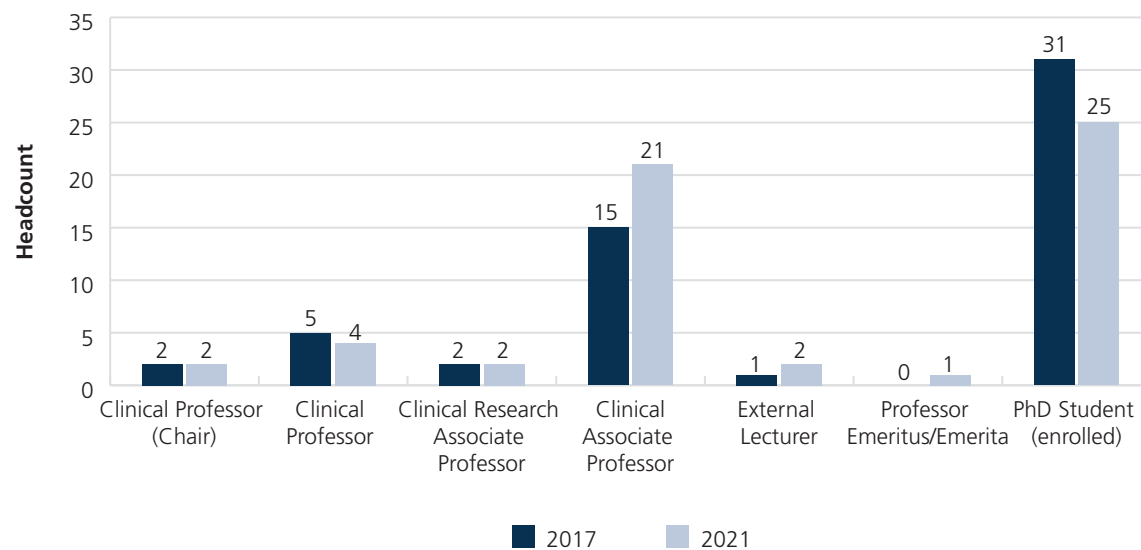
2. Approval of legal contracts is time consuming, and the waiting time is about 3 months. In cases where you wish to move fast, the research is significantly delayed and precious time wasted, ultimately leading to increased risk of being second or third to publish new findings. More assistance is needed and waiting times need to be reduced.
3. Developing and maintaining budgets, making financial plans, paying invoices is done by the researcher leading to reduced time to do research and an increased risk of unprofessional execution. More assistance is needed to improve the quality of financial work and allow the researcher to focus on research.

Dermatological research would, both clinical and experimental, be improved if there is more time allocated during patient visits to also include

patients into clinical research studies. The high number of patients during ambulatory work, leave very little time to take care of inclusion into research projects. Also, there is hence a need to both integrate PhD students in the clinical work, but also to space the patient visits more.

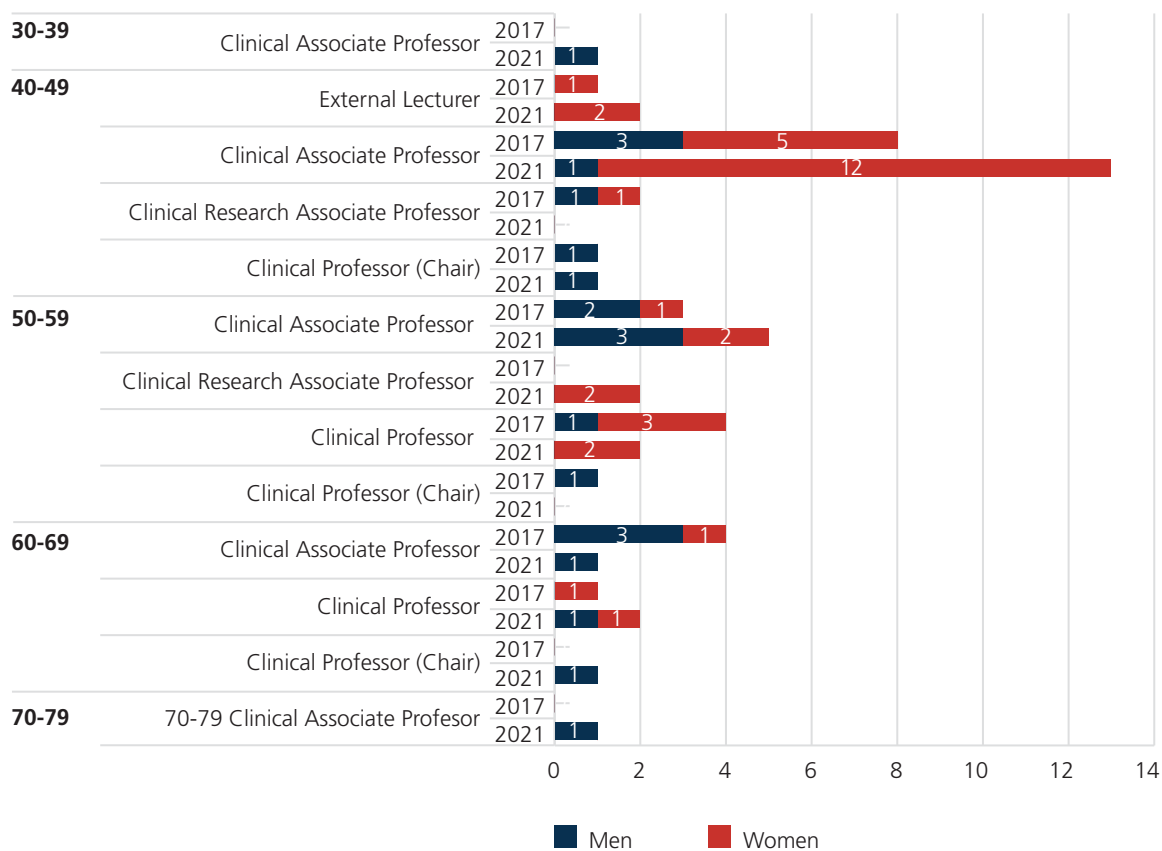
Moreover, additional funding from national and international sources to do ambitious high-level research is needed. There is a need for more time to prepare good and large funding applications to e.g., NIH and ERC, and to get professional help to do this. Often the ½ TAP given with professorships is not available, and therefore establishing and maintain budgets, timelines, etc. is done by the researcher ultimately taking precious time away to do the main application. Also, many foundations do not support research in dermatology and allergology.

## Academic Staff in Dermatovenerologi 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Dermatovenerologi 2017 & 2021



Source: KUPA



### STRENGTHS

- Academic tradition in multiple important skin diseases using mostly clinical data from trials, cohort studies, surveys, and health registries. Research is mostly published in high impact dermatology journals.
- High number of master students in dermatological research, and an overall high number of PhD students ensure widespread research knowledge among dermatologists.
- Extensive international collaboration, and well established, internationally acknowledged academic traditions with a high impact on the field of dermatology and allergy.
- Many research results are operationalized and implemented in clinical practice, recommendations, or regulations (EU and national) aiming at prevention.

### WEAKNESSES

- Few high impact articles in medical journals outside of the specialty, in part due to limited facilitation by university to develop major applications to e.g., EU and NIH, in turn leading to very few internationally funded research projects.
- A large private sector of dermatology, where little research is done.
- There is shortage of post-doctoral positions.
- It can be difficult to retain researchers with other educations than MD if there are no possibilities for affiliations at IKM, even though they bring their own funding, and as a result their publications are not with IKM affiliation.

## SWOT

### OPPORTUNITIES

- Academic and clinical track record present an attractive profile for international collaboration.
- Dermatology has an interface with many other specialties. Skin diseases can be used as models of general pathological processes.
- Improved infrastructure to access patients seen or registered in primary and secondary sectors.

### THREATS

- The majority of future students and doctors steering away from career in research leading to research waste.
- Not enough time to do research due to administrative burden and increasing bureaucracy.
- Waiting and approval times for data storage are very long.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Dermatovenerology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 115        | 128        | 126        | 104        | 147        |
|               | Letter          | 20         | 5          | 11         | 14         | 21         |
|               | Review          | 30         | 22         | 23         | 31         | 24         |
| Danish        | Journal article | 4          | 6          | 3          | 9          |            |
| <b>Total</b>  |                 | <b>169</b> | <b>161</b> | <b>163</b> | <b>158</b> | <b>192</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 49.1%   | 413              | 9,926     | 24                        | 2.63                           |
| Only national collaboration          | 26.2%   | 220              | 3,166     | 14.4                      | 1.84                           |
| Only institutional collaboration     | 24.0%   | 202              | 2,493     | 12.3                      | 1.58                           |
| Single authorship (no collaboration) | 0.7%    | 6                | 75        | 12.5                      | 1.98                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                        | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|----------------------------------------------------------------|------------------------------|----------------------------|
| Journal of the European Academy of Dermatology and Venereology | 98                           | 9.228                      |
| Contact Dermatitis                                             | 95                           | 6.419                      |
| British Journal of Dermatology                                 | 82                           | 11.113                     |
| Acta Dermato-Venereologica                                     | 64                           | 3.875                      |
| Journal of the American Academy of Dermatology                 | 36                           | 15.487                     |
| Lasers in Surgery and Medicine                                 | 28                           | 4.025                      |
| Allergy: European Journal of Allergy and Clinical Immunology   | 23                           | 14.710                     |
| Ugeskrift for Laeger                                           | 19                           |                            |
| JAMA Dermatology                                               | 17                           | 11.816                     |
| Dermatology                                                    | 15                           | 5.197                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Dermatovenerology        | 599                              | 2.28                           | 5                                     | 16                                    | 30.2                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Bruusgaard-Mouritsen MA, Jensen BM, Poulsen LK, Duus Johansen J, Garvey LH. Optimizing investigation of suspected allergy to polyethylene glycols. J Allergy Clin Immunol. 2022 Jan;149(1):168-175 Epub 2021 May 28.
2. Saunte DML, Pereiro-Ferreirós M, Rodríguez-Cerdeira C, Sergeev AY, Arabatzis M, Prohić A, Piraccini BM, Lecerf P, Nenoff P, Kotrekova LP, Bosshard PP, Padovese V, Szepietowski JC, Sigurgeirsson B, Nowicki RJ, Schmid-Grendelmeier P, Hay RJ. Emerging antifungal treatment failure of dermatophytosis in Europe: take care or it may become endemic. J Eur Acad Dermatol Venereol. 2021 Jul;35(7):1582-1586. doi: 10.1111/jdv.17241. Epub 2021 Apr 22. PMID: 33768571
3. Line B Nørreslet, Sofie M Edslev, Maja-Lisa Clausen, Esben M Flachs, Niels E Ebbehøj, Paal S Andersen, Tove Agner. Hand eczema and temporal variation of Staphylococcus aureus clonal complexes: A prospective observational study. J Am Acad Dermatol 2022 Nov;87(5):1006-1013. doi: 10.1016/j.jaad.2021.04.037. Epub 2021 Apr 17.

# EMERGENCY MEDICINE

REPRESENTING PROFESSOR: KASPER IVERSEN

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Emergency medicine is a new specialty and is characterized by a short and sparse research tradition. Most of the previous research in Denmark has been register-based and descriptive.

Recently, focus has been on designing larger interventional trials and studies focusing on imaging techniques (primary ultrasound) and risk assessment. Organizational research and implementation research are also growing subjects in Denmark. As emergency medicine is by far the specialty that handles the highest number of patients, there are excellent possibilities for making large interventional trials that could optimize and change patient management and treatment.

The international collaboration is challenged by large differences in the organization of emergency departments. Research collaborations have however been established with Sweden and The Netherlands.

There are several established cross-disciplinary collaborations with infection medicine, anesthesia, and cardiology. In particular, the collaboration between researchers from emergency medical services is close. Emergency medicine is represented in the steering committee by two CAGs ("Precision diagnostics in cardiology" and "Prognostication of Acute Recovery Capacity – in an Aging Population")

The collaboration within the specialties is close and growing. Very recently, a national network for emergency medicine has been established with a primary focus on making national interventional studies. The Danish professors in emergency medicine have at least two meetings annually and arrange together a post graduate course in research methodology in emergency medicine.

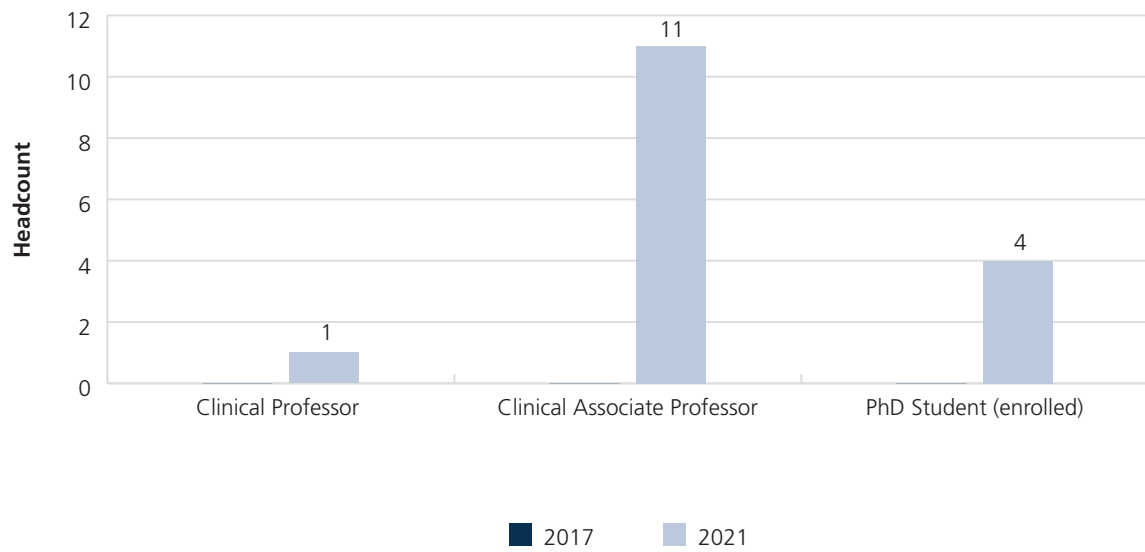
As Emergency Medicine not yet is an independent subject in the pre graduate medical education, teaching is sparse.

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To bring research at the speciality of Emergency Medicine to an even higher level would require:

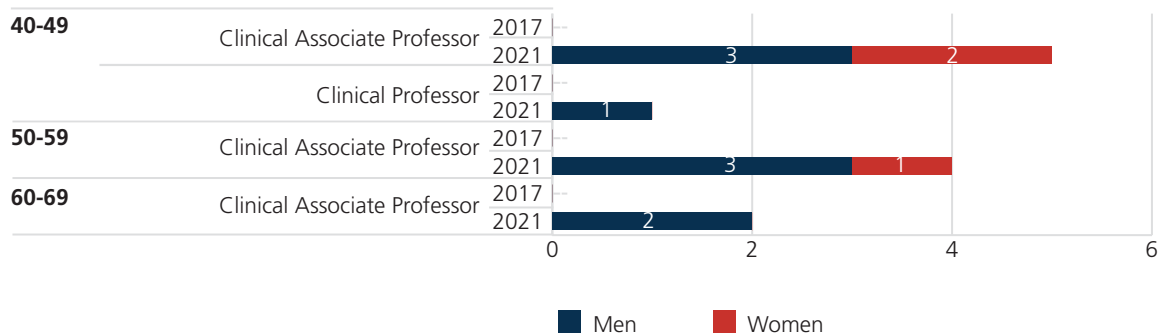
1. Better use of - and far better access to - existing health-related data in central registries and to hospital record data, and possibility to perform randomized trials within the electronic health record system would boost the production of guideline defining studies.
2. Better regulatory/legal access to apply the huge Danish biobanks in research.
3. Acceptance of use of research generated data for clinical use.
4. Making research an important part of hospital operation with part of budgets allocated to research, giving all patients possibility to be part of research projects.
5. Making organizational changes a subject of research using quasi randomized designs.

### Academic Staff in Emergency Medicine 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Emergency Medicine 2017 & 2021



Source: KUPA

### STRENGTHS

- High degree of collaboration with other institutions in DK and internationally
- Very high number of patients in the Danish emergency departments (1,3 million admissions annually)
- Relatively small research “community”, making collaboration easy and effective
- Large political interest
- Use of Danish registers

### WEAKNESSES

- Difficult to get funding as no Danish funds have special interest in emergency medicine
- Weak research tradition and few specialists in emergency medicine, making recruitment of new researchers difficult.
- Not an independent subject at the university, making recruitment difficult.
- Different electronic health records in Denmark.

## SWOT

### OPPORTUNITIES

- Use of a national universal electronic health records
- Use of electronic health records to randomize patients.
- Danish nationwide registries and use of artificial intelligence
- Use of cluster randomized study designs with opt out instead of active informed consent.

### THREATS

- Administrative obstacles to obtain patient data from electronic patient charts
- Obstacles to get permission to perform cluster randomized studies
- Long delay due to administrative handling in ethics committees and legal authorities
- Increasing obstacles for performing clinical research in terms of bureaucracy and recruitment of younger researchers
- Electronic hospital records not supported sufficiently to structure data collection of relevant data and obstacles for data flow back to the researchers

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Emergency Medicine – Peer-reviewed

|               |                 | 2017 | 2018 | 2019      | 2020      | 2021      |
|---------------|-----------------|------|------|-----------|-----------|-----------|
| International | Journal article |      |      | 22        | 25        | 29        |
|               | Letter          |      |      |           | 1         | 3         |
|               | Review          |      |      |           | 2         | 5         |
| Danish        | Journal article |      |      |           | 1         | 1         |
| <b>Total</b>  |                 |      |      | <b>22</b> | <b>29</b> | <b>38</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 32.1%   | 35               | 574       | 16.4                      | 2.33                           |
| Only national collaboration          | 33.9%   | 37               | 855       | 23.1                      | 3.9                            |
| Only institutional collaboration     | 33.9%   | 37               | 161       | 4.4                       | 0.61                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                              | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|----------------------------------------------------------------------|------------------------------|----------------------------|
| Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine | 6                            | 3.803                      |
| Clinical Biochemistry                                                | 5                            | 3.625                      |
| European Heart Journal - Cardiovascular Pharmacotherapy              | 5                            | 11.177                     |
| Ugeskrift for Laeger                                                 | 3                            |                            |
| Clinical Infectious Diseases                                         | 3                            | 20.999                     |
| European Heart Journal                                               | 3                            | 35.855                     |
| International Journal of Cardiology                                  | 3                            | 4.039                      |
| Biomarkers                                                           | 3                            | 2.663                      |
| International Journal of Cardiovascular Imaging                      | 3                            | 2.316                      |
| BMJ Open                                                             | 3                            | 3.017                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Emergency Medicine       | 74                               | 1.62                           | 2.7                                   | 6.8                                   | 9.5                                    |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Bundgaard H, Bundgaard JS, Raaschou-Pedersen DET, von Buchwald C, Todsén T, Norsk JB, Pries-Heje MM, Vissing CR, Nielsen PB, Winsløw UC, Fogh K, Hasselbalch R, Kristensen JH, Ringgaard A, Porsborg Andersen M, Goecke NB, Trebbien R, Skovgaard K, Benfield T, Ullum H, Torp-Pedersen C, Iversen K. Effectiveness of Adding a Mask Recommendation to Other Public Health Measures to Prevent SARS-CoV-2 Infection in Danish Mask Wearers : A Randomized Controlled Trial. *Ann Intern Med.* 2021 Mar;174(3):335-343.
  2. Fogh K, Strange JE, Scharff BFSS, Eriksen ARR, Hasselbalch RB, Bundgaard H, Nielsen SD, Jørgensen CS, Erikstrup C, Norsk J, Nielsen PB, Kristensen JH, Østergaard L, Ellermann-Eriksen S, Andersen B, Nielsen H, Johansen IS, Wiese L, Simonsen L, Fischer TK, Folke F, Lippert F, Ostrowski SR, Benfield T, Mølbak K, Ethelberg S, Koch A, Sönksen UW, Vangsted AM, Krause TG, Fomsgaard A, Ullum H, Skov R, Iversen K. Testing Denmark: a Danish Nationwide Surveillance Study of COVID-19. *Microbiol Spectr.* 2021 Dec 22;9(3)
  3. Árnadóttir Á, Pedersen S, Bo Hasselbalch R, Goetze JP, Friis-Hansen LJ, Bloch-Münster AM, Skov Jensen J, Bundgaard H, Iversen K. Temporal Release of High-Sensitivity Cardiac Troponin T and I and Copeptin After Brief Induced Coronary Artery Balloon Occlusion in Humans. *Circulation.* 2021 Mar 16;143(11):1095-1104.
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# INTERNAL MEDICINE: CARDIOLOGY

REPRESENTING PROFESSOR: LARS KØBER

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Cardiology is the largest sub-specialty and has a strong tradition for translational national and international large-scale clinical trials.

Thus, cardiology is probably the specialty within medicine with most evidence-based treatments, predominantly due to a tradition for large scale randomized clinical trials.

Atherosclerotic heart disease is the main cause of death globally and research in this area is highly prioritized and ranges from prevention to treatment of end-stage disease. There is special interest in prevention of cardiovascular (CV) diseases ranging from research in risk factors (genetic risk factors, hypertension, overweight, dyslipidemia, diabetes etc.). In patients with established disease there is a large area of research in treatment of ischemic heart disease (acute and chronic), and all of the complications as arrhythmias, heart failure and cardiac arrest. Within all these areas there is focus on many different aspects such as genetics, biomarkers, pharmacological and non-pharmacological therapies with devices and transplantation. Development of stem cell therapy has the potential to change management of many heart diseases in the future but is still lacking a breakthrough in CV diseases.

Growing research areas include several rare diseases incl congenital heart diseases and inherited diseases.

There is expanding research in valvular diseases (including endocarditis) and diseases in the pulmonary vasculature and severe lung diseases. Transplantation is a separate research area.

The unique Danish registers have supported the development of a strong research tradition within cardiovascular epidemiology and pharmacoepidemiology, and in this area we are among the most respected and productive in the world.

Cardiology is probably the specialty within medicine with most evidence-based treatments, predominantly due to a tradition for large scale randomized clinical trials.

Research in 'personalized medicine' is being pursued in collaboration with people from basic science and computer technology (deep learning) with participation of cardiologists in several CAGs, which has been extended into intl. collaboration. Here identification of novel disease mechanisms, new potential treatment targets, clinical use of combined omics and trials of genetic engineering – antisense technologies (ASO) or CRISP-Cas-9 technologies are rapidly expanding in cardiology – and are expected to create extensive changes in future diagnostics and therapies.

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Cardiology research is continuously growing, but better use of - and far better access to - existing health-related data in central registries and to hospital record data, and possibility to perform randomized trials within the electronic health record system would boost the production of guideline defining studies.

Furthermore, there is need for better regulatory/legal access to apply the huge Danish biobanks in research, and acceptance of use of research generated data for clinical use.

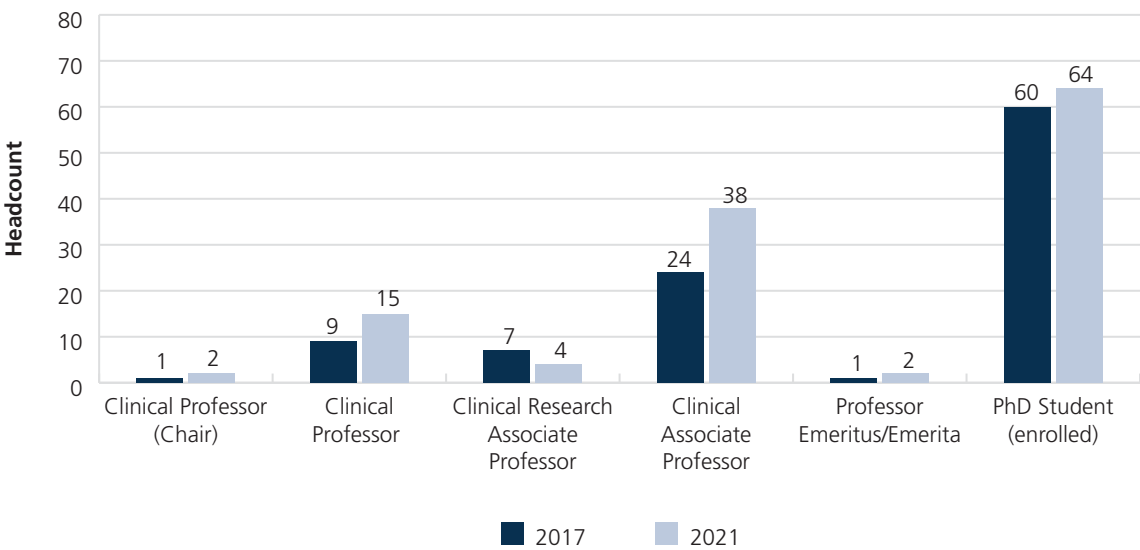
We need to make research an important part of hospital operation with part of budgets allocated to research, giving al patients possibility to be part of research projects.

There is also a need for a combination of/ support of collaboration of presently independent research milieus.

Further collaboration between the hospital sector with the universities – KU/DTU – to promote basic science:

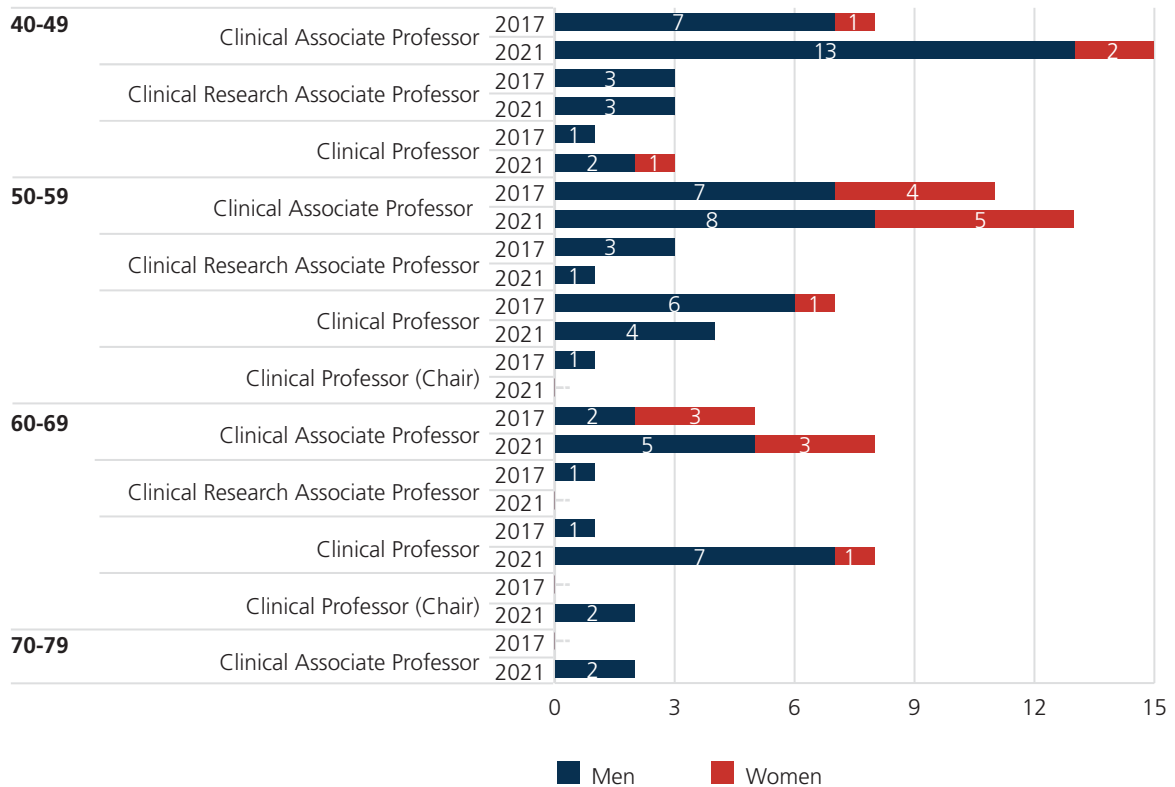
- A) Data computer science.
- B) Extended laboratory research incl. omics

Academic Staff in Internal Medicine: Cardiology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Internal Medicine: Cardiology 2017 & 2021



Source: KUPA

#### STRENGTHS

- High degree of collaboration with other institutions in DK and internationally
- Very research-active faculty
- Growing population of patients with large medical needs
- Large public interest/appeal
- Utilization of Danish registers

#### WEAKNESSES

- Only modest collaboration with basic science
- Research areas are often dominated by single individuals making the milieu vulnerable
- Structured research career process for clinicians is lacking during cardiology education

#### SWOT

#### OPPORTUNITIES

- Collaboration between cardiologists using same electronic health records
- Potential of electronic hospital records to structure data collection
- Linkage between phenotype and genotype in large populations
- Danish nationwide registries and use of artificial intelligence

#### THREATS

- Administrative obstacles to obtain patient data from electronic patient charts
- Obstacles to get permission to perform genetic studies
- Long delay due to administrative handling in ethics committees and legal authorities
- Increasing obstacles for performing clinical research in terms of bureaucracy and recruitment of younger researchers
- Electronic hospital records not supported sufficiently to structure data collection of relevant data, and obstacles for data flow back to the researchers

#### SCIENTIFIC PRODUCTION IN THE SPECIALITY

##### Number of articles in Internal Medicine: Cardiology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 293        | 354        | 371        | 426        | 481        |
|               | Letter          | 16         | 6          | 5          | 12         | 21         |
|               | Review          | 21         | 18         | 22         | 32         | 31         |
| Danish        | Journal article | 4          | 8          | 3          | 6          | 2          |
|               | Review          | 1          |            |            |            | 1          |
| <b>Total</b>  |                 | <b>335</b> | <b>386</b> | <b>401</b> | <b>476</b> | <b>536</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 55.3%   | 1135             | 40,624    | 35.8                      | 3.71                           |
| Only national collaboration          | 26.9%   | 553              | 7,225     | 13.1                      | 1.6                            |
| Only institutional collaboration     | 17.6%   | 362              | 3,039     | 8.4                       | 0.94                           |
| Single authorship (no collaboration) | 0.2%    | 4                | 342       | 85.5                      | 5.23                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                         | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|-------------------------------------------------|------------------------------|----------------------------|
| European Heart Journal                          | 80                           | 35.855                     |
| International Journal of Cardiology             | 61                           | 4.039                      |
| European Journal of Heart Failure               | 55                           | 17.349                     |
| Journal of the American College of Cardiology   | 53                           | 27.203                     |
| Journal of the American Heart Association       | 52                           | 6.106                      |
| Europace                                        | 48                           | 5.486                      |
| Resuscitation                                   | 44                           | 6.251                      |
| Circulation                                     | 42                           | 39.918                     |
| International Journal of Cardiovascular Imaging | 41                           | 2.316                      |
| PLoS ONE                                        | 39                           | 3.752                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine:       |                                  |                                |                                       |                                       |                                        |
| Cardiology               | 1,513                            | 2.82                           | 5.3                                   | 14.6                                  | 23.4                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Anne-Sophie Sillesen, Ottilia Vøgg, Christian Pihl, Anna Axelsson Raja, Karin Sundberg, Cathrine Vedel, Helle Zingenberg, Finn Stener Jørgensen, Niels Vejlsttrup, Kasper Iversen, Henning Bundgaard. Prevalence of Bicuspid Aortic Valve and Associated Aortopathy in Newborns in Copenhagen, Denmark. JAMA. 2021 Feb 9;325(6):561-567. doi: 10.1001/jama.2020.27205.
  2. Svendsen JH, Diederichsen SZ, Højberg S, Krieger DW, Graff C, Kronborg C, Olesen MS, Nielsen JB, Holst AG, Brandes A, Haugan KJ, Køber L. Implantable loop recorder detection of atrial fibrillation to prevent stroke (The LOOP Study): a randomised controlled trial. Lancet. 2021 Oct 23;398(10310):1507-1516. doi: 10.1016/S0140-6736(21)01698-6. Epub 2021 Aug 29. PMID: 34469766
  3. Søndergaard L, Kasner SE, Rhodes JF, Andersen G, Iversen HK, Nielsen-Kudsk JE, Settergren M, Sjöstrand C, Roine RO, Hildick-Smith D, Spence JD, Thomassen L; Gore REDUCE Clinical Study Investigators. HYPERLINK "<https://pubmed.ncbi.nlm.nih.gov/28902580/>" Patent Foramen Ovale Closure or Antiplatelet Therapy for Cryptogenic Stroke. N Engl J Med. 2017 Sep 14;377(11):1033-1042. doi: 10.1056/NEJMoa1707404. PMID: 28902580
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# INTERNAL MEDICINE: ENDOCRINOLOGY

REPRESENTING PROFESSOR: PETER SCHWARZ

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Endocrinology calls for collaboration with many other specialities and ranges from basic to clinical science:

**Type 1 and 2 diabetes:** Aetiology, prevention and early detection of diabetes, prevention and treatment of late diabetic complications, clinical trials aiming at implementing new treatment modalities including interventions in lifestyle factors including diet and exercise, insulin types and insulin pump technology, hypoglycaemia research and diabetes in pregnancy. A new field focusing on management of in-hospital diabetes and glucocorticoid induced diabetes is evolving.

**Obesity:** clinical management, e.g. RCT on weight maintenance after diet-induced weight loss. Extensive research on effects of bariatric surgery with national and international collaborations, and on complications to bariatric surgery. Pathophysiological research on fat metabolism, appetite regulation, bile acids metabolism and genetic profiling in relation to weight regulation.

**Osteoporosis:** basic mechanisms, epidemiology, and clinical trials.

**Thyroid:** clinical research (e.g. the largest ever RCT in hyperthyroidism), basic and epidemiological studies on thyroid and pregnancy, epidemiology of “cold” nodules, as well as the effect of national iodine supplementation; new treatment modalities in hypothyroidism; world-leading PRO research.

**Androgen use and abuse:** long term health consequences and evidence-based treatment modalities incl. a state-of-the-art RCT and large-scale national observational studies initiated.

**Gonadal function,** male fertility, basic and clinical applications.

**GI peptide** research, from basic to clinical application

**Calcium disturbances:** basic and clinical research

**Pituitary:** effects, clinical studies in novel treatment modalities

**Adrenal:** effects, treatment modalities, new diagnostic approaches, a nationwide state-of-the-art RCT on glucocorticoid-induced insufficiency.

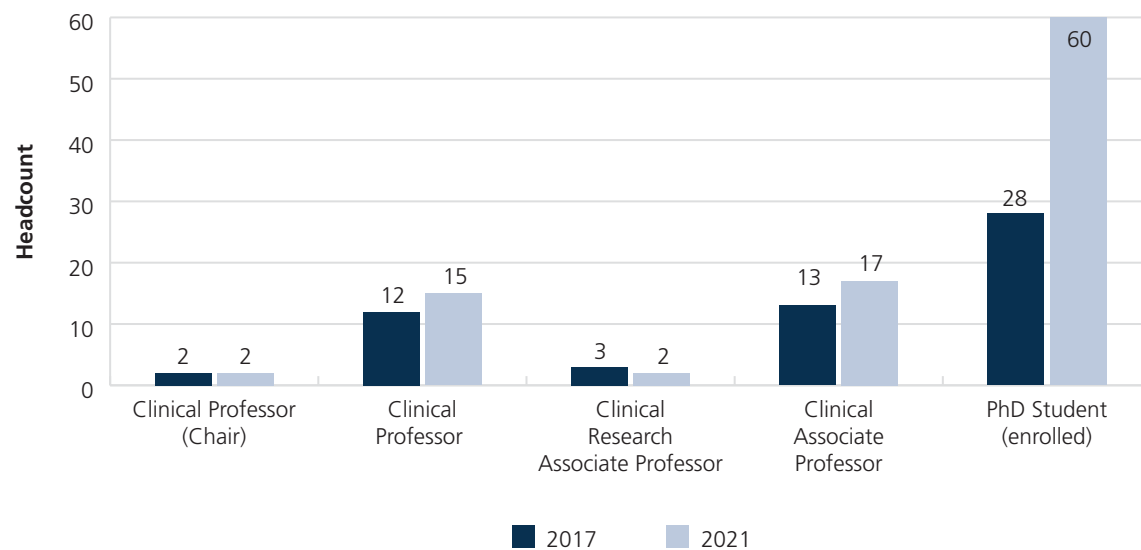
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To bring research at the speciality of Internal Medicine: Endocrinology to an even higher level, the committee would recommend a conversion from the current competitive disintegrated financing to a strategic, long-lasting, large-scale financing of a clinical research infrastructure in Denmark, taking advantage of the opportunities listed above to facilitate relevant clinical research. This would heighten the level both quantitatively and qualitatively and better exploit the resources of clinical scientists.

Based on the facts that:

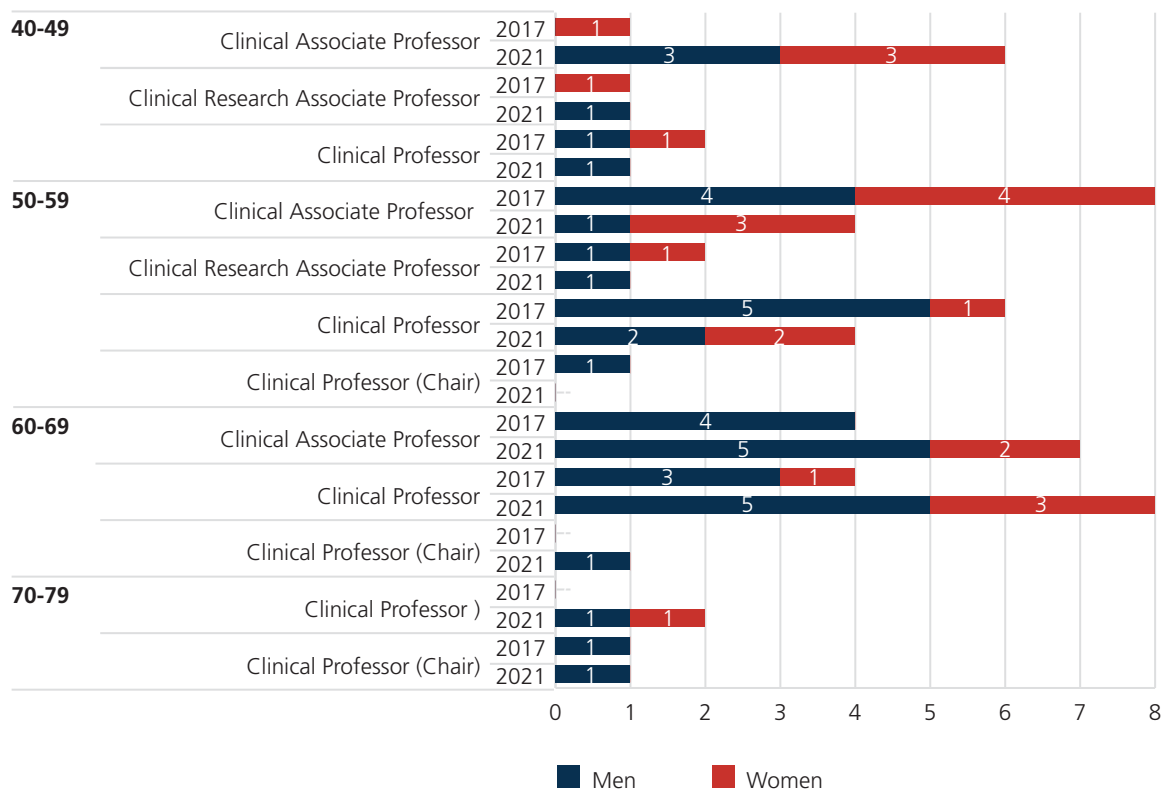
1. our speciality houses some very strong research environments
2. the Danish health system has a unique elaborate, strong, and coherent infrastructure
3. there is a need of trials evaluating current (and new) treatments and clinical management
4. a large proportion of scientists' time is wasted on unrewarded grant applications
5. history has proven the huge benefit of sufficient, constant, strategic financing of a clinical research unit (Steno)

### Academic Staff in Internal Medicine: Endocrinology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Endocrinology 2017 & 2021



Source: KUPA



### STRENGTHS

- Steno Diabetes Center Copenhagen network and funding
- A strong tradition for collaboration between basic science and clinical research
- Collaboration with Technical University of Denmark with regards to technology development
- Register-based research
- A clear notion of the importance of continued integration between subspecialties (i.e. diabetes and classical endocrinology)
- Extensive worldwide collaboration both directly and together with basic science units in Denmark

### WEAKNESSES

- Fragmented clinical research
- Career development in clinical research hampered by lack of senior researcher positions with clinic and research, particularly transition from PhD to specialist.
- Lack of access to patient population seen in general practice (i.e. patients with diabetes or patients at risk)
- Large clinical production demand i.e. less time to research (i.e. focus on production in favor of innovation/research)

## SWOT

### OPPORTUNITIES

- Taking more advantage of the link between basic and clinical research
- Thus, great opportunity to increase the collaborate with basic science departments at the university
- Focus on prevention and very prevalent diseases (type 2 DM, osteoporosis)
- Epidemiological research due to detailed and valid national registers
- Stimulate hospitals and authorities to support clinical academic research, by providing a larger number of positions combining clinical activity and research

### THREATS

- Regulatory barriers for research and regulatory balance between data protection and research
- A devastating lack of administrative, particularly legal, assistance and institutional review boards, worsened by the pandemic
- Declining funding of investigator-initiated studies from public sources
- Large clinical production demand
- Steno Diabetes Center Copenhagen: potential influence on type of (diabetes) research by restriction of allocation of funding
- Declining attractiveness of clinical academic positions due to insufficiently rewarding system, leading to increased drain from academia to pharma.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Endocrinology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 195        | 216        | 221        | 207        | 256        |
|               | Letter          | 9          | 3          | 3          | 8          | 9          |
|               | Review          | 26         | 23         | 24         | 21         | 31         |
| Danish        | Journal article | 3          | 10         | 3          | 2          |            |
|               | Letter          |            | 2          | 1          |            |            |
| <b>Total</b>  |                 | <b>233</b> | <b>254</b> | <b>252</b> | <b>238</b> | <b>296</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 42.8%   | 528              | 21,047    | 39.9                      | 3.93                           |
| Only national collaboration          | 42.9%   | 530              | 9,649     | 18.2                      | 1.96                           |
| Only institutional collaboration     | 13.8%   | 170              | 2,673     | 15.7                      | 1.62                           |
| Single authorship (no collaboration) | 0.6%    | 7                | 294       | 42                        | 2.18                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                          | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------------------|------------------------------|----------------------------|
| Diabetes, Obesity and Metabolism                 | 59                           | 6.410                      |
| Diabetologia                                     | 51                           | 10.460                     |
| Diabetes Care                                    | 43                           | 17.152                     |
| Journal of Clinical Endocrinology and Metabolism | 37                           | 5.799                      |
| Diabetic Medicine                                | 27                           | 4.213                      |
| PLoS ONE                                         | 27                           | 3.752                      |
| Diabetes                                         | 24                           | 9.337                      |
| Journal of Diabetes and its Complications        | 21                           | 3.219                      |
| Ugeskrift for Læger                              | 20                           |                            |
| Endocrine Connections                            | 18                           | 3.221                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine:       |                                  |                                |                                       |                                       |                                        |
| Endocrinology            | 935                              | 2.77                           | 5.3                                   | 13.6                                  | 21.9                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Rossing P, Inzucchi SE, Vart P, Jongs N, Docherty KF, Jhund PS, Køber L, Kosiborod MN, Martinez FA, Ponikowski P, Sabatine MS, Solomon SD, DeMets DL, Bengtsson O, Lindberg M, Langkilde AM, Sjöstrand M, Stefansson BV, Karlsson C, Chertow GM, Hou FF, Correa-Rotter R, Toto RD, Wheeler DC, McMurray JJV, Heerspink HJL; DAPA-CKD and DAPA-HF Trial Committees and Investigators. *Dapagliflozin and new-onset type 2 diabetes in patients with chronic kidney disease or heart failure: pooled analysis of the DAPA-CKD and DAPA-HF trials*. Lancet Diabetes Endocrinol. 2022 Jan;10(1):24-34. doi: 10.1016/S2213-8587(21)00295-3. Epub 2021 Nov 29.
2. Svendsen OL, Rabe OC, Winther-Jensen M, Allin KH. *How common is the rare Charcot foot in patients with diabetes*. Diabetes Care 2021;44:e62–e63.
3. Brandt-Jacobsen NH, Lav Madsen P, Johansen ML, Rasmussen JJ, Forman JL, Holm MR, Rye Jørgensen N, Faber J, Rossignol P, Schou M, Kistorp C. Mineralocorticoid Receptor Antagonist Improves Cardiac Structure in Type 2 Diabetes. JACC Heart Failure. 2021 Aug;9(8):550-558. doi: 10.1016/j.jchf.2021.02.016.

# INTERNAL MEDICINE: GASTROENTEROLOGY AND HEPATOLOGY

REPRESENTING PROFESSOR: LISE LOTTE GLUUD

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The specialty encompasses several subspecialties; research is being undertaken in each subspecialty:

**Functional gastrointestinal disorders:**

Epidemiological and clinical studies evaluating irritable bowel syndrome including studies evaluating the importance of gut microbiota.

**Inflammatory bowel diseases:** Clinical, pathophysiological, and epidemiological studies evaluating diagnosis, prognostication and treatment. Ongoing nationwide multicenter clinical studies evaluating the natural disease course and prognosis are currently ongoing. In addition, the impact of novel treatment strategies on disease outcomes are assessed. By combining clinically well-characterized cohorts with substantial biobanking the goal is to generate accurate prediction models to determine treatment response as well as short- and long-term disease prognosis. Diagnostic studies using artificial intelligence to evaluate histology and abdominal ultrasound to characterize patients. Translational studies on cytokines and cellular function in the intestine have generated novel knowledge of the disease.

**Nutrition and short bowel syndrome:**

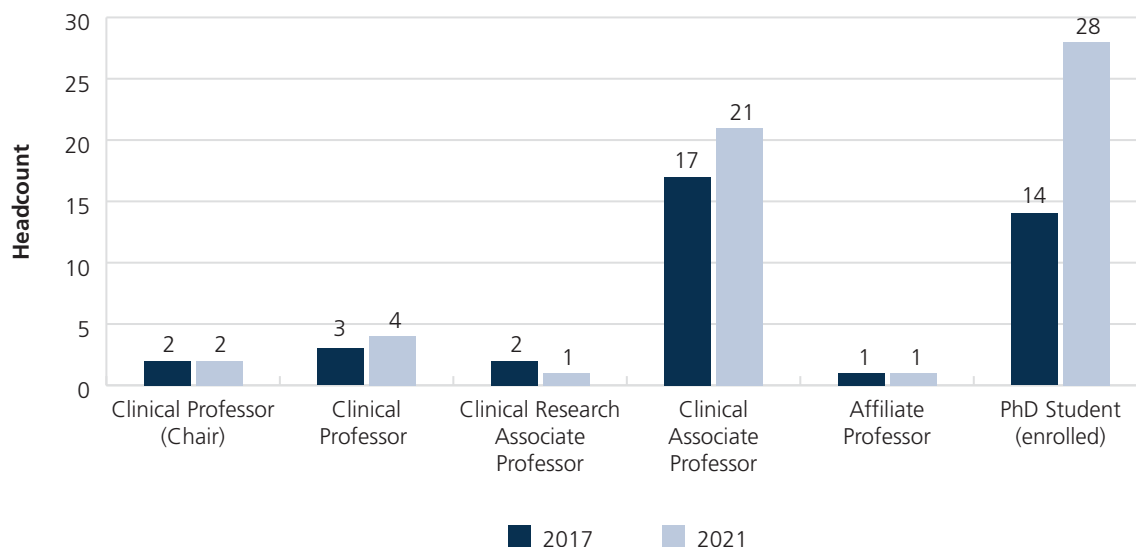
Multinational clinical, epidemiological, and pathophysiological studies aiming to improve nutritional uptake in patients with short bowel syndrome as well as intestinal failure epidemiology and studies evaluating gastrointestinal hormones and studies evaluating the beneficial and harmful effects of home parenteral nutrition.

**Pancreas:** Pathophysiological and clinical studies with the aim to improve the understanding of the processes involved in the changes occurring in the acute and late phase of pancreatitis, recurrent acute pancreatitis, and progression to chronic pancreatitis.

**Liver disease:** Multinational pathophysiological studies evaluating complications in cirrhosis including haemodynamic alterations and development of acute-on-chronic liver failure. Clinical, epidemiological, and pathophysiological studies evaluating the pathophysiology of cirrhosis and non-alcoholic fatty liver disease using a multi-omics approach to identify biomarkers of progression and improve the diagnosis. Intervention studies including patients with cirrhosis as well as patients with NAFLD.

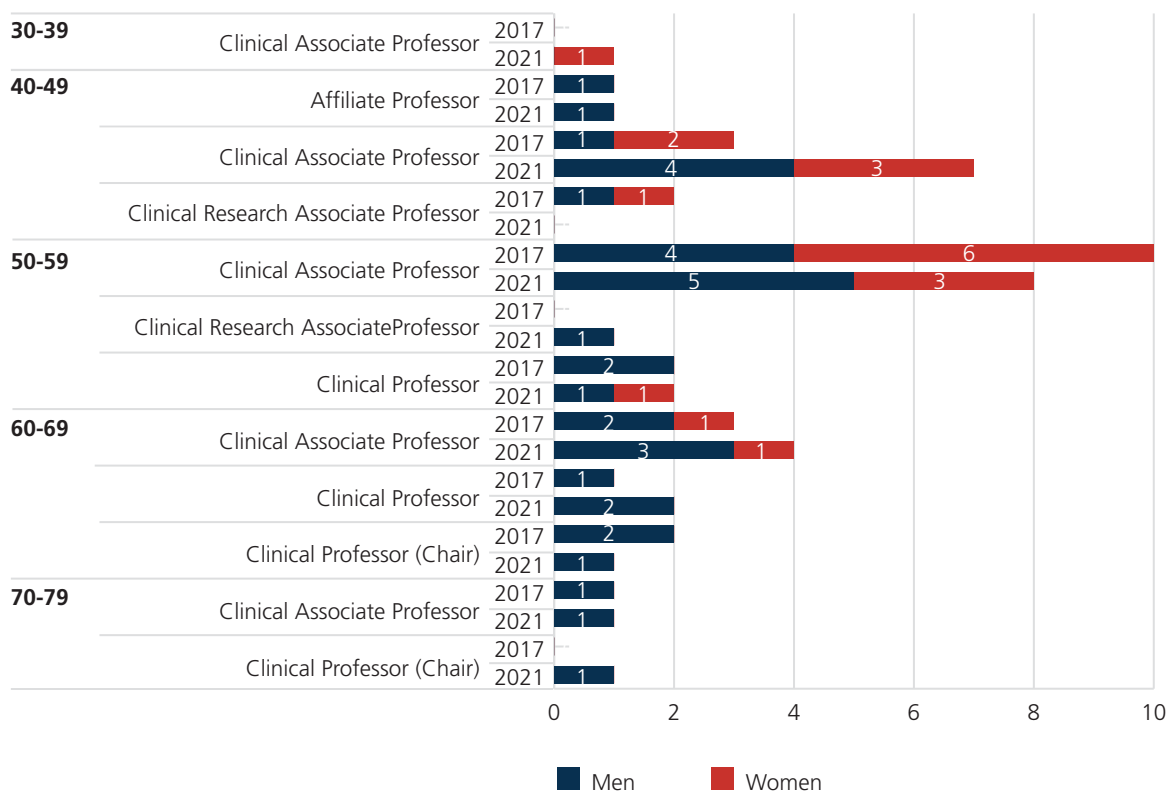
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## Academic Staff in Internal Medicine: Gastroenterology and Hepatology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Internal Medicine: Gastroenterology and Hepatology 2017 & 2021



Source: KUPA

### STRENGTHS

- Internationally recognized within: Liver diseases, especially cirrhosis and non-alcoholic fatty liver disease, functional gastrointestinal disorders, inflammatory bowel disease; short bowel syndrome.

### WEAKNESSES

- The scientific contribution mainly stems from a few departments and although collaboration between departments has been a clear focus in certain areas, especially inflammatory bowel diseases and liver diseases, additional efforts are needed to strengthen collaborative efforts further
- The most specialised hospital (Rigshospitalet) has a limited volume within the speciality
- Additional focus on malignant diseases is needed.

## SWOT

### OPPORTUNITIES

- Increased collaboration between departments
- Establish a scientific board to help promote collaboration, the initial steps are taken in certain disease areas
- An increasing number of researchers have continued their work after their PhD which in time can lead to an increasing number of postdocs.

### THREATS

- Limited number of postdocs
- Funding is difficult
- Clinical workload is high and leaving limited time dedicated to research.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Gastroenterology and Hepatology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 71        | 74        | 60        | 66        | 57        |
|               | Letter          | 1         | 3         |           | 2         | 2         |
|               | Review          | 18        | 11        | 14        | 8         | 9         |
| Danish        | Journal article | 1         | 1         | 6         | 4         | 2         |
|               | Letter          |           |           |           | 1         |           |
|               | Review          |           |           |           |           | 2         |
| <b>Total</b>  |                 | <b>91</b> | <b>89</b> | <b>80</b> | <b>81</b> | <b>72</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 43.8%   | 176              | 4,497     | 25.6                      | 2.4                            |
| Only national collaboration          | 30.9%   | 124              | 1,618     | 13                        | 1.14                           |
| Only institutional collaboration     | 24.6%   | 99               | 1,220     | 12.3                      | 1.26                           |
| Single authorship (no collaboration) | 0.8%    | 3                | 46        | 15.3                      | 0.9                            |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                     | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|---------------------------------------------|------------------------------|----------------------------|
| Scandinavian Journal of Gastroenterology    | 31                           | 3.027                      |
| Journal of Crohns and Colitis               | 16                           | 10.020                     |
| Alimentary Pharmacology and Therapeutics    | 14                           | 9.524                      |
| Ugeskrift for Laeger                        | 13                           |                            |
| Cochrane Database of Systematic Reviews     | 12                           | 12.008                     |
| Journal of Parenteral and Enteral Nutrition | 11                           | 3.896                      |
| United European Gastroenterology Journal    | 9                            | 6.866                      |
| Liver International                         | 8                            | 8.754                      |
| Pancreatology                               | 8                            | 3.977                      |
| Clinical Gastroenterology and Hepatology    | 8                            | 13.576                     |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                                                    | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|----------------------------------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine: Gastroenterology and Hepatology | 328                              | 1.63                           | 2.7                                   | 7                                     | 14                                     |
| IKM                                                | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                                               | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen                           | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Pedersen JS, Rygg MO, Serizawa RR, Kristiansen VB, Albrechtsen NJW, Gluud LL, Madsbad S, Bendtsen F. Effects of Roux-en-Y Gastric Bypass and Sleeve Gastrectomy on Non-Alcoholic Fatty Liver Disease: A 12-Month Follow-Up Study with Paired Liver Biopsies. J Clin Med. 2021 Aug 24;10(17):3783.
  2. Eliasson J, Hvistendahl MK, Freund N, Bolognani F, Meyer C, Jeppesen PB. Apraglutide, a novel glucagon-like peptide 2 analog, improves fluid absorption in patients with short bowel syndrome intestinal failure: findings from a placebo-controlled, randomized phase 2 trial. JPEN J Parenter Enteral Nutr. 2021: 1-9. [Online ahead of print].
  3. Rode AA, Chehri M, Krogsgaard LR, Heno KK, Svendsen AT, Ribberholt I, Helms M, Engberg J, Schønning K, Tvede M, Andersen CØ, Jensen US, Petersen AM, Bytzer P. Randomised clinical trial: a 12-strain bacterial mixture versus faecal microbiota transplantation versus vancomycin for recurrent Clostridioides difficile infection. Aliment Pharmacol Ther 2021;53(9):999-1009.
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# INTERNAL MEDICINE: GERIATRICS

REPRESENTING PROFESSOR: CHARLOTTE SUETTA

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## **EVIDENCE-BASED RESEARCH IS HIGHLY NEEDED TO IMPROVE TREATMENT OF GERIATRIC PATIENTS**

The typical geriatric patient is over 80 years, chronically ill, with multi-morbidity (+3), polypharmacy (+5) leading to complicated clinical problems and treatment processes, physical frailty sarcopenia and cognitive impairment. In the case of acute illness and hospitalization, diagnosis and treatment are often complicated by competing illnesses, loss of physical abilities, polypharmacy and social challenges. At present more than 2/3 of all acutely admitted patients are over 65 years, a number that is steadily growing. Despite of these challenges, there is a lack of research and knowledge guiding diagnostics and treatment of frail geriatric patients.

Our research topics reflects the common geriatric domains;

- Physical frailty and sarcopenia, Cognitive impairment, AD and delirium
- Acute geriatrics
- Osteoporosis, falls and fractures
- Polypharmacy
- Multimorbidity

The geriatric specialty is characterized by the cross-disciplinary nature due to the complex clinical problems and cross disciplinary collaborations between different medical fields and healthcare disciplines (physiotherapists, nurses, social workers and in case of dementia neuropsychologists) is crucial.

Furthermore, there is a close and fruitful collaboration between researchers in CopenAge (Copenhagen Center of Clinical Age Research) a collaboration between all geriatric departments in the Region of Greater Copenhagen (RegionH and Region Sj) and Center for Healthy Aging at University of Copenhagen. Together we are

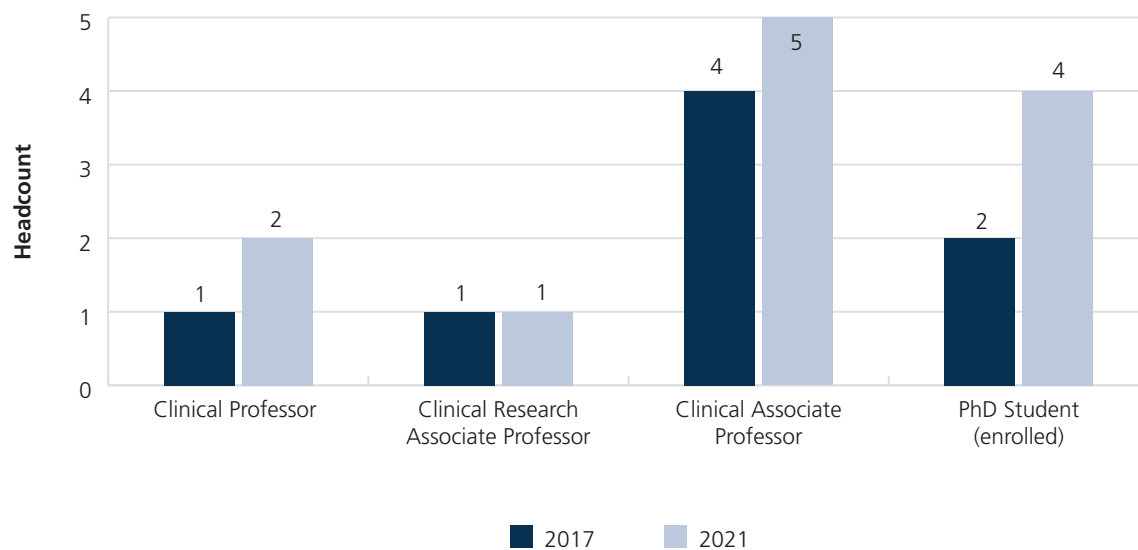
aiming at increasing our translational knowledge about the drivers (and biomarkers) of accelerated aging, cellular senescence, oxidative stress and inflammation.

Lastly, we have several ongoing collaborations with National and International research groups within the field of frailty, osteoporosis, nutrition, sarcopenia, exercise, falls, hip-fractures and cognitive impairment (MCI and AD)

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To bring research at the speciality of Internal Medicine: Geriatrics to an even higher level would require an increase in our National and International research collaborations. Moreover, the implementation of more mechanistic evidence in geriatric research is needed. Furthermore, we need time and more funding.

### Academic Staff in Internal Medicine: Geriatrics 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Geriatrics 2017 & 2021



Source: KUPA

### STRENGTHS

- Local, Regional, National, and international collaborations
- The link we have established between basic and clinical research is rare
- The last 4 years we have worked towards implementing a more systematic approach to clinical research within the geriatric departments, locally as well as nationally, which makes it easier to conduct large scale clinical studies that are highly needed
- Excellent role models among the geriatric chief medical staff leaders

### WEAKNESSES

- Little tradition for research
- Small specialty
- Difficult to conduct research in geriatric patients due to age, comorbidities, and polypharmacy
- Patients are often too frail to volunteer for research projects

## SWOT

### OPPORTUNITIES

- Support for young geriatricians that are interested in research
- Great variability in research topics
- Good opportunities for collaboration across hospitals due to our CopenAge collaboration
- Excellent possibilities for collaborations with other specialties in RegionH and in Denmark
- The Geriatric field and specialty are rapidly expanding and has over the last 5-10 years proven to be increasingly important in many cross disciplinary settings/collaborations e.g. orto-geriatrics, onco-geriatrics, uro-geriatrics as well as in the acute setting, which is reflected in the interest and large number of number of applicants for the positions in geriatric medicine

### THREATS

- Lack of funding
- Little interest from pharma in geriatric patients
- Many studies get obstructed by the abundance of information that needs to read and understood by the patient, leading to low (and non-representable) inclusion rates
- Lack of understanding from VEK regarding the importance of including frail cognitive impaired patients in clinical trials
- Clinical trials should be classified depending on the type of intervention, simple investigations including blood samples or non-invasive tests should be a lot easier to conduct and with less restrictions on inclusion

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Geriatrics – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 50        | 49        | 34        | 45        | 39        |
|               | Letter          | 1         | 1         | 1         |           | 2         |
|               | Review          | 1         | 2         | 1         | 2         | 1         |
| Danish        | Journal article | 1         |           |           |           | 2         |
| <b>Total</b>  |                 | <b>53</b> | <b>52</b> | <b>36</b> | <b>47</b> | <b>44</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 54.6%   | 125              | 11,643    | 93.1                      | 7.76                           |
| Only national collaboration          | 31.0%   | 71               | 635       | 8.9                       | 1.03                           |
| Only institutional collaboration     | 14.0%   | 32               | 477       | 14.9                      | 2.12                           |
| Single authorship (no collaboration) | 0.4%    | 1                | 0         | 0                         | 0                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                        | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|----------------------------------------------------------------|------------------------------|----------------------------|
| Nature Genetics                                                | 9                            | 41.379                     |
| Nature Communications                                          | 8                            | 17.694                     |
| BMJ Open                                                       | 7                            | 3.017                      |
| Scientific Reports                                             | 7                            | 4.996                      |
| PLoS ONE                                                       | 6                            | 3.752                      |
| Lancet                                                         | 5                            | 202.731                    |
| Nature                                                         | 5                            | 69.504                     |
| Journal of the European Academy of Dermatology and Venereology | 5                            | 9.228                      |
| Experimental Gerontology                                       | 5                            | 4.253                      |
| Allergy: European Journal of Allergy and Clinical Immunology   | 4                            | 14.710                     |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine:       |                                  |                                |                                       |                                       |                                        |
| Geriatrics               | 184                              | 5.07                           | 10.9                                  | 22.3                                  | 31.5                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Lund CM, Vistisen KK, Olsen AP, Bardal P, Schultz M, Dolin TG, Rønholt F, Johansen JS, Nielsen DL. The effect of geriatric intervention in frail older patients receiving chemotherapy for colorectal cancer: a randomised trial – GERICO. Br J Cancer. 2021 Jun;124(12):1949-1958. doi: 10.1038/s41416-021-01367-0. Epub 2021 Apr 7. PMID: 33828260
2. Alcazar J, Frandsen U, Prokhorova T, Kamper RS, Haddock B, Aagaard P, Suetta C. Changes in systemic GDF15 across the adult lifespan and their impact on maximal muscle power: the Copenhagen Sarcopenia Study. J Cachexia Sarcopenia Muscle. 2021 Oct 6. doi: 10.1002/jcsm.12823
3. Kamper RS, Alcazar J, Andersen LL, Haddock B, Jørgensen NR, Hovind P, Suetta C. Associations between inflammatory markers, body composition, and physical function: the Copenhagen Sarcopenia Study. J Cachexia, Sarcopenia Muscle. Nov 2021. DOI: 10.1002/jcsm.12832

# INTERNAL MEDICINE: HAEMATOLOGY

REPRESENTING PROFESSOR KIRSTEN GRØNBÆK

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- The joint research teams cover all areas of haematology: Lymphoproliferative cancers, myeloid cancers, hemoglobinopathies, sickle cells disease, iron deficiency, thrombosis and hemostasis and hematological cancer predispositions such as clonal hematopoiesis and hereditary cancer. The transplantation center conducts donor stem cell transplantations, CAR-T and cellular therapies. We have large clinical trial units and a renowned Phase I unit which e.g. has conducted successful first-in-man studies.

Several groups have translational focus and generate a plethora of OMICs data (point mutations, structural variations, gene expression, epigenetics, proteomics/metabolomics, microbiomics), which are coupled to clinical and epidemiological data into machine learning algorithms. We work on single cell studies (gene expression and proteomics). RH has a fully automated drug screenings facility, which combined with flow cytometry allows for high throughput evaluation of the effect of drugs on individual cell types. The Finsen Laboratory is leading in hematopoietic stem cell biology and has e.g. generated disease models for a large range of myeloid cancers.

- All groups collaborate on an international level. We conduct clinical trials with colleagues world-wide, we actively engage in scientific groups in- and outside Europe including e.g. HOVON and Stand up to Cancer in the US.
- Hematology has two CAGs: The Zealand Inflammation Research Initiative (ZIRI), and CAG in Translational Hematology. We have nation-wide collaborations in the

“Danish Center for Precision Medicine in Blood Cancer” and in DaLyCa, a national collaboration on lymphoproliferative diseases.

- We collaborate extensively with colleagues nation-wide.
- We are actively engaged in research-based teaching: The master in precision medicine, BRIDGE, and design and teach in many PhD courses. We arrange large national and international conferences and are frequent lecturers at many national and international meetings.

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We have built up a large infrastructure for translational hematological research (e.g., biobanking of live material, OMICs, bioinformatics, drug screening, mouse models, big data modelling), unfortunately the funding is running out and, moving forward, there are no Danish funding bodies which support the establishment and maintenance of research infrastructures (e.g., cancer centers) at a significant scale.

So, basic funding of research infrastructure is essential if we shall maintain today's level of research and is also the foundation on which external funding for defined projects can be obtained. Importantly, region Zealand have successfully implemented a model where part of the income/saved money from company trials are made available to research e.g., investigator-initiated clinical studies.

Cellular therapies/immunotherapy/gene therapy are becoming increasingly used in hematology and, moving forward, there will be a need for

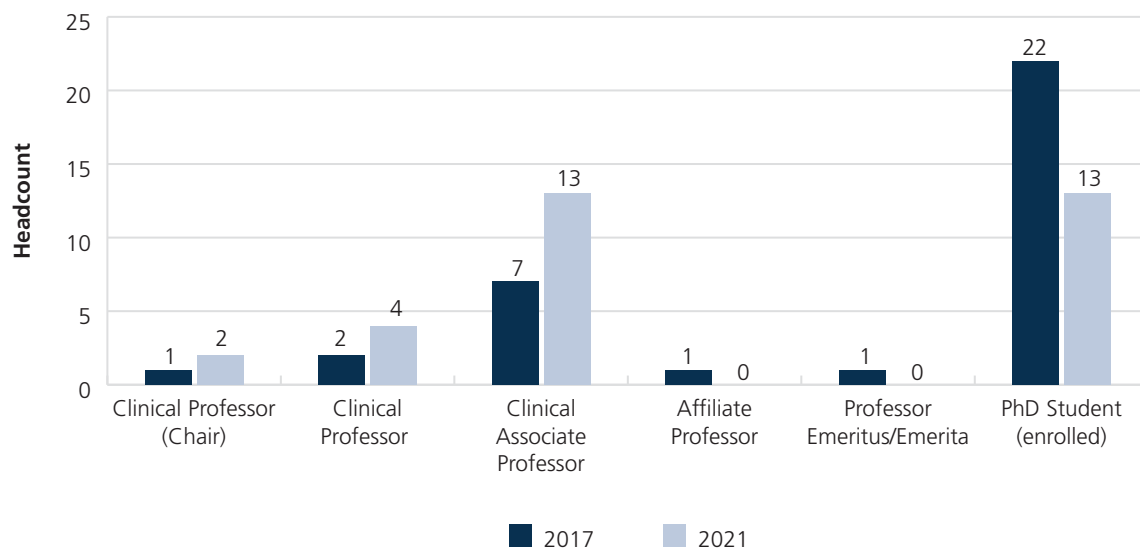
expanding infrastructure (including GMO facilities for production of CAR-T cells at Rigshospitalet) to also house research in these areas.

In addition, not all disease areas and types of research are equally well represented, and some research leaders are likely to retire within a 5-10-year period. Thus, moving forward, it would be important to identify "the next generation physician scientists" and in particular in the less

well covered disease- and research areas to do strategic investments in younger researchers.

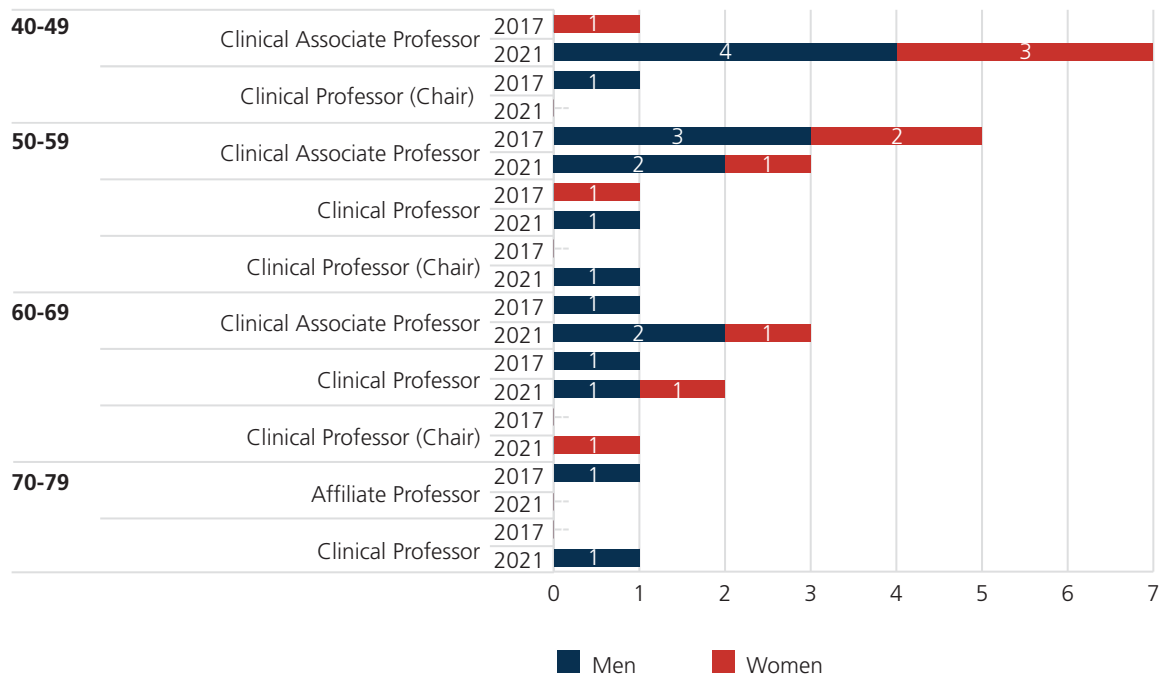
So, in conclusion, we have a high quality and quantity of research at the moment, but this is not likely to continue or expand unless significant research investments are made.

#### Academic Staff in Internal Medicine: Haematology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Internal Medicine: Haematology 2017 & 2021



Source: KUPA

### STRENGTHS

- A general high engagement in research
- Easy access to patients and patient material with just two departments
- Advanced infrastructure
- Close collaboration between clinical and basic science

### WEAKNESSES

- Lack of basic funding for research infrastructure
- Large delays and problems with regulatory bodies
- Individual research groups are “geographically scattered” across the hospital
- Not all subspecialties are equally well represented

### SWOT

### OPPORTUNITIES

- To maintain and expand on the already well-established infrastructure
- Overcome the regulatory obstacles
- Locate hematological research groups in close proximity
- Make sure the next generation researchers are attracted/invested in

### THREATS

- Lack of funding
- Regulations make research impossible and less competitive
- Less basic and translational research in the future due to larger costs, slower generation of results than e.g. epidemiology
- Lack of (research) nurses and other staff



## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Haematology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021       |
|---------------|-----------------|-----------|-----------|-----------|-----------|------------|
| International | Journal article | 42        | 80        | 65        | 65        | 96         |
|               | Letter          | 3         | 5         | 5         | 1         | 8          |
|               | Review          | 4         | 7         | 5         | 6         | 8          |
| Danish        | Journal article | 1         | 2         | 3         | 2         |            |
|               | Review          |           |           |           | 1         | 5          |
| <b>Total</b>  |                 | <b>50</b> | <b>94</b> | <b>78</b> | <b>75</b> | <b>117</b> |

Source: CURIS

## COLLABORATION 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 50.9%   | 204              | 5,224     | 25.6                      | 2.74                           |
| Only national collaboration          | 29.7%   | 119              | 1,482     | 12.5                      | 1.39                           |
| Only institutional collaboration     | 19.5%   | 78               | 491       | 6.3                       | 0.61                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                         | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|---------------------------------|---------------------------------|-------------------------------|
| European Journal of Haematology | 18                              | 3.674                         |
| Leukemia                        | 17                              | 12.897                        |
| British Journal of Haematology  | 15                              | 8.615                         |
| Haematologica                   | 15                              | 11.047                        |
| Leukemia and Lymphoma           | 14                              | 2.996                         |
| Bone Marrow Transplantation     | 12                              | 5.176                         |
| Blood                           | 11                              | 25.476                        |
| Blood advances                  | 11                              | 7.647                         |
| Ugeskrift for Laeger            | 11                              |                               |
| Nature Communications           | 10                              | 17.694                        |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                                   | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|-----------------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Internal Medicine:<br>Haematology | 274                                         | 1.67                                     | 2.9                                         | 8.4                                         | 14.6                                            |
| IKM                               | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                              | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen          | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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### 3 most prominent publications from 2021

1. Brieghel C, Aarup K, Torp MH, Andersen MA, Yde CW, Tian X, Wiestner A, Ahn IE, Niemann CU. Clinical Outcomes in Patients with Multi-Hit TP53 Chronic Lymphocytic Leukemia Treated with Ibrutinib. *Clinical Cancer Research*, 2021, Aug 15;27(16):4531-4538. DOI: 10.1158/1078-0432.CCR-20-4890
  2. Schoof EM, Furtwängler B, Üresin N, Rapin N, Savickas S, Gentil C, Lechman E, Keller UAD, Dick JE, Porse BT. Quantitative single-cell proteomics as a tool to characterize cellular hierarchies. *Nat Commun*. 2021 Jun 7;12(1):3341. doi: 10.1038/s41467-021-23667-y.PMID: 34099695.
  3. Tulstrup M, Sørensen M, Hansen JW, Gillberg L, Needhamsen M, Kaastrup K, Helin K, Christensen K, Weischenfeldt J, Grønbæk K. TET2 mutations are associated with hypermethylation at key regulatory enhancers in normal and malignant hematopoiesis, *Nat Commun*. 2021 Oct 18;12(1):6061. doi: 10.1038/s41467-021-26093-2. PMID: 34663818.
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# INTERNAL MEDICINE: INFECTIOUS DISEASES

REPRESENTING PROFESSOR JENS LUNDGREN

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## RESEARCH AREAS AND TRANSLATIONAL ASPECTS

*HIV:* pathogenesis, pathophysiology, treatment, transmission risk factors, infectious and non-infectious comorbidities.

*Viral hepatitis:* focus on hepatitis C virus (pathophysiology and antiviral treatment).

*Infections in the central nervous system:* meningitis, brain abscesses, encephalitis.

*Key affected populations:* epidemiology of HIV, viral hepatitis and tuberculosis.

*Tuberculosis:* host response and immunity, prevention of TB reactivation in vulnerable groups, improved diagnosis.

*Malaria:* In collaboration with ISIM, UCPH, an established research activity re vaccine development.

*Respiratory infections:* SARS-CoV-2 and influenza.

Trial platforms to examine prophylactic (incl vaccines) and therapeutic interventions.

*Bacterial infections:* host genetic susceptibility, antibiotic stewardship, pneumonia, fecal transplantation.

*Population-level research using national registry data:* wide profile of infections.

*Infectious and immune-related diseases in patients with immune dysfunction:* contribution of the microbiome, host genetic variates, etc – use of imaging to further define clinical phenotyping.

*Translational research aimed at understanding how physical activity impact health with specific focus on inflammation and metabolism.*

## INTERNATIONAL COLLABORATION

Incl. leadership of NIH funded global infectious disease collaborations (INSIGHT) and pandemic preparedness (STRIVE).

## NATIONAL CROSS-DISCIPLINARY COLLABORATORS (CAGS, OTHER)

Incl leadership of PERSIMUNE – research infrastructure across disciplines @ Rigshospitalet. Developed a set of research tools (e.g., host and microbiome genome sequencing) used across disciplines.

## COLLABORATION WITHIN THE SPECIALTY

Trials National involving public-private partnership. Registry-based collaborative research efforts incl on HIV (Danish HIV cohort study), etc.

## RESEARCH-BASED TEACHING

Extensive training founded on research of Ph.D.-students, and pre-graduate pre-graduate students.

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To bring research at the speciality of Internal Medicine: Infectious Diseases to an even higher level would require:

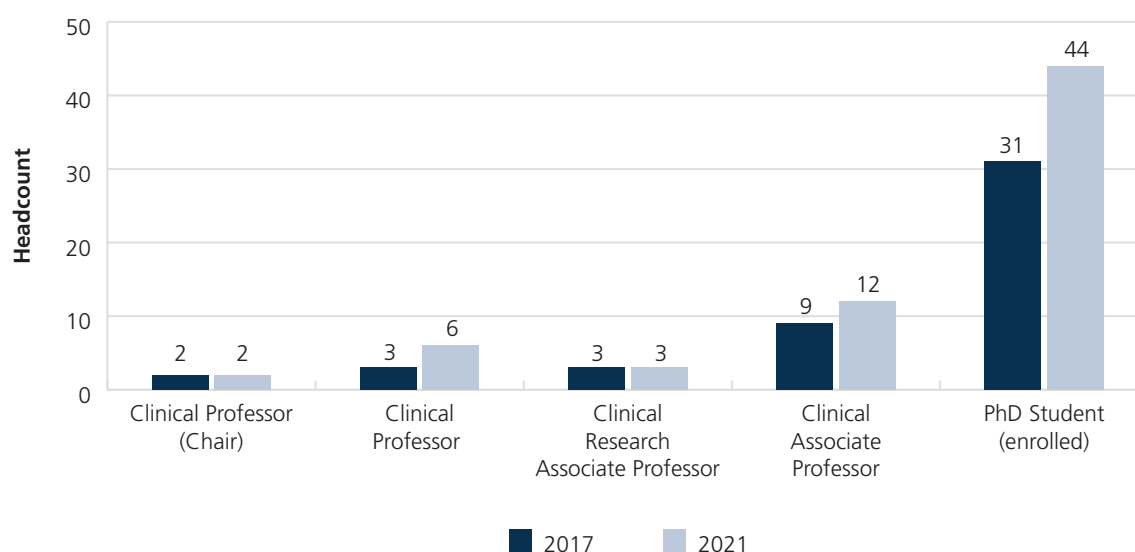
1. **Improvement of quality and reduced timing of approval for new research projects by relevant authorities.** Currently, the process is slow, and heavily influenced by assessors' individual opinion (as opposed to base review of precedence from prior similar cases) when handling individual project applications. This significantly impact negatively on progress of research portfolio resulting in time wasted to address pertinent and relevant research questions.
2. **Initiatives to ensure better and continued research activities after completion of a PhD** Younger colleagues must focus on their clinical training, and in particular the most

promising research talents faced significant challenges to maintain their research activities in conjunction with this. Allocation of secured time to focus on research as part of a clinical position would be preferable. Also, within the field of infectious diseases, many talented researchers are not affiliated with the University, and hence prevented to serve as principal supervisor to PhD students, and official supervisor of medical students required

projects to achieve a bachelor and candidate degree.

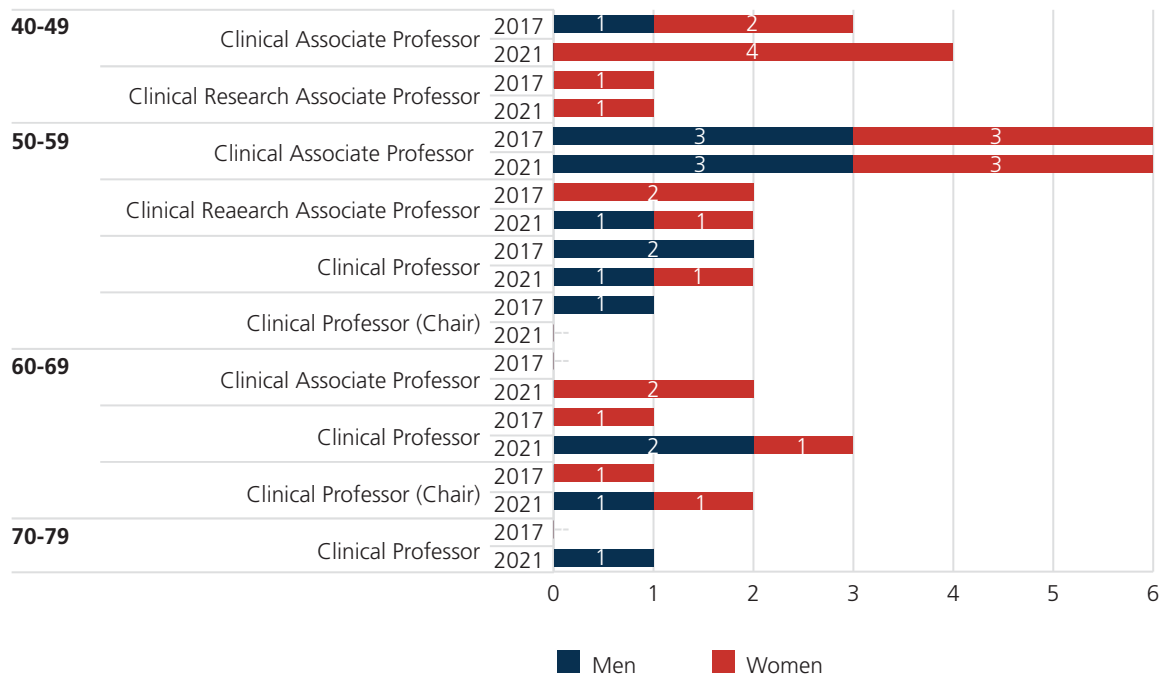
3. **Improves joined research projects across field of medicine.** The COVID-pandemic has demonstrated the strength of such cross-disciplinary research efforts. This experience should form the basis of creating a framework that continue to facilitate this type of collaboration. IKM could play a pivotal role in doing so.

#### Academic Staff in Internal Medicine: Infectious Diseases 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Infectious Diseases 2017 & 2021



Source: KUPA

### STRENGTHS

- High and consistent research productivity and involvement in training of medical research students, PhD students and post.docs.
- Decades of international competitive research outputs related to viral infections including HIV and viral hepatitis.
- Comprehensive ability to perform population-based research based on Danish registry data incl. social determinants and ascertainment of complete follow-up over decades by use of the CPR-numbering system.
- Extensive international network of departments of infectious diseases, coordinated from Copenhagen, and which has performed multiple studies.

### WEAKNESSES

- Relatively weak, although improving, research profile in relation to commonly occurring infections such as pneumonia, sexually transmitted bacterial infections, urinary tract infections, and gastroenteritis.
- Research activities remains fragmented to some extent – synergies for research are not fully exploited.
- Infectious diseases experts working at the various University Hospitals affiliated with University of Copenhagen, that actually are affiliated with the institute of clinical medicine, constitute approximately 50% of the total field of eligible associate professors. This situation creates multiple unfortunate situations of “ghost” supervising, and impaired academic development opportunities.

## SWOT

### OPPORTUNITIES

- Given the emerging global agenda for antimicrobial resistance, a still not curbed HIV pandemic, novel treatments for viral hepatitis, continued emerging new infections, reemergences of epidemics due to vaccine-preventable infections, the emerging understanding of the health implications from how the microbiome is composed, the public health relevance of the infectious disease research agenda will be maintained in the future.
- Novel .....omics technologies and how these interact with infections and immunity is an obvious new research direction for the speciality to embrace.
- Substantial recent investment in the infectious disease speciality research profile has been made by domestic and international funding bodies (Danish National Research Foundation, European Commission, NIH, private foundations).
- Emerging research activities in relation to neuroinfections, bone infections, duration of antibiotic therapy for systemic infections, and infectious complications to iatrogenic immune dysfunction.

### THREATS

- The administrative hurdles (legal approvals, overhead, controllers involved with research budget) continue to expand and will negatively impact on the ability to conduct clinical research if not controlled/reversed.
- The electronic health record IT structure used within the Capital region is still not able to seamlessly export data for research purposes.
- Funding from private sources may continue to increase its domination – and as such decide on direction of research. Solution to remain competitive for larger funding is to engage in larger research consortia.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Infectious Diseases – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 147        | 170        | 145        | 144        | 175        |
|               | Letter          | 4          | 1          | 3          | 11         | 7          |
|               | Review          | 5          | 5          | 7          | 6          | 5          |
| Danish        | Journal article | 4          | 7          | 4          | 6          | 1          |
|               | Letter          | 1          | 3          | 4          | 2          | 1          |
|               | Review          |            |            |            |            | 3          |
| <b>Total</b>  |                 | <b>161</b> | <b>186</b> | <b>163</b> | <b>169</b> | <b>192</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 50.8%   | 432              | 15,451    | 35.8                      | 3.72                           |
| Only national collaboration          | 28.1%   | 239              | 3,581     | 15                        | 1.78                           |
| Only institutional collaboration     | 20.5%   | 174              | 2,294     | 13.2                      | 1.1                            |
| Single authorship (no collaboration) | 0.7%    | 6                | 585       | 97.5                      | 3.76                           |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                        | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|--------------------------------|---------------------------------|-------------------------------|
| PLoS ONE                       | 40                              | 3.752                         |
| Ugeskrift for Laeger           | 35                              |                               |
| Clinical Infectious Diseases   | 28                              | 20.999                        |
| HIV Medicine                   | 25                              | 3.094                         |
| AIDS                           | 24                              | 4.632                         |
| Journal of Infectious Diseases | 23                              | 7.759                         |
| Diabetologia                   | 21                              | 10.460                        |
| Scientific Reports             | 21                              | 4.996                         |
| BMC Infectious Diseases        | 19                              | 3.670                         |
| Nature Communications          | 15                              | 17.694                        |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                                           | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|-------------------------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Internal Medicine:<br>Infectious Diseases | 652                                         | 2.52                                     | 4.3                                         | 12.9                                        | 20.1                                            |
| IKM                                       | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                                      | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen                  | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Høgh J, Knudsen AD, Thudium RF, Gelpi M, Sigvardsen PE, Fuchs A, Kühl JT, Afzal S, Nordestgaard BG, Benfield T, Køber L, Gerstoft J, Kofoed KF, Nielsen SD. HIV infection is associated with thoracic and abdominal aortic aneurysms: a prospective matched cohort study. *Eur Heart J*. 2021 7;42(30):2924-2931. doi: 10.1093/eurheartj/ehab348. PMID: 34240121.
  2. Tetens MM, Haahr R, Dessau RB, Krogfelt KA, Bodilsen J, Andersen NS, Møller JK, Roed C, Christiansen CB, Ellermann-Eriksen S, Bangsbo JM, Hansen K, Andersen CØ, Lebech AM, Obel N, Omland LH. Assessment of the Risk of Psychiatric Disorders, Use of Psychiatric Hospitals, and Receipt of Psychiatric Medication Among Patients With Lyme Neuroborreliosis in Denmark. *JAMA Psychiatry*. 2021 Feb 1;78(2):177-186. doi: 10.1001/jamapsychiatry.2020.2915. PMID: 33026438; PMCID: PMC7542530.
  3. Jens D Lundgren, Birgit Grund, Christina E Barkauskas, Thomas L Holland, Robert L Gottlieb, Uriel Sandkovsky, Samuel M Brown, Kirk U Knowlton, Wesley H Self, D Clark Files, Mamta K Jain, Thomas Benfield, Michael E Bowdish, Bradley G Leshnower, Jason V Baker, Jens-Ulrik Jensen, Edward M Gardner, Adit A Ginde, Estelle S Harris, Isik S Johansen, Norman Markowitz, Michael A Matthay, Lars Østergaard, Christina C Chang, Victoria J Davey, Anna Goodman, Elizabeth S Higgs, Daniel D Murray, Thomas A Murray, Roger Paredes, Mahesh K B Parmar, Andrew N Phillips, Cavan Reilly, Shweta Sharma, Robin L Dewar, Marc Teitelbaum, Deborah Wentworth, Huyen Cao, Paul Klekotka, Abdel G Babiker, Annetine C Gelijns, Virginia L Kan, Mark N Polizzotto, B Taylor Thompson, H Clifford Lane, James D Neaton. A Neutralizing Monoclonal Antibody for Hospitalized Patients with Covid-19. *N Engl J Med*, 2021 Mar 11;384(10):905-914
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# INTERNAL MEDICINE: NEPHROLOGY

REPRESENTING PROFESSOR BO FELDT-RASMUSSEN

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## RESEARCH AREAS AND TRANSLATIONAL ASPECTS

Nephrology embraces many research areas in a wide spectrum of underlying diseases, many treatment modalities, and serious co-morbidities along with progression of renal disease. Research areas include: cardiology, rheumatology, diabetology, immunology, infectious disease, transplant surgery, dialysis, acute kidney disease (AKI), shared decision making and epidemiology. A translational approach was reflected in a Postdoctoral fellowship "BRIDGE – Translational Excellence Programme" (OptiMED-GFR).

**International collaboration** through official work groups within the European Renal Association (ERA). We are chairing "Diabesity" with EU funding of d.kr. 11 mill in 2022. International collaboration is also established within the individual research groups. We are members of several European Reference Networks (ERN) for rare diseases.

## National cross disciplinary collaboration

is widespread in the field of cardiology, rheumatology, diabetology, immunology, transplant surgery, infectious diseases, gastroenterology, and epidemiology. We are members of numbers of CAGs.

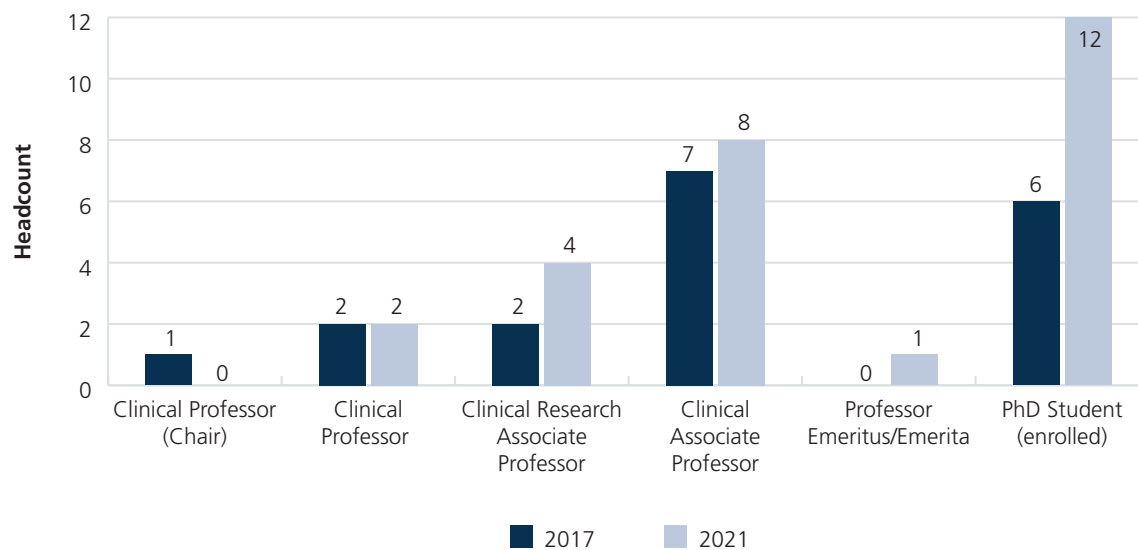
**Collaboration within the speciality** is rapidly growing in investigator initiated national and multicenter RCT and observational studies:

- ADAPT; RCT in patients with minimal change syndrome
  - PRAISE: RCT in patients with interstitial nephritis
  - DANWARD AF: RCT of anticoagulation and stroke vs bleeding risk in patients with atrial fibrillation and CKD5d.
  - POCKET: RCT testing Tolvaptan and pathophysiological mechanisms in patients with ADPKD
  - PRIMETIME: Cross sectional/ observational study of diabetic kidney disease including kidney biopsies
  - CADDY and HOLT-ED: Multicentre cardiac arrhythmia observational studies in dialysis patients
  - Copenhagen -MBD group: Focusing on mineral and bone disorders in CKD.
  - Copenhagen-CKD cohort study: Vascular calcifications and cardiovascular disease etc.
  - Trial Nation: Initiated collaboration.
- 

To bring research at the speciality of Internal Medicine: Nephrology to an even higher level would require more overall commitment of the politicians and the hospitals to provide budget, space, logistics and training of research personnel.

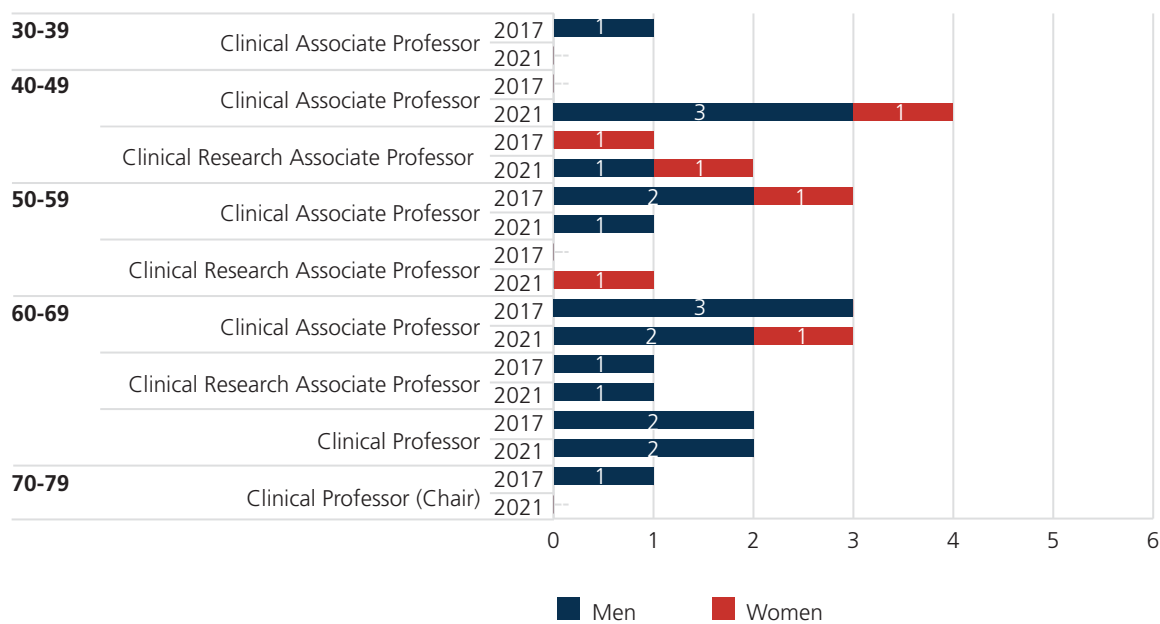
- Furthermore, there is a need for career development of clinical researchers; providing more budget and space for post docs. In addition to this there is need for more opportunities for funding of PhD students
- There must also be a change in the approval of scientific protocols, assisted by sufficient and qualified legal assistance to ensure smooth and fast approval.
- It is required to reduce the clinical workload of selected senior and junior researchers.
- Lastly, there could be provided advanced research courses for senior researchers as the career develops

### Academic Staff in Internal Medicine: Neuphrology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Neuphrology 2017 & 2021



Source: KUPA

### STRENGTHS

- Regional and national network and collaboration
- Clinical research units at all five nephrology centers
- Research focus on many different aspects of acute and chronic kidney disease.
- All centers report to the National Registry of Danish Patients with end-stage renal disease. Excellent for research purposes.

### WEAKNESSES

- Administration of funding is laborious, and the overhead of funding is increasing
- The clinical workload of junior- and senior doctors is high leaving only little time for research

## SWOT

### OPPORTUNITIES

- Growing national (multiregional) network/ collaboration
- An increasing and collaborating group of professors, associate research professors and doctors with scientific merits and PhD degrees.
- Increased funding dedicated to research in kidney disease (2019-2024)
- Collaboration with other institutes and specialties

### THREATS

- Major clinical workload at all places
- Very long waiting for approval of projects in the Ethics committee, Data protection agency and very laborious dialogue regarding other aspects of legislation
- Financing of PhD students and Postdoc's

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Neuphrology – Peer-

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 16        | 24        | 21        | 21        | 45        |
|               | Letter          |           |           |           | 1         | 1         |
|               | Review          | 4         | 3         | 2         | 5         | 9         |
| Danish        | Journal article | 1         | 1         |           | 2         |           |
|               | Letter          | 1         | 1         |           |           |           |
| <b>Total</b>  |                 | <b>22</b> | <b>29</b> | <b>23</b> | <b>29</b> | <b>55</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 38.2%   | 58               | 1,007     | 17.4                      | 1.87                           |
| Only national collaboration          | 22.4%   | 34               | 226       | 6.6                       | 0.78                           |
| Only institutional collaboration     | 39.5%   | 60               | 398       | 6.6                       | 0.64                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                             | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|-------------------------------------|------------------------------|----------------------------|
| Nephrology Dialysis Transplantation | 13                           | 7.186                      |
| BMC Nephrology                      | 7                            | 2.585                      |
| Nephron                             | 6                            | 3.457                      |
| Ugeskrift for Laeger                | 6                            |                            |
| PLoS ONE                            | 6                            | 3.752                      |
| Transplant International            | 5                            | 3.842                      |
| Kidney International                | 4                            | 18.998                     |
| American Journal of Transplantation | 4                            | 9.369                      |
| Open Forum Infectious Diseases      | 4                            | 4.423                      |
| Scandinavian Cardiovascular Journal | 3                            | 1.992                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                               | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|-------------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine: Nephrology | 99                               | 1.28                           | 2                                     | 8.1                                   | 16.2                                   |
| IKM                           | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                          | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen      | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Heaf JG, Sørensen SS, Hansen A. Increased incidence and improved prognosis of glomerulonephritis: a national 30-year study. Clin Kidney J. 2020 Nov 3;14(6):1594-1602. doi: 10.1093/ckj/sfaa169. eCollection 2021 Jun.
  2. Nelveg-Kristensen KE, Szpirt W, Carlson N, McClure M, Jayne D, Dieperink H, Gregersen JW, Krarup E, Ivarsen P, Torp-Pedersen C, Egfjord M. Increasing incidence and improved survival in ANCA-associated vasculitis-a Danish nationwide study. Nephrol Dial Transplant. 2021 Dec 31;37(1):63-71. doi: 10.1093/ndt/gfaa303.PMID: 33313875
  3. Martin Thorbjørn Lundin, Iain Bressendorff, Bent Kristensen, Niklas Rye Jørgensen, Rizwan Butt, Ditte Hansen. Randomized Trial of Acute Changes in Plasma Phosphate After Phosphorus-Standardized Meals in Peritoneal Dialysis. Kidney Int Rep. 2021 Jan 7;6(2):304-312. doi: 10.1016/j.ekir.2020.11.003. eCollection 2021 Feb.
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# INTERNAL MEDICINE: RESPIRATORY MEDICINE

REPRESENTING PROFESSOR CHARLOTTE SUPPLI ULRIK

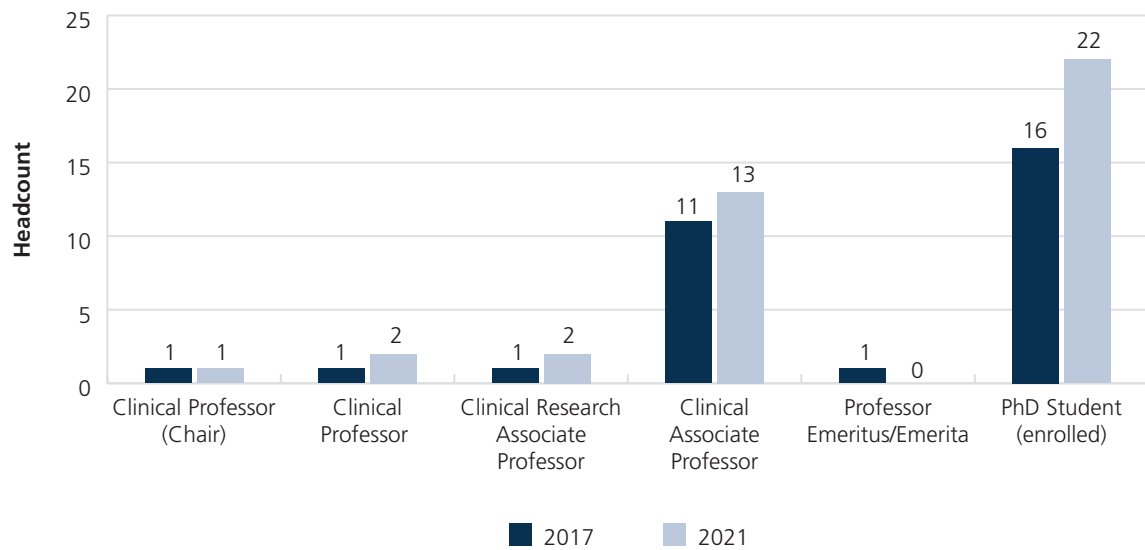
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- Respiratory medicine covers many research areas ranging from translational to clinical, epidemiological, and quality improvement studies.
  - The professors and associate professors at the hospitals are the main drivers of respiratory research.
  - Main focus is the most common respiratory diseases such as asthma, COPD, lung cancer, airway infections and interstitial lung diseases. Regarding the translational aspects of the respiratory field, we collaborate with researchers within respiratory physiology, clinical biochemistry (e.g. Nordic Bioscience), and tobacco control HCPs.
  - In the past five years, we've had two more two more professors and several clinical associate research professors, so there is now a professor at each of the major respiratory departments, (Hvidovre, Gentofte- and Bispebjerg). All of the professors have broad international research cooperation., including participation in research groups within the ERS, ISAR, EMBARC, pulmonary rehabilitation, and also chairing NSAN and NORDSTAR. In COPD research, the large independent network COP:TRIN has national and international collaborators, and also partner in the European Air4COPD study
  - Head of Assembly 6 (Environment and Epidemiology), European Respiratory Society.
  - Partner in the CAG Novel strategies to diagnose and treat bacterial infections (BACINFECT). Furthermore, and also due to the covid-19 pandemic, we are engaged in research projects with other specialties (infectious diseases, cardiology, intensive care, and obstetrics).
  - All respiratory units (DCM employees) have cross-specialty collaboration within and between hospitals.
  - We have close research relationships with colleagues in all other Danish regions in studies within asthma, COPD and ILS, also as part of the Danish Respiratory Research Network and Trial Nation Denmark Respiratory.
  - All pre- and postgraduate teaching is evidence- and research based, and many of our PhD students are recruited while being medical students.
- 

To bring research at the speciality of Internal Medicine: Respiratory Medicine to an even higher level would require a facilitation of collaboration with basic science researchers, including researchers from the Panum Institute. Furthermore, a faster process of permissions from authorities (VEK, LMST, and 'Dataanmeldelse') is of outmost importance. Even stronger national collaboration within respiratory medicine (platforms actually thriving). Lastly, an easier access to funding of PhD-projects is needed.

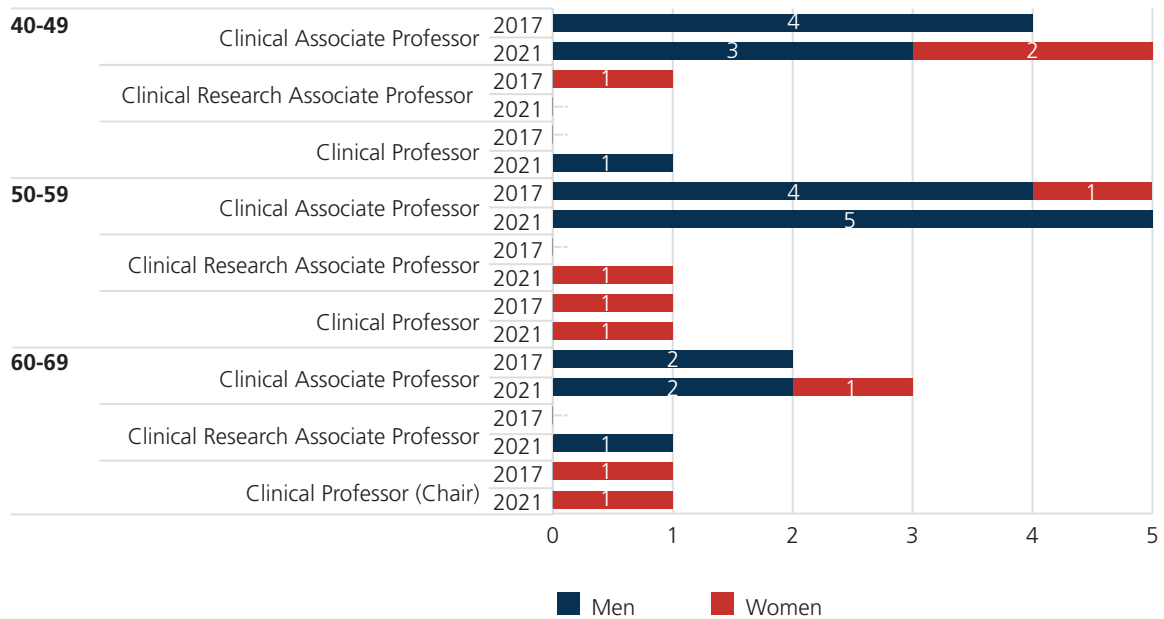


### Academic Staff in Internal Medicine Respiratory Medicine: 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Respiratory Medicine 2017 & 2021



Source: KUPA

### STRENGTHS

- Broad specialty – covers acute, invasive and highly specialized activities
- Large pipeline with new, primarily, biologic therapies
- Although few academic physicians, those who are in the field have both Nordic and worldwide impact
- More young physicians in training to respiratory medicine have a PhD or obtain it one before becoming specialist, than 5-10 years ago

### WEAKNESSES

- Few academic physicians are on national and international boards of funding
- Many patients with both acute and recurrent admissions - with a high number of patients being admitted out of office hours
- High morbidity, many hospitalizations - costly group
- Modest tradition for academic development as a part of the clinical work

## SWOT

### OPPORTUNITIES

- An increasing number of young physicians are recruited for respiratory medicine
- Fast growing, strong research groups achieving international recognition in interstitial lung disease, asthma, and COPD
- Pharmaceutical companies support research in respiratory medicine
- Many available positions for the coming physicians at the hospitals

### THREATS

- Little dedicated funding available for respiratory medicine
- Leaderships focus mainly on clinical work, and not academic work
- Busy specialty with little time for research for younger colleagues
- Younger physicians are considering other specialties than respiratory medicine, including Acute Medicine

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Respiratory Medicine – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021       |
|---------------|-----------------|-----------|-----------|-----------|-----------|------------|
| International | Journal article | 47        | 44        | 46        | 64        | 101        |
|               | Letter          | 1         |           | 1         | 7         | 3          |
|               | Review          | 7         | 13        | 6         | 11        | 18         |
| Danish        | Journal article | 1         | 1         | 4         | 4         | 1          |
|               | Letter          |           | 1         |           |           |            |
|               | Review          |           |           |           |           | 2          |
| <b>Total</b>  |                 | <b>56</b> | <b>59</b> | <b>57</b> | <b>86</b> | <b>125</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 44.2%   | 161              | 3,232     | 20.1                      | 2.71                           |
| Only national collaboration          | 27.8%   | 101              | 844       | 8.4                       | 1.22                           |
| Only institutional collaboration     | 27.2%   | 99               | 873       | 8.8                       | 0.99                           |
| Single authorship (no collaboration) | 0.8%    | 3                | 13        | 4.3                       | 0.46                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                 | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|---------------------------------------------------------|------------------------------|----------------------------|
| International Journal of COPD                           | 20                           | 2.732                      |
| European Clinical Respiratory Journal                   | 19                           |                            |
| Respiratory Medicine                                    | 15                           | 4.582                      |
| Respiratory Research                                    | 13                           | 7.162                      |
| Respiration                                             | 11                           | 3.966                      |
| Ugeskrift for Laeger                                    | 11                           |                            |
| European Respiratory Journal                            | 10                           | 33.809                     |
| Journal of Heart and Lung Transplantation               | 8                            | 13.569                     |
| Journal of Allergy and Clinical Immunology: In Practice | 8                            | 11.022                     |
| BMC Pulmonary Medicine                                  | 7                            | 3.320                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine:       |                                  |                                |                                       |                                       |                                        |
| Respiratory Medicine     | 239                              | 1.22                           | 0.4                                   | 5.9                                   | 13.4                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Håkansson KEJ, Backer V, Ulrik CS. Socioeconomic biases in asthma control and specialist referral of possible severe asthma. Eur Respir J. 2021 Dec 16;58(6):2100741. doi: 10.1183/13993003.00741-2021. Print 2021 Dec.PMID: 33986027
  2. Eklöf J, Ingebrigtsen TS, Sørensen R, Saeed MI, Alispahic IA, Sivapalan P, Boel JB, Bangsbo J, Ostergaard C, Dessau RB, Jensen US, Hansen EF, Lapperre TS, Meteran H, Wilcke T, Seersholm N, Jensen JS. Use of inhaled corticosteroids and risk of acquiring Pseudomonas aeruginosa in patients with chronic obstructive pulmonary disease. Thorax. 2021 Aug 26;thoraxjnl-2021-217160. doi: 10.1136/thoraxjnl-2021-217160. Online ahead of print.PMID: 34446524
  3. Porsbjerg C, Nieto-Fontarigo JJ, Cerps S, Ramu S, Menzel M, Hvidtfeldt M, Silberbrandt A, Froessing L, Klein D, Sverrild A, Uller L. Phenotype and severity of asthma determines bronchial epithelial immune responses to a viral mimic. Eur Respir J. 2021 Dec 16:2102333. doi: 10.1183/13993003.02333-2021. Online ahead of print.PMID: 34916261
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# INTERNAL MEDICINE: RHEUMATOLOGY

REPRESENTING PROFESSOR MIKKEL ØSTERGAARD

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## **RESEARCH AREAS AND TRANSLATIONAL ASPECTS:**

Rheumatology is a broad specialty with research groups within inflammatory arthritis (rheumatoid arthritis, spondyloarthritis, psoriatic arthritis, gout), systemic lupus erythematosus and vasculitis, myositis, sports medicine, physical training and clinical rehabilitation, osteoarthritis, degenerative spine diseases, nursing and self-management of treatment. Activities include investigator-initiated clinical studies, epidemiological research including register-based studies, imaging studies (MRI, ultrasound), translational studies including laboratory biomarkers (investigated in tissues, serum and plasma), imaging biomarkers (e.g. ultrasound, MRI, optical imaging) and qualitative methods.

## **INTERNATIONAL COLLABORATION, NATIONAL CROSS-DISCIPLINARY COLLABORATORS AND COLLABORATION WITHIN THE SPECIALITY:**

The specialty has a broad and well-functioning national and international collaboration network, including being part of Clinical Academic Groups (CAG) on "Physical Activity and Sports in Clinical Medicine" (imPAct), "Research OsteoArthritis Denmark" (ROAD) and "Low-grade inflammation" and as coordinators in European research collaboration network for European SpA registries. The faculty post-graduate research program: "Basic and Clinical Research in Musculoskeletal Sciences" hold their annual 2-day seminar together with the CAGs imPAct and ROAD. The nationwide quality registry, DANBIO, is located with chairman and secretariat at Rigshospitalet, Glostrup. A multitude of clinical and registry-based studies of national and international character have been initiated benefitting from the DANBIO infrastructure and the affiliated biobank (the Danish Rheumatologic Biobank).

## **RESEARCH-BASED TEACHING:**

Knowledge acquired through research is as quickly as possible implemented in the clinic and in the teaching at pre- and particularly post-graduate training. This has been recognized and awarded as number 1 ranking by Shanghai Ranking's Global Ranking of Sport Science Schools and Departments and recognitions as European Alliance of Associations for Rheumatology (EULAR) Centre of Excellence (COPECARE and Parker institute), and EULAR Imaging training centre and EULAR Imaging research Centre (Both COPECARE).

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To bring research at the speciality of Rheumatology to an even higher level would require Improved options for physicians to perform part-time research at various levels in the clinical education system (incl "hoveduddannelsesstillinger"). This includes both better structural conditions (e.g., 20-50% part-time research during specialist education) as well as financial support for young research active MDs under specialist education.

Furthermore, we need smoother handling of approvals for data handling (GDPR) and research ethics is vital for the clinical research activity and for registry-based studies.

There is a need for increased recruitment of nurses, physiotherapists, occupational therapists into rheumatological research

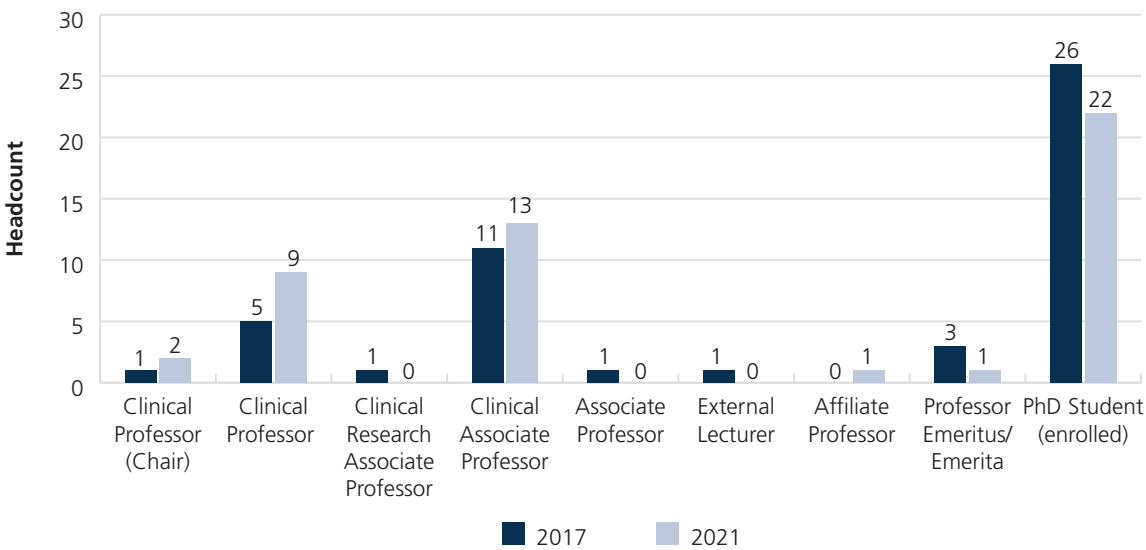
Additionally, we need to establish an official academic track (e.g., title as associate professor) for non-MDs in hospital employment connected to rheumatology research groups.

Lastly, we need to Improve recruitment options of young colleagues for rheumatology research including.

- a) More focus on introduction to research within rheumatology early during the medical study,
- b) mandated introduction to our clinical

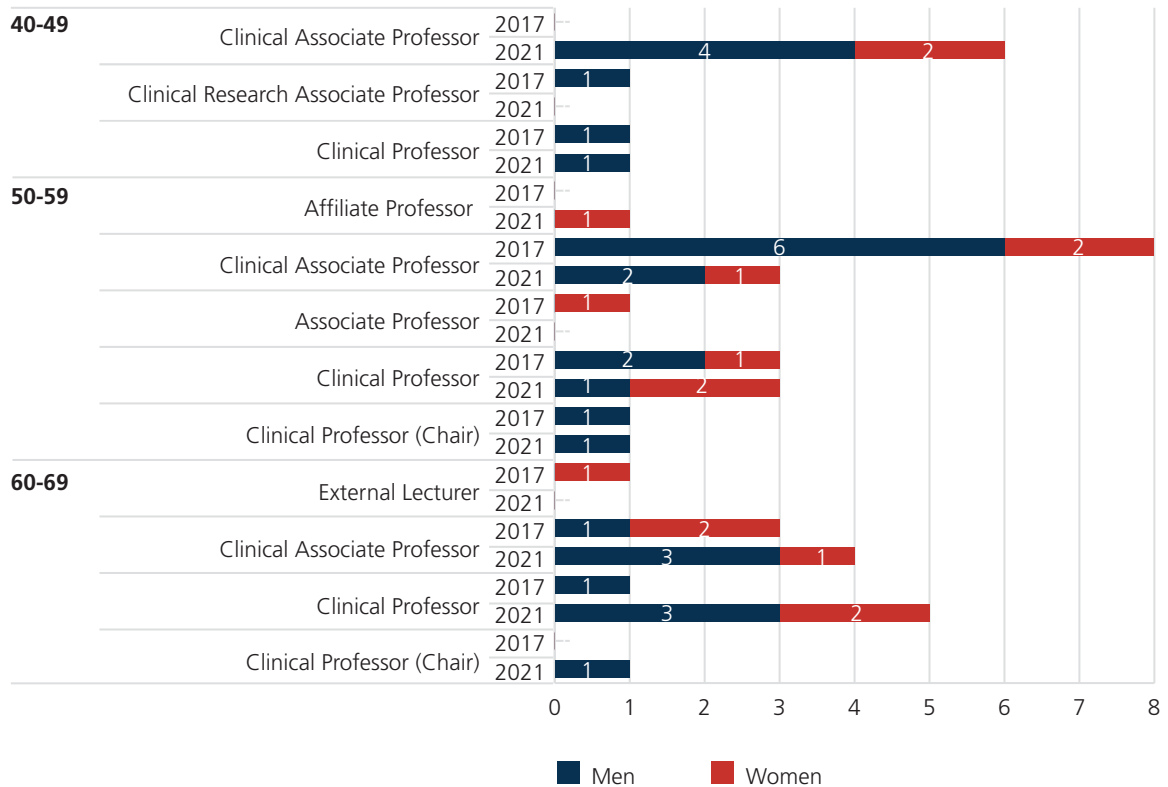
specialty for medical students (currently, medical students only encounter our clinics if the student specifically chooses this as part of research training), c) more focus on the rheumatology specialty during the formalized training program of medical students.

Academic Staff in Internal Medicine: Rheumatology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Internal Medicine: Rheumatology 2017 & 2021



Source: KUPA

### STRENGTHS

- Large multidisciplinary research group, high productivity, good organization (e.g. COPECARE, Institute of Sports Medicine and Parker Institute)
- Quick implementation of research results in clinical practice
- Different complementing groups (Copenhagen Center for Arthritis Research (COPECARE), Lupus and Vasculitis unit, Institute for Inflammation Research (lab), Professors with diverse health professional backgrounds (e.g. including also nursing, physiotherapy in leadership roles for cross-disciplinary research)
- Researchers located in vicinity of clinicians (and most researchers also do clinical work)
- Support from head of department

### WEAKNESSES

- Research in degenerative spine diseases in general, and research in spine surgery in particular (no professor)
- Compared to other areas (e.g., endocrine, cardiovascular, neuro or cancer) the musculoskeletal system has no major private foundation dedicated to grants in this area

## SWOT

### OPPORTUNITIES

- One common organization/department on several locations in the Capital Region
- Increased collaboration
- Better infrastructure (Create research facilities/ mutual supporting staff)

### THREATS

- Long handling times/Slow approval of projects from Ethical Committee and lawyers dealing with GDPR.
- One department, split on many addresses.
- GDPR rules and not the least its varying interpretation, across Danish Regions and across countries
- Epic (Sundhedsplatformen)
- Reduced research funding in Denmark

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Internal Medicine: Rheumatology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 120        | 107        | 116        | 114        | 146        |
|               | Letter          | 2          | 2          | 5          | 4          | 4          |
|               | Review          | 16         | 9          | 17         | 10         | 16         |
| Danish        | Journal article | 2          |            | 1          | 2          | 1          |
|               | Letter          | 1          |            | 1          |            |            |
| <b>Total</b>  |                 | <b>141</b> | <b>118</b> | <b>140</b> | <b>130</b> | <b>167</b> |

Source: CURIS



## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 56.6%   | 370              | 12,095    | 32.7                      | 2.77                           |
| Only national collaboration          | 24.9%   | 163              | 1,949     | 12                        | 1.2                            |
| Only institutional collaboration     | 17.9%   | 117              | 1,199     | 10.2                      | 1.12                           |
| Single authorship (no collaboration) | 0.6%    | 4                | 16        | 4                         | 0.35                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                              | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------|------------------------------|----------------------------|
| Annals of the Rheumatic Diseases     | 56                           | 27.973                     |
| Journal of Rheumatology              | 42                           | 5.346                      |
| Rheumatology                         | 39                           | 7.046                      |
| Scandinavian Journal of Rheumatology | 25                           | 3.057                      |
| RMD Open                             | 24                           | 5.806                      |
| Arthritis Research and Therapy       | 18                           | 5.607                      |
| BMJ Open                             | 18                           | 3.017                      |
| Seminars in Arthritis and Rheumatism | 17                           | 5.431                      |
| Arthritis Care and Research          | 16                           | 5.178                      |
| PLoS ONE                             | 13                           | 3.752                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                                 | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|---------------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Internal Medicine: Rheumatology | 489                              | 2.33                           | 3.1                                   | 9                                     | 18.6                                   |
| IKM                             | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                            | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen        | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Nabi H, Georgiadis S, Loft AG, Hendricks O, Jensen DV, Andersen M, Chrysidis S, Colic A, Danebod K, Hussein MR, Kalisz MH, Kristensen S, Lomborg N, Manilo N, Munk HL, Pedersen JK, Raun JL, Mehnert F, Krogh NS, Hetland ML, Grintborg B. Comparative effectiveness of two adalimumab biosimilars in 1318 real-world patients with inflammatory rheumatic disease mandated to switch from originator adalimumab: nationwide observational study emulating a randomized clinical trial. *Annals of the Rheumatic Diseases* 2021, 80, 11, 1400-1409.
  2. Kristensen LE, Keiserman M, Papp K, McCasland L, White D, Lu W, Wang Z, Soliman AM, Eldred A, Barcomb L, Behrens F. Efficacy and safety of risankizumab for active psoriatic arthritis: 24-week results from the randomised, double-blind, phase 3 KEEPSAKE 1 trial. *Annals of the Rheumatic Diseases* 2021. Epub 2021 Dec 15.0
  3. Bayer ML, Hoegberget-Kalitsch M, Svensson RB, Hjoertshoej MH, Olesen JL, Nybing JD, Boesen M, Magnusson SP, Kjaer M. Chronic sequelae after muscle strain injuries: Influence of heavy resistance training on functional and structural characteristics in a randomized controlled trial. *American Journal of Sports Medicine* 49: 2783-94, 2021.
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# NEUROLOGY

## REPRESENTING PROFESSOR GITTE MOOS KNUDSEN

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### RESEARCH AREAS AND TRANSLATIONAL ASPECTS

Neurology covers all research areas within neurology and neurophysiology. Neurology currently employs 19 professors, most of them are specialists in neurology. In 2020, the total external funding was about 100 mio DKK.

*Neurology* research is conducted at the following hospitals:

Rigshospitalet constitutes the largest department of neurology, and it has the largest research output. Rigshospitalet represents the following research areas, where basic and clinical research goes hand in hand: Dementia and other neurodegenerative disorders, Epilepsy, Headache/migraine, Multiple sclerosis/neuroinflammatory disorders, Neurobiology, and neuroimaging, Neurointensive care, Neuromuscular disorders, Neurophysiology, Sleep disorders, Stroke/cerebrovascular disorders and Traumatic brain and spinal cord injuries.

Bispebjerg focuses particularly on movement disorders, stroke, and post-mortem brain tissue examinations; Dianalund on epilepsy; Herlev and Hillerød hospital on cerebrovascular disorders. Hvidovre focuses on neuroimaging and Roskilde has a special focus on dementia and electrophysiological (EEG) recordings.

### INTERNATIONAL COLLABORATION

A formal analysis of the fraction of *Neurology* publications with foreign institutions as co-author affiliations has not been conducted, but it is estimated to be up to half of all publications, and the international collaboration is only growing. *Neurology* has significant involvement in leadership of large, international clinical trials.

### NATIONAL CROSS-DISCIPLINARY COLLABORATORS

*Neurology* intimately collaborates with *Psychiatry*, but also with several other medical specialities. *Neurology* also collaborates with basic scientists at University Copenhagen, e.g., neuroscientists, pharmacists, data science, statisticians, geneticists, psychologists, and bioinformatics. Neurology also has multiple national collaborators with, e.g., The Danish Technical University, other Danish universities, and university hospitals.

### COLLABORATION WITHIN NEUROLOGY

Collaboration is frequent across and between subdisciplines of *Neurology* but no formal analyses of the trends in affiliations between subdisciplines or campuses has been made.

### RESEARCH-BASED TEACHING

Pre-graduate teaching in *Neurology* is highly research-based. At least a PhD-degree and a continued research output must be documented by all professors and associate professors. The theoretical course systematically includes relevant basic science, and the clinical training focuses on evidence-based interventions. The aims and evaluations of the course have been based on the principles of constructive alignment and are using the SOLO taxonomy. A significant number of medical students also receive supervision for their master theses in *Neurology*, which often include smaller research protocols.

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- To bring research at the speciality of Neurology to an even higher level would require less time spend on waiting for approval of research projects. The bureaucracy and time spend on producing and waiting for approval for starting research projects has since the last

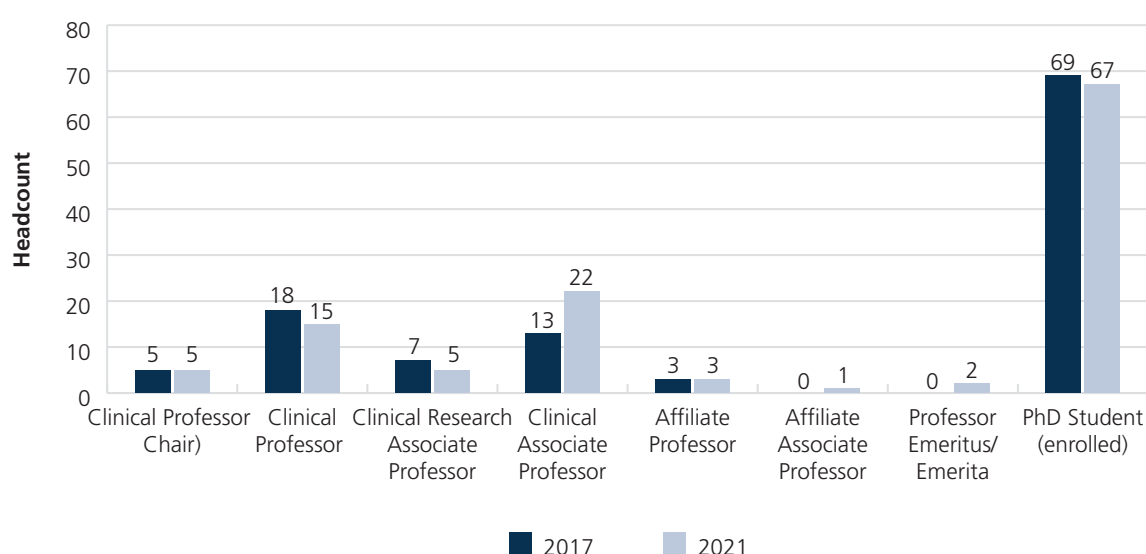
research evaluation only been growing. The pandemic is only for a small part to be blamed for the delay. This has set in on multiple levels; the ethics committees, the legal contractual aspects, the financial reporting through the hospital system, GDPR demands, etc.

- For example, the ethics committee now often questions the scientific aims and design and legal administrators are the main contact point for the researcher and this is prohibitive for a reasonable dialogue about scientific content. They also ask for a ridiculous amount of detail (ex.: if the protocol says “we will measure steroid hormones”, they ask you to specify exactly which biochemical structures you will measure). Such demands are prohibitive for exploratory analyses and have no real ethical implications. You can submit amendments, but processing of those amendments currently takes 5 months.
- The different funding opportunities for applying for PhD-stipends has gone drastically down and at the same time, the University tuition fee for enrolment of PhD-students is high. For the individual research group, it often makes better sense to hire a postdoc

for whom there is no obligatory course work and no tuition fee. Hiring postdocs instead of PhD-students is often an advantage for the progress of a research project, but not overall sustainable in the long run. On that note, a more flexible approach from the PhD schools when it comes to spending of the tuition fee would be welcome.

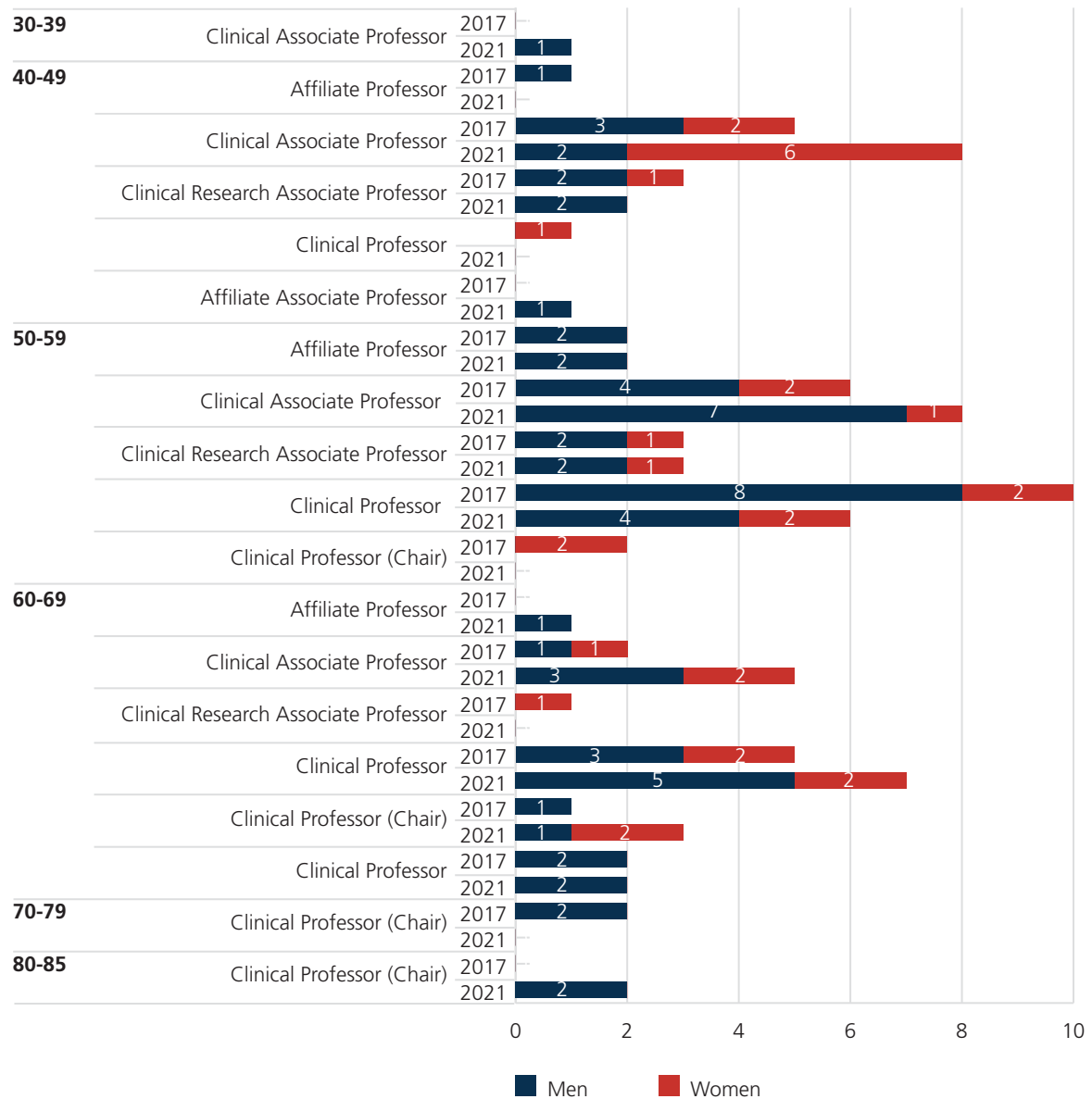
- There is a lack of a clear career track for non-medical scientists. This means that non-medical scientists often are at the mercy of strong group leaders and dependent on them for funding and for taking supervisor responsibilities for PhD-students that effectively is supervised by the non-medical scientist. The same problem – although less prominent – also exists for medical early career scientists.
- The demand for publishing open access has increasingly become a (reasonable) demand from funders, but the cost of having a paper open access published is in the order of 20.000 DKK can to some research groups be prohibitive and moreover, the expense typically emerges after the funding period has come to an end.

### Academic Staff in Neurology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Neurology 2017 & 2021



Source: KUPA

#### STRENGTHS

- Sustained high research output
- Successful external funding, e.g., the Lundbeck Foundation
- Strong national and international collaboration

#### WEAKNESSES

- Distributed locations and insufficient synergy
- No strategy for targeted recruitment of medium-career investigators or diversity
- Psychiatry not part of the regular hospitals

#### SWOT

#### OPPORTUNITIES

- Neuroscience Academy Denmark is launched by the Lundbeck foundation as a national initiative
- Exploitation of access to large well-described patient populations

#### THREATS

- Bureaucratic and time-consuming paperwork with the RegionH ethics committee which has excessive delay in response time (6 months)
- Similar for the data protection agency and lawyers that ratify collaboration contracts
- Increased in time-consuming research administration and hospital bureaucracy
- Resistance to genome wide association analyses

#### SCIENTIFIC PRODUCTION IN THE SPECIALITY

##### Number of articles in Neurology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 262        | 278        | 321        | 350        | 365        |
|               | Letter          | 5          | 1          | 1          | 6          | 6          |
|               | Review          | 43         | 29         | 39         | 45         | 42         |
| Danish        | Journal article | 6          | 6          | 4          | 5          | 3          |
|               | Letter          |            | 2          | 5          | 4          |            |
|               | Review          |            |            |            | 1          | 8          |
| <b>Total</b>  |                 | <b>316</b> | <b>316</b> | <b>370</b> | <b>411</b> | <b>424</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 52.4%   | 936              | 37,689    | 40.3                      | 3.74                           |
| Only national collaboration          | 22.2%   | 396              | 4,223     | 10.7                      | 1.11                           |
| Only institutional collaboration     | 24.8%   | 442              | 5,429     | 12.3                      | 1.17                           |
| Single authorship (no collaboration) | 0.6%    | 11               | 292       | 26.5                      | 1.84                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                  | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|------------------------------------------|------------------------------|----------------------------|
| Cephalalgia                              | 114                          | 6.075                      |
| Journal of Headache and Pain             | 55                           | 8.592                      |
| Neurology                                | 42                           | 11.800                     |
| Ugeskrift for Laeger                     | 40                           |                            |
| European Journal of Neurology            | 37                           | 6.288                      |
| Multiple Sclerosis Journal               | 32                           | 5.855                      |
| Multiple Sclerosis and Related Disorders | 31                           | 4.808                      |
| Journal of Alzheimer's Disease           | 29                           | 4.160                      |
| NeuroImage                               | 26                           | 7.400                      |
| Frontiers in Neurology                   | 26                           | 4.086                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Neurology                | 1356                             | 2.74                           | 4.4                                   | 13.3                                  | 20.4                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Koch-Henriksen N, Magyari M. Apparent changes in the epidemiology and severity of multiple sclerosis. *Nat Rev Neurol*. 2021 Nov;17(11):676-688.
  2. Al-Karagholi MA, Ghanizada H, Nielsen CAW, Hougaard A, Ashina M. Opening of ATP sensitive potassium channels causes migraine attacks with aura. *Brain*. 2021 Sep 4;144(8):2322-2332.
  3. Bonardi CM, Heyne HO, Fiannacca M, Fitzgerald MP, Gardella E, Gunning B, Olofsson K, Lesca G, Verbeek N, Stamberger H, Striano P, Zara F, Mancardi MM, Nava C, Syrbe S, Buono S, Baulac S, Coppola A, Weckhuysen S, Schoonjans AS, Ceulemans B, Sarret C, Baumgartner T, Muhle H, Portes VD, Toulouse J, Nougues MC, Rossi M, Demarquay G, Ville D, Hirsch E, Maurey H, Willems M, de Bellescize J, Altuzarra CD, Villeneuve N, Bartolomei F, Picard F, Hornemann F, Koolen DA, Kroes HY, Reale C, Fenger CD, Tan WH, Dibbens L, Bearden DR, Møller RS, Rubboli G. KCNT1-related epilepsies and epileptic encephalopathies: phenotypic and mutational spectrum. *Brain*. 2021 Dec 31;144(12):3635-3650. doi: 10.1093/brain/awab219.
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# NEUROSURGERY

## REPRESENTING PROFESSOR TIIT MATHIESEN

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The department that covers the speciality of neurosurgery has an annual caseload over 3300 cranial operations and is the largest neurosurgical department devoted to cranial neurosurgery in northern Europe; the high numbers create a unique opportunity for research.

Research is organized via the virtual structure: "Personalized Neurosurgery Research Center (PERNS). The research focus is on translational aspects of the major neurosurgical disease categories: subarachnoid hemorrhage and stroke; Intraparenchymal brain tumors; meningiomas; pediatric brain tumors; Cerebrospinal fluid abnormalities and hydrocephalus; blood brain barrier function; traumatic brain injury and functional neurosurgery-epilepsy. CSF physiology, epidemiology, genetics, imaging, cerebellar mutism and neuroinflammation are important topics.

At least five groups (Meningioma, Glioma, CSF-study group; vascular; chronic subdural) have translational structures where leading preclinical and clinical scientists at BRIC, Bartholin center, Center for translational neuromedicine, Dept. of Epidemiology Research, Statens Serum Institut, Dept. of Neonatal Diseases. NRU, Dept for nuclear medicine, DTU, KB, neuroradiology and neuropathology collaborate. Some of these multidisciplinary collaborations are supported by the Tandem grand or Lundbeck foundation professors' grant.

Moreover, the collaborations are national and virtual structures for meningioma, subdural hematoma, subarachnoid hemorrhage, and hydrocephalus research include all neurosurgical departments in Denmark. The national collaborations have international ramifications, primarily to the Nordic countries, Great Britain, USA, Canada, Germany, and other European countries.

Research is focused on providing evidence for treatment guidelines via mechanistic analyses and validation in population based cohorts – which also forms the foundation of teaching on pre- and postgraduate levels, including international research based courses in oncology, skull-base surgery, peripheral nerve surgery etc.

The latest research report is available on: [https://www.rigshospitalet.dk/english/departments/neuroscience-centre/departments-of-neurosurgery/research/Documents/annualresearchreport\\_web\\_2021.pdf](https://www.rigshospitalet.dk/english/departments/neuroscience-centre/departments-of-neurosurgery/research/Documents/annualresearchreport_web_2021.pdf)

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To bring research at the speciality of Neurosurgery to an even higher level must it become feasible to combine research training on the PhD and Post Doc levels with clinical training.

Regular consultant positions should be combined with time for research; research activity should be recorded and considered as part of regular work.

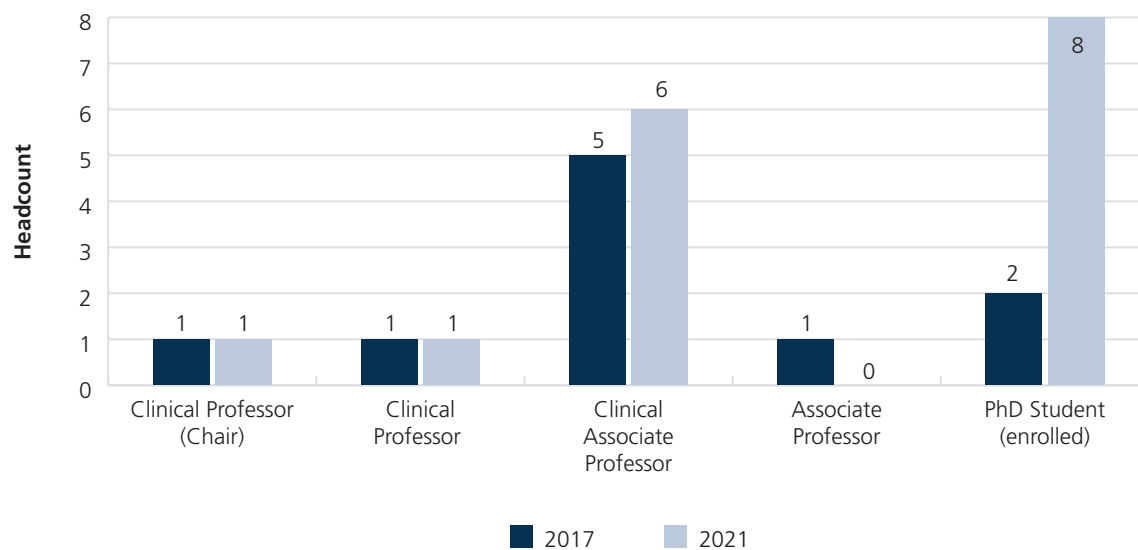
Every clinical research position should be combined with dedicated research funding; clinical professors should have a research budget combined with the position.

International collaborations are presently very difficult to realize due to legal obstacles; we need a better workflow for anonymous data and biological material.

Journal impact-factors must not be used uncritically as proxy parameters of scientific quality; scientific quality must be evaluated by peer evaluations by experts in the field.

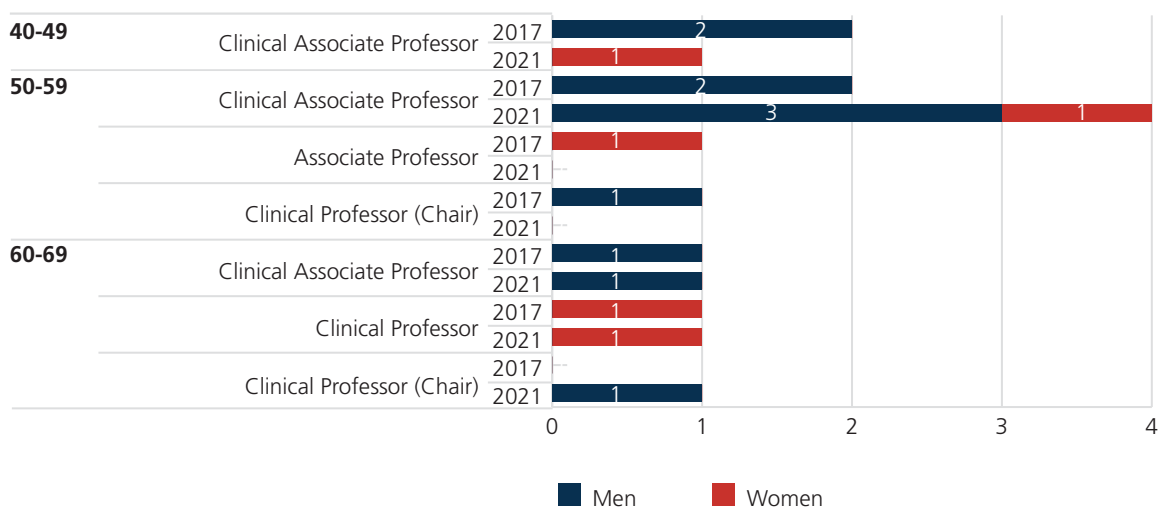
Need to remove the extensive limitations for research that involves international or national collaborations outside of Region Hovedstaden and arrive at new legislation or adaption of legislation that will respect patient integrity without hindering research.

### Academic Staff in Neurosurgery 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Neurosurgery 2017 & 2021



Source: KUPA

### STRENGTHS

- Largest department for cranial neurosurgery in Northern Europe
- Research and development integrated part of clinical work
- Excellent access to registries and bio-bank material
- Excellent collaborative research environment – clinical and preclinical

### WEAKNESSES

- Too little research focus on mechanistic and hypothesis driven research
- Too much focus on production of healthcare and guidelines
- Too few academic research positions
- Limited budget for R&D and much potential research time spent on grant applications

## SWOT

### OPPORTUNITIES

- Integration of clinical and academic R&D
- New departmental research infrastructure: "Copenhagen Personalized Neurosurgery Research Center" (PERNS)
- Research collaboration with Pharmaceutical industry and translational research collaboration with start-up biomed companies
- Cutting-edge collaborating clinical and pre-clinical scientists

### THREATS

- Limited infrastructure for R&D; clinician-scientists do not have individual offices for creative work
- Lack of continuity in research – too few brief PhD projects and lack of critical mass
- Research evaluation through proxy-parameters and biometrics perverts science and provide incitements for short-sighted projects and publications tailored for IF-fishing
- Research funding and work with legislation obstacles to collaborative research require extensive resources and are unpredictable

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Neurosurgery – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 11        | 13        | 18        | 26        | 34        |
|               | Review          |           |           | 1         | 8         | 4         |
| Danish        | Journal article | 2         | 2         | 2         | 3         |           |
|               | Review          |           |           |           |           | 1         |
| <b>Total</b>  |                 | <b>13</b> | <b>15</b> | <b>21</b> | <b>37</b> | <b>39</b> |

Source: CURIS

## COLLABORATION 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 49.2%   | 59               | 502       | 8.5                       | 1.27                           |
| Only national collaboration          | 20.0%   | 24               | 183       | 7.6                       | 1.17                           |
| Only institutional collaboration     | 30.8%   | 37               | 231       | 6.2                       | 0.68                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                        | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------|------------------------------|----------------------------|
| Acta Neurochirurgica           | 27                           | 2.816                      |
| Ugeskrift for Laeger           | 8                            |                            |
| Cancers                        | 5                            | 6.575                      |
| Child's Nervous System         | 4                            | 1.532                      |
| World Neurosurgery             | 4                            | 2.210                      |
| BMJ Open                       | 4                            | 3.017                      |
| Neurosurgery                   | 3                            | 5.315                      |
| Neurosurgical Review           | 3                            | 2.800                      |
| Clinical Epidemiology          | 3                            | 5.814                      |
| Fluids and Barriers of the CNS | 3                            | 6.961                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Neurosurgery             | 83                               | 1.09                           | 0                                     | 6                                     | 10.8                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Grønbæk JK, Wibroe M, Toescu S, Frič R, Thomsen BL, Møller LN, Grillner P, Gustavsson B, Mallucci C, Aquilina K, Fellows GA, Molinari E, Hjort MA, Westerholm-Ormio M, Kiudeliene R, Mudra K, Hauser P, van Baarsen K, Hoving E, Zipfel J, Nysom K, Schmiegelow K, Sehested A, Juhler M, Mathiasen R; CMS study group. Postoperative speech impairment and surgical approach to posterior fossa tumours in children: a prospective European multicentre cohort study. *Lancet Child Adolesc Health*. 2021 Nov;5(11):814-824. doi: 10.1016/S2352-4642(21)00274-1. Epub 2021 Oct 6. PMID: 34624241.
2. Solumsmoen S, Poulsen G, Kjellberg J, Melbye M, Munch TN. The impact of specialised treatment of low back pain on health care costs and productivity in a nationwide cohort. *EClinicalMedicine*. 2021 Dec 24;43:101247. doi: 10.1016/j.eclinm.2021.101247. eCollection 2022 Jan.
3. Giraldi L, Vinsløv Hansen J, Wohlfahrt J, Fugleholm K, Melbye M, Munch TN. Postoperative de novo epilepsy after craniotomy: a nationwide register-based cohort study. *J Neurol Neurosurg Psychiatry*. 2022 Apr;93(4):436-444. doi: 10.1136/jnnp-2021-326968. Epub 2021 Nov 29. PMID: 34845003; PMCID: PMC8921591.

# OBSTETRICS AND GYNAECOLOGY

REPRESENTING PROFESSOR HENRIETTE SVARRE NIELSEN

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## DESCRIPTION OF RESEARCH FOCUS WITHIN THE SUBSPECIALITIES

### REPRODUCTIVE MEDICINE

Is characterized by strong and scientifically flourishing collaborative initiatives including *CoNARTaS* a Nordic collaboration following a cohort of 300,000 children born after assisted conception assessing morbidity and mortality as compared to spontaneously conceived children. *HiCART* an interdisciplinary cohort study with physical examinations incl. heart MR/CT scans on 600 children and adolescents born after ART. *ReproUnion* an EU/Interreg project involving 12 reproductive units with a total budget of 20 mill euro. *ReproUnion* has the last three years focused on five reproductive challenges herein collection of data and bio-samples on 5000 infertile couples (*RUBIC*). DaHoRs has more than two decades experience of reproductive and gynecological epidemiological research. Recent focus is on health implications of transgender persons, pregnancy loss and hormonal therapy use. Fertility Assessment and Counselling (FAC) longitudinal studies on the implications of the first FAC clinic in Denmark. *CVP*-project and *PREGCO*: Covid-infections and vaccines in pregnant women in Denmark and maternal and perinatal outcomes. We are in front with ovarian cryopreservation in oncological patients and studying co-morbidity and long-term prognosis in polycystic ovary syndrome women. Several large multicenter investigator initiated RCTs are ongoing (INVICSI, FET: Optimising, FET immediate, ReproFlor *et al.*)

### FETAL MEDICINE

Prenatal screening and diagnosis has been a focus of research in the specialty for decades and has provided results to establish the most modern, national, cost-effective, prenatal

screening program securing all Danish pregnant women a free two-step screening offer at 11-14 weeks and at 19-20 weeks of pregnancy. The detection rate of fetal chromosome abnormalities and fetal cardiac abnormalities in Denmark are the highest worldwide on a national level. All Danish fetal medicine units have a unique research cooperation, not least by their common contribution to collect clinical, genetical and follow-up data from all Danish pregnancies in the Danish Fetal Medicine Database.

### OBSTETRICS

Our research focuses on understanding the major causes of maternal and perinatal mortality and morbidity improving health and wellbeing of young families. We focus on improving the translation of research from clinical trials and population studies to clinical practice. Adding advanced statistical analyses including artificial intelligence to data from population-based health registries we aim to deliver targeted care for pregnant women. Examples of our research strengths and achievements include: Understanding the mechanism of diabetes, overweight and preeclampsia and the effect of targeted optimized treatment on short and long-term outcomes. Understanding the impact of physical activity during pregnancy. Evaluation of effect of induction practice in post-term pregnancies on the risk of stillbirths. Evaluation of obstetric skill training programs. Developing a clinical decision-making tool to predict individual success and complications during an attempted vaginal birth after cesarean section. Understand inter-generational impacts of health and disease in pregnant women. Evaluation of the neuroprotective effect of Magnesium Sulfate in preterm delivery. Evaluation of the short and long-term impact of the decision of mode of breech delivery in first pregnancy. Studies of the

impact of the Covid-19 pandemic on maternal and perinatal health outcomes.

### UROGYNAECOLOGY

In a multidisciplinary co-operation, we are involved in frontline research in advanced urodynamic investigations (reflectometry), urogynaecological database research, phase 1 testing of potential new uropharmaca and the development of a new device for non-surgical treatment of urinary incontinence.

### BENIGN GYNECOLOGY

We represent frontline interdisciplinary collaborative research in gynecological pathophysiology through prospective well-phenotyped cohorts including *COPL* with 1500 whole genome sequenced pregnancy loss trios in collaboration with deCODE genetics and funded by Bioinnovation Institute. *Mi-Mens*, *Mi-Endo* and *MiRPL* exploring the gut, oral, vaginal and endometrial microbiome during the menstrual cycle, in endometriosis and recurrent pregnancy loss. *DYSCOVER* is the first RCT in the world testing vaginal microbiome transplantation for dysbiosis.

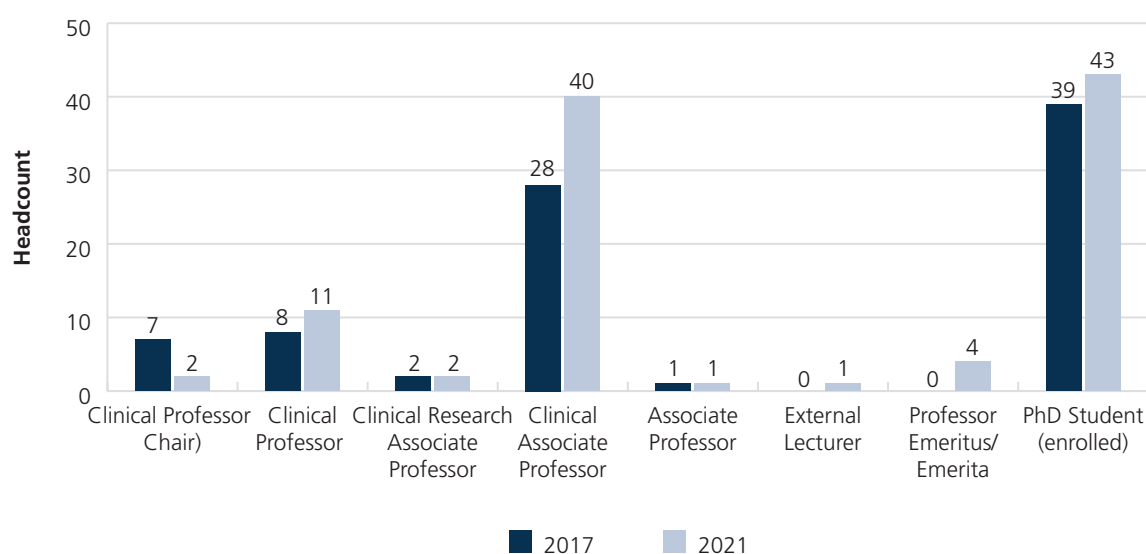
### GYNECOLOGICAL CANCER

We are involved in frontline translational research including molecular biological epidemiology and mechanistic studies. Through the establishment of large population-based cohorts with collection of biological samples and information from questionnaires and linkages with nationwide registries, we have obtained results, which have contributed to improved cervical cancer screening strategies, diagnosing of and treatments for all gynecological cancers as well as the development of a vaccine against HPV related gynecological cancer.

### EDUCATION RESEARCH

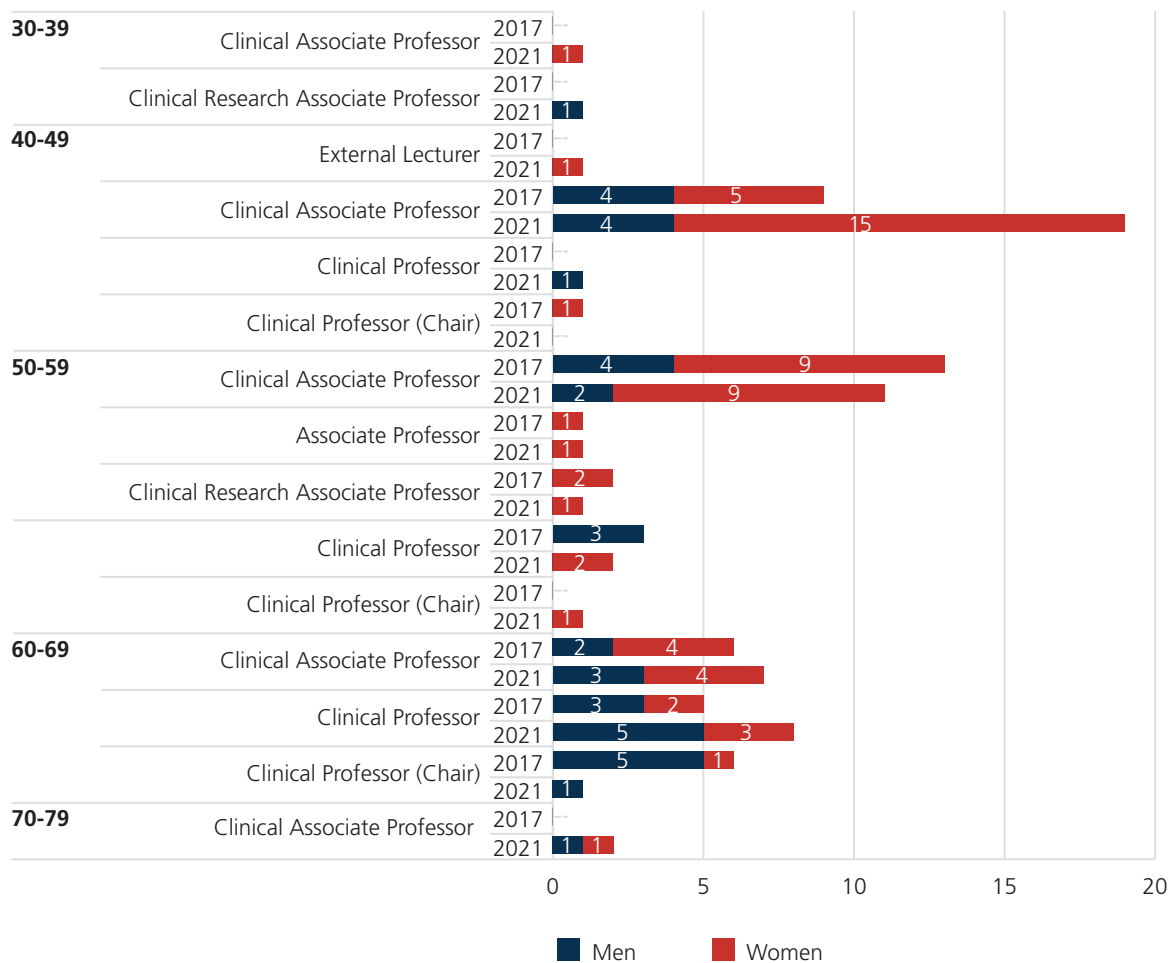
This is an emerging area of research in OB/GYN and we represent frontline producers of new evidence on how to perform valid assessments and effective training of trainees. Existing research include the use of simulation-based training of technical and diagnostic skills, development and validation of new methods for assessment of trainees' competencies, and artificial intelligence (AI)-based methods for gaining insight into quality of care during emergency clinical situations, operating rooms activities, and obstetric imaging.

## Academic Staff in Obstetrics and Gynaecology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Obstetrics and Gynaecology 2017 & 2021



Source: KUPA



### STRENGTHS

- Great collegial, professional, and social ties
- Active use of unique national registries combined with biobanks
- National guidelines and collaborations
- Many highly engaged, dedicated, skilled, competent clinical researchers
- Great and open dialog
- Bridging clinic and university

### WEAKNESSES

- Too many small projects and limited collaborations/coordination of larger projects across hospitals
- (lack of) communication between university and hospital
- Data access is difficult, time consuming and expensive
- Specialty with high clinical workload and limited part-time research-positions
- Enormous amounts of data with an unreleased potential due to lack of time and money
- RCT studies are often impossible/unethical in obstetrics
- Single persons or small research groups struggle with economics and recruitment & retention of young researchers
- Low visibility

## SWOT

### OPPORTUNITIES

- Never been more gender equality in health
- Large interest in closing gaps caused by under-funding related to understand mechanisms in reproductive and women's health
- Technical advancements e.g., organoids to overcome challenges in studying reproduction in vivo
- Data science advancements enabling relevant trio investigation (father, mother, fetus)

### THREATS

- Increasing production demands in the clinic limit research time
- Increasing strategic funding limit independent research
- A popular specialty where young researchers leave research when starting clinical education and a large proportion never finalize initiated research
- A large proportion of clinicians leave the public institutions due to workload and working conditions to work in the private sector with better working conditions, higher salary and more spare time
- Large bureaucracy especially legal aspect and increasing complicated to collaborate with other regions
- Difficult to get funding for clinical research
- Increasing focus on work/life balance will affect research
- Too much internal competition risk meaning that we become outcompeted by larger research areas

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Obstetrics and Gynaecology – Peer-reviewed

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 177        | 162        | 190        | 187        | 187        |
|               | Letter          | 5          | 4          | 1          | 2          | 5          |
|               | Review          | 19         | 18         | 11         | 14         | 20         |
| Danish        | Journal article | 6          | 3          | 8          | 7          | 4          |
|               | Letter          | 4          | 4          | 2          |            |            |
|               | Review          |            | 1          |            |            | 6          |
| <b>Total</b>  |                 | <b>211</b> | <b>192</b> | <b>212</b> | <b>210</b> | <b>222</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 41.1%   | 419              | 8,824     | 21.1                      | 2.46                           |
| Only national collaboration          | 33.8%   | 344              | 3,650     | 10.6                      | 1.26                           |
| Only institutional collaboration     | 24.4%   | 249              | 2,152     | 8.6                       | 1.01                           |
| Single authorship (no collaboration) | 0.7%    | 7                | 208       | 29.7                      | 3.6                            |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                                      | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|----------------------------------------------|---------------------------------|-------------------------------|
| Acta Obstetrica et Gynecologica Scandinavica | 76                              | 4.544                         |
| Ugeskrift for Laeger                         | 43                              |                               |
| Human Reproduction                           | 41                              | 6.353                         |
| Fertility and Sterility                      | 30                              | 7.490                         |
| International Urogynecology Journal          | 29                              | 1.932                         |
| BMJ Open                                     | 23                              | 3.017                         |
| Gynecologic Oncology                         | 21                              | 1.39                          |
| PLoS ONE                                     | 20                              | 3.752                         |
| Reproductive BioMedicine Online              | 19                              | 4.567                         |
| Fluids and Barriers of the CNS               | 3                               | 6.961                         |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                               | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|-------------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Obstetrics and<br>Gynaecology | 787                                         | 1.55                                     | 2                                           | 9.8                                         | 16.9                                            |
| IKM                           | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                          | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen      | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Mikkelsen AP, Greiber IK, Scheller NM, Lidegaard Ø. Association of Labor Epidural Analgesia With Autism Spectrum Disorder in Children. *JAMA* 2021 Sep 28;326(12):1170-1177. doi: 10.1001/jama.2021.12655. PMID: 34581738
  2. Mathiesen ER, Ali N, Alibegovic AC, Anastasiou E, Cypriak K, de Valk H, Does J, Dunne F, Gall MA, Garcia SD, Hanaire HP, Husemoen LLN, Ivanišević M, Kempe HP, McCance DR, Damm P. Risk of Major Congenital Malformations or Perinatal or Neonatal Death With Insulin Detemir Versus Other Basal Insulins in Pregnant Women With Preexisting Diabetes: The Real-World EVOLVE Study. *Diabetes Care*. 2021 Sep;44(9):2069-2077. doi: 10.2337/dc21-0472. Epub 2021 Jul 30. PMID: 34330786
  3. Berntsen S, Laivuori H, la Cour Freiesleben N, Loft A, Söderström-Anttila V, B Oldereid N, Romundstad LB, Magnusson Å, Petzold M, Bergh C, Pinborg A. A systematic review and meta-analysis on the association between ICSI and chromosome abnormalities. *Hum Reprod Update*. 2021 Aug 20;27(5):801-847. doi: 10.1093/humupd/dmab005.
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# OPHTHALMOLOGY

## REPRESENTING PROFESSOR STEFFEN HEEGAARD

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The field of ophthalmology provides a natural step to other medical specialties as many diseases in the eye are also found outside the eye.

The organization in ophthalmology is one big, fused eye department in the Capital Region and one smaller eye department in Roskilde in the Zealand region. In both regions there are minor satellite eye departments. We have 6 professors in total and 14 associate professors in the specialty.

The specialty is divided into 8 subspecialties, and we have strong research environments in almost all subspecialty areas. The field of ophthalmology has also close collaboration to the University of Copenhagen. Many studies are also in translational medicine. We have close connection to the medical industry and are conducting clinical trials for the medical industry.

The field of ophthalmology has collaboration all over the world and is closely connected research wise to the Department of ophthalmology in London and eye departments in the US.

The field of ophthalmology is represented in the following CAGs: Allergy, Acute Cag and The Zealand Inflammation Research Initiative (ZIRI).

The collaboration within the field of ophthalmology in the two regions is good. The smaller eye department in the Zealand Region is focusing on inflammation causing age-related macular degeneration. The Department in the Capital region is focusing on other retinal diseases such as diabetes besides all the other subspecialties.

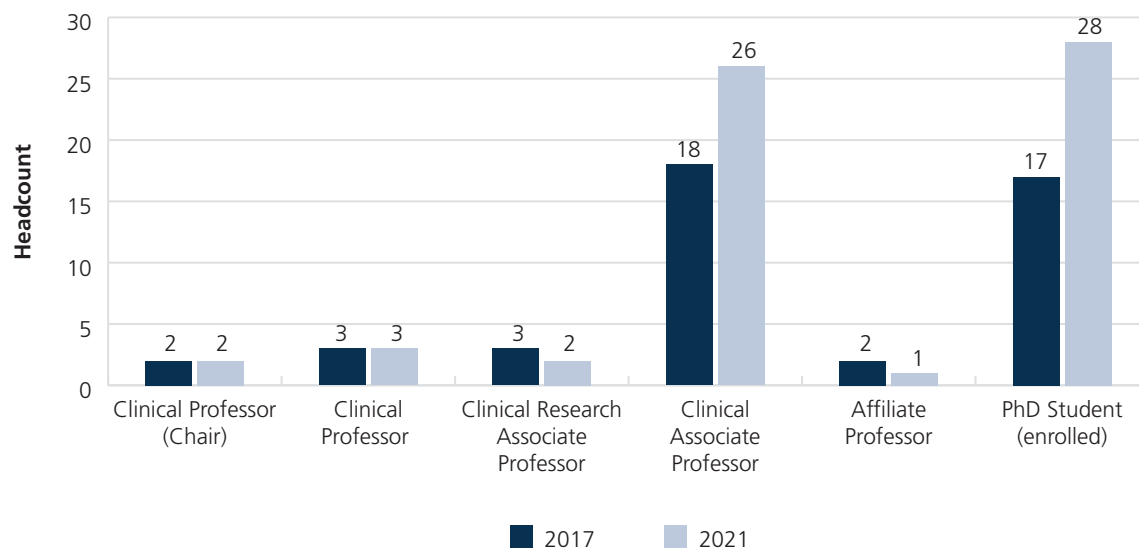
The teaching of medical students is research-based, and all our teachers are scientifically active. This is the best way to make sure focus is on research-based teaching. We work continuously on improving the teaching of our medical students. All medical students are taught ophthalmology in a 28-hour course consisting of clinics and lectures.

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To bring research of the speciality of Ophthalmology to an even higher level would require focus on the provided resources and flexibility. Furthermore, we will need our own laboratories and technicians allocated to our research field. We will need offices for the staff.

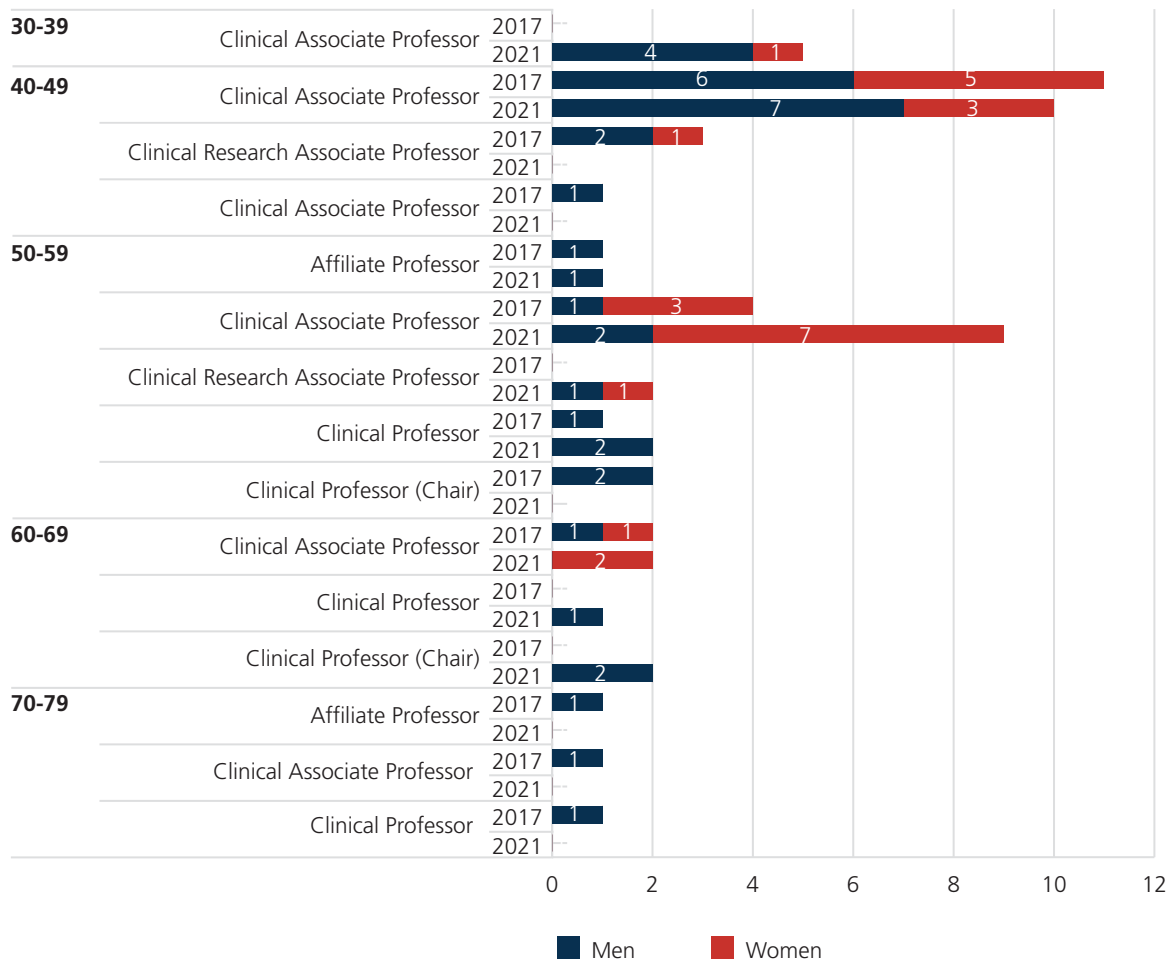
In addition, the possibility to allocate the scientifically strong consultants for some days per week doing research work, will give better research. These issues are not possible in a busy clinical day, but more flexibility going "in and out" of a position could be valuable.

### Academic Staff in Ophtalmology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Ophtalmology 2017 & 2021



Source: KUPA

#### STRENGTHS

- High clinical level with the possibility of including many patients that will substantiate the research
- Relatively few established research units
- High research production and high research output from each researcher
- Reasonable good financial possibilities
- Continuous recruitments to the phd education
- Many common diseases in the specialty

#### WEAKNESSES

- Eye research can be regarded as having little relation to other medical specialties.
- Research can be regarded as “longhaired”.
- Internal competition (tough mental environment).
- Limited numbers of post doc positions
- Few doctorate theses
- Relatively easy to get funding to the younger researchers. If we are to raise our research level, we need bigger amounts of research funding for bigger research projects and not only minor phd studies.

### SWOT

#### OPPORTUNITIES

- More collaboration outside the specialty (genetics, immunology, neurology, oncology, endocrinology, hematology, pediatrics, and epidemiology)
- More contact to preclinical/basic researchers.
- More focus on research
- Collaboration across Denmark and outside Denmark

#### THREATS

- Ophthalmology will not fall within the focus areas of the Institute of clinical medicine
- Reduced contact to preclinical research
- Isolation in relation to other specialties
- Administrative burdens (registration, accounts etc)
- Economical burdens (overhead, PURE is shut down)
- Heavy administrative tasks that reduces the fun of doing research and breaks your moral. Long handling time by the layers reading the contracts in the region and ethical committee, making it impossible to make “easy” research. The approval of contracts outside Denmark is very time-consuming. Different application places where you must apply and the offices are not suited for handling the various questions being raised.

#### SCIENTIFIC PRODUCTION IN THE SPECIALITY

##### Number of articles in Ophthalmology – Peer-reviewed

|               |                 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------|-----------------|------|------|------|------|------|
| International | Journal article | 79   | 55   | 53   | 67   | 72   |
|               | Letter          | 1    | 2    | 4    | 1    | 2    |
|               | Review          | 9    | 10   | 8    | 13   | 19   |
| Danish        | Journal article | 1    | 1    | 2    | 2    | 4    |
|               | Letter          |      |      | 1    |      |      |
| Total         |                 | 90   | 68   | 68   | 83   | 97   |

Source: CURIS



### Collaboration 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 41.7%   | 165              | 3,015     | 18.3                      | 2.01                           |
| Only national collaboration          | 33.1%   | 131              | 1,189     | 9.1                       | 1.41                           |
| Only institutional collaboration     | 24.8%   | 98               | 811       | 8.3                       | 1.09                           |
| Single authorship (no collaboration) | 0.5%    | 2                | 7         | 3.5                       | 0.27                           |

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### TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                        | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|------------------------------------------------|------------------------------|----------------------------|
| Acta Ophthalmologica                           | 109                          | 3.988                      |
| Investigative Ophthalmology and Visual Science | 20                           | 4.925                      |
| British Journal of Ophthalmology               | 11                           | 5.915                      |
| American Journal of Ophthalmology              | 9                            | 5.488                      |
| Ophthalmology                                  | 8                            | 14.277                     |
| Ugeskrift for Laeger                           | 8                            |                            |
| Journal of Neuro-Ophthalmology                 | 7                            | 4.415                      |
| Retina                                         | 7                            | 3.975                      |
| JAMA Ophthalmology                             | 7                            | 8.287                      |
| BMC Ophthalmology                              | 6                            | 2.090                      |

Source: SciVal and JCR

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Ophthalmology            | 297                              | 1.58                           | 2.4                                   | 9.8                                   | 19.5                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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**3 most prominent publications from 2021**

1. Liisborg C, Skov V, Kjær L, Hasselbalch HC, Sørensen TL. Patients with MPNs and retinal drusen show signs of complement system dysregulation and a high degree of chronic low-grade inflammation. *EClinicalMedicine*. 2021 Dec 25;43:101248. doi: 10.1016/j.eclinm.2021.101248. eCollection 2022 Jan.
  2. Erichsen JH, Holm LM, Forslund Jacobsen M, Forman JL, Kessel L. Prednisolone and Ketorolac vs Ketorolac Monotherapy or Sub-Tenon Prophylaxis for Macular Thickening in Cataract Surgery: A Randomized Clinical Trial. *JAMA Ophthalmol*. 2021 Oct 1;139(10):1062-1070. doi: 10.1001/jamaophthalmol.2021.2976.PMID: 34383010.
  3. D'Souza M, Bagger M, Alberti M, Malmborg M, Schou M, Torp-Pedersen C, Gislason G, Svane IM, Kiilgaard JF. Immune Checkpoint Inhibitor Treatment and Ophthalmologist Consultations in Patients with Malignant Melanoma or Lung Cancer-A Nationwide Cohort Study. *Cancers (Basel)*. 2021 Dec 23;14(1):49. doi: 10.3390/cancers14010049.PMID: 35008211
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# ORTHOPAEDIC SURGERY

REPRESENTING PROFESSOR ANDERS TROELSEN

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Orthopaedic surgery includes prevention, diagnostics, treatment, palliation, and rehabilitation of patients with diseases, injuries, and congenital malformations of the musculoskeletal system, both of a traumatic and non-traumatic nature. The treatment can be conservative or surgical.

The speciality is centrally located in the treatment of congenital, traumatological, developmental, degenerative, infectious, and neoplastic disorders of the musculoskeletal system.

In addition, the orthopedic surgeon plays a central role in the treatment of the severely injured patient. In recent years, the speciality has undergone significant development with the formation of 9 subspecialties: Traumatology, Hand surgery, Shoulder and elbow surgery, Spinal surgery, Tumor surgery, Foot and ankle surgery, Pediatric orthopedics, Hip and knee arthroplasty and Sports traumatology.

(Ref. *The Danish Orthopaedic Society (DOS)*  
<https://www.ortopaedi.dk/om-dos/hvad-er-ortopaedisk-kirurgi/>)

Orthopaedic surgery has research areas within all the major fields of the speciality. The research focus varies and reflects the interest at the local clinics.

Within the orthopaedic field, there is a great tradition for collaboration with other specialities, such as Radiology, Anaesthesiology, Physiotherapy, Occupational therapy, Sports medicine and Geriatrics. Also, a lot of the local research units are in collaboration with other national and international research units.

Major research areas which are covered are:

- Various clinical research questions within all areas of orthopaedic surgery are evaluated by means of clinical studies, including RCT's,

databases and international multicentre studies

- Optimizing treatment strategies in joint replacement surgery (e.g., fast track surgery)
- Testing of new developments in knee and hip arthroplasty designs and materials applying special techniques such as RSA radiography and DEXA

The majority of research projects are conducted within the following areas:

- Hip and knee replacement surgery (Hvidovre Hospital, Rigshospitalet, Gentofte Hospital and Bispebjerg Hospital)
- Shoulder and elbow surgery (Herlev Hospital and Køge Sygehus)
- Traumatology (Hvidovre Hospital, Herlev Hospital and Bispebjerg Hospital)
- Orthopaedic oncology (Rigshospitalet)
- Hip fractures and fractures in elderly (Bispebjerg Hospital, Hvidovre Hospital and Herlev Hospital)
- Sports traumatology and arthroscopic surgery (Bispebjerg Hospital and Hvidovre Hospital)
- Spinal surgery (Rigshospitalet)
- Hand surgery (Gentofte Hospital)
- Pediatric orthopedics (Hvidovre Hospital and Rigshospitalet)

## PARTICIPATIONS IN CAGS

Orthopaedic surgery is represented in two CAGs (Clinical Academic Group) under GCHSP (Greater Copenhagen Health Science Partners).

These are:

- CAG ROAD (Research in Osteoarthritis Denmark) led by Professor Anders Troelsen (Hvidovre Hospital). Steering committee members from our speciality are Professor Per Hölmich (Hvidovre Hospital), Professor Søren Overgaard (Bispebjerg Hospital) and Professor Thomas Bandholm (Hvidovre Hospital).

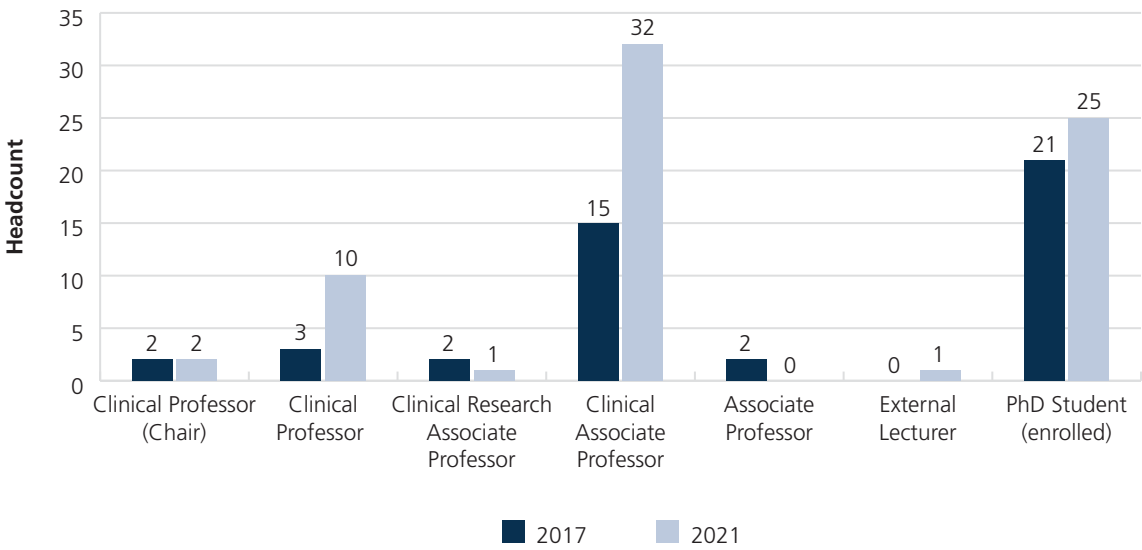
- CAG imPact (Physical activity and sport in clinical medicine). Steering committee members from our speciality are Professor Per Hölmich and Professor Kristian Thorborg, both from Hvidovre Hospital.

committee members from our speciality are Professor Per Hölmich (Hvidovre Hospital), Professor Kristian Thorborg (Hvidovre Hospital) and Professor Michael Krogsaard (Bispebjerg Hospital).

### PARTICIPATING IN IOC RESEARCH

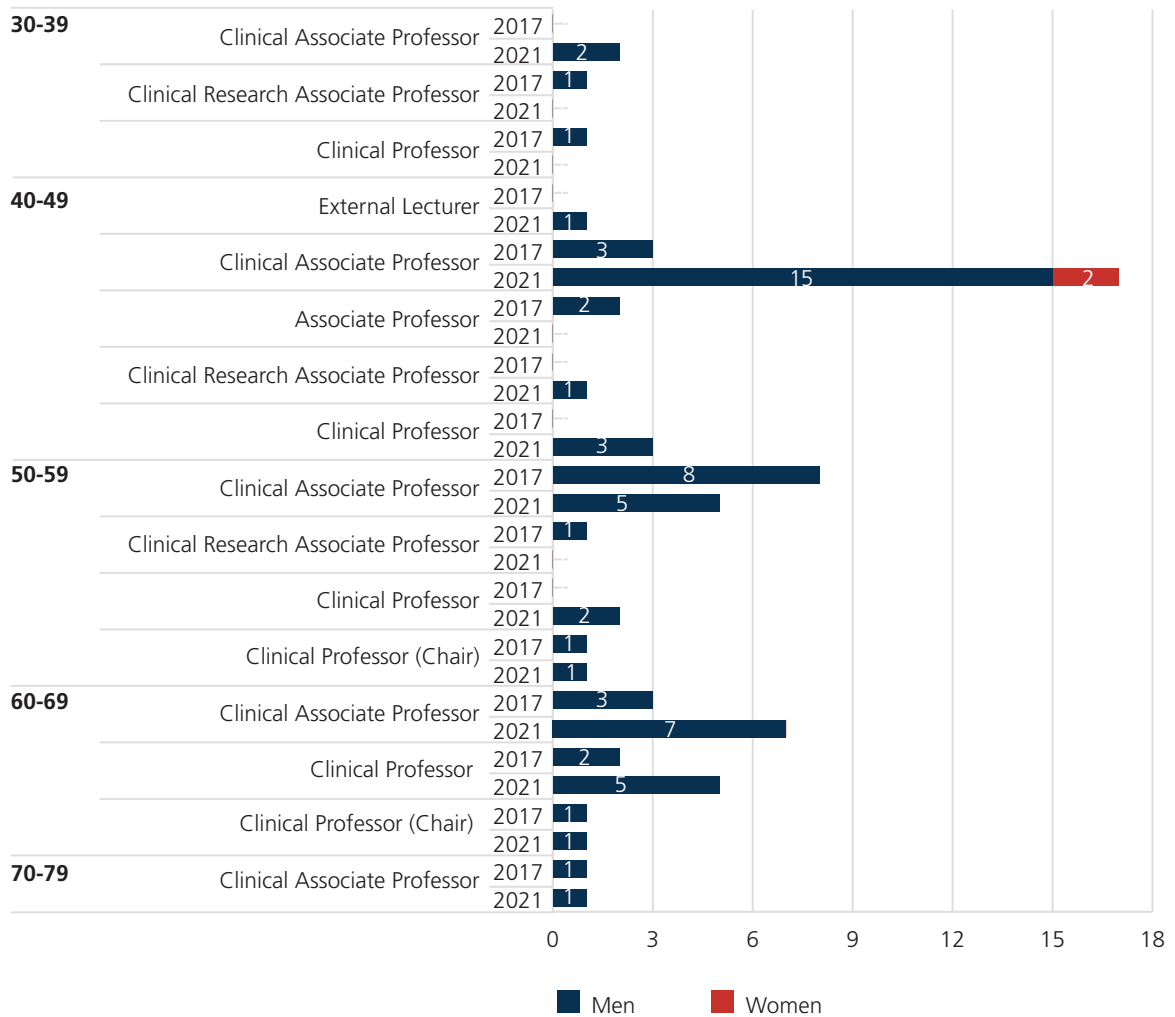
Orthopaedic surgery is well-represented in the IOC Research Centre Copenhagen. Steering

Academic Staff in Orthopaedic Surgery 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Orthopaedic Surgery 2017 & 2021



Source: KUPA

### STRENGTHS

- Orthopaedic surgery is taking part or leading strategically important initiatives, such as the formation of CAGs or international collaborations, such as IOC research
- Well-organized research groups have been created in most departments in Copenhagen e.g., Hvidovre Hospital (SORC-C, CORH), PMR-C (at multiple sites), Rigshospitalet (orthopaedic oncology), Køge Sygehus (CEBO)
- More pre-graduate students show interest in starting early in orthopaedic surgery research
- Good opportunities for recruiting patients for clinical studies
- Numerous collaborations with national and international groups

### WEAKNESSES

- Orthopaedic research is not performed frequently in all departments
- Dependence on external (including industry) funding
- Lack of organizational visibility
- Much time spent on applying for grants
- Career pathways for MD and non-MD, non-specialists are poorly defined and thus making recruitment difficult

## SWOT

### OPPORTUNITIES

- Regional research meetings could stimulate research collaboration between departments
- More part-time personnel with specified research time could result in a markedly rise of ongoing research activities – especially in hospitals outside the Copenhagen area
- More research groups or departments apply for larger grants together
- Departments or research groups apply for EU funding together with foreign research groups
- New study plan for medical students facilitated of increased interest in orthopaedic surgery
- Increasing participation in large collaborations could increase grants and funding
- Increasing use of social media to increase the awareness of orthopaedic surgery and its possibilities
- Redefining orthopedics being more broad and inclusive towards our cross-sectorial collaborators

### THREATS

- Economic – fewer foundations and grants cater to the field
- The risk of political decisions changing the structure of the hospital/department both financially as well as strategically
- More time assigned for administration and documentation resulting in less research time for researchers with full-time or part-time clinical work
- More time spent on various ethical and legal data security improvement applications
- Increasing overheads will limit the chances competing for funding from e.g. industry and other funding organizations
- Limited integrations of innovative technical solutions (such as robotics and assistive technology) in clinical and academic everyday

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Orthopaedic surgery – Peer-reviewed

|               |                 | 2017      | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|-----------|------------|------------|------------|------------|
| International | Journal article | 81        | 110        | 91         | 111        | 161        |
|               | Letter          | 2         | 2          | 4          | 2          | 3          |
|               | Review          | 5         | 7          | 5          | 6          | 11         |
| Danish        | Journal article | 3         | 4          | 7          | 5          | 1          |
|               | Letter          | 1         |            |            |            |            |
|               | Review          |           |            |            |            | 3          |
| <b>Total</b>  |                 | <b>92</b> | <b>123</b> | <b>107</b> | <b>124</b> | <b>179</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 39.2%   | 231              | 3,304     | 14.3                      | 1.98                           |
| Only national collaboration          | 35.6%   | 210              | 1,898     | 9                         | 1.46                           |
| Only institutional collaboration     | 24.6%   | 145              | 1,066     | 7.4                       | 0.9                            |
| Single authorship (no collaboration) | 0.7%    | 4                | 11        | 2.8                       | 0.13                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|--------------------------------------------------------|---------------------------------|-------------------------------|
| Acta Orthopaedica                                      | 53                              | 3.925                         |
| Knee Surgery, Sports Traumatology, Arthroscopy         | 26                              | 4.114                         |
| British Journal of Sports Medicine                     | 22                              | 18.488                        |
| Scandinavian Journal of Medicine and Science in Sports | 22                              | 4.645                         |
| American Journal of Sports Medicine                    | 20                              | 7.010                         |
| Ugeskrift for Laeger                                   | 17                              |                               |
| Journal of Arthroplasty                                | 16                              | 4.435                         |
| Danish Medical Journal                                 | 15                              | 1.865                         |
| Bone and Joint Journal                                 | 14                              | 5.385                         |
| Clinical Orthopaedics and Related Research             | 12                              | 4.755                         |

Source: SciVal and JCR

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## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Orthopaedic Surgery      | 415                                         | 1.44                                     | 1.4                                         | 10.4                                        | 18.8                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited



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### 3 most prominent publications from 2021

1. Lasse Ishøj, Mathias Fabricius Nielsen, Kasper Krommes, Rasmus Skov Husted, Per Hölmich, Lisbeth Lund Pedersen, Kristian Thorborg. Femoroacetabular impingement syndrome and labral injuries: grading the evidence on diagnosis and non-operative treatment—a statement paper commissioned by the Danish Society of Sports Physical Therapy (DSSF). *Br J Sports Med* 2021 Nov;55(22):1301-1310. doi: 10.1136/bjsports-2021-104060. Epub 2021 Sep 16.
  2. Liv Riisager Wahlsten, Bochra Zareini, Lærke Smedegaard, Gunnar H Gislason, Henrik Palm, Stig Brorson. A medical history of arterial thrombosis is a strong predictor of post-operative myocardial infarction and stroke in patients with hip fractures-a nationwide cohort study. *Age Ageing* 2021 Jun 28;50(4):1252-1260. doi: 10.1093/ageing/afaa279
  3. Kirill Gromov, Stanislas Grassin-Delyle, Nicolai B Foss, Lars Møller Pedersen, Christian S Nielsen, Elodie Lamy, Anders Troelsen, Saik Urien, Henrik Husted. Population pharmacokinetics of ropivacaine used for local infiltration anaesthesia during primary total unilateral and simultaneous bilateral knee arthroplasty. *Br J Anaesth* 2021 Apr;126(4):872-880. doi: 10.1016/j.bja.2020.11.038. Epub 2021 Jan 15.
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# OTORHINO-LARYNGOLOGY

REPRESENTING PROFESSOR CHRISTIAN VON BUCHWALD

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Otopathology with special emphasis on bone dynamics in undecalcified materials and the development of the osteo materials and the development of the osteo-dynamic concept of otosclerosis.

Surgical simulation including the initiation and development of the leading Visible Ear Simulator software.

- Vestibular Schwannomas, epidemiology, clinic, and biomarkers
- Mb Meniere treatment effect - evidence
- Population-based dizziness epidemiology
- Cochlear implant, role and development, speech, and hearing
- Audio-vestibular disorders
- Obstructive sleep apnea and DISE
- New diagnostic and treatment strategies in OSA patients
- Biomarkers for daytime sleepiness
- Head and neck cancer in general

Biomarkers for oral carcinoma metastasis and mapping of oral cancer cells

Optical-guided tumor targeted surgery and nucleotide-based imaging modalities in head and neck cancer

Rise of HPV and oropharyngeal cancer, i.e. epidemiology, clinic and genetic profiling of HPV+ and HPV- oropharyngeal cancer, the role of robotic surgery and impact on survival and Qol

Rehabilitation, fast recovery, days alive and out of hospital

The use of stem cells in salivary glands on head and neck cancer patients with xerostomia treated with radiotherapy

Liquid biopsies as surveillance of HPV+ oropharyngeal cancers and non-HPV induced head and neck cancers

- Salivary gland tumors and cancer
- Lymphomas of the head and neck
- Head and neck cancer and otitis media in Greenland
- Otitis media and biofilm

The global airways concept i.e., the role of addressing the paranasal sinuses in patients with asthma (type 2 inflammation), COPD and in cystic fibrosis and primary cilia dyskinesia

The role of biologics in the treatment of type 2 inflammation (nasal polyps/asthma)

The role of moderators in treatment of cystic fibrosis

## **ESTABLISHED INTERNATIONAL COLLABORATIONS:**

affiliated professor, Jeff Myers, M D Anderson, Houston

MEEI, Harvard, Boston

University of Lund, Dept. of ORL

Karolinska

Sct. Thomas and Guys Hospital, London

University of Manchester

Several university clinics in Germany, Australia, Japan, New Zealand

National cross-disciplinary collaborators (CAGs, other).

www.DAHANCA

ACROBATIC (national platform for improvement of cancer surgery funded by Danish Cancer Society)

Chair of the CAG: optical Guided cancer Surgery, co-chair in vestibular disorders

Chair of national studies on biologics for severe nasal polyposis  
Established Hearing and Balance Research Center together with DTU

Collaboration within the speciality  
National common studies on H&N, biologics, vestibular Schwannomas etc

#### RESEARCH-BASED TEACHING:

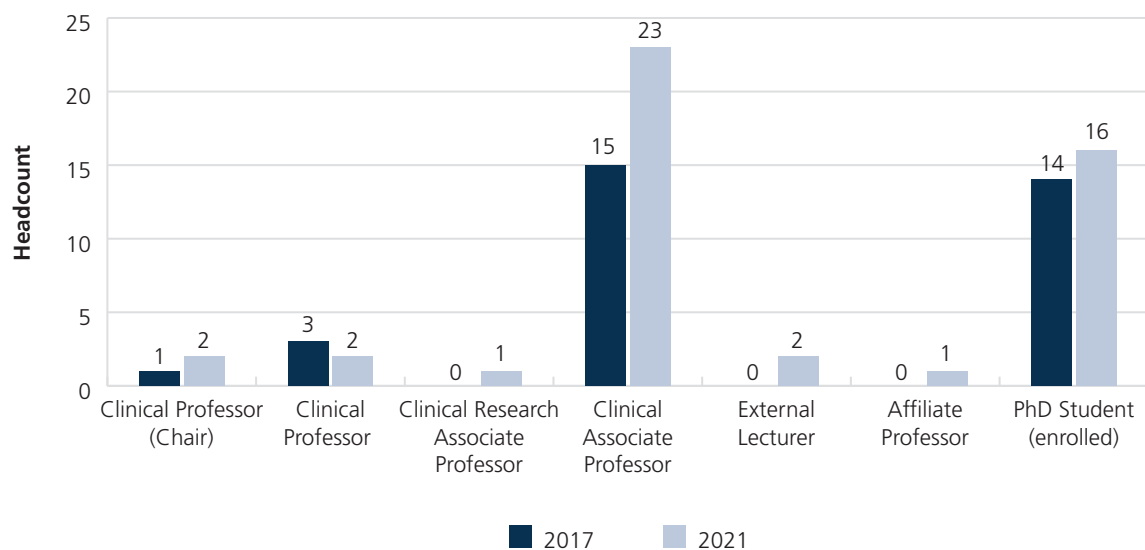
Research on evidence training in otosurgery including 3D-simulation, in H&N and FESS (endoscopic sinus surgery) as well as pre-graduate teaching in otoscopy, tracheostomy etc.  
Many/most of the research activities are in close collaboration with CAMES

In comment for all our research is to get to next level, which we aim to reach in the coming years.

We have established the East Danish Center of Head and Neck Cancer (covering RegionH and RegionS) and the Copenhagen Hearing and Balance Centre (in close collaboration with DTU). The initiatives combined with a stronger international collaboration in close connection with basic research.

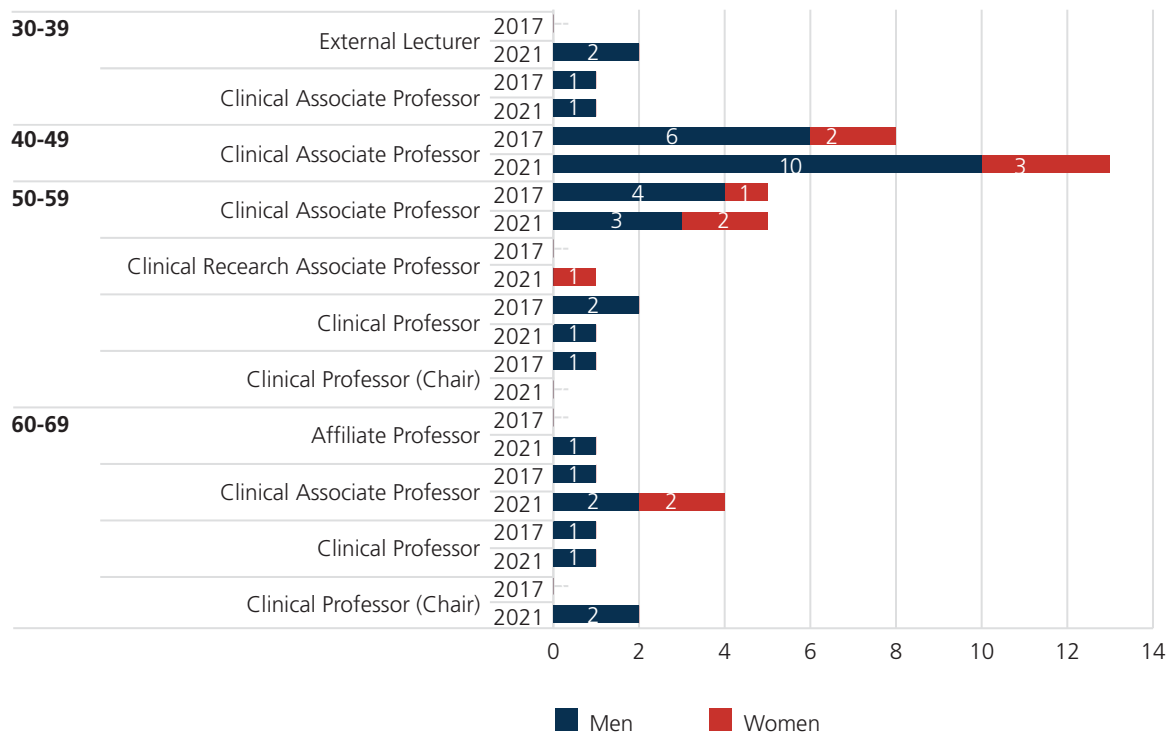
We also have to focus on the feeding chain addressing the best young and senior researchers, i.e. securing them fruitful career

#### Academic Staff in Otorhinlaryngology 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Otorhinolaryngology 2017 & 2021



Source: KUPA

### STRENGTHS

- Close association between research and clinic
- High volume of diseases (in public and at our clinic we represent centers of H&N cancer, neuro-otology, otology, audiology, inflammatory lesion (i.e. nasal polyps, CF, PCD – extending to “united airways”-concept)
- Strong profile/large network (nationally and internationally)
- Free research
- Full Time researchers and labs are located in the clinic – and close to the university
- We have initialized – and are continuing focusing on improving – a research feeding chain in close collaboration with the clinic and the university

### WEAKNESSES

- Very busy working day in the clinic with limited time to contribute for the clinical associate professors and clinicians to contribute to research
- As a surgical specialty our younger researchers (PhD and postdocs) will lose time and opportunities regarding surgical training – and thereby an non-optimal situation in regard to future positions (unless researchers will have a high priority when returning to the clinic)
- Financial support to be improved in order to reach next level
- Part-time positions with clinic and research are requested
- The organization or platform on which the research is based is fragile

## SWOT

### OPPORTUNITIES

- Identification and coordination of our cutting edge research aiming at a clear vision and strategy to reach next level (reaching the ‘excellent’ donations/foundations)
- Stronger profile and impact of the research in clinic as a natural part of the leading system in the organization of the clinic
- We have access to, and are networking with the best researchers outside our specialty as well as to the basic research nationally and internationally

### THREATS

- ‘Non-equal’ conditions/competition between paraclinical and medical specialties vs surgical specialties (i.e. ORL) since surgical competences for an ORL/ENT specialist have to be accomplished in parallel with research
- The IF in ORL journals is low compared to medical or paramedical journals
- Strategical research seems to become more dominant (determined by the administrators)
- Increasing overhead and time to spend on administration including EPIC
- Research does not count as ‘production’ by the hospital owners and the demand an increased production

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Otorhinolaryngology – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021       |
|---------------|-----------------|-----------|-----------|-----------|-----------|------------|
| International | Journal article | 71        | 73        | 70        | 77        | 98         |
|               | Letter          | 2         |           | 1         | 3         | 5          |
|               | Review          | 7         | 8         | 14        | 8         | 16         |
| Danish        | Journal article | 5         | 5         | 7         | 2         | 2          |
|               | Letter          |           | 3         | 1         |           |            |
|               | Review          |           |           | 1         |           | 3          |
| <b>Total</b>  |                 | <b>85</b> | <b>89</b> | <b>94</b> | <b>90</b> | <b>124</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 25.2%   | 117              | 2,509     | 21.4                      | 3.63                           |
| Only national collaboration          | 33.6%   | 156              | 1,457     | 9.3                       | 1.56                           |
| Only institutional collaboration     | 40.7%   | 189              | 1,575     | 8.3                       | 0.85                           |
| Single authorship (no collaboration) | 0.4%    | 2                | 5         | 2.5                       | 0.31                           |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                                                | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|--------------------------------------------------------|---------------------------------|-------------------------------|
| Ugeskrift for Laeger                                   | 27                              |                               |
| European Archives of Oto-Rhino-Laryngology             | 26                              | 3.236                         |
| Acta Oto-Laryngologica                                 | 23                              | 1.698                         |
| Acta Oncologica                                        | 22                              | 4.311                         |
| International Journal of Pediatric Otorhinolaryngology | 18                              | 1.626                         |
| Otology and Neurotology                                | 17                              | 2.619                         |
| Danish Medical Journal                                 | 14                              | 1.865                         |
| Head and Neck                                          | 12                              | 3.821                         |
| Respiratory Medicine                                   | 10                              | 4.582                         |
| Laryngoscope                                           | 9                               | 2.970                         |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Otorhinolaryngology      | 344                                         | 1.8                                      | 1.7                                         | 7.3                                         | 13.1                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Ruud Kjær, E. K., Jensen, J. S., Jakobsen, K. K., Lelkaitis, G., Wessel, I., von Buchwald, C. & Grønhøj, C  
The Impact of Comorbidity on Survival in Patients With Head and Neck Squamous Cell Carcinoma: A Nationwide Case-Control Study Spanning 35 Years  
17 Feb. 2021, I: *Frontiers in Oncology*. 10, s. 617184 617184.

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  2. Rasmussen, J. H., Olin, A. B., Lelkaitis, G., Hansen, A. E., Andersen, F. L., Johannesen, H. H., Kjaer, A., Fischer, B. M., Specht, L., Bentzen, S. M., von Buchwald, C., Wessel, I. & Vogelius, I. R.,  
Intratumor heterogeneity is biomarker specific and challenges the association with heterogeneity in multimodal functional imaging in head and neck squamous cell carcinoma  
June 2021, I: *European Journal of Radiology*. 139, s. 109668 109668.

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  3. Reznitsky, M., Petersen, M. M. B. S., West, N., Stangerup, S-E. & Caye-Thomasen, P  
The natural history of Vestibular Schwannoma growth - prospective 40-year data from an unselected national cohort  
5 May 2021, I: *Neuro-Oncology*. 23, 5, s. 827-836 10 s.
-



# PAEDIATRICS

## REPRESENTING PROFESSOR DINA CORTES

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### **PAEDIATRIC RESEARCH COVERS MANY TOPICS AND WE COLLABORATE WITH MANY INTERNATIONAL GROUPS**

In DK 10% of schoolchildren have asthma. COPSAC studies asthma and chronic inflammatory diseases by follow-up studies in prospective clinical birth cohorts. Danish Pediatric Pulmonary Service studies severe chronic lung diseases eg Cystic Fibrosis.

GR, Rigshospitalet (RH) focus on growth from birth to adulthood, on puberty and reproduction. Impact of genetic, epigenetic, hormonal, lifestyle and environment factors are studied together with eg EDMaRC.

Bonkolab, RH studies cancer etiology, tumor biology, pharmacology and toxicology of anticancer agents, and psychosocial issues. Treatment follows international protocols, and 5-years survival rate is 87%. We join CAG Ci.

Steno Diabetes Center Copenhagen follows 900 children and adolescents with type 1 diabetes, integrating clinical and basic research.

In Capital Region 30% are hospitalized with infections during childhood. CAG CHILD, coordinated from RH, studies prevention, diagnosis, and treatment of infections, including COVID-19.

We carry out large RCTs at Vaccine Trial Unit.

Mortality, brain injury and other neonatal conditions and diseases are challenges with high impact. Neonates are studied and followed-up in prospective clinical birth cohorts.

Cerebral palsy, a frequent severe disorder is studied using the unique Danish CP register. We also study eg epilepsy and Tourette syndrome.

We study congenital disorders in Copenhagen Baby Heart study, urogenital disorders eg cryptorchidism and join CAG SURF.

Research in rare diseases focus on therapeutic strategies, neonatal screening and WGS for early diagnosis.

We study clinical and basic research aspects of 400 children with inflammatory bowel disease and many children with obesity.

### **THE MEDICAL STUDENTS GET RESEARCH-BASED TEACHING**

The students use "Pædiatri" a Danish version of "Paediatrics" by Nygaard and Schmiegelow. Danish consultants have included more research-based information in the book.

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The workload teaching medical students in paediatrics is high, as every medical student has a course in five weeks in pediatrics including the examination. The semester is extended to 20 weeks. The number of medical students is 250-275 every semester. Therefore, in average every one of the seven departments in paediatrics has constantly about 9 medical students for 20 weeks every semester.

Previously, there was one clinical professor (chair) in paediatrics at Copenhagen University Hospital Herlev, one at Copenhagen University Hospital Hvidovre and four at Copenhagen University Hospital Rigshospitalet. Now we have only two, in total. It would be valuable if there was a clinical professor (chair) in paediatrics at each major hospital, Rigshospitalet, Herlev, Hvidovre, Hillerød and one at one of the departments in the Region Zealand to strengthen paediatrics as an academic subject at the University of Copenhagen and take care of more university assignments compared to fixed time professors.

It would be valuable for research and for the career paths to clinical professorships, if there was a higher number of clinical research associate professors.

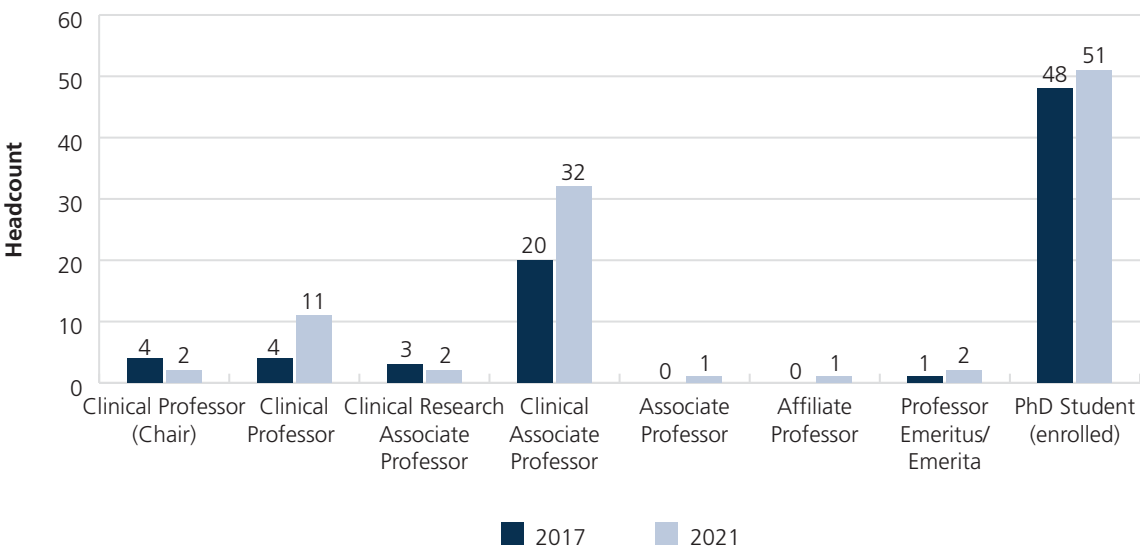
This can be done by increasing the number of clinical research associate professors at the University of Copenhagen, and it could also be considered to convert an associate professorship, B, to a research associate professorship, if the candidate is qualified for a clinical research associate professorship. The last way would be without expenses for the University of Copenhagen.

In agreement with text above, it would be valuable if there was at least one clinical research

associate professor at each major hospital, Rigshospitalet, Herlev, Hvidovre, Hillerød and one at one of the departments in the Region Zealand. Now, we have three clinical research associate professors, in total.

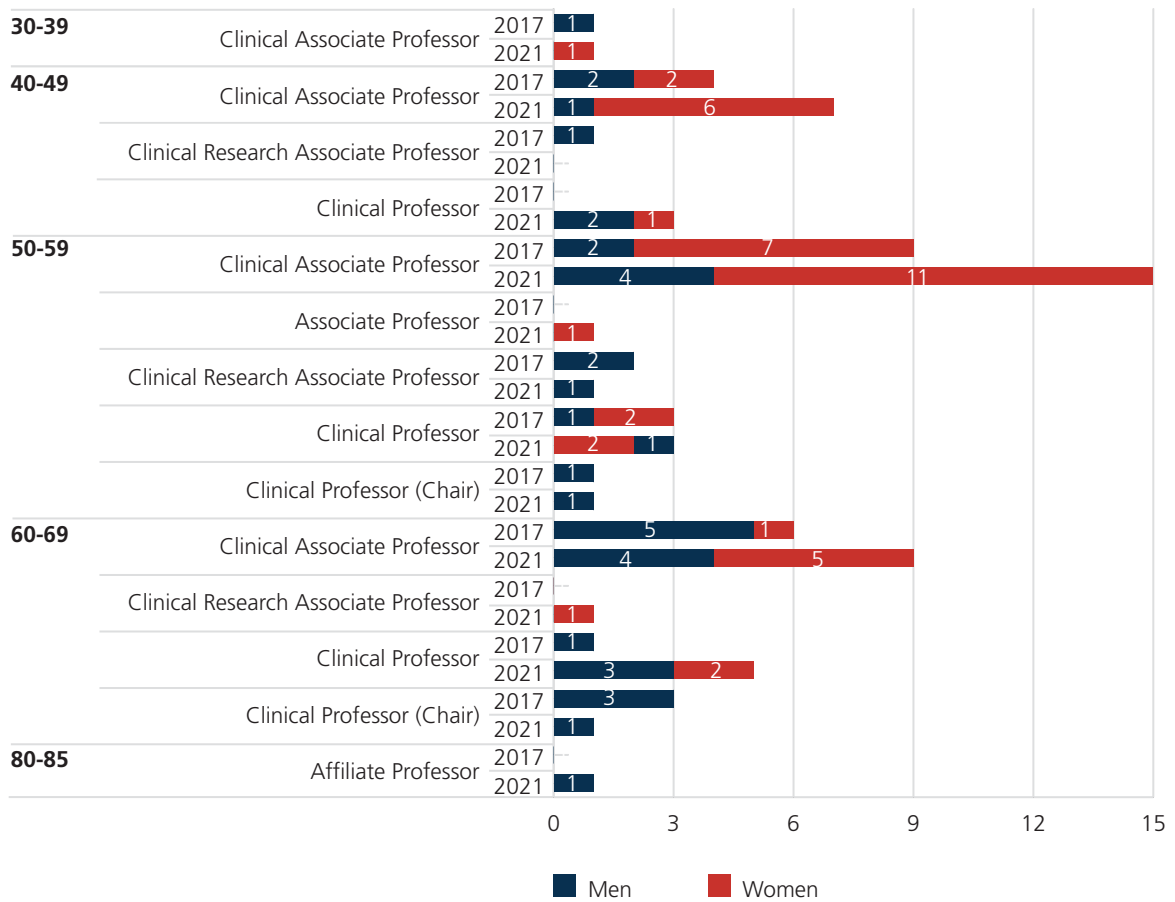
It could also be valuable for career paths if it was possible to achieve a “clinical post doc” title including for example at least 20% of the working hours for research, so the candidate could get an affiliation to the University of Copenhagen with a medical degree but before the candidate is a medical specialist. This could be done without cost for the University of Copenhagen.

Academic Staff in Paediatrics 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Paediatrics 2017 & 2021



Source: KUPA

### STRENGTHS

- High academic activity in the speciality with well-established research units in close collaboration with the clinic.
- Unique registry opportunities to assess short- and long-term outcomes of diseases, and different kinds of treatments of at a complete national level.
- Strong international collaborations and commitments.
- High degree of participation in CAGs totally five.

### WEAKNESSES

- In 2022, only two clinical professor (tenured) and only three clinical research associate professors.
- Busy clinical work combined with a high demand of teaching and examination of medical students may reduce the time for research.
- Difficulties in knowing what to do, before you can do clinical research and much waiting time to be allowed to start doing clinical research.
- Much time used to provide research funding.

## SWOT

### OPPORTUNITIES

- High clinical activity at the departments with a lot of different diseases including the prenatal diagnosed disorders.
- Further opportunities within the established CAGs.
- Further elaboration of national and international scientific networks.

### THREATS

- Increasingly busy clinical work with limited time for research.
- Increasingly difficult getting research funding and getting access to be allowed to carry out clinical research.
- Scientific talents choose clinical work for research due to difficulties in getting research funding and difficulties in getting accept to carry on the research
- Now, it is possible to get an appointment as a pediatrician in training and as a consultant in pediatrics without having done much research.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Paediatrics – Peer-reviewed

|               |                 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------|-----------------|------|------|------|------|------|
| International | Journal article | 162  | 172  | 166  | 190  | 207  |
|               | Letter          | 3    | 3    | 4    | 9    | 3    |
|               | Review          | 8    | 8    | 9    | 21   | 18   |
| Danish        | Journal article | 5    | 9    | 5    | 9    | 3    |
|               | Letter          | 1    | 2    | 1    |      |      |
|               | Review          |      |      |      |      | 5    |
| Total         |                 | 179  | 194  | 185  | 229  | 236  |

Source: CURIS

### Collaboration 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 48.2%   | 475              | 10,042    | 21.1                      | 2.2                            |
| Only national collaboration          | 27.2%   | 268              | 2,966     | 11.1                      | 1.23                           |
| Only institutional collaboration     | 24.4%   | 241              | 1,769     | 7.3                       | 0.91                           |
| Single authorship (no collaboration) | 0.2%    | 2                | 0         | 0                         | 0                              |

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### TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|--------------------------------------------------------|------------------------------|----------------------------|
| Acta Paediatrica, International Journal of Paediatrics | 35                           | 4.056                      |
| Journal of Clinical Endocrinology and Metabolism       | 35                           | 5.799                      |
| Ugeskrift for Laeger                                   | 34                           |                            |
| Pediatric Diabetes                                     | 26                           | 3.409                      |
| PLoS ONE                                               | 26                           | 3.752                      |
| Human Reproduction                                     | 19                           | 6.353                      |
| Pediatric Blood and Cancer                             | 17                           | 3.838                      |
| Pediatric Research                                     | 15                           | 3.953                      |
| Journal of Allergy and Clinical Immunology             | 14                           | 14.290                     |
| European Journal of Endocrinology                      | 13                           | 6.558                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Paediatrics              | 745                              | 1.6                            | 2.3                                   | 8.7                                   | 17.9                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Skakkebaek NE, Lindahl-Jacobsen R, Levine H, Andersson AM, Jørgensen N, Main KM, Lidegaard Ø, Priskorn L, Holmboe SA, Bräuner EV, Almstrup KA, Franca LR, Znaor A, Kortenkamp A, Hart RJ, Juul A. Environmental factors in declining human fertility. *Nature Rev Endocrinol* 2021, 18(3):139-157, PMID: 34912078
2. Rago D, Pedersen CT, Huang M, Kelly RS, Gürdeniz G, Brustad N, Knihtil H, Lee-Sarwar KA, Morin A, Rasmussen MA, Stokholm J, Bønnelykke K, Litonjua AA, Wheelock CE, Weiss ST, Lasky-Su J, Bisgaard H, Chawes BL. Characteristics and Mechanisms of a Sphingolipid-associated Childhood Asthma Endotype. *Am J Respir Crit Care Med*. 2021 Apr 1;203(7):853-863.
3. Andrés-Jensen L, Attarbaschi A, Bardi E, Barzilai-Birenboim S, Bhojwani D, Hagleitner MM, Halsey C, Harila-Saari A, van Litsenburg R, Hudson MM, Jeha S, Kato M, Kremer L, Mlynarski W, Möricke A, Pieters R, Piette C, Raetz E, Ronceray L, Toro C, Valsecchi MG, Vrooman LM, Weinreb S, Winick N, Schmiegelow K; on behalf of the Ponte di Legno Quality Survival working group. Severe Toxicity Free Survival: Clinician-defined definitions of unacceptable long-term toxicities following acute lymphoblastic leukemia. *Lancet Haematology* 2021;8:e513-e523.

# PATHOLOGY

REPRESENTING ASSOCIATE PROFESSOR  
LISE METTE RAHBK GJERDRUM

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Pathology encompasses diseases in all human organs and research covers multiple areas. A main area of research is cancer, e.g., in brain, breast, colorectal, pancreatic, lung, melanoma, gynecological, soft tissue tumors, malignant lymphoma and leukemia. Most of these investigations elucidates alterations in morphology, phenotype, and genotype (DNA/RNA/epigenetics/proteomics) associated with disease and possibly implicated in early detection, diagnosis, prognosis, therapy, and pathogenesis. The overall aim is to improve and strengthen personalized treatment for patients. This is achieved by investigations on various aspects of tumor biology hereby the tumor cell phenotype, heterogeneity, and the interaction of tumor cells with the microenvironment and results are often correlated to clinical aspects. Examples of other areas include inflammatory conditions (i.e., inflammatory bowel disease), transplantations, diabetes, rheumatology, Covid-19, and neurodegenerative disorders (i.e., Alzheimers and prion diseases).

Research methods includes analyses of both tumor morphology and phenotype (immunohistochemistry, immunofluorescence, incl. multiplexing techniques), genetic changes (WGS, WES, targeted NGS, RNA-seq, NanoString gene expression assays), proteomics, single cell analyses (RNAScope, GeoMx transcriptomics, ECCITE-seq, deep visual proteomics) and development of deep learning methods for promoting AI into oncology. Supplements with animal studies occur.

Most of the investigations are conducted in close collaboration with clinical/paraclinical departments and basic research departments at the UCPH, DTU, BRIC, RUC and in some instances medical industries. All researchers have extensive national and international collaborations, including John Hopkins, MD Anderson, NIH/

NCI Bethesda, Mofitt Cancer center, Cleveland, Chicago, Philadelphia, Vancouver, Alberta, Adelaide, Heinrich Heine University, Charité, University Hospitals in Heidelberg, Freiburg, Kiel, Stuttgart, Münster, Bologna, Pisa, Edinburgh, Birmingham, Leeds, Bern, Radboud, Amsterdam, Leiden, Wien, Turku, and Stockholm.

Several researchers participate in /co-founds national and international research centers and networks.

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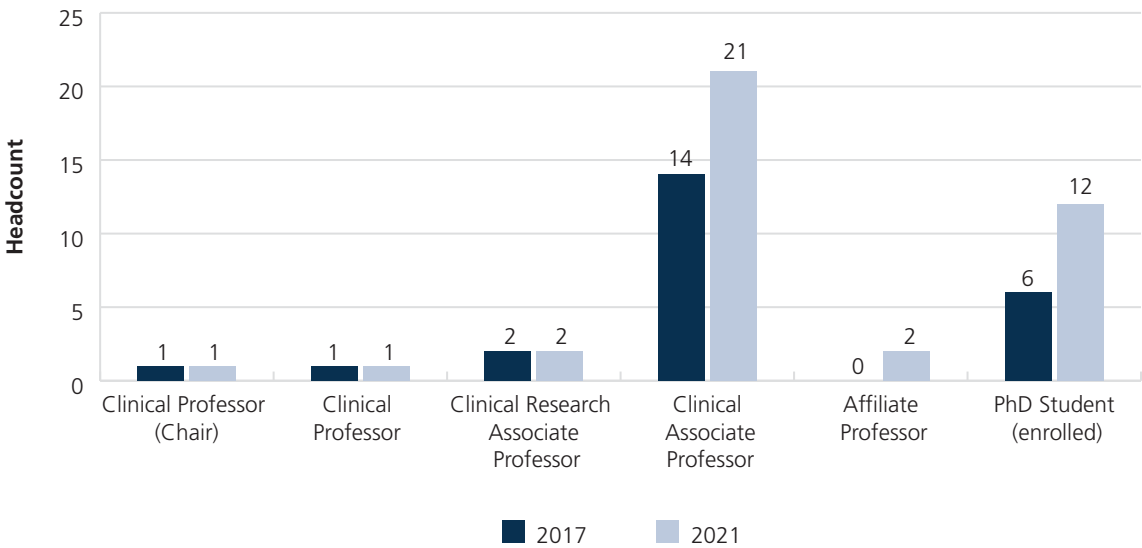
A major obstacle is routine obligations (diagnostics and administrative) and the workload of pathologist in general leaves little dedicated time for research, and this have led to a decrease in pathologist driven research within the two last decades. In general, there needs to be an increased focus on increasing the numbers of professors, associate research professors and research active pathologist in training. The pathology departments should identify pathologist in training with particular research interest and give them the possibility to pursue their interest with redemption from routine obligation and funding of minor projects to jumpstart their career. This will increase the potential number of senior research candidates with implications for both research quantitatively and qualitatively. In general, focus on career plans for researchers (medical doctors and AC) is warranted. It is essential that pathology departments again consider research as a mandatory part of their DNA and that research projects increasingly are initiated by researchers within Pathology with increasing numbers of PhD students and post docs attached. Likewise, senior researchers would benefit from (more) dedicated time for research, especially if not holding a part time position. Research in the various departments in general would benefit from common administrative support regarding

fundraising, accounting and for ex. writing and high-quality illustrations.

In general, international collaborations can stimulate new ideas and research strategies. More interaction with foreign institutions through exchange of staff pathologists, senior researchers and PhD students will increase the impact on own research.

At a political level, legislation regarding research processes should be revisited, as the current situation delays and prevents important research with major clinical implications.

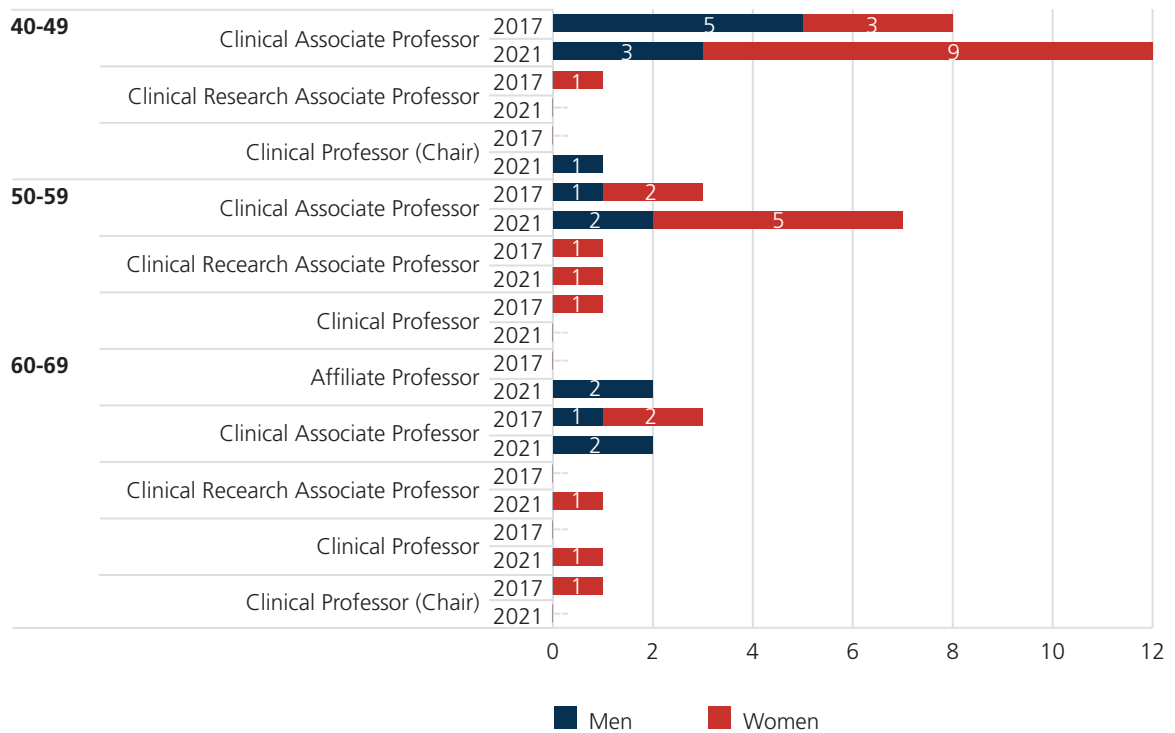
Academic Staff in Pathology 2017 & 2021 - Headcount



Source: KUPA



### Age and Gender distribution of Academic Staff in Pathology 2017 & 2021



Source: KUPA

### STRENGTHS

- Unique expertise in combining disease morphology with spatial omics, sequencing, multiplexing techniques and deep learning methods
- Pathology covers all human diseases and the archival/biobanked material represents a unique source for basic and translational research
- Possibilities for correlation of research output to clinical/epidemiological registers/databases with direct benefits for the patients
- Central role in precision medicine with established routine analyses on DNA, RNA, epigenetics, and AI/digital pathology, that can be utilized within research

### WEAKNESSES

- Insufficient awareness and focus on requirements for research (time and money)
- Insufficient recruitment and mentoring of research interested pathologists in training, as well as lack of career plans for AC researchers
- Enrolment of medical students into research projects is hampered by lack of visibility in medical school (4 weeks tuition with 6 other specialties)
- In general lack of pathologists and due to work overload, limited time for participation in research symposia and conferences

## SWOT

### OPPORTUNITIES

- Possibilities for establishing nationwide, large archival and fresh tissue cohorts on various diseases including rare entities
- Excellent opportunity to contribute to translational research and bring novel biomarkers into worldwide and national guidelines
- Excellent possibility for establishing collaboration with basic researchers at UCPH, BRIC, DTU, RUC and medical industries
- Excellent education of PhD students and post docs in translational research

### THREATS

- Shortage of staff and high load of routine diagnostic obligations causing limited time for dedicated research, often to be performed after work hours
- Too few pathologists with part time research employments (i.e., professors, associate research professors and in general)
- Cumbersome processes regarding legislation and approvals for initiating research, both national and in particular international collaborations
- Decreasing funding possibilities for smaller research groups, not affiliated to large consortiums/excellence centers/CAGs

**SCIENTIFIC PRODUCTION IN THE SPECIALITY**  
**Number of articles in Pathology – Peer-reviewed**

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021       |
|---------------|-----------------|-----------|-----------|-----------|-----------|------------|
| International | Journal article | 58        | 75        | 72        | 57        | 105        |
|               | Letter          | 4         | 1         | 1         |           | 3          |
|               | Review          | 4         | 4         | 6         | 5         | 12         |
| Danish        | Journal article |           | 1         | 1         | 2         | 2          |
|               | Letter          |           |           | 1         |           |            |
| <b>Total</b>  |                 | <b>66</b> | <b>81</b> | <b>81</b> | <b>64</b> | <b>122</b> |

Source: CURIS

**Collaboration 2017-2021**  
**Includes: Articles, Letters, Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 47.0%   | 187              | 4,355     | 23.3                      | 2.12                           |
| Only national collaboration          | 26.4%   | 105              | 1,395     | 13.3                      | 1.18                           |
| Only institutional collaboration     | 26.4%   | 105              | 1,009     | 9.6                       | 1.01                           |
| Single authorship (no collaboration) | 0.2%    | 1                | 3         | 3                         | 1.55                           |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                                     | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|---------------------------------------------|---------------------------------|-------------------------------|
| Acta Oncologica                             | 17                              | 4.311                         |
| PLoS ONE                                    | 15                              | 3.752                         |
| Cancers                                     | 11                              | 6.575                         |
| Oncotarget                                  | 10                              | 5.168                         |
| APMIS                                       | 8                               | 3.428                         |
| British Journal of Cancer                   | 8                               | 9.089                         |
| Pathology Research and Practice             | 7                               | 3.309                         |
| International Journal of Molecular Sciences | 7                               | 6.208                         |
| International Journal of Cancer             | 7                               | 7.316                         |
| BMC Cancer                                  | 6                               | 4.638                         |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Pathology                | 283                                         | 1.67                                     | 1.8                                         | 9.5                                         | 18.4                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Knudsen AM, Halle B, Cédile O, Burton M, Baun C, Thisgaard H, Anand A, Hubert C, Thomassen M, Michaelsen SR, Olsen BB, Dahlrot RH, Bjerkvig R, Lathia JD, Kristensen BW. Surgical resection of glioblastomas induces pleiotrophin-mediated self-renewal of glioblastoma stem cells in recurrent tumors. *Neuro Oncol.* 2021 Dec 29;noab302. doi: 10.1093/neuonc/noab302. Epub ahead of print. PMID: 34964899.
  2. Nielsen PR, Eriksen JO, Lindahl LM, Wehkamp U, Bzorek M, Andersen G, Woetmann A, Iversen L, Ødum N, Litman T, Gjerdrum LMR. Diagnostic Two-Gene Classifier in Early-Stage Mycosis Fungoides: A Retrospective Multicenter Study. *J Invest Dermatol.* 2021 Jan;141(1):213-217.e5. doi: 10.1016/j.jid.2020.04.026. Epub 2020 May 23. PMID: 32454067.
  3. Olsen LM, Engel PJH, Goudkade D, Villanacci V, Thagaard J, Walbech JS, Bohr J, Kupcinkas J, Verhaegh B, Münch A, Guagnozzi D, Fernández-Bañares F, Munck LK, Fiehn AK. Histological disease activity in patients with microscopic colitis is not related to clinical disease activity or long-term prognosis. *Aliment Pharmacol Ther.* 2021 Jul;54(1):43-52. doi: 10.1111/apt.16381. Epub 2021 May 21. PMID: 34018208.
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# PLASTIC SURGERY

REPRESENTING PROFESSOR TINE ENGBERG DAMSGAARD

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## RESEARCH AREAS

### Herlev Hospital

Melanoma and non-melanoma skin cancer; clinical, translational, and register-based studies on diagnosis, treatment, recurrence, mortality, surveillance, and patient empowerment. We evaluate surgical methods for breast reconstruction with focus on safety and complications and patient satisfaction. A special interest in hereditary breast cancer and patient satisfaction and oncologic outcomes after surgery with breast reconstruction. The department offers advanced surgery for lymphedema with micro surgical lympho-venous anastomoses, which we evaluate scientifically. Post-gestational rectus diastasis is another scientific focus area along with a number of other individual studies of plastic surgery procedures.

### Zealand University Hospital

The department provides advanced oncoplastic and microsurgical breast reconstructive techniques and is running several clinical and preclinical research projects related to this topic. Clinical and molecular factors causing painful capsular contracture in implant-breast-reconstructions and the use of structured patient-reported outcome measures after breast cancer reconstruction in order to improve patients follow-up are to examples of research activities in this field. Further, quality of life investigations and register-studies after non-melanoma skin cancer reconstructions as well as clinical studies of electro-chemotherapy in skin-cancer are of special scientific interest. A specific scientific focus is the interdisciplinary treatment of patients suffering from Hidradenitis suppurativa. Together with the department for dermatology, the department serves national function for this specific disease. Another scientific main field is *Tissue Engineering* of in vivo vascularized soft tissue free flaps. The aim is an in vivo creation of axially vascularized and transplantable soft tissue flaps, which enable

stable coverage of complex defects – e.g., with exposed bone. Zealand University Hospital has an international research collaboration and many years of research experience in this field.

### Rigshospitalet

The department carries out research in all fields of the specialty i.e., trauma including burns, congenital malformations (cleft lip and palate, vascular anomalies), melanoma, non-melanoma skin cancers, advanced reconstructive procedures in the reconstructive pathway after oral cancers, sarcomas, breast cancer and lymphedema. Moreover, the department research has broadened widely since the ACROBATIC -center for surgical innovation – was founded, empowering the research to reach national and international even higher standard. Thus, we perform multidisciplinary research with focus on oral cancers, sarcoma, breast cancer, late-effects after treatment for cancer, breast reconstruction (implant-based and autologous procedures).

## INTERNATIONAL COLLABORATION

### Herlev Hospital

Melanoma: From the Melanoma Institute  
Australia: Jonathan R Strech, Richard A Scolyer, Pascale Guitera. From Lund University: Christian Ingvar, Karolin Isaksson

### Zealand University Hospital

Tissue Engineering: Heidelberg University/BG traumacenter Ludwigshafen, Germany: Ulrich Kneser; UT Southwestern, Dallas, USA: Dominic Henn; Medical University Vienna, Austria: Helga Bergmeister; UKSH Lübeck, Germany: Cor de Wit  
Breast cancer reconstruction: UKSH Lübeck, Germany: Dirk Rades, Joachim Rudy, Alexander Katalinic

### Rigshospitalet

Breast reconstruction: UZ Brussels, Department of Plastic and Reconstructive Surgery: Professor Mustapha Hamdi. Breast reconstruction and

lymphedema: Sant Pau Hospital, Barcelona:  
professor Jaume Masia and Gemma Pons.

## **NATIONAL CROSS-DISCIPLINARY COLLABORATORS**

### **Herlev Hospital**

Melanoma: Prof. Inge Marie Svane, Henrik Schmidt, Lars Bastholt, Eva Ellebæk (oncologists), Torben Steiniche (pathology), Helle Hendel (Nuclear medicine), Prof. Stig Bojesen and Børge Nordestgaard, (Clin. Biochemistry), Pernille Envold Bistrup (psychology, epidemiology), prof. Christoffer Johansen (epidemiology), Prof. Suanne Dalton (epidemiology)

Non-melanoma skin cancer: Prof. Julie Gehl (oncology).

Breast cancer: prof. Peer Christiansen, ass. Prof. Tove Tvedskov, prof. Ann Marie Gerdes, prof. Niels Kroman, Pernille Envold Bistrup

### **Zealand University Hospital**

Breast cancer reconstruction: Anne-Vibeke Lænkholm (pathology), Ismail Gögenur (general surgery).

Hidradenitis suppurativa: Gregor Jemec (dermatology).

Non-melanoma skin cancer: Prof. Julie Gehl (oncology).

### **Rigshospitalet**

The department is a big player in the newly established national center for surgical innovation – ACROBATIC, collaborating with clinical researchers at all the university hospitals. The surgeons/clinicians are: breast cancer/breast reconstruction/late-effects: Professor Birgitte Offersen, Professor Peer Christiansen, Associate Professor Tove Tvedskov, Clinical Research Professor Volker Schmidt, Associate Professor Lone Bak Hansen, Associate Professor Jørn Bo Thomsen, Associate Professor Camilla Bille, Professor Robert Zacharia, Professor Jens Ahm Sørensen. Vascular anomalies: Associate Professor Camilla Bille, Associate Professor Thomas Juhler, Professor Olav Bjørn Pedersen. Sarcoma: Professor Thomas Baad Hansen.

## **COLLABORATION WITHIN THE SPECIALTY**

### **Herlev Hospital**

Collaboration with colleagues from Aarhus and Odense University Hospital, and with each other within the Capital Region and with the Zealand Region.

The department participate in several national trials: The RECON study, BREAST AB study and the upcoming PRIME study. We have initiated the national HEBRECA study (hereditary breast cancer), the ctDNA study (melanoma) and the DermLoop study (melanoma).

### **Zealand University Hospital**

Collaboration with colleagues from Odense University Hospital and with each other within the Capital Region.

The department participate in several national trials: BREAST AB study, the ctDNA study (melanoma), the upcoming PRIME study and POSEBL study.

### **Rigshospitalet**

The department collaborates with all the plastic surgery departments in Denmark and initiated the DBCG RT-Recon trial, the BREAST-AB trial and the newly launched POSEBL-study. Participates as well in the ctDNA-study (melanoma). Within the field of vascular anomalies, a new study is being initiated as a multicenter study entailing the three vascular anomalies centers in Denmark. In addition, research in enhanced recovery has been performed in both breast reconstruction as well as reconstruction after head and neck cancers.

## **RESEARCH-BASED TEACHING**

### **Herlev Hospital**

We teach evidence-based clinical medicine/surgery. We perform research in how to diagnose skin cancer lesions and if AI -assisted learning can optimize teaching (DERMloop)

### **Zealand University Hospital**

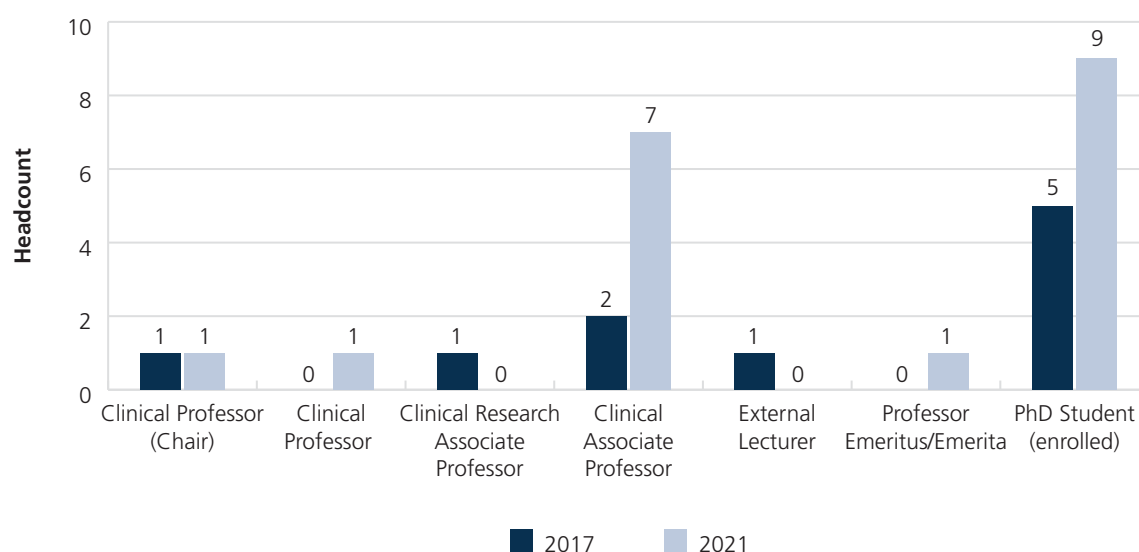
We teach evidence-based clinical medicine/surgery.

### **Rigshospitalet**

The entire teaching platform is based on evidence in clinical health care. Knowledge, projects and trials are evaluated and discussed in regular research meetings for nurses, medical students, PhD-students and surgeons. Moreover, research theory is taught as well (i.e., statistics, literature search etc.)

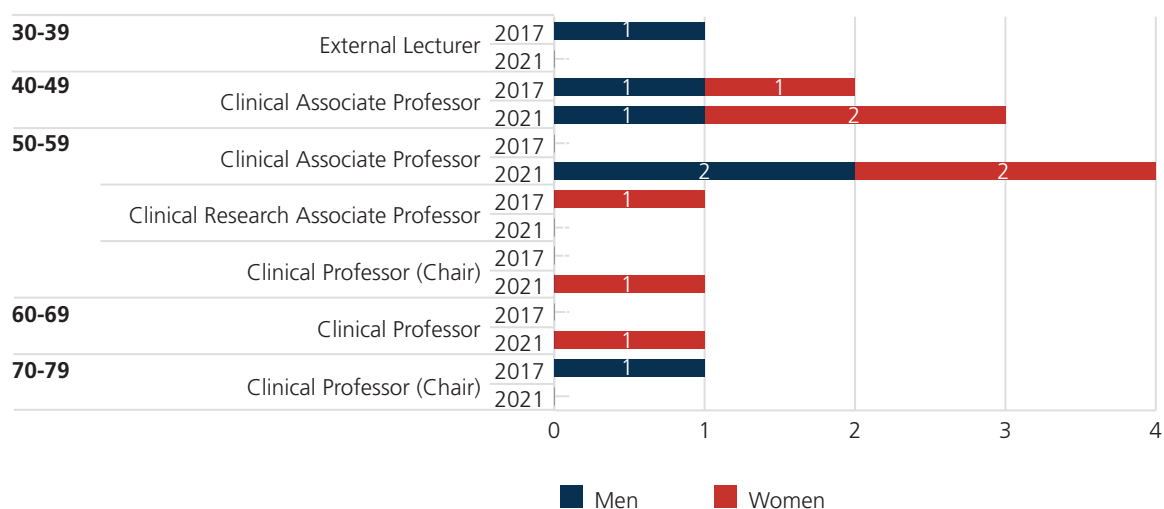
To bring research at the speciality of Plastic Surgery to an even higher level would require better/improved funding and dedicated research staff including research nurses. Additionally, we need funding for PhD students and student researchers. There should be 1 position as clinical assistant/year for a PhD student at each department/hospital.

### Academic Staff in Plastic Surgery 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Plastic Surgery 2017 & 2021



Source: KUPA



### STRENGTHS

- Expertise in melanoma, breast reconstruction and microsurgery, and in translational clinical research concerning autologous stem cell and fat grafting in burns treatment. National and international network with other research groups and active multidisciplinary research activities. High patient flow in especially melanoma, breast reconstruction and microsurgery and uniform centralized treatment nationally enables large research projects. Moreover, focus on in vivo tissue engineering.
- Permanent staff resources associated with Institute of Clinical Medicine:
- Herlev Hospital: One clinical professor, one associate professor (C-level) + 1 C-level vacant
- Rigshospitalet: One clinical professor + one professor emeritus (still active in research and supervising). 2 associate professors (C-level) + 1 C-level vacant
- Zealand University Hospital: One clinical research associate professor, one post-graduate associate professor (B-level)
- 2 post-docs at Rigshospitalet

### WEAKNESSES

- Fewer active senior researchers in the specialty
- Small specialty
- Continuously suffering for a heavy clinical burden
- Surgeons need to see patients and perform surgery to keep up the high level of clinical skills. This is time consuming and takes time off/ focus from research
- Currently, only one senior surgeon (person) in each Hospital is employed with a half time research and teaching and half time regular clinical obligations.

## SWOT

### OPPORTUNITIES

- Four PhD students at Rigshospitalet and four at Herlev Hospital, one at Zealand University Hospital
- A growing number of young clinical researchers are performing clinical research supervised by the post-docs and PhD-students and associate professors
- Formal research units have been established at Rigshospitalet and Herlev Hospital and at Zealand University Hospital

### THREATS

- Heavy clinical burden takes time from research from the clinical associate professors and specialists
- Applying for funding is time consuming and difficult to achieve
- Young colleagues interested in research are employed for short periods of time during their specialist training years, which makes it difficult to engage them in long-term scientific projects.
- Specialists do not have curricular need to document research activities, therefore it is difficult to motivate colleagues for the importance of research in daily clinic.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Plastic Surgery – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 11        | 17        | 13        | 9         | 27        |
|               | Letter          |           | 1         |           |           | 1         |
|               | Review          | 3         | 1         |           | 3         | 4         |
| Danish        | Journal article | 4         | 6         | 5         | 3         | 1         |
|               | Letter          | 1         |           |           | 1         |           |
| <b>Total</b>  |                 | <b>19</b> | <b>25</b> | <b>18</b> | <b>16</b> | <b>33</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 18.7%   | 20               | 235       | 11.8                      | 1.54                           |
| Only national collaboration          | 26.2%   | 28               | 465       | 16.6                      | 2.39                           |
| Only institutional collaboration     | 55.1%   | 59               | 264       | 4.5                       | 0.48                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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### TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                  | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|----------------------------------------------------------|---------------------------------|-------------------------------|
| Ugeskrift for Laeger                                     | 21                              |                               |
| Journal of Plastic, Reconstructive and Aesthetic Surgery | 12                              | 3.022                         |
| Journal of Plastic Surgery and Hand Surgery              | 7                               | 1.295                         |
| International Journal of Surgery Case Reports            | 4                               |                               |
| Aesthetic Surgery Journal                                | 3                               | 4.485                         |
| Plastic and Reconstructive Surgery - Global Open         | 3                               |                               |
| Lymphatic Research and Biology                           | 2                               | 2.349                         |
| Plastic and Reconstructive Surgery                       | 2                               | 5.169                         |
| Journal of the American Academy of Dermatology           | 2                               | 15.487                        |
| International Journal of Molecular Sciences              | 2                               | 6.208                         |

Source: SciVal and JCR

### FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Plastic Surgery          | 74                                          | 1.18                                     | 1.4                                         | 5.4                                         | 13.5                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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### 3 most prominent publications from 2021

1. Koepple C, Zhou Z, Huber L, Schulte M, Schmidt K, Gloe T, Kneser U, Schmidt VJ\*, de Wit C\*. Expression of Connexin43 Stimulates Endothelial Angiogenesis Independently of Gap Junctional Communication In Vitro. *Int J Mol Sci* 2021 Jul 9;22(14):7400. doi: 10.3390/ijms22147400. [\* contributed equally]
  2. Kalstrup J, Willert CB, Weitemeyer MBM, Chakera AH, Hölmich LR. Immediate direct-to-implant breast reconstruction with acellular dermal matrix: Evaluation of complications and safety. *Breast* 2021. 60: 192-198.
  3. Lauritzen E, Engberg Damsgaard T. Use of Indocyanine Green Angiography decreases the risk of complications: A systematic review and meta-analysis. *JPRAS* 2021; 74 (8):1703-1707 doi:10.1016/j.bjps.2021.03.034
-

# PSYCHIATRY

## REPRESENTING PROFESSOR MERETE NORDENTOFT

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### RESEARCH AREAS AND TRANSLATIONAL ASPECTS

Psychiatric research is carried out in Mental Health Services in the Capital Region of Denmark (RHP) and Psychiatry Region Zealand (PRZ)).

In RHP, research is organized in a network of psychiatric professors and associate professors, senior researchers and PhD-students from different research milieus. We conduct basic psychiatric research with neurobiological, psychophysiological, psychopathological and neurocognitive assessments aiming for better understanding of pathogenesis. We utilize the unique, high quality national registers, and we link information from registers with biological material from national biobanks. We carry out large high quality randomized clinical trials testing pharmacological and psychosocial interventions. We combine quantitative and qualitative research methods to provide as with a better understanding of mental health and culture.

In PRZ, research is organized in a central research unit supporting local emerging environments. The focus is on personality disorders, dimensional psychopathology, Body& Mind and psychotherapy. PRZ carries out multicenter RCTs.

### INTERNATIONAL COLLABORATION

Many international visiting professors and a strong international collaboration with research groups all over the world.

### NATIONAL CROSS-DISCIPLINARY COLLABORATORS (CAGS, OTHER)

Collaboration with researchers in all five Danish Regions and with research departments at University of Copenhagen.

### COLLABORATION WITHIN THE SPECIALITY

Strong collaboration between psychiatric researchers at all Danish Regions.

### RESEARCH-BASED TEACHING

Research based pre- and postgraduate teaching. We carry out pre-graduate education research, currently an RCT of the effect of e-training with authentic patient videos, and previously testing new communication focused topics in the pre-clerkship lectures. We have a postgraduate PhD-program in psychiatry with a growing number of training courses. We are part of the Neuroscience Academy Denmark, funded by the Lundbeck Foundation

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To bring research at the speciality of Psychiatry to an even higher level we will need better possibilities for permanent (or longer term) positions for senior researchers (e.g., doctors, psychologists, and statisticians), and university affiliation for nurses, psychologist, and other academia within IKM. Clinicians should be allowed better opportunities for participating in research (e.g., as combined clinical- and research positions), and have time to attend meeting where research results are presented.

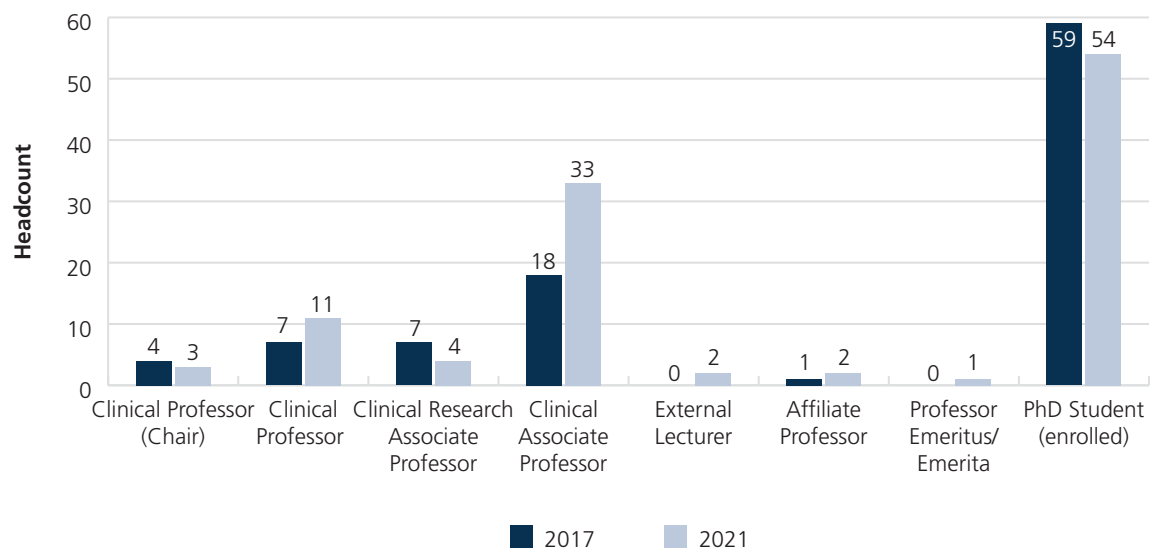
Furthermore, we need more top-down priority of research i.e., making room for clinical research in the day-to-day practice.

We also need more collaboration across the five regions to ensure sufficient power in RCTs.

Thematic means from external funds aimed at solving the major (non-biological) problems in psychiatry that could attract high-ranking researchers permanently.

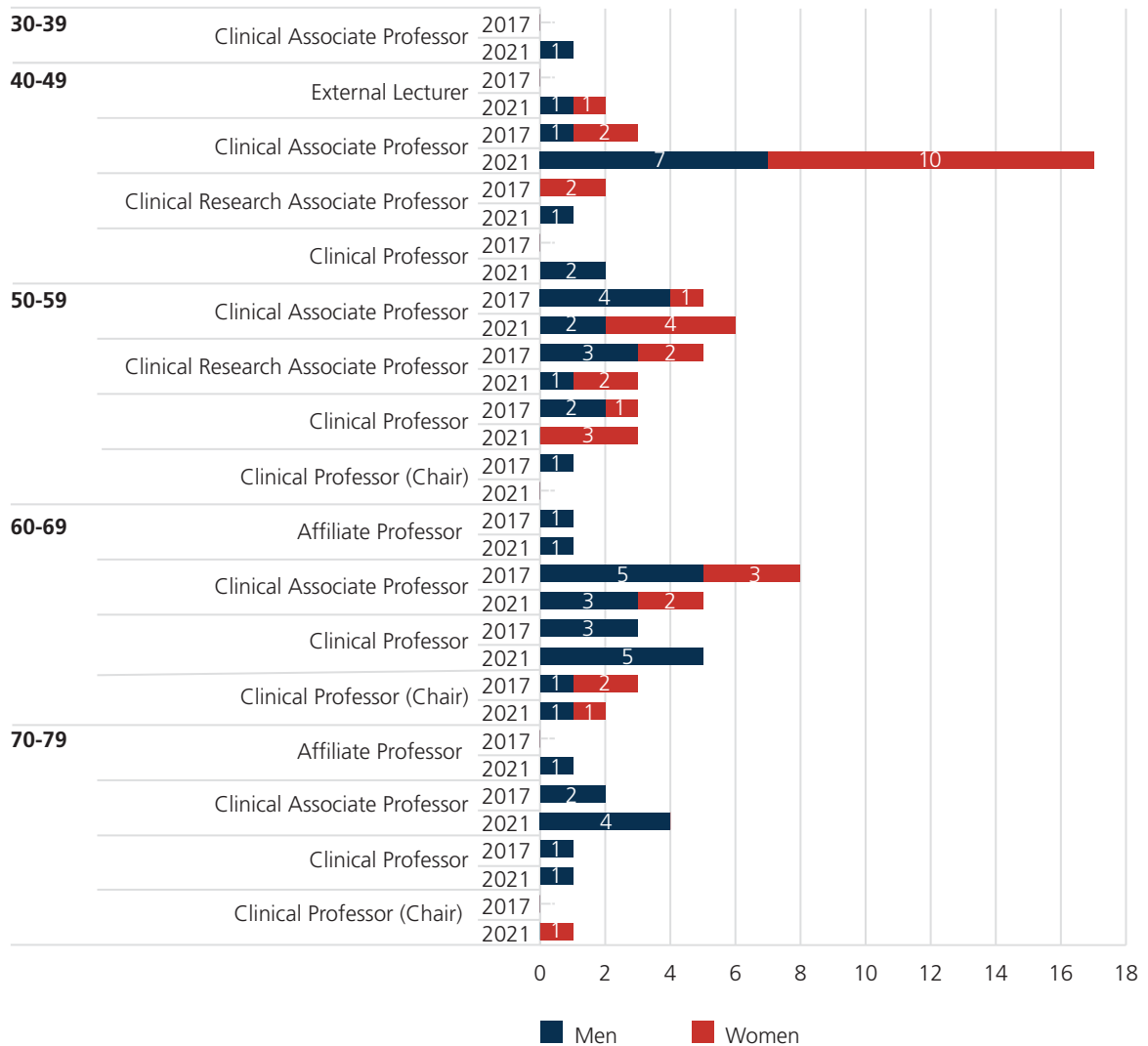
Lastly, we need to Improve research infrastructure (statistician; legislation; accounting etc.)

### Academic Staff in Psychiatry 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Psychiatry 2017 & 2021



Source: KUPA

### STRENGTHS

- Access, experience and expertise in epidemiological research, RCTs, neuroimaging techniques, and well-characterized patient cohorts.
- Access and experience in animal models for psychosis, depression and drug abuse. A large lab with animal facilities and extensive possibilities for lab analyses will be ready and available for all psychiatric researchers
- The number of professors and associate research professors has increased rapidly. The strongest research milieus are large with 30-60 researchers
- The theme-based collaboration on anxiety, depression and personality disorders and the distribution of a network of research nurses provide for researcher-clinician exchange fora across all units in the region

### WEAKNESSES

- We are short of easy access to senior statisticians
- The capacity for neuroimaging is limited
- Very limited possibilities for funding of post doc positions, and no possibility for post-docs with university affiliation

## SWOT

### OPPORTUNITIES

- Unique opportunities due to our access to unique data resources and our strong infrastructure
- Unexploited possibilities for collaboration and transfer of knowledge between research groups including cross-regional shared positions and co-production of new PhD-courses.
- Possibilities for attracting world leading scientists as guest professors and collaborators
- Strong tradition for large clinical trials and a very good basis for recruitment of participants to trials

### THREATS

- Risk of an increasing split between psychiatric research and clinical practice, mainly because of the increased production and the increasing demands of professionalism in research
- The increasing level of documentation of safety in research makes it necessary to set aside specific resources for managing all the necessary documents.
- Waiting time for permissions in regional ethical committee, data surveillance agency and legal departments is very challenging and unacceptably time consuming
- Difficulties in getting funding for post docs and senior researchers, especially if they are not medical doctors. We may lose expertise in molecular biology, epidemiology, psychology, and engineering because of the limited career track possibilities.



**SCIENTIFIC PRODUCTION IN THE SPECIALITY**  
**Number of articles in Psychiatry – Peer-reviewed**

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 176        | 206        | 240        | 236        | 269        |
|               | Letter          | 3          | 3          | 6          | 8          | 3          |
|               | Review          | 30         | 30         | 27         | 21         | 23         |
| Danish        | Journal article | 11         | 17         | 10         | 4          | 1          |
|               | Review          |            |            |            |            | 8          |
| <b>Total</b>  |                 | <b>220</b> | <b>256</b> | <b>283</b> | <b>269</b> | <b>304</b> |

Source: CURIS

**COLLABORATION 2017-2021**  
**Includes: Articles, Letters, Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 53.0%   | 684              | 23,313    | 34.1                      | 2.83                           |
| Only national collaboration          | 32.7%   | 422              | 4,644     | 11                        | 1.08                           |
| Only institutional collaboration     | 13.3%   | 172              | 2,117     | 12.3                      | 0.93                           |
| Single authorship (no collaboration) | 0.9%    | 12               | 63        | 5.2                       | 0.67                           |

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**TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                        | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|--------------------------------|---------------------------------|-------------------------------|
| Acta Psychiatrica Scandinavica | 49                              | 7.734                         |
| Schizophrenia Research         | 45                              | 4.662                         |
| Ugeskrift for Laeger           | 41                              |                               |
| Journal of Affective Disorders | 40                              | 6.533                         |
| Nordic Journal of Psychiatry   | 36                              | 2.099                         |
| Psychological Medicine         | 31                              | 10.592                        |
| Psychiatry Research            | 26                              | 11.225                        |
| Schizophrenia Bulletin         | 24                              | 7.348                         |
| Frontiers in Psychiatry        | 24                              | 5.435                         |
| JAMA Psychiatry                | 22                              | 25.941                        |

*Source: SciVal and JCR*

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**FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES****Includes: Articles, Letters, Reviews and Conference articles (2017-2020)**

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Psychiatry               | 999                                         | 2.12                                     | 3.9                                         | 11.3                                        | 19.4                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

*Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited*

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### 3 most prominent publications from 2021

1. Sigvard AK, Nielsen MØ, Gjedde A, Bojesen KB, FuglØ D, Tangmose K, Kumakura Y, HeltØ K, Ebdrup BH, Jensen LT, Rostrup E, Glenthøj BY.  
Dopaminergic Activity in Antipsychotic-Naïve Patients Assessed With Positron Emission Tomography Before and After Partial Dopamine D2 Receptor Agonist Treatment: Association With Psychotic Symptoms and Treatment Response.  
Biol Psychiatry. 2022 Jan 15;91(2):236-245. doi: 10.1016/j.biopsych.2021.08.023.
  2. Posselt CM, Albert N, Nordentoft M, Hjorthøj C.  
The Danish OPUS Early Intervention Services for First-Episode Psychosis: A Phase 4 Prospective Cohort Study With Comparison of Randomized Trial and Real-World Data. Am J Psychiatry. 2021;178(10):941-51.
  3. Reinholdt N, Hvenegaard M, Christensen AB, Eskildsen A, Hjorthøj C, Poulsen S, Arendt MB, Rosenberg NK, Gryesten JR, Aharoni RN, AlrØ AJ, Christensen CW, Arnfred SM.  
"Transdiagnostic versus Diagnosis-Specific Group Cognitive Behavioral Therapy for Anxiety Disorders and Depression: A Randomized Controlled Trial."  
Psychother Psychosom. 2021 Jun 10:1-14. doi: 10.1159/000516380.
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# RADIOLOGY

## REPRESENTING PROFESSOR ADAM ESPE HANSEN

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- Artificial Intelligence: smart AI-based protocols, AI-based detection and delineation of lesions or tumors, osteoarthritis and lung diseases on radiographs, stroke on MRI, GTV, NLP, AI-based reduction of radiation dose. Building of a national imaging framework for imaging data to facilitate research, test and validation of existing and future AI algorithms in radiology.
- Collaboration with KU, data scientists, industry partners, other medical universities in Denmark and abroad. Foundation of Radiological AI testcenter (RAIT).
- High-resolution ultrasound: development and human trials in collaboration with DTU, Dept. of Biomedical Science (KU) and clinical specialties.
- Simulation training in ultrasound: Collaboration with CAMES.
- Weight bearing musculoskeletal cross-sectional imaging.
- Precision medicine in oncology: MR imaging of brain tumor physiology for treatment response monitoring and development of novel treatment strategies. Participation in national DCCC Brain Tumor Center (with oncology, neurosurgery, pathology).
- International collaboration with European countries and the US in Artificial Intelligence, Interventional Radiology, photon-counting CT, prostate cancer and MRI, arthritis, cross-sectional weight-bearing musculoskeletal imaging and MRI contrast media.
- Collaboration with Dept. of Nuclear Medicine Rigshospitalet (AI and Hybrid Imaging).
- Postgraduate regional education about AI in radiology in collaboration between RAIT, DIKU and Center for regional education (CRU) in RegionH.
- Collaboration between DTU and RAIT to develop new AI algorithms for quantifying soft and bony tissue compositions in joints and muscles.
- Imaging Partner in the International reference center for sports imaging research at

Bispebjerg hospital and EULAR Center of Excellence, the Parker Institute.

- Board member in the CAG initiative of osteoarthritis ROAD and in the CAG initiative of Physical activity and sport in clinical medicine.
  - Individualized attention to PhD students.
  - Initiation of Magnetic Resonance Imaging PhD course.
- 

To bring research at the speciality of Radiology to an even higher level would require more midlevel associate professors with dedicated research time needed to care for continuity of research, and to support PhD students. Also, to ensure the necessary clinical implementation after successful research projects.

The Department should take advantage of the ability to AI programs as a resource to obtain tools for investigative research studies in collaboration with software experts.

Furthermore, we need continuous elaboration on early success in research areas.

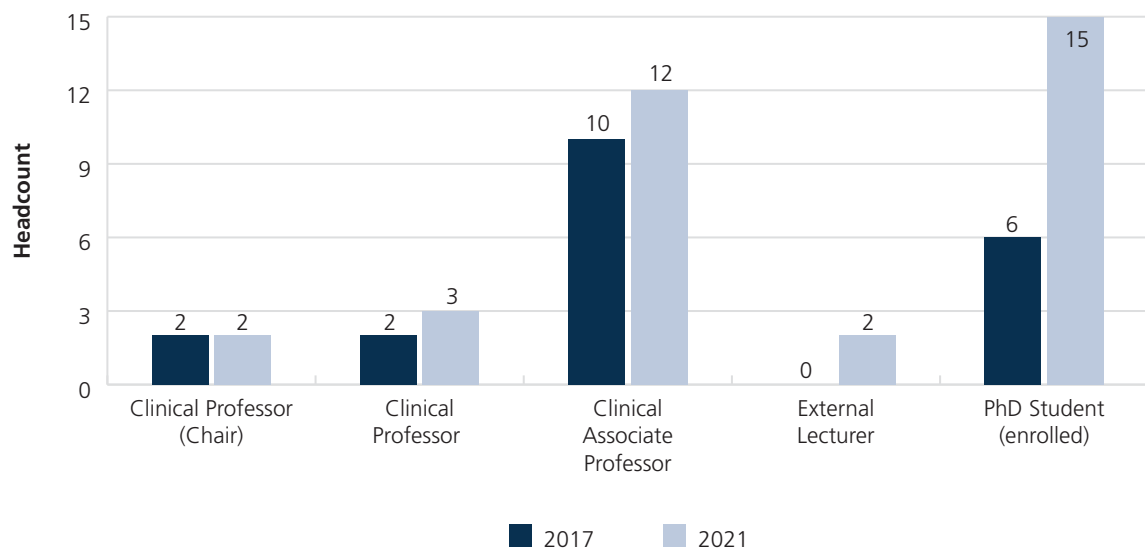
The facilities (office, meeting) need to be located close to the examination areas in the departments and we need access to the most modern equipment.

There is need for better visibility in the pregraduate MD program to recruit future colleagues.

Management of research data is both a challenge from a legal and practical perspective. The Hospital and IT section of Region Hovedstaden need to support IT infrastructure for research data storage much more actively.

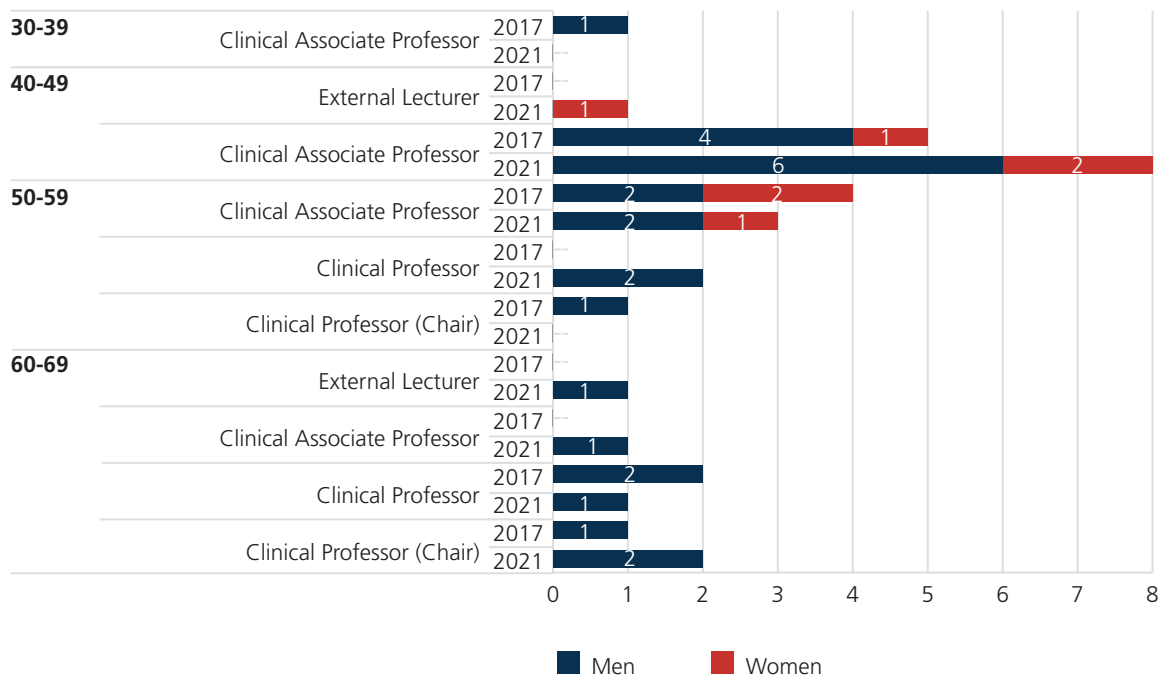
Lastly, we need easier application and faster evaluation from Ethical Committees and data protection agencies.

### Academic Staff in Radiology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Radiology 2017 & 2021



Source: KUPA

### STRENGTHS

- Positive relationship between house staff and PhD students promotes empowerment with an emphasis on students' active participation in their own education, and in quality improvement activities and advocacy projects
- Diverse patient population and pathology, including excellent exposure to cases
- Resources from the medical school, with opportunities to mentor medical students
- Radiology plays a central role in development of AI, personalized medicine and there are many active collaborations across specialties.

### WEAKNESSES

- Increasing clinical demands, where mentors are unable to spend the needed time on a single PhD student, which disrupts the mentorship goal of the program.
- Research funding nationwide is difficult especially in the diagnostic field.
- Increasing clinical demands may decrease the available time slots for research examinations.
- Excessive workload for radiologists due to continuing and exponentially increase of number of images and data size decreases the time for research, which may not be provided.

## SWOT

### OPPORTUNITIES

- Increase the visibility of radiology to medical students including (mandatory) visits to radiology departments.
- Realize the research potential in the large amount of diagnostic imaging performed daily.
- Realize the potential of AI – testing, implementing and inspiring other clinical specialties to use AI.
- Take advantage of the teaching and research potential from staff having acquired a PhD degree.

### THREATS

- Recruiting in a competitive marketplace with other large PhD programs.
- Increasing clinical production, resulting in less time for dedicated research and teaching.
- Minor visibility in the pregraduate curriculum.
- Increasing demands for research and data applications with lack of transparency/relevancy for the users and without professional assistance.

**SCIENTIFIC PRODUCTION IN THE SPECIALITY**  
**Number of articles in Radiology – Peer-reviewed**

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 57        | 48        | 48        | 47        | 61        |
|               | Letter          | 1         |           |           | 2         |           |
|               | Review          | 4         | 7         | 15        | 11        | 10        |
| Danish        | Journal article | 1         | 3         |           |           | 1         |
|               | Letter          |           |           |           | 2         |           |
|               | Review          |           |           |           |           | 2         |
| <b>Total</b>  |                 | <b>63</b> | <b>58</b> | <b>63</b> | <b>62</b> | <b>74</b> |

Source: CURIS

**Collaboration 2017-2021**  
**Includes: Articles, Letters, Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 38.0%   | 115              | 3,011     | 26.2                      | 2.46                           |
| Only national collaboration          | 33.3%   | 101              | 1,252     | 12.4                      | 1.27                           |
| Only institutional collaboration     | 28.4%   | 86               | 1,093     | 12.7                      | 1.34                           |
| Single authorship (no collaboration) | 0.3%    | 1                | 0         | 0                         | 0                              |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                                 | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|-------------------------------------------------------------------------|---------------------------------|-------------------------------|
| Diagnostics                                                             | 23                              | 3.992                         |
| European Radiology                                                      | 15                              | 7.034                         |
| Acta Radiologica                                                        | 14                              | 1.701                         |
| Ultrasound in Medicine and Biology                                      | 14                              | 3.694                         |
| Ultrasound International Open                                           | 11                              |                               |
| IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control | 9                               | 3.267                         |
| Osteoarthritis and Cartilage                                            | 8                               | 7.507                         |
| Ugeskrift for Laeger                                                    | 7                               |                               |
| European Journal of Vascular and Endovascular Surgery                   | 7                               | 6.427                         |
| Ultraschall in der Medizin                                              | 6                               | 5.445                         |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Radiology                | 228                                         | 1.94                                     | 4.4                                         | 11.4                                        | 20.6                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited



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### 3 most prominent publications from 2021

1. Nayahangan LJ, Dietrich CF, Nielsen MB. Simulation-based training in ultrasound - where are we now? *Ultraschall Med* 2021 Jun;42(3):240-244 doi: 10.1055/a-1352-5944
  2. Døssing A, Müller FC, Becce F, Stamp L, Bliddal H, Boesen M. Dual-Energy Computed Tomography for Detection and Characterization of Monosodium Urate, Calcium Pyrophosphate, and Hydroxyapatite: A Phantom Study on Diagnostic Performance. *Invest Radiol*. 2021 Jul 1;56(7):417-424.
  3. Nayahangan, L.J., Albrecht-Beste, E., Konge, L., Brkljačić B., Catalano C., Ertl-Wagner B, Riklund K & Nielsen MB. Consensus on technical procedures in radiology to include in simulation-based training for residents: a European-wide needs assessment. *Eur Radiol* 31, 171–180 (2021) <https://doi.org/10.1007/s00330-020-07077-0>
-

# SURGERY

## REPRESENTING PROFESSOR ISMAIL GÖGENUR

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The research areas covered by the specialty are distributed within major research areas with focus on development of surgical technique, perioperative optimization in surgery, development of personalized medicine within surgery and focus on evidence-based medicine in the specialty.

Within the subspecialties an increasing focus has been placed towards certain subgroups of patients such as patients undergoing GI cancer surgery and emergency surgery.

The research activities are increasingly multidisciplinary involving collaboration between researchers within different surgical specialties and between researchers and methodological experts within epidemiology, data science, and translational research. This has resulted in generation of and strengthening and consolidation of research environments where major activities are seen within the development of technological improvements with intraoperative imaging, robotic surgery and different Artificial Intelligence based methodologies for patient monitoring and development of prediction models in the patient trajectory. Research is interdisciplinary leading to strong collaborations and high impact publications not only within the field of surgery but also anesthesia and perioperative medicine.

Based on the Danish registries including the national clinical quality databases there are several high impact publications within the area of abdominal wall surgery, GI cancer surgery, emergency surgery and breast cancer surgery. In the basic science area of tissue healing and in the oncological area, transcriptomic research and preclinical studies are performed to understand mechanisms behind normal versus diseased tissues in wound healing and identify new targets in the tumor microenvironment respectively. With more than 1.400 new cases of primary breast cancer every year with the centralized of breast

cancer surgery at HGH the center is one of the largest in Europe conducting research in both development of new operative and perioperative techniques and nurse care in the patient trajectory. Finally, endoscopic diagnostics and treatments (both upper GI and lower GI) are in the core of surgical minimally invasive procedures with developments of new techniques leading to new treatments in upper and lower GI diseases and metabolic diseases.

The research focus areas in the hospitals of the Capital Region of Copenhagen (RHG, HGH, HAH, BFH, NOH) and region of Zealand (ZUH, NSR) are focused on the following topics

- Personalized medicine within upper and lower GI-cancer involving translational and data science methodologies (ZUH, RHG)
- Robotic surgery within upper GI surgery including generation of robotic surgery training curriculum (RHG)
- Evidence-based Medicine (HGH)
- Intraoperative perfusion imaging (RHG, ZUH)
- Abdominal wall hernias (BFH, HGH, ZUH)
- Tissue healing and modelling (BFH, RH)
- Perioperative optimization in emergency surgery (NOH, HAH, HGH, ZUH, NSR)
- Perianal diseases (BFH)
- Inflammatory bowel disease (BFH, HGH, HAH)
- Breast cancer surgery (HGH)
- Prehabilitation in cancer surgery (ZUH, RHG)
- Fluid balance monitoring (HGH)
- Post operative rehabilitation (HGH)
- Endoscopic diagnostics and treatments (all hospitals)

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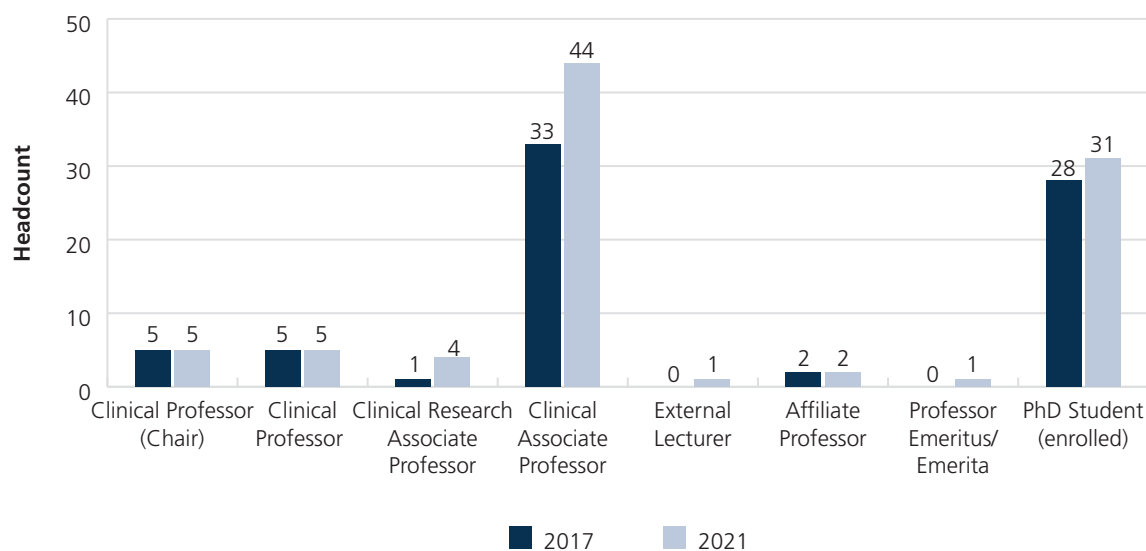
With the huge increase in number of patients that will need surgery in the future and a demographic development resulting in a higher group of patients with comorbidities that will need surgical intervention, there is an urgent need for focus on how research can facilitate improved patient care.

The national initiatives on generating larger regional and national research networks are highly warranted and should be an area of focus in the future for the surgical specialty and for the development of clinical research within the surgical specialty. At the same time, the interdisciplinary collaboration is also necessary for both an increase in quality and quantity.

A limitation in the process towards network generation is lack of a research infrastructure that can support the clinical research. This should be a focus area in the future.

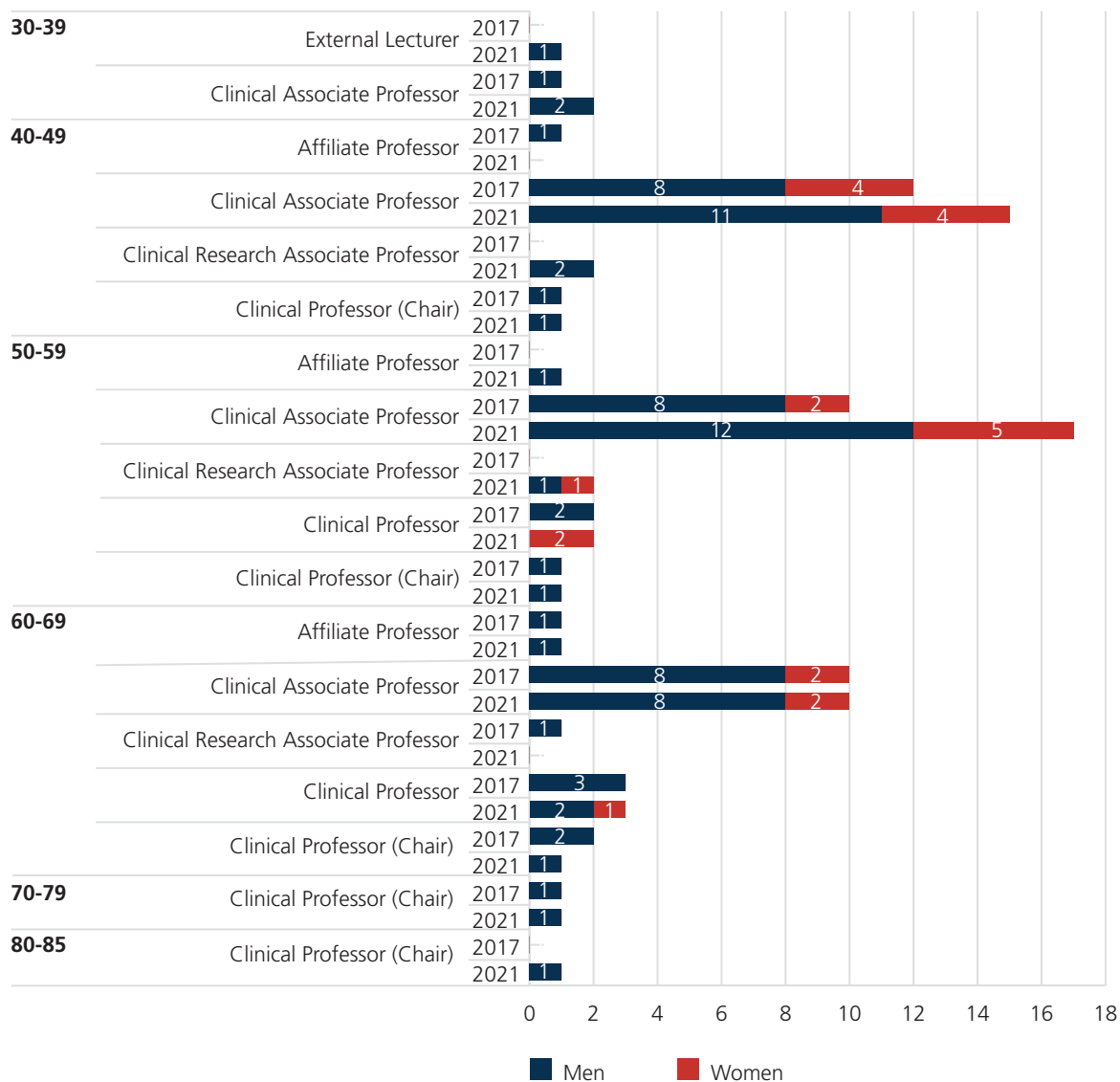
Surgical research methodology has its limitation concerning the design possibilities. This can be a limitation in the funding opportunities where funders may be more prone to support research methodologies with more rigorous design within other medical specialties and in particular basic science. There is a need for coordinated cross-sectional and cross-professional efforts on regional and hospital level to facilitate the further possibilities to increase surgical research as the demand for better patient care is increasing drastically within the next few years.

### Academic Staff in Surgery 2017 & 2021 - Headcount



Source: KUPA

## Age and Gender distribution of Academic Staff in Surgery 2017 & 2021



Source: KUPA

### STRENGTHS

- Strong interdisciplinary research environments
- High production of research within the epidemiological research area involving more and more Danish and international registries leading to good real-world evidence generation
- Increased activity within the generation of evidence-based medicine in the surgical specialty
- Research within robotic surgery and training
- Research within the topic of personalized medicine in surgery

### WEAKNESSES

- Not enough cross institutional research activities leading to only few research networks
- Very few researchers with a nursing background
- Lack of good interdisciplinary research networks involving surgical, anaesthesiologic, and nursing research leading to silo generation in the research focused on the perioperative period
- Poor integration of research in diagnostic modalities within surgery

## SWOT

### OPPORTUNITIES

- Clinical research and patient care are likely to benefit from studies on artificial intelligence aided tools in detection/diagnosis and treatment of patients
- Make postdoc research positions more attractive in order to have them maintain research activity during the certification period.
- Creating platforms within robotic surgery where the platform can be utilized to develop surgical decision making through physiological measurements, integration of big data in the operating room and imaging during surgery
- Focus on cross-sectional research, with a focus on rehabilitation and long-time benefits

### THREATS

- Increasing high workload for the main clinical staff makes it impossible for them to contribute to research, mainly full-time or part-time researchers can do it
- Funding is increasingly a problem and co-funding by the hospital may be a problem on several hospitals
- There is need for a way that young researchers can maintain their university connection after they finish a PhD until they can obtain a position as associate professor

**SCIENTIFIC PRODUCTION IN THE SPECIALITY**  
**Number of articles in Surgery – Peer-reviewed**

|               |                 | 2017       | 2018       | 2019       | 2020       | 2021       |
|---------------|-----------------|------------|------------|------------|------------|------------|
| International | Journal article | 165        | 153        | 160        | 147        | 185        |
|               | Letter          | 3          |            | 3          | 3          | 10         |
|               | Review          | 21         | 18         | 13         | 29         | 27         |
| Danish        | Journal article | 8          | 14         | 12         | 4          | 3          |
|               | Letter          | 1          | 1          | 1          |            |            |
|               | Review          |            | 1          |            |            | 3          |
| <b>Total</b>  |                 | <b>198</b> | <b>187</b> | <b>189</b> | <b>183</b> | <b>228</b> |

Source: CURIS

**Collaboration 2017-2021**  
**Includes: Articles, Letters, Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 27.9%   | 264              | 6,766     | 25.6                      | 2.74                           |
| Only national collaboration          | 33.5%   | 317              | 3,724     | 11.7                      | 1.25                           |
| Only institutional collaboration     | 38.0%   | 359              | 3,525     | 9.8                       | 1.28                           |
| Single authorship (no collaboration) | 0.6%    | 6                | 85        | 14.2                      | 2.38                           |

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## TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                                    | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|------------------------------------------------------------|---------------------------------|-------------------------------|
| Ugeskrift for Laeger                                       | 47                              |                               |
| Danish Medical Journal                                     | 36                              | 1.865                         |
| Acta Anaesthesiologica Scandinavica                        | 29                              | 2.274                         |
| Colorectal Disease                                         | 27                              | 3.917                         |
| Hernia : the journal of hernias and abdominal wall surgery | 23                              | 2.920                         |
| Scandinavian Journal of Gastroenterology                   | 23                              | 3.027                         |
| International Journal of Colorectal Disease                | 21                              | 2.796                         |
| Acta Oncologica                                            | 21                              | 4.311                         |
| Surgical Endoscopy and Other Interventional Techniques     | 20                              | 3.453                         |
| British Journal of Surgery                                 | 18                              | 11.122                        |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Surgery                  | 713                                         | 1.64                                     | 2.2                                         | 9.1                                         | 15.7                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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### 3 most prominent publications from 2021

1. Nayahangan, L.J., Albrecht-Beste, E., Konge, L., Brkljačić B., Catalano C., Ertl-Wagner B, Riklund K & Nielsen MB. Consensus on technical procedures in radiology to include in simulation-based training for residents: a European-wide needs assessment. *Eur Radiol* 31, 171–180 (2021) <https://doi.org/10.1007/s00330-020-07077-0>
  2. Baker JJ, Öberg S, Rosenberg J. Reoperation for Recurrence is Affected by Type of Mesh in Laparoscopic Ventral Hernia Repair: A Nationwide Cohort Study. *Ann Surg*. 2021 epub ahead of print doi:10.1097/SLA.0000000000005206
  3. Alexander Bonde, Kartik M Varadarajan, Nicholas Bonde, Anders Troelsen, Orhun K Muratoglu, Henrik Malchau, Anthony D Yang, Hasan Alam, Martin Sillesen. Assessing the utility of deep neural networks in predicting postoperative surgical complications: a retrospective study. *Lancet Digit Health*. 2021 Aug;3(8):e471-e485
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# UROLOGY

## REPRESENTING PROFESSOR ANDREAS RØDER

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The specialty of Urology includes benign diseases, urogenital cancers, and kidney transplantation. There are urological departments located at Rigshospitalet-Glostrup, Herlev-Gentofte, and Sjællands Universitetshospital. All are involved in both investigator-initiated clinical trials and international sponsor-initiated clinical trials (phase 1-4) targeting the epidemiology, diagnosis, treatment, surgical techniques, and rehabilitation of urological diseases, including:

### **PROSTATE CANCER:**

Research on all stages of the disease, including pharmaco-epidemiology, treatment strategies (surgical and pharmaceutical), biomarkers and diagnostic tools.

A cross-disciplinary collaboration with Copenhagen Academy for Medical Education focuses on surgical skills and learning techniques.

### **BLADDER CANCER:**

Surgical complications, recurrence, long-term mortality, and treatment of bladder cancer, including the

World's first blinded RCT comparing open vs. robotic surgery.

### **RENAL CANCER:**

Surgical techniques, outcomes, epidemiology, biomarkers, and genetics.

### **KIDNEY TRANSPLANTATION:**

Surgical complications, including an upcoming RCT comparing open vs. robotic kidney transplantation.

### **ANDROLOGY:**

Erectile dysfunction including treatment and association with cardiovascular disease, surgical sperm retrieval, fertility preservation in male cancer survivors, testicular torsion and testicular microlithiasis. A cross-disciplinary collaboration with Department of Cardiology, Herlev-Gentofte

Hospital and Department of Growth and Reproduction, Rigshospitalet.

### **BENIGN PROSTATE HYPERPLASIA:**

RCT comparing prostatic artery embolization vs. transurethral microwave thermotherapy.

Collaboration between Herlev-Gentofte Hospital and Rigshospitalet.

Research on surgical management of male urinary incontinence.

As a new initiative, junior urological researchers at Rigshospitalet have organized a research-based workshop for medical students, including poster presentations and training of practical skills.

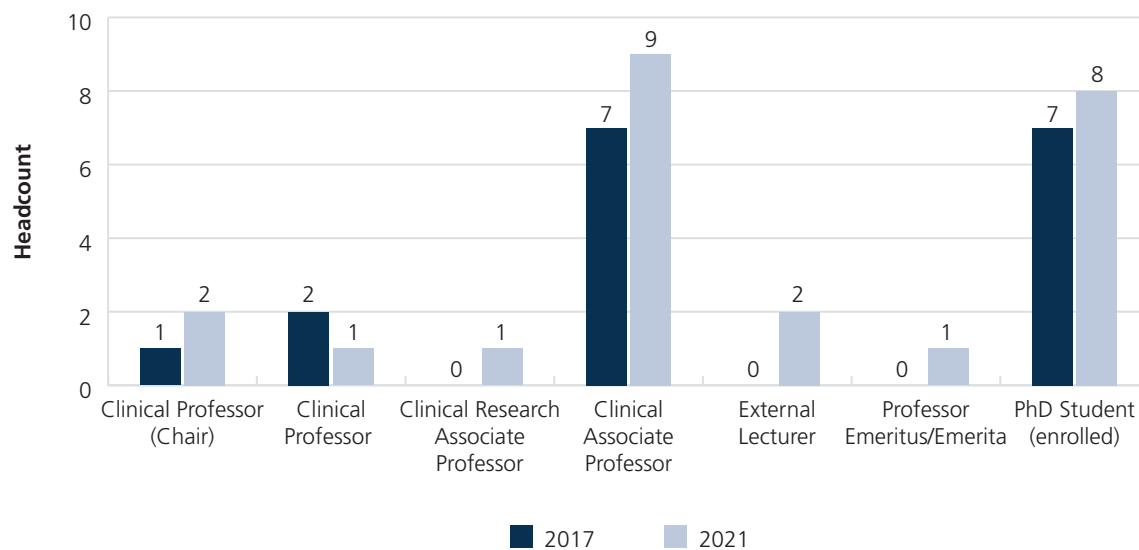
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To bring research at the speciality of Urology to an even higher level would require a workload on key clinical researchers is massive with limited time allocated for research. Significant portions of this time are tied up in applying for approval of projects through relatively complicated and lengthy processes. A streamlining of these and shortening of the waiting time would be very helpful.

In addition, clinical research is highly dependent on raising funds which is time-consuming, yet the success rate is often low. Additional funding and investments from both public and private partners are needed to ensure clinical research of the highest level in the future.

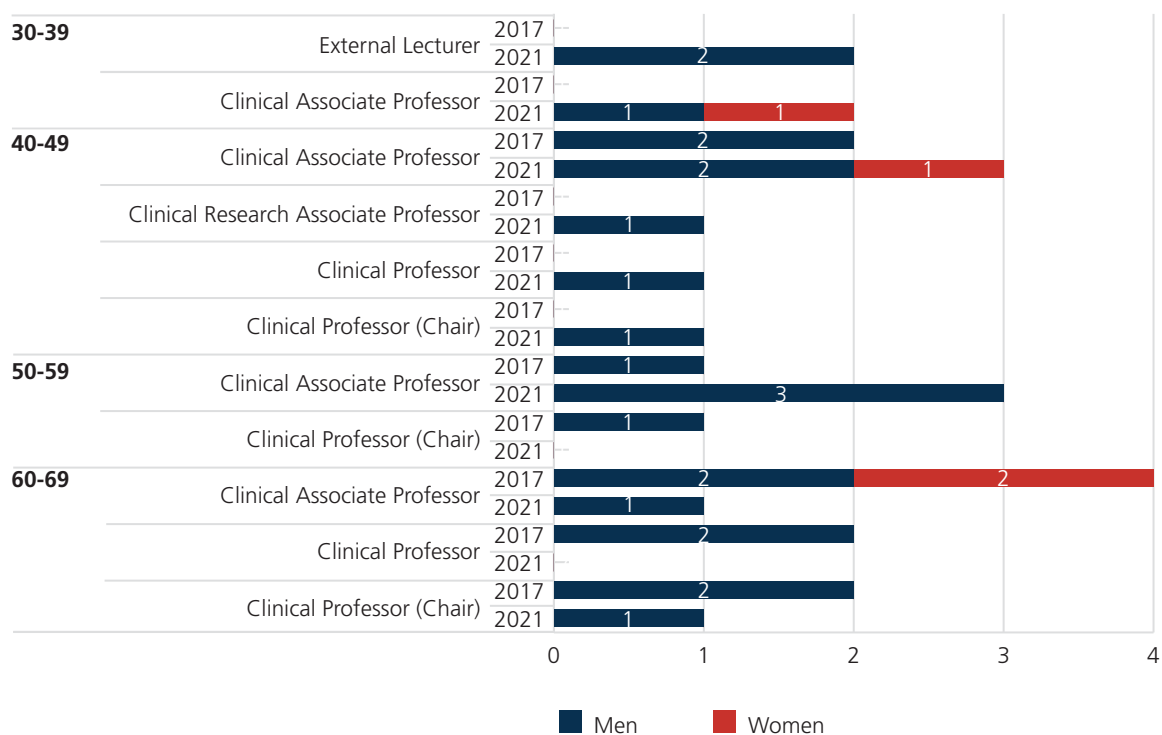
Furthermore, PhD students are typically recruited locally among young doctors and research active medical students previously affiliated to local research units. Obligatory advertisements on a public platform could be a way of further strengthening collaboration within the specialty - and shed light on possible cross-disciplinary and translational research collaborations.

### Academic Staff in Urology 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Urology 2017 & 2021



Source: KUPA

### STRENGTHS

- Well defined specialty with a high number of patient referrals yearly
- Increase in research activities and collaborations within the specialty
- Strong track record of industrial collaborations and international research collaborations
- Broad range of scientific areas covered from basic research, epidemiology, translational research to randomized controlled trials
- Increase in number of junior researchers adding academic synergy within the specialty

### WEAKNESSES

- Surgical research is not well funded publicly or privately
- Clinicians with a PhD degree often stop doing research once they have obtained their academic degree
- Historically a relatively weak research field

## SWOT

### OPPORTUNITIES

- New research areas arise, including research on new technologies, minimally invasive options and surgical procedures moving into a robotic era.
- Strengthening translational interdisciplinary research, such as research collaborations with basic researchers, epidemiologists, health economists, computer specialists etc.

### THREATS

- Increase in clinical workload leads to less time for research
- Complex regulation of clinical data complicates initiation and conduct of clinical and epidemiological research
- Research projects are taken over by specialties involved in patient care of urological patients

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Urology – Peer-reviewed

|               |                 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------|-----------------|------|------|------|------|------|
| International | Journal article | 21   | 27   | 31   | 27   | 34   |
|               | Letter          | 1    | 1    | 2    |      | 1    |
|               | Review          | 3    | 3    | 1    | 5    | 7    |
| Danish        | Journal article | 1    | 2    | 1    | 3    |      |
|               | Review          |      |      |      |      | 2    |
| Total         |                 | 26   | 33   | 35   | 35   | 44   |

Source: CURIS

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### Collaboration 2017-2021

Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 42.5%   | 74               | 2,774     | 37.5                      | 4.17                           |
| Only national collaboration          | 29.3%   | 51               | 365       | 7.2                       | 0.78                           |
| Only institutional collaboration     | 28.2%   | 49               | 293       | 6                         | 0.77                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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### TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                         | Number of articles 2017-2021 | Journal Impact Factor 2021 |
|---------------------------------|------------------------------|----------------------------|
| Scandinavian Journal of Urology | 34                           | 1.899                      |
| Ugeskrift for Laeger            | 9                            |                            |
| European Urology                | 6                            | 24.267                     |
| Urology                         | 5                            | 2.633                      |
| Acta Oncologica                 | 5                            | 4.311                      |
| Diagnostics                     | 5                            | 3.992                      |
| Journal of Urology              | 4                            | 7.600                      |
| BMJ Open                        | 4                            | 3.017                      |
| European Urology Focus          | 4                            | 5.952                      |
| APMIS                           | 3                            | 3.428                      |

Source: SciVal and JCR

## FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| Urology                  | 128                              | 2.4                            | 5.5                                   | 12.5                                  | 17.2                                   |
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

### 3 most prominent publications from 2021

1. Jensen CFS, Dong L, Gul M, Fode M, Hildorf S, Thorup J, Hoffmann E, Cortes D, Fedder J, Andersen CY, Sønksen J. Fertility preservation in boys facing gonadotoxic cancer therapy. Nat Rev Urol. 2022 Feb;19(2):71-83. doi: 10.1038/s41585-021-00523-8. Epub 2021 Oct 19.
2. Maibom SL, Røder MA, Aasvang EK, Rohrsted M, Thind PO, Bagi P, Kistorp T, Poulsen AM, Salling LN, Kehlet H, Brasso K, Joensen UN. Open vs robot-assisted radical cystectomy (BORARC): a double-blinded, randomised feasibility study. BJU Int. 2021 Oct 17. doi: 10.1111/bju.15619.
3. Ternov KK, Nolsøe AB, Bratt O, Fode M, Lindberg H, Kistorp C, Palapattu G, Klausen TW, Sønksen J, Østergren PB. Quality of life in men with metastatic castration-resistant prostate cancer treated with enzalutamide or abiraterone: a systematic review and meta-analysis. Prostate Cancer Prostatic Dis. 2021 Dec;24(4):948-961. doi: 10.1038/s41391-021-00359-8.

# VASCULAR SURGERY

REPRESENTING PROFESSOR JONAS PETER EIBERG

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Thanks to the close integration of research and clinic, the department of vascular surgery aims to encourage investigation of clinical questions, innovative thinking and solutions; as well as to breed the next generation of clinical academic leadership in vascular surgery.

## MAIN RESEARCH AREAS

### Aorta and its major branches

- Improved and individualised risk prediction of abdominal aortic aneurysms (AAA)
  - Three-dimensional (3D) ultrasound (US) for volume quantification of AAA and intraluminal thrombus (ILT), with and without ultrasound contrast
  - Circulating biomarkers, including proteomics and neo-epitopes, for AAA growth, vessel wall degradation and ILT development
  - US assessment of AAA biomechanics and its association to aneurysm growth
  - Improved surveillance programs of small AAA with a focus on advanced US methods
  - Medical treatment of AAA: growth inhibiting drugs and anticoagulation treatment of ILT
- Treatment of AAA and aortic dissections
  - Evidence-based surveillance following Endovascular Aortic Repair (EVAR and FEVAR) with US and CT.
  - RCT for optimization on intraoperative imaging during EVAR
  - Evaluation of electromagnetic, radiation free catheter treatment (FORS)
  - Ancillary treatment to enhance aortic remodeling after EVAR
  - Ongoing RCT to evaluate best treatment for uncomplicated Stanford type B aortic dissection
  - Prediction of EVAR failures and the prognostic value of risk factors and different devices

- Development of improved endovascular methods to treat AAA and aortic dissections
- Carotid disease
  - Contrast-enhanced ultrasound (CEUS) for improved quantification and description of the plaque
  - Improved identification of thrombus and echolucent plaques with 3D-CEUS
  - Proteomics in carotid disease: plaque and circulating
- Lower limb arteries and peripheral arterial disease
  - Non-surgical treatment of PAD
  - Diagnostic value of US based follow-up after endovascular treatment
  - Proteomics and description of endovascular treated lesions
- Visceral arteries
  - Ongoing RCT on endovascular treatment of mesenteric arterial disease and renovascular disease

### Vascular surgical educational

- Ongoing RCT's investigating learning styles, learning curves and definition of mastery levels in vascular surgery
- Development and implementation of simulation-based education in vascular surgery
- Interdisciplinary and cross-curricular simulation-based training
- Evidence-based certification of vascular US

### Selected international and national collaboration (within the speciality)

- Collaborates with several European vascular centres on evidence-based development of vascular education: open and endovascular procedures and diagnostic ultrasound.
- Collaborates in several multinational RCT's on medical treatment of AAA, stent treatment of aortic dissections, medical treatment of PAD as

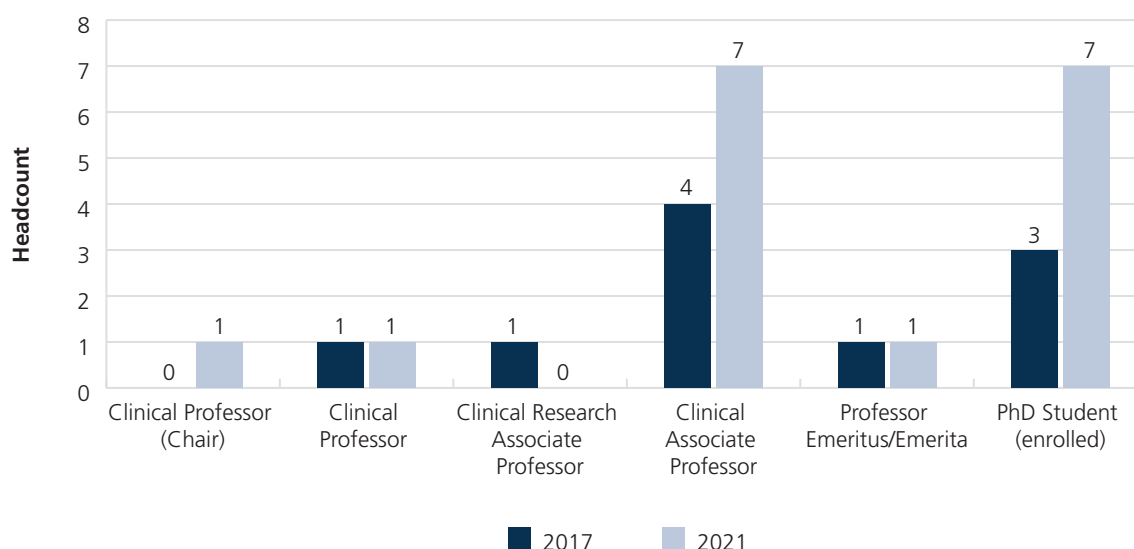
well as international registries on treatment of aortic disease.

- The speciality has, since 1998, had a successful research and development collaboration with the world's leading manufacturer of diagnostic ultrasound.
- The speciality has several successful research and development collaborations with leading endovascular device manufacturers.
- European Union's Horizon 2020 research and innovation programme. The Medical Digital Twin for Aneurysm Prevention (MeDiTaTe) and Treatment
- Research collaboration with Aarhus University Hospital on endovascular treatment of complex aortic disease
- The Department of Vascular Surgery in Aarhus and the National Research Centre for the Working Environment (NRCWE) on a national project on Burnout and Psychosocial Work Environment in Vascular Surgery
- Collaborates with Copenhagen Academy of Medical Education and Simulation (CAMES)

and Danish Society of Vascular Surgery (DKKS) and European Society of Vascular Surgery (ESVS) on evident based education of vascular surgeons and nurses.

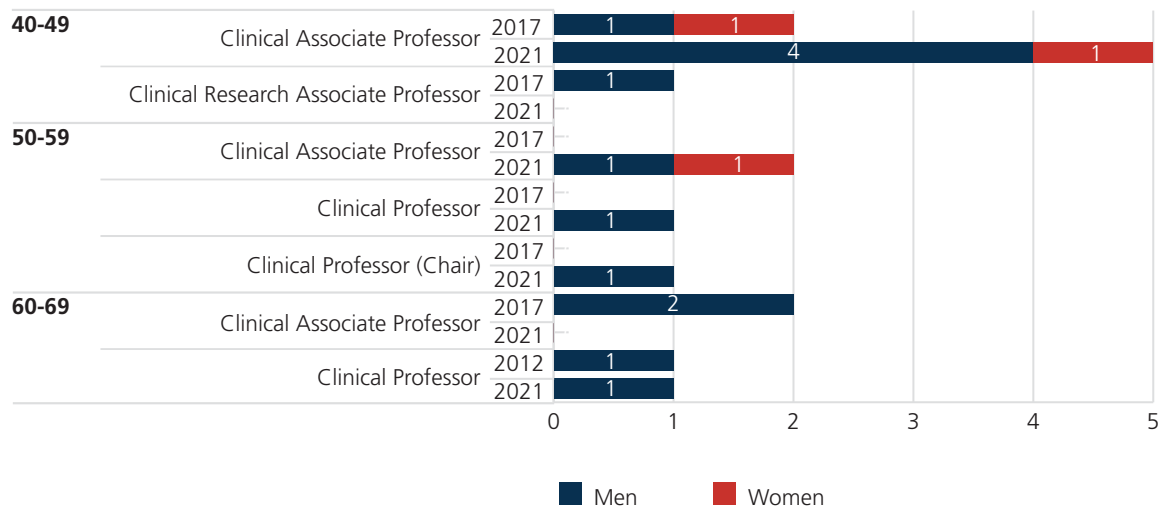
Development and strengthening of the research unit's framework and organisation are considered most important to promote independent research support and growth. The development of a research coordinator function and permanent ancillary research staff must be a priority. The physical locations for researchers must be strengthened; first and foremost, more space is needed. The employment of senior researchers in post-doc positions with protected research time is essential to ensure continuous growth and the development of future academic leaders. Increased and improved international collaboration and exchange of researchers at post doctoral level to allow strengthening of the international frameworks and facilitate a better base for independent grant support.

#### Academic Staff in Vascular Surgery 2017 & 2021 - Headcount



Source: KUPA

### Age and Gender distribution of Academic Staff in Vascular Surgery 2017 & 2021



Source: KUPA



### STRENGTHS

- Well established within clinical research of vascular diseases for decades
- An enthusiastic and fast-growing research unit
- Considerable patient and treatment volume and flow in one of Europe's largest vascular clinics with strong clinical and research relationships to other relevant specialties
- Strong and wide international network
- The department has a firm profile within vascular ultrasound and endovascular procedures and surgical treatment of vascular disease
- Development contract for the past 20 years with the leading manufacturer of ultrasound equipment
- Two professors and one post doc (20%), increasing number of PhD students (5)

### WEAKNESSES

- Limited experience in/facilities for basic/animal research within vascular disease
- Lack of formalized clinical prospective registries across all vascular disease entities
- More Scandinavian research project and RCTs. Similar hospital systems, traditions and language will be able to facilitate research projects.
- Most funding is from company unrestricted research grants. More focus on grants from public funds.

## SWOT

### OPPORTUNITIES

- Largest vascular surgical department in Europe with a large number of new referrals and large treatment volume. Good opportunities for large cohorts and sample sizes.
- Within the last 1-3 years several younger and more research-oriented consultants have been hired
- Within the last 5 years, the research unit has been reinvented, focusing on collaboration, synergy and knowledge sharing
- Creation of prospective registries for all patients entering the clinical department
- Potential to form a central hub in Vascular Research in the Nordics

### THREATS

- Physical space of department limited at the same time as the number of referrals and treatment increases
- The underproduction of specialists in vascular surgery reduces competition for attractive positions resulting in a less general interest in participating in research
- To bring research at the Department of Vascular Surgery to an even higher level, the Research Unit strongly needs a support function and research coordination to facilitate academic development.
- At the moment, there is limited incentives for young vascular surgeon to pursue combined clinical and academic careers
- As Vascular Surgery is a small specialty and the opportunity for pure research positions are scarce. As VS competes with much larger, internal medicine based specialties for similar grants and funds, positive outcomes are scarce.

## SCIENTIFIC PRODUCTION IN THE SPECIALITY

### Number of articles in Vascular Surgery – Peer-reviewed

|               |                 | 2017      | 2018      | 2019      | 2020      | 2021      |
|---------------|-----------------|-----------|-----------|-----------|-----------|-----------|
| International | Journal article | 10        | 18        | 16        | 25        | 40        |
|               | Letter          |           | 1         |           | 1         | 1         |
|               | Review          | 1         |           | 1         | 2         | 3         |
| Danish        | Journal article |           |           | 1         |           | 1         |
| <b>Total</b>  |                 | <b>11</b> | <b>19</b> | <b>18</b> | <b>28</b> | <b>45</b> |

Source: CURIS

## Collaboration 2017-2021

### Includes: Articles, Letters, Reviews and Conference articles

|                                      | Overall | Scholarly Output | Citations | Citations per Publication | Field-Weighted Citation Impact |
|--------------------------------------|---------|------------------|-----------|---------------------------|--------------------------------|
| International collaboration          | 46.1%   | 53               | 1,102     | 20.8                      | 2.95                           |
| Only national collaboration          | 38.3%   | 44               | 280       | 6.4                       | 1                              |
| Only institutional collaboration     | 15.6%   | 18               | 63        | 3.5                       | 0.61                           |
| Single authorship (no collaboration) | 0.0%    | 0                | 0         | 0                         | -                              |

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### TOP 10 JOURNALS WITH THE HIGHEST NUMBER OF ARTICLES

Includes: Articles, Letters, Reviews and Conference articles

| Journal                                               | Number of articles<br>2017-2021 | Journal Impact<br>Factor 2021 |
|-------------------------------------------------------|---------------------------------|-------------------------------|
| European Journal of Vascular and Endovascular Surgery | 21                              | 6.427                         |
| Annals of Vascular Surgery                            | 7                               | 1.607                         |
| Medical Education                                     | 4                               | 7.647                         |
| Circulation                                           | 4                               | 39.918                        |
| Ultrasound in Medicine and Biology                    | 4                               | 3.694                         |
| Medical Teacher                                       | 3                               | 4.277                         |
| Ultraschall in der Medizin                            | 3                               | 5.445                         |
| Journal of Vascular Surgery                           | 3                               | 4.860                         |
| Advances in Health Sciences Education                 | 3                               | 3.629                         |
| Ultrasound in Obstetrics and Gynecology               | 3                               | 8.678                         |

Source: SciVal and JCR

### FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES

Includes: Articles, Letters, Reviews and Conference articles (2017-2020)

|                          | Number<br>of pub-<br>lications<br>in SciVal | Field-<br>Weighted<br>Citation<br>Impact | Output in Top<br>1% Citation<br>Percentiles | Output in Top<br>5% Citation<br>Percentiles | Output in<br>Top 10%<br>Citation<br>Percentiles |
|--------------------------|---------------------------------------------|------------------------------------------|---------------------------------------------|---------------------------------------------|-------------------------------------------------|
| Vascular Surgery         | 70                                          | 1.85                                     | 2.9                                         | 5.7                                         | 14.3                                            |
| IKM                      | 12,172                                      | 2.29                                     | 3.8                                         | 11.6                                        | 19.8                                            |
| SUND                     | 20,873                                      | 2.08                                     | 3.3                                         | 10.9                                        | 18.9                                            |
| University of Copenhagen | 40,065                                      | 1.96                                     | 3                                           | 11.1                                        | 19.6                                            |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included, since they have not had the proper amount of time to be cited

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### 3 most prominent publications from 2021

1. Lawaetz M, Sandholt B, Eilersen EN, Petersen C, Tørslev K, Shilenok D, Houliind KC, Sillesen H, Shahidi S, Rathenborg LK, Eiberg J. Low Risk of Neurological Recurrence while Awaiting Carotid Endarterectomy: Results From a Danish Multicentre Study. *Eur J Vasc Endovasc Surg.* 2021 Jun 11:S1078-5884(21)00361-0. doi: 10.1016/j.ejvs.2021.04.016. Epub ahead of print. PMID: 34127375
  2. Cecilie Markvard Møller, Thomas Clausen, Birgit Aust, Jonas Peter Eiberg. A cross-sectional national study of burnout and psychosocial work environment in vascular surgery in Denmark. *J Vasc Surg.* 2022 May;75(5):1750-1759.e3. doi: 10.1016/j.jvs.2021.11.042. Epub 2021 Nov 14. PMID: 34788647 DOI: 10.1016/j.jvs.2021.11.042
  3. Sveinsson M, Sonesson B, Dias N, Björres K, Kristmundsson T, Resch T. Five Year Results of Off the Shelf Fenestrated Endografts for Elective and Emergency Repair of Juxtarenal Abdominal Aortic Aneurysm. *Eur J Vasc Endovasc Surg.* 2021 Apr;61(4):550-558.
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# ALIGNMENT BETWEEN RESEARCH AND EDUCATIONAL ACTIVITIES

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IKM's employees provide pregraduate teaching on almost all courses in the master's programme for medical sciences as well as in the 6<sup>th</sup> semester of the bachelor's programme, i.e., in 7 out of 12 semesters. IKM staff delivers teaching on 4 bachelor courses and 64 master degree courses (medical sciences study programmes). In addition, IKM's employees contribute with teaching on six other master programmes, e.g., Master in Human Biology, Master in Health and Informatics (Table 5, Appendix A). On top of this clinical teaching, our staff deliver supervision for medical students during their bachelor thesis and their master thesis. In addition, IKM delivers teaching in six specific postgraduate PhD school programmes as well as 17 courses in Executive Master's programmes (Table 6, Appendix A).

The teaching takes place primarily in the hospitals and is spread over approximately 115 different departments in ~20 hospitals in the two regions. Teaching is provided by almost 1,000 professors and associate professors. This teaching requires both clinical experience and research and

teaching experience from the employees, but not all lecturers are active in research. Many clinical associate professors are primarily employed to provide bedside teaching in clinical departments and here research experience is less important.

## **RESEARCH INTEGRATION IN TEACHING**

Our motivation for introducing students to research is to secure and develop research-based teaching for future doctors and thereby create a basis for recruiting future researchers. New treatments and diagnostic options as well as the use of large amounts of data are increasingly challenging conventional medical science. It is thus of crucial importance that future doctors are better equipped to handle and further develop the precision medicine of the future. Therefore, medical students must be taught more about data analysis and technology. This requires that the teachers have broad and specialized knowledge within the field. IKM will actively support the faculty's initiative with the creation of a competence course for lecturers in health and data. We will take initiative to facilitate the

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establishment of a digital core curriculum in all clinical courses in the medical studies programmes and in other studies at SUND. And we will lay the ground for an understanding among our students that they should be prepared for a professional life with a focus on life-long-learning.

### **Alignment between research and educational activities**

The University Board has launched a joint project on research-integrating teaching activities.

The ambition is that all students should have the opportunity to experience research first hand during their programme, and that research integration should play a clear role in all programmes.

The UCPH Study Environment Survey from 2021 indicates that, according to the medical students, there is room for improvement in the areas of awareness of research (*"I am aware of some of the research activities that take place at my institution"*) and participation in research (*"Some of the things that we do are reminiscent of research"*). On the other hand, the students indicate that they are often presented with new research in the teaching and that they often have a chance to meet with researchers during classes. IKM employees act as supervisors on both bachelor projects and master theses for medical students, and the numbers are presented in Table 7, Appendix A.

**Bachelor thesis.** The purpose of the bachelor thesis is to give the student an introduction to the essence of research in the form of hypothesis formation, hypothesis testing and dissemination of results, thereby enabling the student to prepare a synopsis under guidance for a self-selected project that is within the health-science subject area. Articles from recognized international journals serve as exemplification, and the teaching is particularly aimed at basic subject research areas that the students have encountered during their bachelor's programme.

**Master's thesis.** Since 2015 the Master's programme for Medicine has included the opportunity to choose between three options

during the 5<sup>th</sup> semester: the research perspective, the specialist/clinical perspective and the international perspective with a clinical project abroad.

For students who do not choose the research perspective, the purpose of the master's thesis (10 ECTS) is for the student to learn to work independently with a scientific project that can be based on literature studies and lasts for at least 4 weeks. In addition, the student must learn to communicate the project's results and conclusions, both in writing and orally.

The research track in the 5<sup>th</sup> semester of the master's programme of the medical school is combined with a master's thesis (25 ECTS) and with an extended stay (at least 16 weeks) within a research group. The purpose of the extended master's thesis is for the student to learn to work independently with a scientific project during the stay in a research group. In addition, the student must learn to communicate the project's results and conclusions, both in writing and orally. The number of students who did a master's thesis in research (25 ECTS) and how many who did a conventional master's thesis project with IKM supervisors is shown in Figure 6, Appendix A. The research track option remains the most popular among the three options and we see this track as an important contribution to the further development of models for involving students in research activities. We believe that this is a unique opportunity to recruit young talents into clinical research. We believe that – with time – we will see a significant number of students who continue into PhD programmes after graduation as a continuation of the research track master's thesis.

### **PHD LEVEL**

On 31 December 2021, the Graduate School of Health and Medical Sciences had a total of 1,863 enrolled PhD students, making it the largest in Denmark.

At the time of enrolment, the clinical PhD student must have a minimum of two supervisors – a principal supervisor who must be either a clinical professor or clinical associate professor

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at SUND and a primary co-supervisor who must fulfil clinical associate professor qualifications. It is mandatory for all principal PhD supervisors to participate in a *Seminar on Responsible Conduct of Research*. As of 1 January 2020, it is mandatory for all principal PhD supervisors to complete the online course *PhD supervision: Rules and regulations*. As of 1 January 2021, all new principal PhD supervisors at SUND are required to complete the course *PhD supervision: advice, tools and practices* (including PhD supervision: rules and regulations) within the first year of supervising a PhD student.

PhD students must complete courses corresponding to a minimum of 28 ECTS and maximum 35 ECTS credits during their 3-year PhD study<sup>10</sup>. Clinical PhD students are typically recruited locally among young doctors and medical students engaged in research activities who are already known in the local environment. It is not obligatory to advertise for PhD students and therefore clinical PhD students are almost always Danish or from other Scandinavian countries. Increased internationalisation among PhD students could be achieved by obligatory (international) advertisements. However, in projects with patient involvement, the ability to speak Danish is essential. In Denmark, the general proportion of international PhD students rose by 19% from 2003 to 2014. Five years after graduation, 41% of the international PhD students from the 2009 graduation cohort remained in Denmark<sup>11</sup>. Eighty-five percent of all our PhD students are of Danish origin, 9% are from other Nordic countries, 4% are from other European countries and 2% are from non-European countries (Figure 9, Appendix A).

Each PhD student associated with IKM must be enrolled in one of the graduate programmes in clinical research. The Graduate School offers ten different graduate programmes in clinical

research, led by academic staff from SUND (six of these are led by IKM professors): Airways, Anaesthesiology and Skin (Head: Clinical professor Charlotte Suppli Ulrik, IKM), Basic and Clinical Research in Musculoskeletal and Oral Sciences (Head: Clinical Professor Michael Kjær, IKM), Cardiovascular Research (Head: Professor Thomas Jespersen), Clinical Cancer Research (Head: Clinical Professor Inge Marie Svane, IKM), Immunology and Infectious Diseases (Head: Professor Jan Pravsgaard Christensen), Life Cycle in Medicine (Head: Clinical Professor Anders Juul, IKM), Medical and Molecular Imaging (Head: Professor Andreas Kjær), Neuroscience (Head: Professor Nanna MacAuley), Psychiatry (Head: Clinical Professor Merete Nordentoft, IKM) and Surgical Sciences (Head: Clinical Professor Ismail Gögenur, IKM).

Each of the university hospitals/centres at Copenhagen University Hospital – Rigshospitalet that have coordinating professors also has a PhD coordinator, 14 in total<sup>12</sup>. The PhD coordinators help to facilitate the contact between the PhD students, the departments at SUND and the Graduate School. The PhD coordinators act as advisors on subjects that are related to the non-scientific content of the PhD period. One of their main tasks is to foster a good academic and social environment for the PhD students and, if necessary, help establish a local environment in which PhD students, who often work in different departments in the hospital, can meet and support each other.

The University's Graduate Talent Programme, also called the 3+5 scheme, is a five-year PhD programme. The programme aims to attract skilled foreign and Danish talent immediately after they have obtained their bachelor's degree, and to a greater degree be competitive in recruitment. The programme thus enables increased integration between the master's and the PhD

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10 Please refer to the "Governance and Structure Memo" for further information about the PhD programme at SUND, University of Copenhagen. See also PhD Rules and Regulations at SUND: [https://healthsciences.ku.dk/phd/guidelines/PhD\\_Guidelines.pdf](https://healthsciences.ku.dk/phd/guidelines/PhD_Guidelines.pdf)

11 [https://healthsciences.ku.dk/phd/guidelines/PhD\\_Guidelines.pdf](https://healthsciences.ku.dk/phd/guidelines/PhD_Guidelines.pdf)

12 The four somatic hospitals in Region Zealand share two PhD coordinators.

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programmes. The five-year programme consists of an A and a B part: Part A is defined as the period from the student starts the programme until they obtain their master's degree. Part B is defined as the period from the student obtains the master's degree until they submit their PhD thesis.

In part A, the student is enrolled both as a master's and PhD student for a three-year period. In part B, the student is only enrolled as a PhD student for a two-year period. According to Danish legislation, the student must pass the master's part (and thereby obtain the master's degree) as part of the course. This is also a requirement to be able to start on part B.

Among the total of the 1,863 (in 2021) PhD students at the SUND postgraduate school, 883 (47.4%) of these were enrolled by IKM, i.e. they have a principal supervisor who is employed at IKM (Table 8, Appendix A). The gender distribution of the PhD students enrolled in 2021 is 66% women and 34% men (Table 9, Appendix A). There is not much variation in these numbers in the last five years. Each year around 250 new PhD students are admitted (enrolled) at the Graduate School with an IKM principal supervisor, and similarly around 200 are awarded a PhD degree among a total of almost 900 PhD students enrolled with an IKM employee as principal supervisor (Figure 7 and Table 8, Appendix A). The difference in these numbers considering the three-year duration of the PhD programme is primarily explained by the delay due to the Covid-19 pandemic. In 2017, there was a balance between enrolment and completed PhD projects, whereas from 2018 there is a growing gap between these two groups (Figure 7, Appendix A).

All specialties have enrolled PhD students with an IKM principal supervisor, but their numbers vary from 1 to 67 based on 2021 data (Figure 8, Appendix A). The largest numbers are in neurology (67), Internal Medicine: Cardiology (64), and Internal Medicine: Endocrinology (61).

The Graduate School of Health and Medical Sciences was evaluated by an international panel

during a site visit in 2019. The panel stressed that SUND offers an excellent scientific environment for training young scientists, and that it performs high-quality research with engaged and ambitious principal supervisors and co-supervisors. Employment rates for graduates are very high.

The evaluation panel had four main recommendations: 1. Clarify the responsibility, function and role of the organization at each level: vice-dean for research, head of graduate school, heads of graduate programmes, PhD coordinators, PhD study board and PhD supervisors; 2. Strengthen visibility and direct communication between the Graduate School and heads of graduate programmes towards the different stakeholders; 3. Facilitate extension of the PhD training period from three to four years to improve quality and to enhance student-supervisor experiences; 4. Establish efficient quality assurance measures and feedback at enrolment, during progression, during educational activities and at completion and defence.

Overall, IKM agrees with the conclusion and recommendations from the international panel. A PhD degree for medical doctors adds value to the clinical skills and competences the PhDs will use in their professional life. We should facilitate that our most talented MDs with a PhD degree continue their research activities. This could be achieved by securing early university affiliation. An extension of the PhD programme from three to four years would be beneficial but would also require a legislative change as well as increased funding. Furthermore, it would delay the clinical specialist training.

### **EXECUTIVE MASTERS' PROGRAMMES**

IKM contributes to postgraduate teaching by taking charge of leadership on the Master's Degree Programme in Headache Disorder (Head of Studies: Professor Rigmor Jensen, IKM) and on the Master's Degree Programme in Personalised Medicine (Head of Studies: Professor Sisse Ostrowski, IKM). The latter is a national initiative and involves collaboration with four other universities in Denmark.



# SOCIETAL IMPACT, INNOVATION AND PRIVATE AND PUBLIC COLLABORATION

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The academic staff at IKM are health promoters, and many of them are engaged in the public debate and are active participants in patient organisations, health councils and other advisory boards. During the Covid-19 pandemic, IKM employees regularly provided health advice and played pivotal roles in communicating epidemiology, clinical information, recommendations about vaccines and novel drug developments to the public. The societal impact from IKM through our internationally recognized clinical experts is substantial and will continue to expand.

## **COMMERCIALISATION AND CONSULTANCY**

IKM staff are involved in a range of clinical trials of novel drugs, medical devices, new treatments or preventive interventions, and serve as consultants for private companies and public organizations. Three clinical associate professors in IKM (innovation ambassadors) have dedicated tasks within innovation and connect innovation activities at the hospitals in the two regions with relevant partners at SUND or with private companies. The innovation ambassadors are

anchored at the hospitals via the coordinating professors and the heads of innovation in the two regions, and in IKM and SUND via Innovation Working Group headed by the Vice-Dean for Innovation and External Relations at SUND. These innovation ambassadors are involved in clinical innovation collaboration programmes such as BETA-HEALTH (<https://betahealth.dk>) and Biomedical Design (<https://biomedicaldesign.dk>), and interact with the BioInnovation Institute (BII, <http://www.bii.dk>). BETA-HEALTH is a Danish national innovation platform for future health care. The aim is to combine clinical research, emerging technologies, and partnerships to solve major challenges in health care. The programme is open for applications for financial support to innovation projects. Biomedical Design is a national clinical innovation programme with a 10-month, full-time postgraduate education programme in identifying and proposing solutions for challenges in a clinical context. This programme is open for applications from health care workers of all educational backgrounds. BII operates an incubator to accelerate world-class life science innovation start-ups. All three

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programmes are supported by the Novo Nordisk Foundation. The innovation ambassadors guide clinical researchers that want to learn more about commercialisation and implementation towards facilitating structures, for example, the Pipeline (<https://sund.ku.dk/innovation>). The Pipeline is SUND's collection of innovation activities and serves as an infrastructure that invites external collaborations on board and offers support to students, researchers and clinicians. The Pipeline offers education programmes in health innovation for researchers from all Danish educational institutions (from PhD to professor level). Taking research results to implementation and commercialisation is still a cumbersome process. In order to facilitate this, more support is needed from TechTrans units and other facilitating entities.

#### **GOALS FOR PUBLIC POLICY AND PUBLIC ENGAGEMENT**

IKM employees provide advice to government institutions, are active in a range of advisory

boards in private and public entities and are commonly used experts in media and popular outreach campaigns. The IKM management is responsible for selecting clinical researchers for both the national and regional ethics committees. A significant number of IKM employees are members of these committees. The academic staff in IKM are active in improving legislative procedures and have been instrumental in facilitating a more effective processing of data approvals.

In the period 2016-2022, two consecutive IKM professors served as chairs of the National Ethics Council<sup>13</sup>.

IKM will continue to actively engage in securing that our employees are heard in all relevant public and media engagements.

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13 Det Ethiske Råd

# RESOURCES, CAPACITY, GOVERNANCE AND ORGANIZATION

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## **OVERALL ORGANISATIONAL FRAMEWORK OF THE DEPARTMENT**

IKM's organisation is somewhat atypical compared to other departments at UCPH. The Head of Department refers to the Dean and is part of the university structure. However, IKM is also part of Copenhagen University Hospital (KUH), which is the organisational framework for the collaboration between SUND, the Capital Region of Denmark and Region Zealand. The aim of KUH is to create a flexible and functional framework for the university-based collaboration in Eastern Denmark and to carry out the strategic planning and follow-up that can help to position Eastern Denmark in the frontline in terms of health science research and education.

KUH is led by a board with six members headed by the Dean of the Faculty of Health and Medical Sciences. The IKM Head of Department is a board member. Each of the two regions is represented by their regional chief operations officers and one more representative.

As the collaboration between UCPH and the two regions is so closely intertwined on all levels, it is crucial that the KUH board creates a flexible and functional overall framework for this to be able to be carried out.

## **GOVERNANCE OF THE DEPARTMENT**

IKM is the largest department in terms of personnel at the University of Copenhagen. We have academic staff at all the hospitals in the Capital Region of Denmark and Region Zealand.

The department management is made up of Head of Department Jesper Hastrup Svendsen, Deputy Heads of Department Ruth Frikke-Schmidt and Peter Bytzer, and Head of Administration Eve Frisenborg.

Only the Head of Administration is situated full time on campus. The Head and Deputy Heads of Department all have positions as clinical professors at IKM and as chief physicians at hospitals in either the Capital Region or Region Zealand.

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The department management has overall responsibility for the department's teaching and administration and for facilitating research within the specialities.

The department management meets every week and communicates daily to deal with current matters within teaching and recruitment as well as to plan upcoming meetings within the department boards, councils, and committees. Once a month, the department management meets with the Head of Studies of Medicine to discuss matters in relation to the study curriculum and issues discussed in the Board of Studies. These meetings have high priority. This meeting structure secures close interaction between the members of the department management regarding updates and knowledge transfer about on-going matters and gives the management opportunities to act when governance challenges can be foreseen.

The Head of Department is in close contact with the Dean. Similarly, the Head of Department is in close contact with the Vice Dean for Research, especially in matters concerning professorship recruitments and job interviews.

Furthermore, the Head of Department is a member of the management team at SUND<sup>14</sup>, who meet biweekly, and of the top 80 university management forum, which meets biannually<sup>15</sup>. In addition, the Head of Department is a member of several research-related fora in the Capital Region of Denmark (such as RHSF<sup>16</sup>), GCHSP and at Rigshospitalet (Forum for Research and Innovation). The Head of Department also attends regular meetings with research leaders from Region Zealand.

Overall responsibility for the Department's budget lies with the Head of Department. The Head of Department and the Head of Administration meet twice a year with the Dean's Office to adjust the budget to support future activities.

### **Organisational cohesion**

With nearly 1,000 academic staff members located at hospitals throughout Eastern Denmark, IKM management has set up an organisational framework that secures representation for staff in each of the 35 medical specialities, for staff at each hospital or centre and for different groups of employees in a matrix illustrated in figure F.

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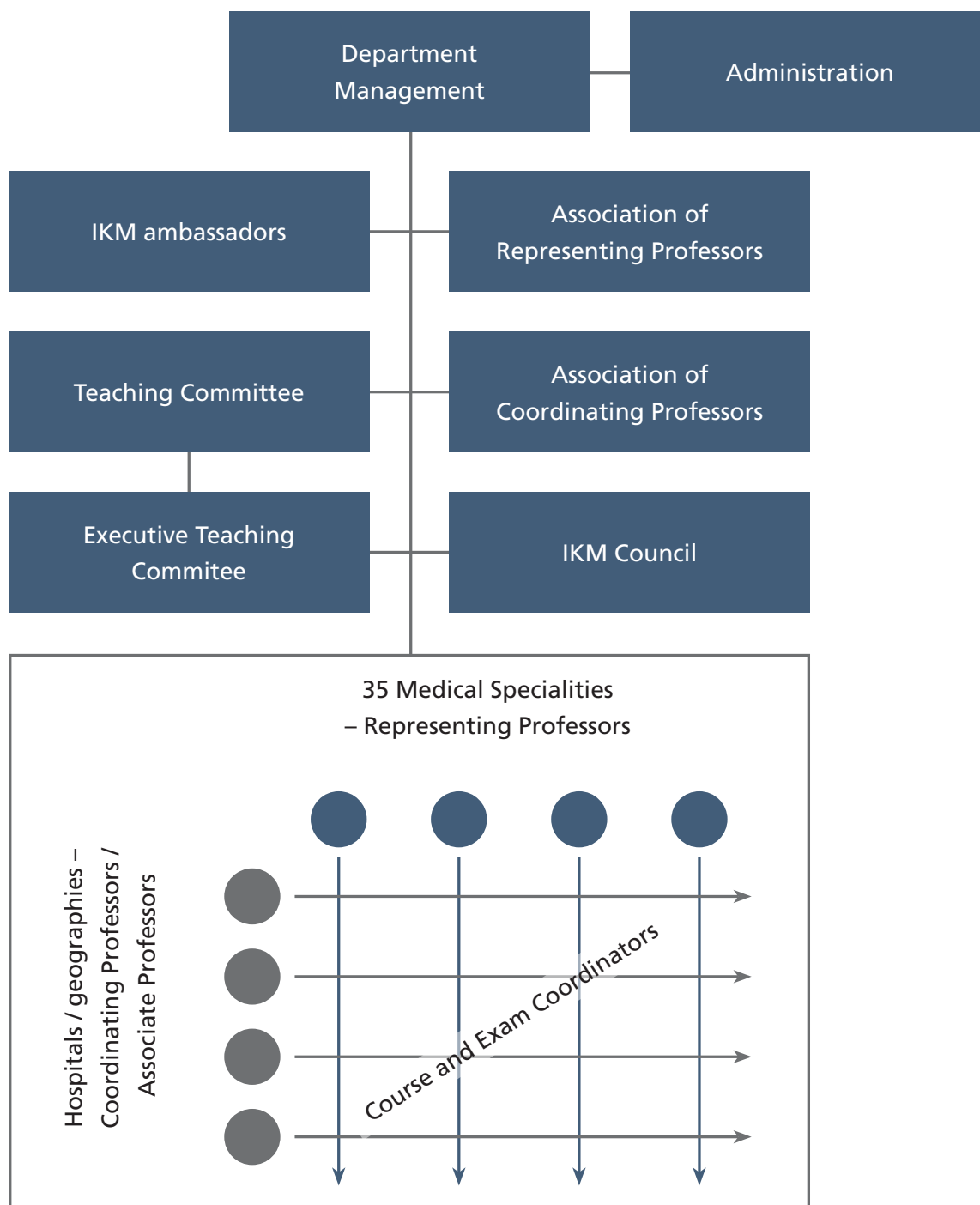
14 Dean, Vice Deans, Faculty Director and Department Heads.

15 Rector, University Director, Administrative Directors, Deans, Vice Deans, Faculty Directors and Department Heads.

16 Region Hovedstadens Forskningsråd

**Figure F.**

**Organization diagram of IKM. The Head of Department and the Department Management refer to the Dean. The Department Council and the various committees refer to the Head of Department. The diagram includes the matrix model with 35 specialities (horizontal axis) and 19 geographies/hospitals (vertical axis).**



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### **Coordinating Professors and Representing Professors**

The coordinating professors are IKM's link to the hospital management and vice versa. They are appointed<sup>17</sup> by the Dean based on a recommendation from the Head of Department and the hospital management for a five-year term. The coordinating professors handle all IKM-related matters at their hospital/centre, including annual group appraisal interviews with the clinical professors and clinical research associate professors at their hospital/centre. The Head of Department conducts annual group appraisal interviews with the coordinating professors. The department management meet with the coordinating professors twice a year, usually in March and October.

In some instances, the role of coordinating professor is undertaken by a clinical associate professor.

Each of the 35 specialities has a representing professor, who is typically a clinical professor (chair). A speciality will have one, two or three clinical professors (chair) depending on the size of the speciality. Representing professors are appointed by the Head of Department for a three-year term upon recommendation from the staff in the speciality. The representing professors are responsible for matters related to both teaching and research for their speciality across all hospitals/centres. All representing professors are members of the Association of Representing Professors, who meet with the Department Management twice a year, usually in March and October.

The role of representing professor can also be undertaken by a clinical associate professor if the staff within the speciality recommend a specific candidate.

The clinical professors have their academic position at the University of Copenhagen, and they are therefore appointed and employed by the University in accordance with the Ministerial Order on the Appointment of Academic Staff at Universities<sup>18</sup>. Their practical working conditions are determined by the KUH board<sup>19</sup>.

### **IKM Council**

The members of the IKM Council<sup>20</sup> are appointed by the department management. The Council is composed of academic staff representatives from all employment categories, an administrative staff representative and a number of student representatives. The staff members are appointed for a three-year period, while student representatives are appointed for a two-year term. The Head of Department is ex-officio chair of the IKM Council.

### **The Teaching Committee**

The Teaching Committee<sup>21</sup>, which is comprised of one of the Deputy Heads of Department and Course and Exam Coordinators, is responsible for all teaching and exams performed by IKM staff. The Executive Committee – Teaching<sup>22</sup>, which is comprised of one of the Deputy Heads of Department, the Head of Studies and selected members from the Teaching Committee, meets biannually. The members of the committees are appointed by the Head of Department from among the staff in the specialities relevant for the specific course or exam.

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17 In this chapter, the term "appointed" is used in relation to a function, not in relation to recruitment to a salaried job.

18 <https://ufm.dk/en/legislation/prevailing-laws-and-regulations/education/files/ministerial-order-on-the-appointment-of-academic-staff-at-universities.pdf>

19 Professor Agreement: [https://sund.ku.dk/om-sund/organisation/hospitaler/universitetshospitalet/dokumenter/aftaler/Aftale\\_om\\_kliniske\\_professorers\\_arbejds-\\_og\\_ans\\_ttelserforhold\\_ved\\_KUH\\_-10.\\_maj\\_2019.pdf](https://sund.ku.dk/om-sund/organisation/hospitaler/universitetshospitalet/dokumenter/aftaler/Aftale_om_kliniske_professorers_arbejds-_og_ans_ttelserforhold_ved_KUH_-10._maj_2019.pdf) (only available in Danish)

20 IKM-Rådet

21 Undervisningsudvalg

22 Forretningsudvalg for undervisningsudvalg

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### **IKM Ambassadors**

IKM wishes to involve our employees in translating the department's strategic objectives into real action in their clinical and academic work at hospitals and hospital departments. Academic staff should have easy access to specialized help within some of the most important focus areas for the department. To support this strategic goal, we have established ambassador functions (this role is covered by a clinical associate professor) within five different key areas:

- Absalon ambassadors (2) are responsible for structure and content in the teaching platform Absalon.
- Clinical ambassador (1) is responsible for facilitating that teaching at the bachelor part of medical school has clinical relevance. This is organized in close contact with relevant heads of courses.
- Digitalisation ambassadors (3) are responsible for developing and implementing a Digital Core Curriculum (DCC) in medical school in collaboration with the DCC working group and the Head of Studies.
- Innovation ambassadors (2) are responsible for helping clinical researchers to navigate in the innovation landscape. The innovation ambassadors interact closely with SUND's Innovation Working Group and with BETA.HEALTH, Biomedical Design, and BII programmes.
- Internationalisation Ambassador (1) is responsible for maintaining and facilitating new exchange contracts with clinical departments at the University Hospitals in the two regions. The internationalisation ambassador interacts closely with academic officers at SUND's Section for Student Affairs.

The ambassadors' individual functions are described where relevant in other chapters of this report.

### **IKM Symposium**

Each year in January, IKM hosts a symposium for all staff members and collaborators from the

University and from outside the University. The symposium includes an academic agenda with focus on research and teaching. The meeting is concluded with a dinner and networking.

### **COMPLEXITY OF THE ORGANISATION**

The complex structure of IKM requires commitment from members of all the different councils and committees. For the IKM management communication and involvement are crucial tools to secure the day-to-day operation of the department as well as long-term strategic goals.

As all academic staff members at IKM have their primary employment at hospitals in either Region Zealand or The Capital Region of Denmark, the management mandate in itself can be a complex matter. This is further exemplified by the Head of Department having a managerial role at IKM and an employee role at a hospital. Well-functioning committees and councils and regular meetings with University and Hospital managements are absolutely crucial for the department's management.

### **SWOT ANALYSES FROM THE COORDINATING (ASSOCIATE) PROFESSORS**

The coordinating (associate) professors play a pivotal role in the collaboration between University and Hospital managements. For that reason, they have each been asked to complete a SWOT analysis on their role focusing on the collaboration with managements at the university and the hospital(s), their influence on research strategies and recruitment of academic staff.

The individual replies are the foundation for the SWOT analysis below.<sup>23</sup>

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23 We have received replies from 11 of the current 14 coordinating (associate) professors. Two positions are currently pending.

## SWOT - Coordinating (Associate) Professors.

### STRENGTHS

- A key role with access to management at IKM and the hospital
- Influence on recruitment at the hospital
- Networking between academic staff across specialities
- The administrative assistance (20% full-time secretary)
- Respected role by colleagues and managements and natural point of contact
- Overview of the hospital unit
- Easy access to IKM staff and option for guidance

### WEAKNESSES

- A lonely position placed between hospital and university
- Mandate somewhat unclear (and weak in some places)
- Appointed by the university but financed from hospital
- Some hospital units are too large for one coordinating professor to oversee
- Slow administrative processes
- Information as opposed to dialogue from the IKM management

## SWOT

### OPPORTUNITIES

- Strategic position to recruit professors
- Impact on the research possibilities at the hospital
- To increase and strengthen the collaboration between hospital and IKM – especially with hospitals in Region Zealand
- Facilitate academic careers for next generation of clinical researchers
- Increase colleagues' knowledge of IKM

### THREATS

- Recruitment of future coordinating (associate) professors may prove difficult
- Very limited personal benefit
- Difficult to focus on one's own research
- Increased workload
- Narrowing window of influence on academic recruitments due to changes in hospital structures and a trend towards centralisation at hospitals
- Some hospitals in Region Zealand tend to recruit academic staff from both UCPH and University of Southern Denmark (SDU), which leads to unclear career paths.

Overall, the coordinating (associate) professors see their position as having a key role with access to managements at both University and Hospital. They have impact on local research possibilities and can help facilitate academic careers for next generation clinical researchers. The position can be used strategically to recruit professors. However, the mandate is not always clear, and the workload is increasing – taking time from the coordinating (associate) professors' own research. Especially the workload and limited personal benefits are issues seen to make future recruitments of coordinating (associate) professors more difficult.

The sometimes unclear mandate for the coordinating (associate) professors and what is seen as a narrowing window of influence on academic recruitments due to changes within the hospital structures point to the complexity of the IKM organisation.

### EXPENDITURE AND EXTERNAL FUNDING

IKM oversees a budget of DKK131 million (~EUR17.6 million). Fifty-nine percent of the department's expenditure is covered by funding stipulated in the annual finance act (educational funding), and 41 percent is covered by funding from external sources (Figure 10, Appendix



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A). External funding (DR50-60) represents an increasing portion of the total expenditure; this is mainly explained by the increasing number of clinical professors who are funded externally (Table 10, Appendix A). The two regions and the hospitals contribute with a large percentage of the salary of our employees by covering the entire consultancy salary (for all clinical professors and all clinical research associate professors) and the professorship fee (for most of the clinical professors except the clinical professors with a chair position). (Figures 11-12, Appendix A)

Among the challenges for IKM's research strategy is the fact that IKM does not have its own research budget. This limits the possibilities of the department management to be agile in starting new research initiatives and to take early initiatives in new areas.

#### **RECRUITMENT AND CAREER PATHS AT THE DEPARTMENT**

In the hospital career path, there is a well-known, well-defined progression in the expected competencies in the various job categories. This is not the case in the clinical university career. For the academic environments, it is a challenge that our employees are not sure whether they possess the qualifications required for a given position. At the same time, it can be difficult to obtain the qualifications and competences that are expected (including the principal supervisor role and university teaching, which both need a formal university appointment).

It is the ambition of the department management that all employees (and potentially future IKM employees) are familiar with the qualifications and requirements that are expected to be met for the advancement to the next level of a clinical university career.

To facilitate this, IKM arranges an annual Career Day for all the department's employees and potential future candidates for IKM positions to disseminate knowledge about career development. In the IKM Council, a dedicated group is working with these tasks.

We want to incorporate a generational change in our strategy so that the research talents of the future are identified earlier and ensured the best possible development opportunities. Work is being done to establish a new job category – the clinical assistant professor – which will be integrated into the main course of study of the medical specialist programme. We want to motivate more young clinical researchers to apply for the elitist postdoc position within translational research – the BRIDGE programme. In today's hospital world, there is a large group of academics, such as molecular biologists, physicists, bioinformaticians, etc., who have insufficient career paths both in the hospital sector and in the university's remit. This particular group of hospital staff are not included in the current job structure for clinical positions, and work is currently underway at ministerial<sup>24</sup> level, to recruit other academics as clinical associate professors.

# OVERALL SWOT ANALYSIS AND CONCLUSION

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The IKM management has made its own overall SWOT analysis partly based on input from coordinating and representing professors.

## SWOT analysis for the research of the overall IKM

### STRENGTHS

- The employees at IKM are active researchers and clinicians
- Mutual understanding between the University and the Regions that research goes hand in hand with clinical practice and improves clinical practice
- GCHSP (with its CAGs) and the BRIDGE programme have strengthened translational research
- Strong leadership network with our sister departments at other Danish Universities (and similar Nordic structure under development)
- A large proportion of our research papers represent international collaboration
- IKM contributes substantially to the total research production of the Faculty of Health as well as UCPH
- Strong tradition for recruiting patients to clinical trials
- Unique high-quality research based on Danish registry data

### WEAKNESSES

- Weak link to shared UCPH identity
- Unfocused external identity
- IKM does not have its own specific funding for strategic research purposes
- International recruitments are challenging
- Structured research career process for clinicians is lacking
- Challenges in getting administrative and legal support for research
- The size and structure of IKM challenges communication

## SWOT

### OPPORTUNITIES

- The IKM leadership has now got a membership position in the KUH board
- IKM has an increased focus on a university career in a clinical context
- IKM's large contribution to the postgraduate teaching (PhD school) gives opportunities to prioritize clinical subjects in content of school programmes
- The new full medical programme in Region Zealand
- Facilitate research collaboration with basic researchers at other universities and the med-tech industry

### THREATS

- Concerns from our employees about work-life balance
- The position as professor may lose its elitist status
- Clinical academic positions lose their attraction
- Increased focus on sources of funding among partners
- GDPR issues, lack of data accessibility and legal approvals
- Large clinical production demand threatens time for research

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## Strengths

The fact that our employees are active researchers as well as clinicians makes IKM unique in a university context. This is supported by the mutual understanding between the University and Regions that a strong research culture lays the foundation for a strong clinical practice.

This again supports yet another common goal between the organizations – to produce the best candidates (including MDs) who have received world-class, research-based teaching, both in their pregraduate and postgraduate education, for the benefit of our future patients and health care system.

A large proportion of our research represents international collaboration but is not limited to this – the collaboration is also between IKM employees and other UCPH researchers as well as researchers from other Danish universities, and between employees in different medical specialties. The GCHSP (and CAGs) and the BRIDGE programmes have further strengthened the translational research and created new and strong ties between institutions across sectors. Our employees work in settings with strong traditions for recruiting patients to clinical trials and with a unique access to Danish registry data that support the potential for high-quality research. IKM employees contribute substantially to the overall UCPH research production, as our employees are involved in more than a third of all UCPH publications and half of SUND publications. This supports the distinctive character of IKM even further.

IKM management has developed a strong leadership network with clinical departments at the other Danish medical schools. We meet on a regular basis and work towards shared goals. Currently we are in the early stages of consolidating a similar Nordic network, which was established a few years ago.

## Weaknesses

IKM employees often refer to themselves as not being seen as a natural part of the

University. There is a shared experience of a gap between IKM clinical researchers and ‘real’ UCPH researchers. To strengthen a shared UCPH identity, the link between IKM academic staff and UCPH could be improved. The size and structure of IKM challenges communication across hospitals and specialties, which again weakens the link to a shared identity.

Furthermore, IKM does not have a clearly defined external identity. Considering our size and contribution to clinical research, the IKM brand is not very well defined or well known – neither within the UCPH structure nor in the public sphere. This may be a result of the wide range of research areas combined with the weak link between our employees and the University.

IKM plays a defining role in research development by implementing academic recruitments in the two regions. The majority of new professorships are proposed and funded by hospitals/hospital departments. This together with the fact that IKM does not have its own specific funding for research purposes weakens IKM’s possibility to directly impact our own research strategy.

IKM employees find it challenging to get sufficient administrative and legal support for research – both from the hospitals and from IKM. On an overall structural level, the Danish Memorandum on Job Structure for Academic Staff at Universities<sup>25</sup> is outdated and does not reflect the need for clinical academic positions in a university context. There is a shortage of relevant academic positions for young clinicians employed in the hospital. As a consequence, a structured academic career path for clinicians is lacking.

International recruitments are challenging as clinicians for the most part need Danish language skills in order to take part in the daily clinical work, which is pivotal for their academic position at IKM.

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25 Job Structure for Academic Staff at Universities 2013 (ufm.dk)

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## Opportunities

Due to a change in the composition of the KUH board, the IKM Head of Department is now a full member of the board. Previously, IKM was represented as an observer at KUH board meetings. This changes the mandate and leaves more room for influence on decisions taken by the board.

IKM has increased its focus on university career paths for clinicians, and we are working actively to change the overall structures at ministerial level as well as to establish a more hands-on approach to recruitment and retention of young as well as established talents.

The new medical degree programme in Region Zealand is an opportunity for IKM to support a strengthening of the research-based teaching in the region by ensuring extensive administrative support for new recruitment.

Through the IKM ambassadors, the department can facilitate collaboration with basic researchers at other universities and within the med-tech industry. The innovation ambassadors are in a great position to strengthen this effort in the coming years.

IKM's contribution to the postgraduate teaching at the SUND PhD School gives ample opportunity to prioritize clinical subjects in the content of the school's programmes.

## Threats

As pointed out in the SWOTs by the coordinating professors and associate professors, there are concerns from our employees about work-life balance. This may influence our ability to recruit among the best talents in the future and to maintain the current employees.

Clinical academic positions lose their attraction due to the weight of the combined workload from IKM as well as the hospitals. A large clinical production demand takes time from

the clinical professors' and clinical research associate professors' dedicated research time. Adding to this, changes in the hospital structures are currently influencing the terms for clinical professors and may to some extent cause the position to lose its elitist status.

There is an increasing focus on financial aspects of the partnership between the University and the Regions. The shared goal has not changed but in a time with limited funding for all parties, this will potentially affect the mutual relationship.

For the researchers, especially GDPR<sup>26</sup> issues, lack of data accessibility and difficulty in getting sufficient legal approvals in a timely manner are causing direct threats to their ability to conduct clinical research. This causes loss of funding opportunities and delays in international collaborations.

## CONCLUSION

IKM is the largest department at UCPH based on headcount with an academic staff of 965 persons and approximately 800 PhD students connected to the department through an IKM primary supervisor.

The department has a unique structure seen in a UCPH context as our staff have their academic position at the university while their main employment as clinicians are at one of the hospitals in either Region Zealand or the Capital Region of Denmark. These shared positions guarantee that medical students and other students receive high-quality, practice-based clinical education, highly relevant for the Danish health system.

The present self-assessment report demonstrates how our academic staff generate an increasing number of research papers (approx. 4,000 in 2021). The research is based on a high degree of international and interdisciplinary collaboration and covers a wide range of topics, spanning from basic research to randomized clinical trials produced by 35 specialities. The average field-

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26 General Data Protection Regulation in EU.

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weighted impact factor for the publications varies among specialities, ranging from an average of 1.09 to 5.07 (data from 2020). The field-weighted citation impact for publications from IKM is higher than the corresponding values from both SUND and the entire UCPH and shows that the research is of high impact, also when seen in an international context.

The present self-assessment shows that most specialities have strong research contours, whereas a minority are weaker. Most specialities have increased both their number of publications and their impact.

The diversity of IKM with its many specialities offers great opportunities for collaboration and interdisciplinary research. On the other hand, the fragmentation of IKM over many hospitals may challenge the overall cohesion and communication. This could call for strategic initiatives to strengthen a shared IKM identity for staff members across different locations and specialities.

IKM has numerous possibilities for influencing agendas and research strategies in many different settings – such as the BRIDGE and GCHSP programmes where our staff are widely represented, or programmes offered at the Graduate School at the Faculty, as well as research strategies in the regions. However, most initiatives for new externally financed professorships come from hospital departments and therefore, in this context, IKM has a relatively passive role in the overall research agenda in the collaboration between the university and the regions. A change in this strategic approach will require that IKM has its own committed research funds in the future.

An overall focus point for the IKM management should be future recruitment and retention of the absolute best clinical researchers. Our research production and its high impact indicate that we are on track. The entire system of clinical research as well as teaching is based on having the best employees and, as pointed out in this report, especially a challenged work-life balance can make this increasingly difficult in the future.

# TERMINOLOGY

|                                               |                                                        |
|-----------------------------------------------|--------------------------------------------------------|
| Affiliate associate professor/professor       | Adjungeret lektor/professor                            |
| Associate professor                           | Lektor                                                 |
| Association of representing professors        | Forsamlingen af ordførende professorer                 |
| Board of studies                              | Studienævn                                             |
| CAMES                                         | Copenhagen Academy of Medical Education and Simulation |
| Clinical assistant professor                  | Klinisk adjunkt                                        |
| Clinical associate professor                  | Klinisk lektor                                         |
| Clinical professor (chair)                    | Lærestolsprofessor                                     |
| Clinical professor                            | Eksternt finansieret klinisk professor                 |
| Clinical research associate professor         | Klinisk forskningslektor                               |
| Coordinating professor                        | Koordinerende professor                                |
| Copenhagen University Hospital                | Københavns Universitetshospital                        |
| Course coordinator                            | Kursusansvarlig                                        |
| Department council                            | IKM råd                                                |
| Department of Clinical Medicine               | Institut for Klinisk Medicin (IKM)                     |
| Emeritus/emerita professor                    | Professor emeritus/emerita                             |
| Exam coordinator                              | Eksamensansvarlig                                      |
| Executive committee – teaching                | Forretningsudvalg for undervisning                     |
| External lecturer                             | Ekstern lektor                                         |
| Faculty of Health and Medical Sciences (SUND) | Det Sundhedsvidenskabelige Fakultet (SUND)             |
| Head of studies                               | Studieleder                                            |
| Postgraduate clinical associate professor     | Postgraduat klinisk lektor                             |
| Professor agreement                           | Professoraftale                                        |
| Representing professor                        | Ordførende professor                                   |
| Teaching committee                            | Undervisningsudvalg                                    |
| University of Copenhagen (UCPH)               | Københavns Universitet                                 |

# APPENDICES

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Appendix A: Facts & Figures

Appendix B: Bibliometric Analysis

## **Supplementary appendices**

Appendix 1: Short CVs from IKM research staff

Appendix 2: SUND Datasheet

Appendix 3: SUND Health Report 2022

Appendix 4: SUND Goals Plan 2022-2025

Appendix 5: UCPH Strategy 2023

Appendix 6: UCPH Structure and Governance

Appendix 7: IKM Self-Assessment Report 2014-2016

Appendix 8: Panel Assessment Report 2014-2016

Appendix 9: Department Management Executive Summary 2014-2016

Appendix 10: Rector Summary UCPH Research Assessment 2014-2016



# APPENDIX A

## – FACTS & FIGURES

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### DEPARTMENT COMPOSITION AND MANAGEMENT IN 2023

#### **MANAGEMENT**

Head of Department:  
Clinical Professor Jesper Hastrup Svendsen

Head of Administration:  
Eve Frisenborg

Deputy Head of Teaching:  
Clinical Professor Peter Bytzer

Deputy Head of Research and Innovation:  
Clinical Professor Ruth Frikke-Schmidt

## **REPRESENTING PROFESSORS/ASSOCIATE PROFESSORS OF THE 35 SPECIALTIES:**

- Anaesthesiology: Clinical Professor Ole Mathiesen
- Cardiothoracic Surgery: Clinical Professor René Horsleben Petersen
- Child and Adolescent Psychiatry: Clinical Professor Søren Dalsgaard
- Clinical Biochemistry: Clinical Professor Børge Nordestgaard
- Clinical Genetics: Clinical Associate Professor Elsebet Østergaard
- Clinical Immunology: Clinical Professor Peter Garred
- Clinical Microbiology: Clinical Professor Henrik Westh
- Clinical Oncology: Clinical Professor Dorte Nielsen
- Clinical Pharmacology: Clinical Professor Kim Dalhoff
- Clinical Physiology and Nuclear Medicine: Clinical Professor Søren Møller
- Dermato-venerology: Clinical Professor Jacob P. Thyssen
- Emergency Medicine: Clinical Professor Kasper Karmark Iversen
- Internal Medicine: Cardiology: Clinical Professor Lars Valeur Køber
- Internal Medicine: Endocrinology: Clinical Professor Peter Schwarz
- Internal Medicine: Gastroenterology and Hepatology: Clinical Professor Lise Lotte Gluud
- Internal Medicine: Geriatrics: Clinical Professor Charlotte Suetta
- Internal Medicine: Haematology: Clinical Professor Kirsten Grønbæk
- Internal Medicine: Infectious Diseases: Clinical Professor Jens Lundgren
- Internal Medicine: Nephrology: Clinical Professor Mads Hornum
- Internal Medicine: Respiratory Medicine: Clinical Professor Charlotte Suppli Ulrik
- Internal Medicine: Rheumatology: Clinical Professor Mikkel Østergaard
- Neurology: Clinical Professor Gitte Moos Knudsen
- Neurosurgery: Clinical Professor Tiit Mathiesen
- Obstetrics and Gynaecology: Clinical Professor Henriette Svarre Nielsen
- Ophthalmology: Clinical Professor Steffen Heegaard
- Orthopaedic Surgery: Clinical Professor Anders Troelsen
- Otorhinolaryngology: Clinical Professor Christian von Buchwald
- Paediatrics: Clinical Professor Dina Cortes
- Pathology: Clinical Research Associate Professor Lise Mette Rahbek Gjerdrum
- Plastic Surgery: Clinical Professor Tine Engberg Damsgaard
- Psychiatry: Clinical Professor Merete Nordentoft
- Radiology: Clinical Professor Adam Espe Hansen
- Surgery: Clinical Professor Ismail Gögenur
- Urology: Clinical Professor Andreas Røder
- Vascular Surgery: Clinical Professor Jonas Eiberg

## **COORDINATING PROFESSORS/ASSOCIATE PROFESSORS:**

- Copenhagen Emergency Medical Services: Clinical Professor Ellen Løkkegaard
- Amager-Hvidovre Hospital: Clinical Professor Thomas Benfield
- Bispebjerg-Frederiksberg Hospital: Clinical Professor Michael Kjær
- Bornholms Hospital: Clinical Professor Finn Gustafsson
- CAMES: Clinical Professor Anders Juul
- Herlev-Gentofte Hospital: Clinical Professor Lone Skov
- Holbæk Sygehus: Clinical Associate Professor Birgitte Brandstrup
- Mental Health Services Region Zealand: Clinical Professor Sidse Marie Arnfred

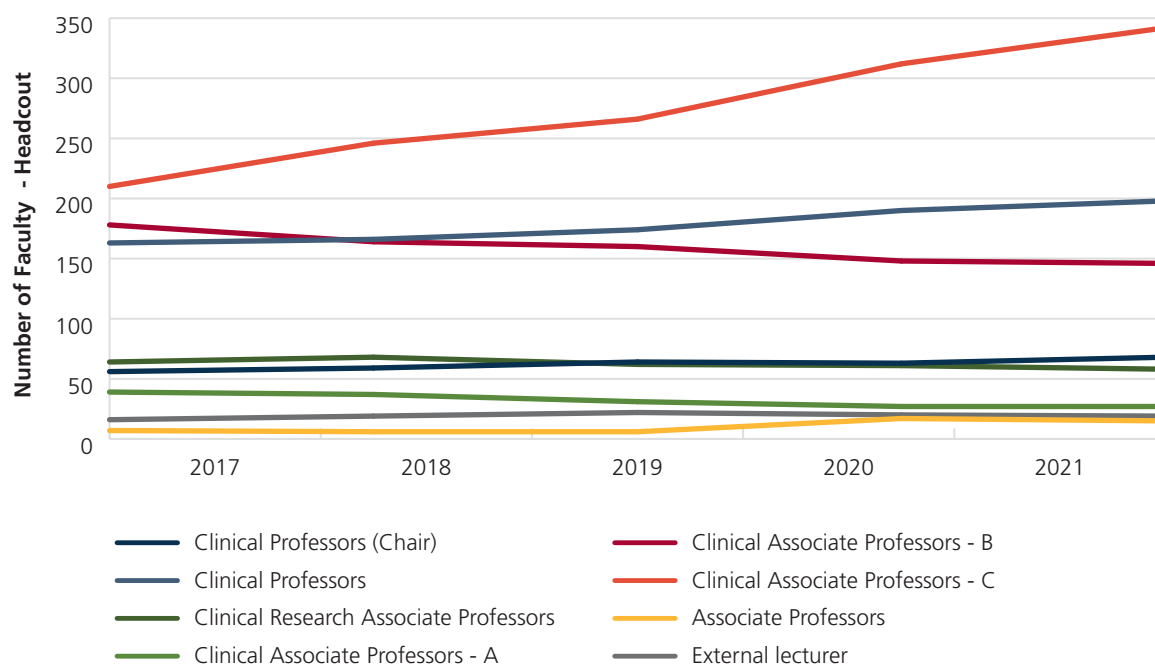
- Mental Health Services Capital Region of Denmark: Clinical Professor Lars Vedel Kessing
- Nordsjællands Hospital: Clinical Professor Ellen Løkkegaard
- Nykøbing Falster Sygehus: Pending
- Næstved, Slagelse, Ringsted Sygehus: Pending
- Rigshospitalet, Heart Centre: Clinical Professor Finn Gustafsen
- Rigshospitalet, Centre for Cancer and Organ Diseases: Clinical Professor Bo Feldt-Rasmussen
- Rigshospitalet, Centre of Diagnostic Investigation: Clinical Professor Peter Garred
- Rigshospitalet, Centre of Head and Orthopaedics: Clinical Professor Christian von Buchwald
- Rigshospitalet, Juliane Marie Centre: Clinical Professor Anders Juul
- Rigshospitalet, Neuroscience Centre: Clinical Professor Gunhild Waldemar
- Zealand University Hospital: Clinical Professor Julie Gehl
- STENO Diabetes Centre: Clinical Professor Lone Skov

## ACADEMIC STAFF:

| Title                                             | Appointment conditions                                                                                                                                                   |
|---------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Clinical Professor/Professor                      | 50 % research and teaching and 50 % clinical work. Clinical position is usually as a consultant at a hospital.                                                           |
| Clinical Research Associate Professor             | 50 % research and teaching and 50 % clinical work. Clinical position as a staff specialist or consultant at a hospital. Must be a medical specialist.                    |
| Clinical Associate Professor                      | Teaching of undergraduate students. Clinical position as a staff specialist or consultant at a hospital. Must be a medical specialist.                                   |
| Postgraduate Clinical Associate Professor         | Postgraduate education within the speciality. Clinical position as a staff specialist or consultant at a hospital or general practitioner. Must be a medical specialist. |
| External Lecturer                                 | Teaching of students. Clinical position other than doctor at a hospital or doctor not employed at a hospital.                                                            |
| Affiliate Professor/Affiliate Associate Professor | Recruited from an international university with an unsalaried affiliation to University of Copenhagen.                                                                   |
| Emeritus/Emerita Professor                        | Retired Clinical Professor with an unsalaried affiliation.                                                                                                               |

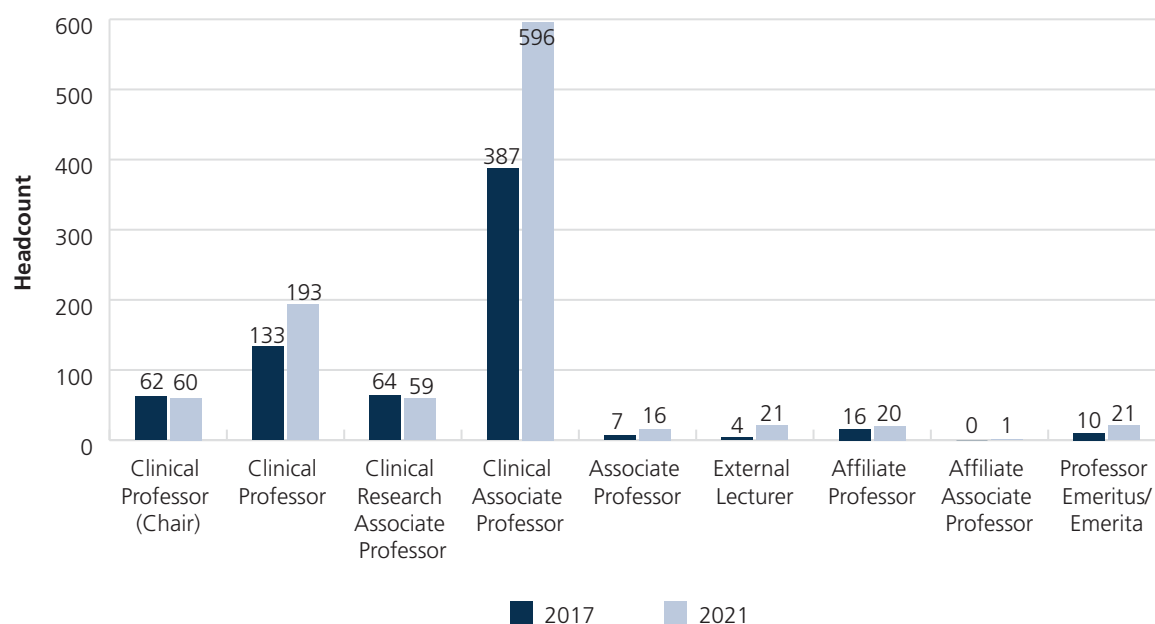
**FIGURE 1:**

**Academic staff (faculty) consist of all Clinical Professors, Clinical Research Associate professors, Clinical Associate Professors (A-C), Associate Professors, External lecturer, Affiliate Professors/Associate Professor. Headcount. IKM 2017-2021**



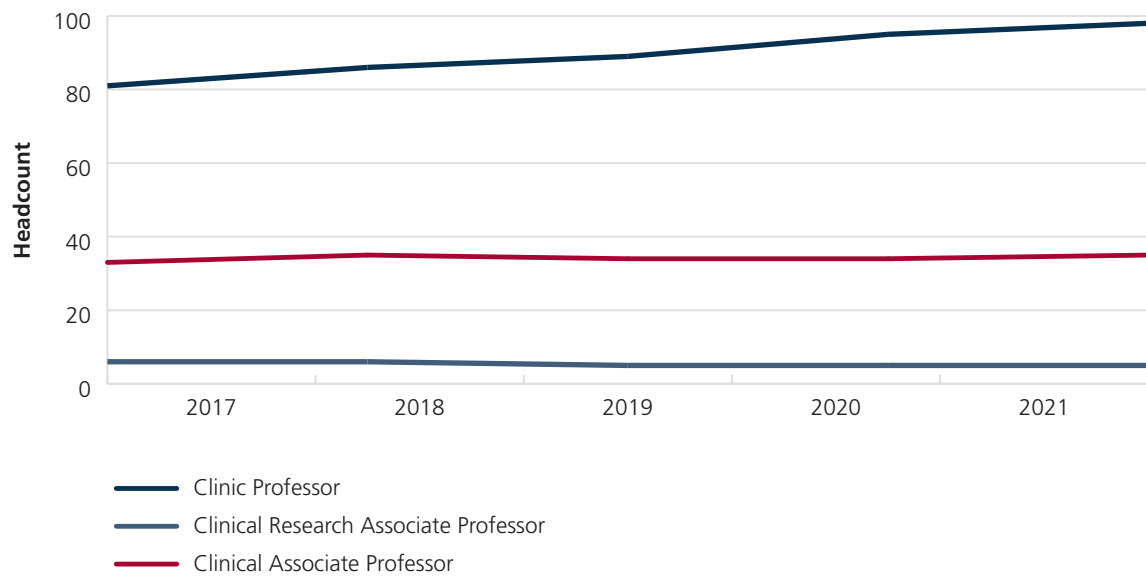
**FIGURE 2:**

**IKM Academic staff (faculty) consist of all Clinical Professors, Clinical Research Associate professors, Clinical Associate Professors, Associate Professors, External lecturer, Affiliate Professors/Associate Professor, Professor Emeritus/Emerita. Headcount 2017 & 2021**



**FIGURE 3:**

**Academic staff (faculty) consist of all Clinical Professors, Clinical Research Associate professors and Clinical Associate Professors calculated as full-time equivalents. IKM 2017-2021**



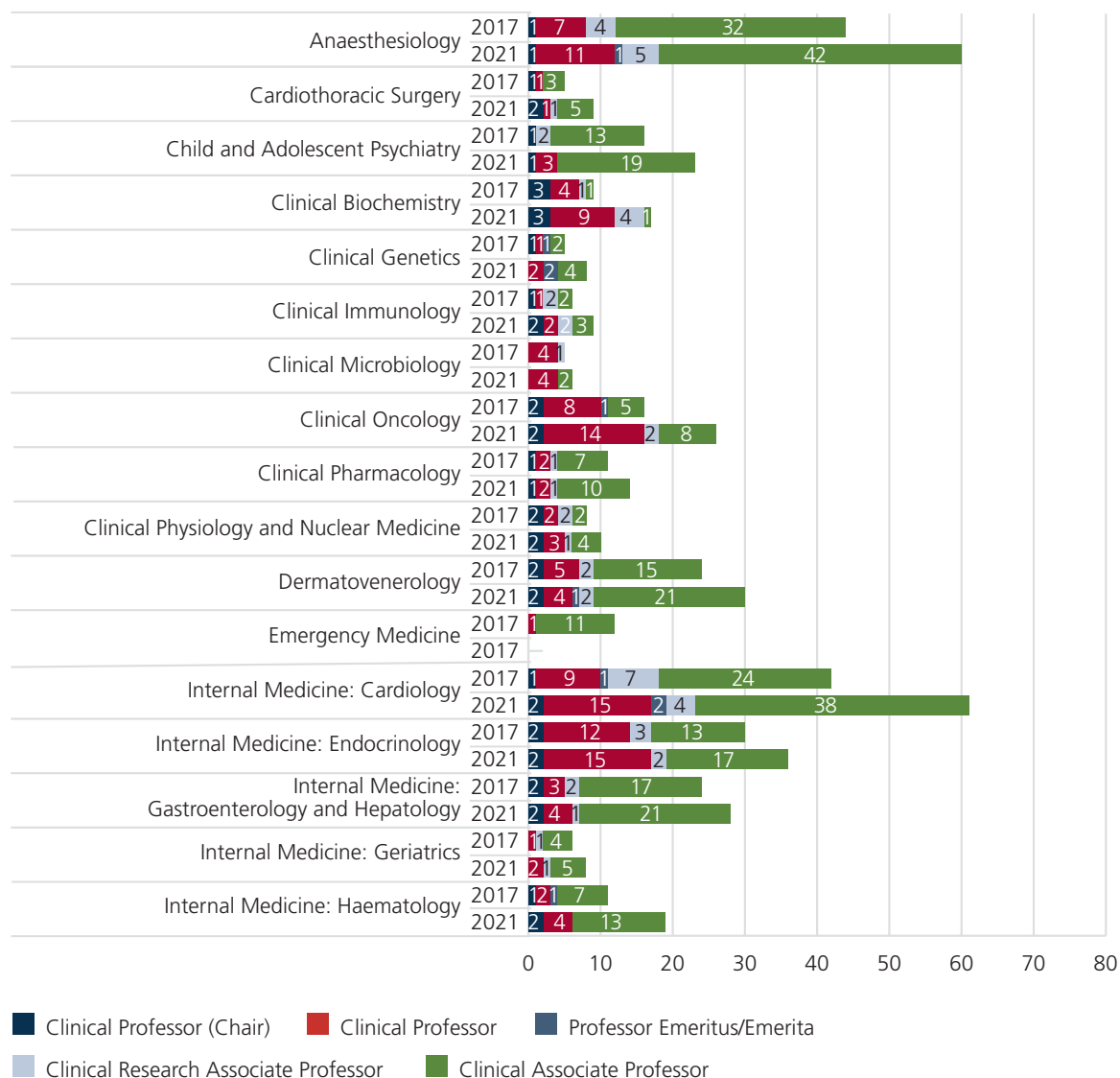
**TABLE 1:**

**Academic staff (faculty) consist of Clinical Professors, Clinical Research Associate Professors and Associate Professors calculated as full time equivalents. IKM 2017-2021**

|                                       | 2017 | 2018 | 2019 | 2020 | 2021 |
|---------------------------------------|------|------|------|------|------|
| Clinic Professor                      | 81   | 86   | 89   | 95   | 98   |
| Clinical Research Associate Professor | 6    | 6    | 5    | 5    | 5    |
| Clinical Associate Professor          | 33   | 35   | 34   | 34   | 35   |

**FIGURE 4A:**

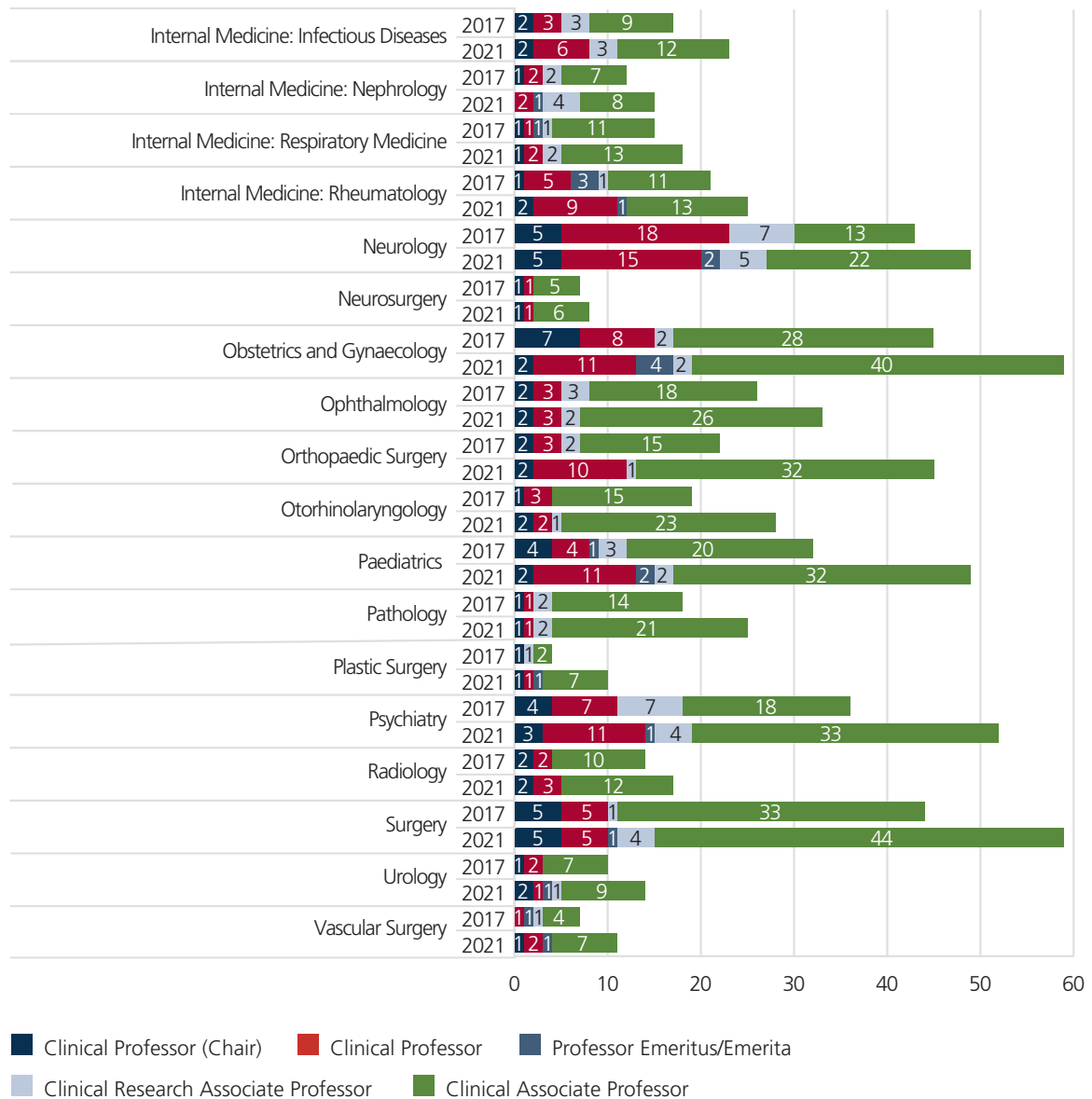
**IKM Academic staff (faculty) in the specialties consist of all Clinical Professors, Clinical Research Associate professors, Clinical Associate Professors, Professor Emeritus/Emerita. Headcount primo 2017 & ultimo 2021.**



Source: KUPA

**FIGURE 4B:**

**IKM Academic staff (faculty) in the specialties consist of all Clinical Professors, Clinical Research Associate professors, Clinical Associate Professors, Professor Emeritus/Emerita.**  
**Headcount primo 2017 & ultimo 2021**



Source: KUPA

## STAFF DIVERSITY 2021:

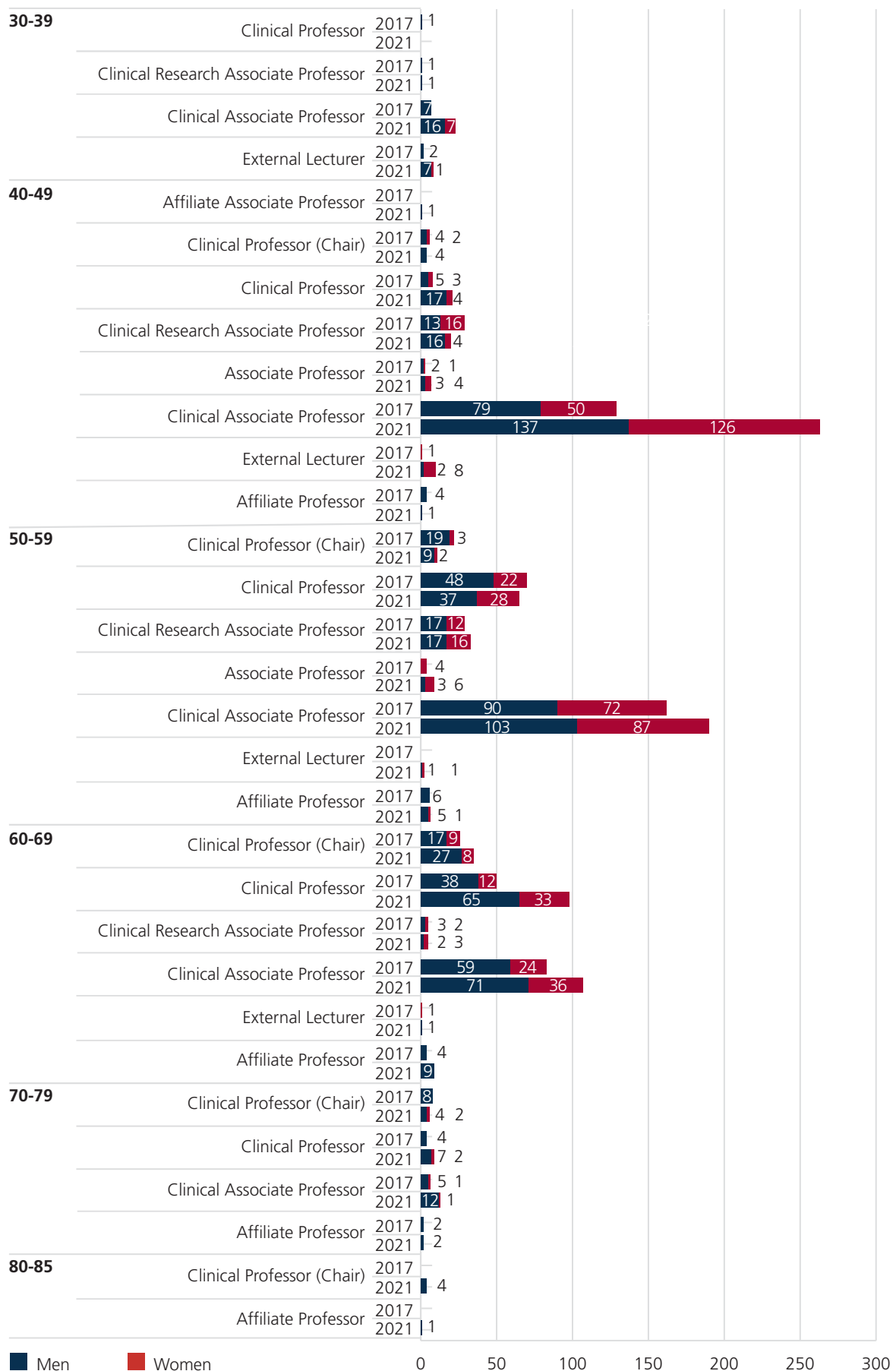
**TABLE 2:**  
**Age and Gender in IKM Academic Staff 2017 & 2021**

| Faculty                               | Age   | 2021       |            | 2017       |            |
|---------------------------------------|-------|------------|------------|------------|------------|
|                                       |       | Men        | Women      | Men        | Women      |
| Clinical Professor (Chair)            | 80-85 | 4          |            |            |            |
|                                       | 70-79 | 4          | 2          | 8          |            |
|                                       | 60-69 | 27         | 8          | 17         | 9          |
|                                       | 50-59 | 9          | 2          | 19         | 3          |
|                                       | 40-49 | 4          |            | 4          | 2          |
| Clinical Professor                    | 70-79 | 7          | 2          | 4          |            |
|                                       | 60-69 | 65         | 33         | 38         | 12         |
|                                       | 50-59 | 37         | 28         | 48         | 22         |
|                                       | 40-49 | 17         | 4          | 5          | 3          |
|                                       | 30-39 |            |            | 1          |            |
| Clinical Research Associate Professor | 60-69 | 2          | 3          | 3          | 2          |
|                                       | 50-59 | 17         | 16         | 17         | 12         |
|                                       | 40-49 | 16         | 4          | 13         | 16         |
|                                       | 30-39 | 1          |            | 1          |            |
| Clinical Associate Professor          | 70-79 | 12         | 1          | 5          | 1          |
|                                       | 60-69 | 71         | 36         | 59         | 24         |
|                                       | 50-59 | 103        | 87         | 90         | 72         |
|                                       | 40-49 | 137        | 126        | 79         | 50         |
|                                       | 30-39 | 16         | 7          | 7          |            |
| Associate Professor                   | 50-59 | 3          | 6          |            | 4          |
|                                       | 40-49 | 3          | 4          | 2          | 1          |
| External Lecturer                     | 60-69 | 1          |            |            | 1          |
|                                       | 50-59 | 1          | 1          |            |            |
|                                       | 40-49 | 2          | 8          |            | 1          |
|                                       | 30-39 | 7          | 1          | 2          |            |
| Affiliate Professor                   | 80-85 | 1          |            |            |            |
|                                       | 70-79 | 2          |            | 2          |            |
|                                       | 60-69 | 9          |            | 4          |            |
|                                       | 50-59 | 5          | 1          | 6          |            |
|                                       | 40-49 | 1          |            | 4          |            |
| Affiliate Associate Professor         | 40-49 | 1          |            |            |            |
| <b>Total</b>                          |       | <b>585</b> | <b>380</b> | <b>438</b> | <b>235</b> |



**FIGURE 5:**

**Age and Gender in IKM Academic Staff 2017 & 2021**



**TABLE 3:**  
Diversity in IKM Academic Staff 2017 & 2021

|                | Male/female ratio (%) |       | Male/female mean age (%) |       |
|----------------|-----------------------|-------|--------------------------|-------|
|                | 2017                  | 2021  | 2017                     | 2021  |
| Academic Staff | 65/35                 | 61/39 | 56/55                    | 58/54 |

## RECRUITMENT

**TABLE 4.**  
Candidates for IKM professorships in the period 2017 - 2021

| 2017 – 2021                                              |        | Professor (Chair) | Externally financed professors |
|----------------------------------------------------------|--------|-------------------|--------------------------------|
| Positions filled by                                      | Male   | 12                | 59                             |
|                                                          | Female | 4                 | 39                             |
| <b>Total</b>                                             |        | <b>16</b>         | <b>98</b>                      |
| Number of applicants                                     | Male   | 45                | 112                            |
|                                                          | Female | 21                | 72                             |
| <b>Total</b>                                             |        | <b>66</b>         | <b>184</b>                     |
| Positions filled by internal IKM candidates              |        | 12                | 65                             |
| Positions filled by Danish candidates                    |        | 15                | 95                             |
| Positions filled by international candidates             |        | 1                 | 3                              |
| Positions filled by Danish candidates from same hospital |        | 10                | 40                             |
| Positions filled without advertisement                   |        | 0                 | 4                              |

## NUMBER OF STUDENTS AND COURSES

**TABLE 5.**  
**Number of SUND students on Bachelor, Master's and Executive Master's level**

|                                                          | 2017         | 2018         | 2019         | 2020         | 2021         |
|----------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|
| <b>Bachelor degree students</b>                          |              |              |              |              |              |
| Medicine                                                 | 1,844        | 1,870        | 1,884        | 1,894        | 1,938        |
| Health & Informatics                                     | 166          | 131          | 129          | 122          | 149          |
| Molecular Biomedicine                                    | 166          | 172          | 184          | 178          | 218          |
| Biomedical Engineering                                   | 163          | 152          | 174          | 212          | NA           |
|                                                          | <b>2,339</b> | <b>2,325</b> | <b>2,371</b> | <b>2,406</b> | <b>2,305</b> |
| <b>Master's degree students</b>                          |              |              |              |              |              |
| Human Biology                                            | 90           | 101          | 105          | 86           | 87           |
| Immunology & inflammation                                | 48           | 62           | 71           | 64           | 70           |
| Medicine                                                 | 1,805        | 1,785        | 1,786        | 1,754        | 1,741        |
| Health & Informatics                                     | 55           | 58           | 60           | 61           | 53           |
| Health Professional Master's Programme                   | 67           | 72           | 73           | 69           | 77           |
| Molecular Biomedicine                                    | 107          | 91           | 81           | 86           | 89           |
| Biomedical Engineering                                   | 144          | 147          | 151          | 155          | 169          |
|                                                          | <b>2,316</b> | <b>2,316</b> | <b>2,327</b> | <b>2,275</b> | <b>2,286</b> |
| <b>Part-time students in Executive Masters' programs</b> |              |              |              |              |              |
| Master of Headache Disorder                              | 20           | 29           | 28           | 37           | 33           |
| Master in Personal Medicin                               | 0            | 0            | 0            | 0            | 35           |
|                                                          | <b>20</b>    | <b>29</b>    | <b>28</b>    | <b>37</b>    | <b>68</b>    |

Source: Tableau

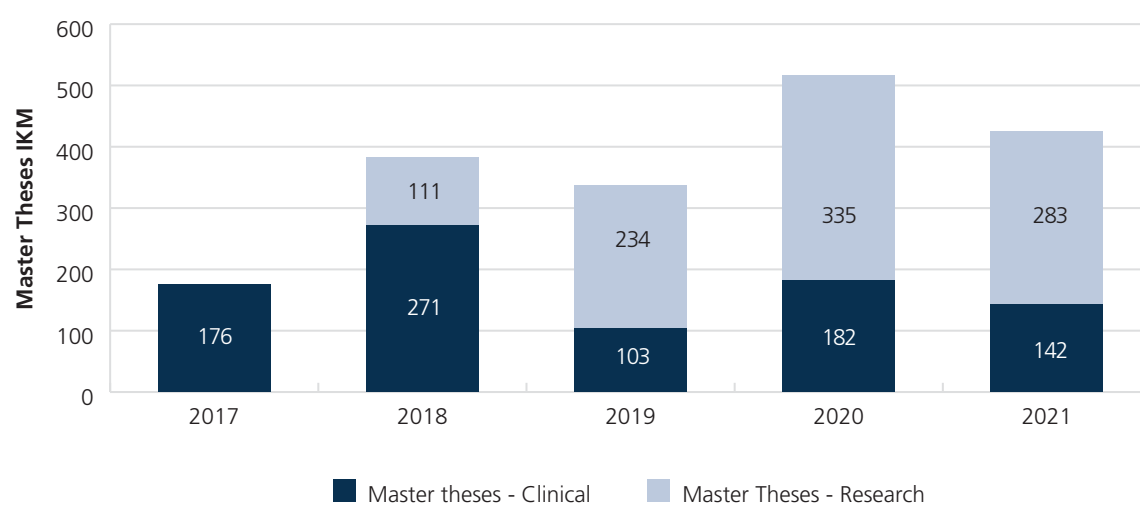
**TABLE 6.**  
**Number of IKM courses and Programs in 2022**

|                                            |    |
|--------------------------------------------|----|
| IKM bachelor courses                       | 4  |
| IKM master's degree courses                | 64 |
| IKM courses in Executive Masters' programs | 17 |
| IKM PhD Programs                           | 6  |

**TABLE 7:****Number of Bachelor Projects and Master Theses supervision IKM 2017-2021**

|                               | 2017       | 2018       | 2019       | 2020       | 2021       | Total        |
|-------------------------------|------------|------------|------------|------------|------------|--------------|
| Bachelor Projects Supervision | 113        | 177        | 107        | 187        | 197        | 781          |
| Master Theses Supervision     | 176        | 382        | 337        | 517        | 425        | 1.837        |
| <b>Total</b>                  | <b>289</b> | <b>559</b> | <b>444</b> | <b>704</b> | <b>622</b> | <b>2.618</b> |

Source: Tableau

**FIGURE 6:****Number of Master Theses in research and clinical theses IKM 2017-2021**

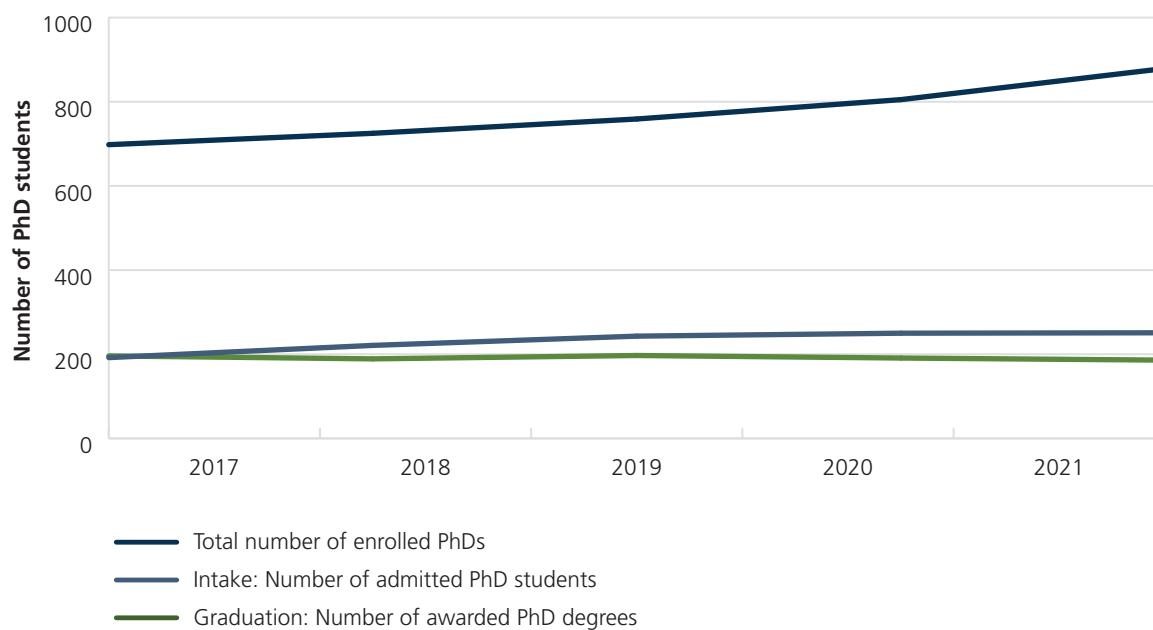
## PHD STUDENTS & SUPERVISION

**TABLE 8:****Development in number of newly admitted, total population of enrolled and graduated PhD students with a main supervisor at IKM 2017-2021**

|      | Total number of enrolled PhDs | Intake: Number of admitted PhD students | Graduation: Number of awarded PhD degrees |
|------|-------------------------------|-----------------------------------------|-------------------------------------------|
| 2017 | 698                           | 192                                     | 196                                       |
| 2018 | 725                           | 221                                     | 189                                       |
| 2019 | 759                           | 243                                     | 197                                       |
| 2020 | 805                           | 250                                     | 191                                       |
| 2021 | 883                           | 251                                     | 186                                       |
|      |                               | <b>1157</b>                             | <b>959</b>                                |

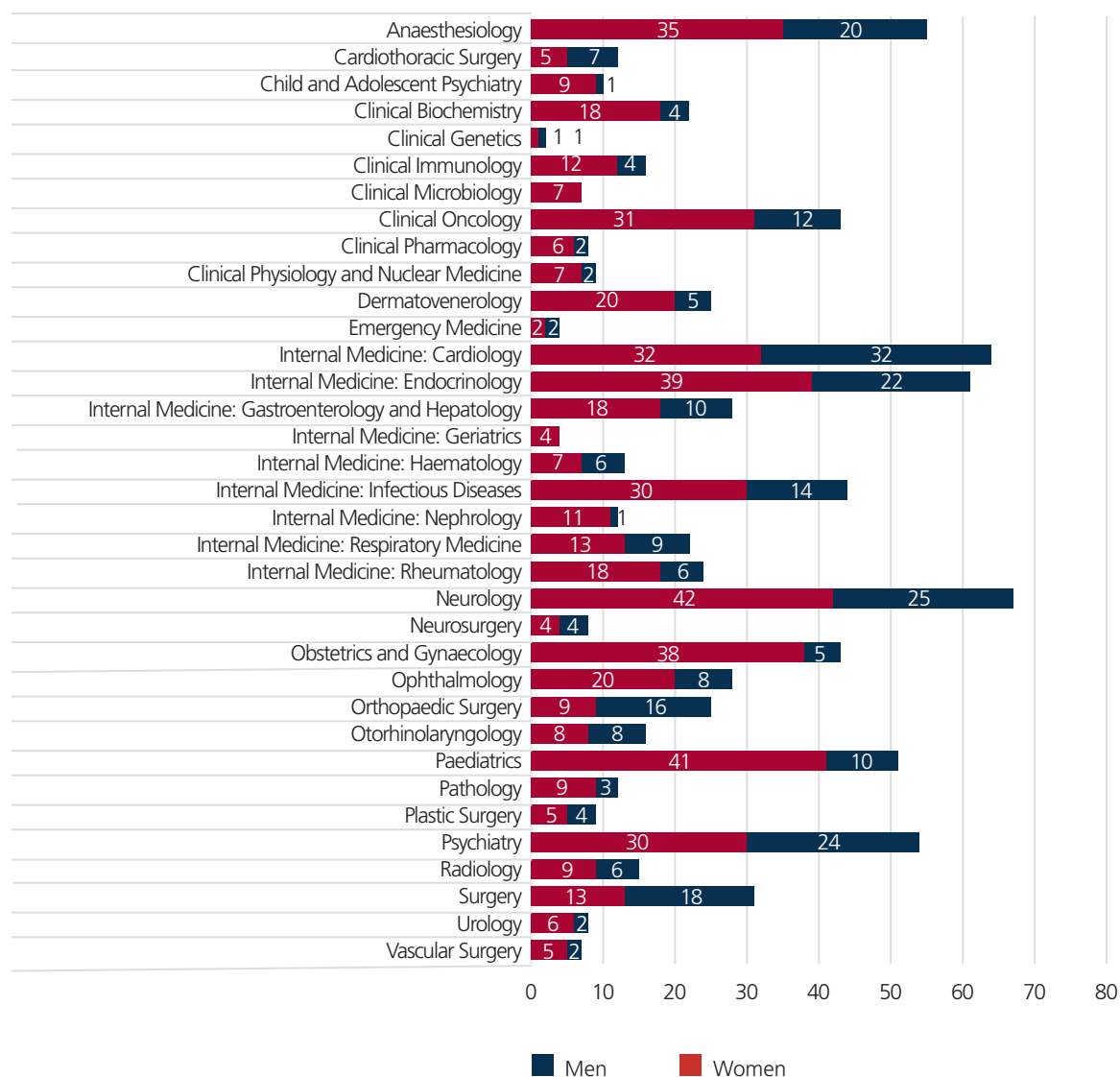
**TABLE 9:****Diversity in total population of enrolled PhD students with a main supervisor at IKM 2021**

|             | Male/female ratio (%): | Danish/non-Danish ratio (%): |
|-------------|------------------------|------------------------------|
| PhD student | 34/66                  | 85/15                        |

**FIGURE 7:****Development in number of newly admitted, total population of enrolled and graduated PhD students with a main supervisor at IKM 2017-2021**

**FIGURE 8:**

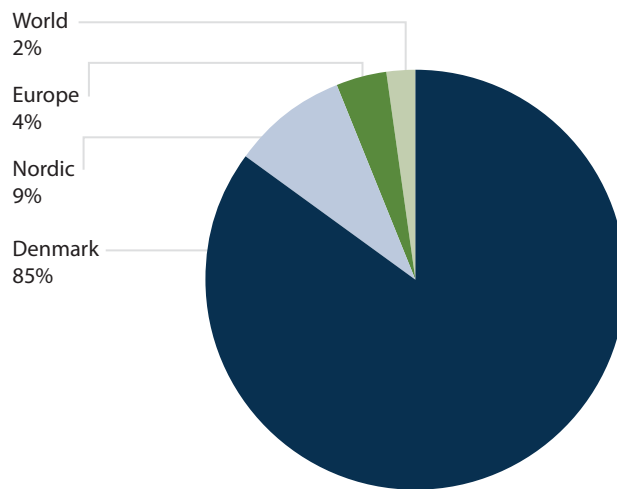
**Number and gender of enrolled PhD students in the Specialities in IKM 2021**



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**FIGURE 9:**

**Diversity in total population of enrolled PhD students IKM 2021**



## EXPENDITURE AND EXTERNAL FUNDING

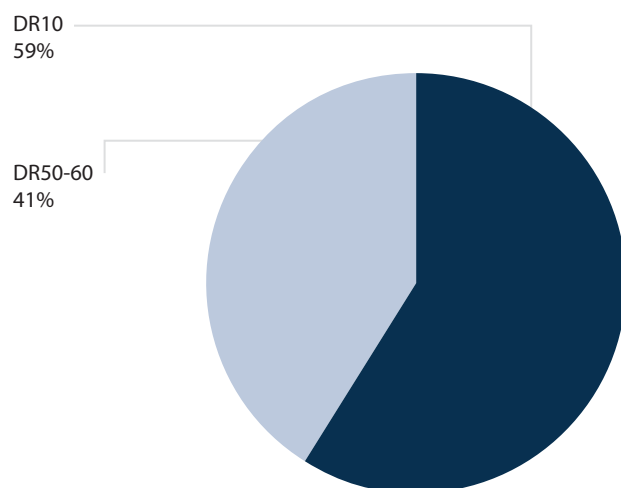
### Sources of expenditure:

DR10 = Basic funding for research and education from the Annual Finance Act

DR50-60 = External funding

**FIGURE 10:**

### The balance in the department's sources of expenditure in 2021



The balance is distributed on a timeline below:

**TABLE 10:**

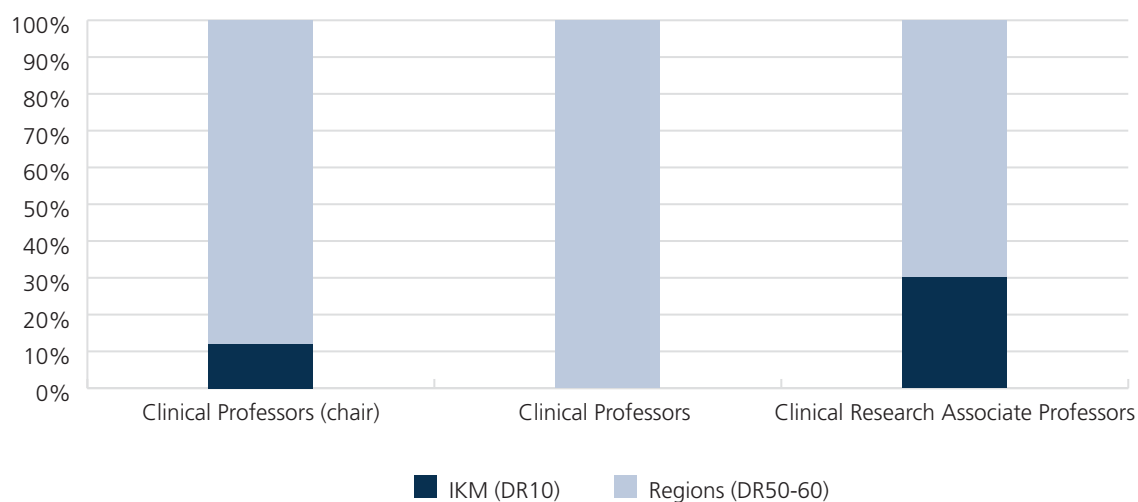
### Distribution of sources for expenditure at IKM in the years 2017-2021:

| Source of expenditure | 2017<br>DKKm | 2017<br>%   | 2018<br>DKKm | 2018<br>%   | 2019<br>DKKm | 2019<br>%   | 2020<br>DKKm | 2020<br>%   | 2021<br>DKKm | 2021<br>%   |
|-----------------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|--------------|-------------|
| DR10                  | 67           | 65%         | 77.6         | 65%         | 79.2         | 64%         | 75.6         | 60%         | 77.6         | 59%         |
| DR50-60               | 36.8         | 35%         | 41.6         | 35%         | 44.4         | 36%         | 50.4         | 40%         | 54           | 41%         |
| <b>Total</b>          | <b>103.8</b> | <b>100%</b> | <b>119.2</b> | <b>100%</b> | <b>123.6</b> | <b>100%</b> | <b>126</b>   | <b>100%</b> | <b>131.6</b> | <b>100%</b> |



**FIGURE 11.**

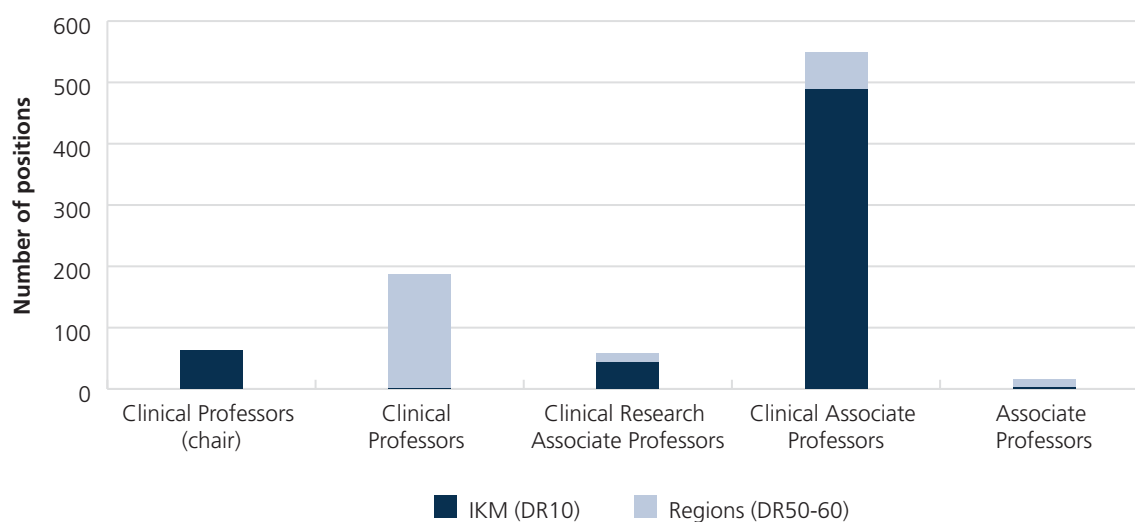
**Source of funding for Clinical Professorships positions and Clinical Research Associate Professorships in percentage**



This figure includes the consultancy salary.<sup>27</sup>

**FIGURE 12.**

**Number of positions at IKM in 2021 and their source of funding**



This figure does not include the consultancy salary.

<sup>27</sup> Consultancy salary is approximately DKK 1 million (~ EUR 0.1 million) annually. On top of this a clinical professor receives an annual fee of DKK 0.2 million (~ EUR 0.03 million). A clinical research associate professor receives an additional annual fee of DKK 0.1 million (~ EUR 0.01 million)

# APPENDIX B

## – BIBLIOMETRIC ANALYSIS

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### INTRODUCTION

This appendix presents the Department of Clinical Medicine (IKM), Faculty of Health and Medical Sciences, University of Copenhagen publication output 2017-2021.

The report contains publication analyses based on the local UCPH database CURIS (Pure), as well as collaboration and citation analyses based on the international database Scopus using SciVal.

**CURIS:** is a local Pure database used for registration of research publications from UCPH. The registrations have several purposes: to give an overview of the research publications from UCPH and to generate publication lists for the researcher profiles at the UCPH website. CURIS was implemented at UCPH in 2007/08. Information specialists from Copenhagen University Library validates all research publications registered in CURIS.

**SciVal:** is an analytic tool based on publication data from Scopus, the world's largest curated abstract and citation database. SciVal uses Scopus data from 1996 to present, covering over 60 million records from more than 7,000 publishers worldwide. Data sets can be exported directly from CURIS into SciVal, enabling creation of new data sets and analysis of e.g., author collaborations and article citations. 96.5% of IKMs journal publications could be retrieved in SciVal.

### Caveats

Bibliometric analyses are based on counting citations given to a publication, where the citation comes from and which citations the publication itself is making. A higher number of citations is

generally perceived as an indication of relevance and quality of the publication and the research that formed the basis for it. This is however not an absolute truth.

Below is a shortened list of caveats to keep in mind when assessing the precision of a bibliometric number as a proxy for quality of the research:

- A citation counts equally for a negative mention as for a positive one
- Traditional citations are currently only counted if the publication doing the citing and the publication cited are both indexed in the same bibliometric database
- Most research fields are not completely indexed in the bibliometric databases, meaning that only a subset of the publications is counted and measured.
- Various fields of the natural sciences have varying degrees of citation practices. It is therefore meaningless to compare different fields of research. Citation practices includes but is not limited to: number of co-authors typically associated with a publication and how the citation count is divided or not; number of references typically given in a publication; the amount of research time going into each publication regardless of publication type.
- Bibliometric counts favour English language publications
- Bibliometric analyses do not count community involvement, engagement and outreach, medical work, and teaching in various forms.

## PUBLICATION DATA

**TABLE 1.**  
**Journal articles IKM 2017-2021 - Peer reviewed**

|                 |                           | 2017        | 2018        | 2019        | 2020        | 2021        |
|-----------------|---------------------------|-------------|-------------|-------------|-------------|-------------|
| English         | Original research article | 2451        | 2679        | 2772        | 2867        | 3371        |
|                 | Review                    | 329         | 317         | 319         | 348         | 412         |
|                 | Letter                    | 80          | 49          | 71          | 94          | 115         |
| Danish          | Original research article | 76          | 118         | 91          | 80          | 32          |
|                 | Review                    | 3           | 3           | 1           | 2           | 55          |
|                 | Letter                    | 11          | 19          | 15          | 10          | 1           |
| Other languages | Original research article | 2           | 6           | 6           | 5           | 6           |
|                 | Review                    | 1           | 3           |             | 1           | 2           |
|                 | Letter                    |             |             |             |             | 1           |
| <b>Total</b>    |                           | <b>2953</b> | <b>3194</b> | <b>3275</b> | <b>3407</b> | <b>3995</b> |

Source: CURIS

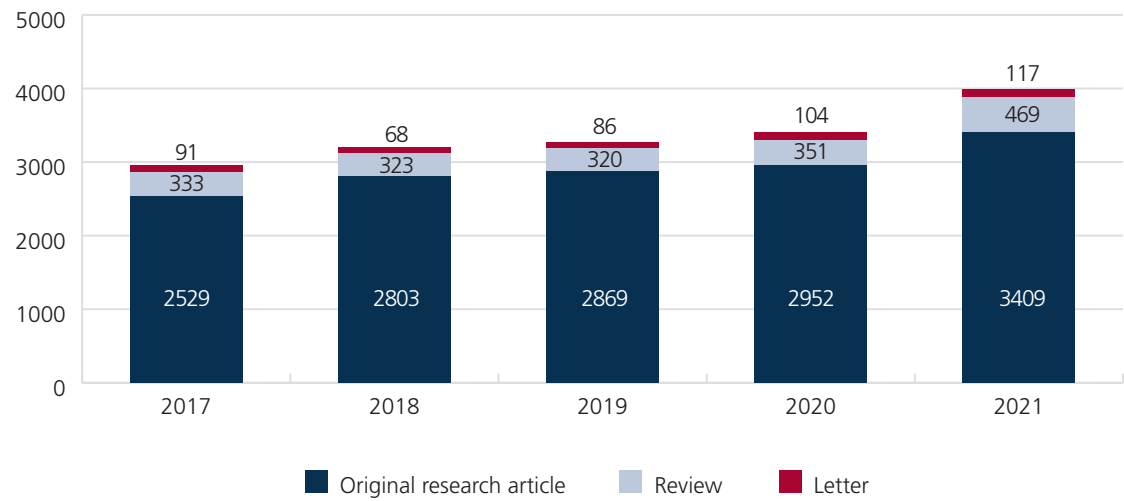
**TABLE 2.**  
**Book/reports IKM 2017-2021 - Peer reviewed**

|                 |                        | 2017      | 2018      | 2019      | 2020      | 2021      |
|-----------------|------------------------|-----------|-----------|-----------|-----------|-----------|
| English         | Book                   |           | 1         |           |           |           |
|                 | Book chapter           | 18        | 20        | 22        | 16        | 12        |
|                 | Article in proceedings | 6         | 17        | 13        | 7         | 9         |
|                 | Report chapter         |           |           |           | 1         |           |
| Danish          | Book                   |           |           |           |           | 2         |
|                 | Book chapter           | 1         |           |           |           |           |
|                 | Report                 |           |           |           | 1         |           |
| Other languages | Book chapter           |           |           |           | 1         |           |
| <b>Total</b>    |                        | <b>25</b> | <b>38</b> | <b>35</b> | <b>26</b> | <b>23</b> |

Source: CURIS

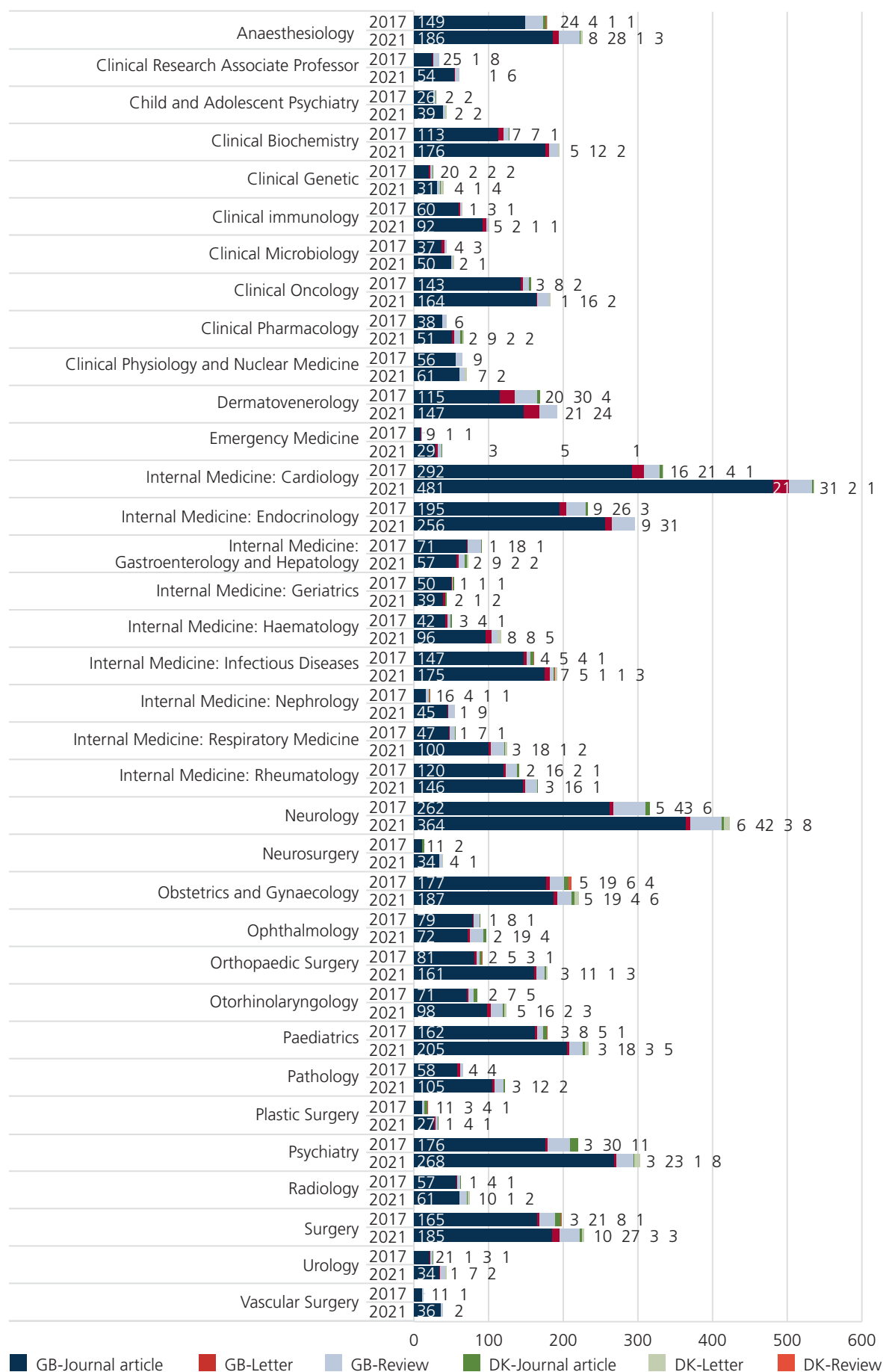
**FIGURE 1.**

**IKM Scientific Production - Peer-reviewed – 2017 - 2021**



Source: CURIS. The total Peer-reviewed scientific production by IKM staff in the period 2017-2021 described as number of publications broken down into different types of research publications

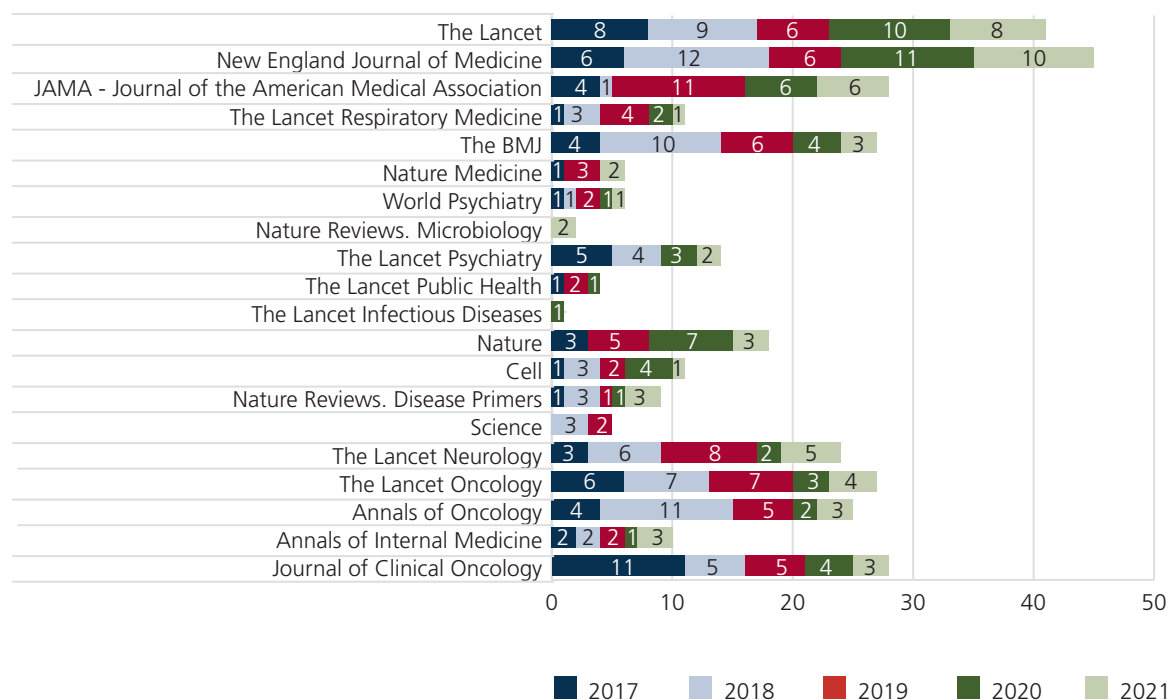
**FIGURE 2: Publications per IKM Speciality 2017 & 2021 Danish and English - Peer reviewed**



Source: CURIS

**FIGURE 3.**

**IKM Scientific Production (peer-reviewed) in top 20 Journals 2017-2021 (Impact factor 2021)**



Source: CURIS

**TABLE 3.****Number of Publications compared to employees in the speciality (ultimo 2021):**

| Speciality                                         | Number of Employees | Number of Publications | Mean per Employees |
|----------------------------------------------------|---------------------|------------------------|--------------------|
| Anaesthesiology                                    | 60                  | 229                    | 3.8                |
| Cardiothoracic Surgery                             | 9                   | 61                     | 6.8                |
| Child and Adolescent Psychiatry                    | 23                  | 43                     | 1.9                |
| Clinical Biochemistry                              | 17                  | 195                    | 11.5               |
| Clinical Genetics                                  | 8                   | 40                     | 5.0                |
| Clinical Immunology                                | 9                   | 103                    | 11.4               |
| Clinical Microbiology                              | 6                   | 54                     | 9.0                |
| Clinical Oncology                                  | 26                  | 184                    | 7.1                |
| Clinical Pharmacology                              | 14                  | 67                     | 4.8                |
| Clinical Physiology and Nuclear Medicine           | 10                  | 71                     | 7.1                |
| Dermatovenerology                                  | 30                  | 192                    | 6.4                |
| Emergency Medicine                                 | 12                  | 38                     | 3.2                |
| Internal Medicine: Cardiology                      | 61                  | 538                    | 8.8                |
| Internal Medicine: Endocrinology                   | 36                  | 296                    | 8.2                |
| Internal Medicine: Gastroenterology and Hepatology | 28                  | 73                     | 2.6                |
| Internal Medicine: Geriatrics                      | 8                   | 44                     | 5.5                |
| Internal Medicine: Haematology                     | 19                  | 117                    | 6.2                |
| Internal Medicine: Infectious Diseases             | 23                  | 192                    | 8.3                |
| Internal Medicine: Nephrology                      | 15                  | 55                     | 3.7                |
| Internal Medicine: Respiratory Medicine            | 18                  | 125                    | 6.9                |
| Internal Medicine: Rheumatology                    | 25                  | 168                    | 6.7                |
| Neurology                                          | 49                  | 431                    | 8.8                |
| Neurosurgery                                       | 8                   | 41                     | 5.1                |
| Obstetrics and Gynaecology                         | 59                  | 224                    | 3.8                |
| Ophthalmology                                      | 33                  | 97                     | 2.9                |
| Orthopaedic Surgery                                | 45                  | 180                    | 4.0                |
| Otorhinolaryngology                                | 28                  | 124                    | 4.4                |
| Paediatrics                                        | 49                  | 238                    | 4.9                |
| Pathology                                          | 25                  | 122                    | 4.9                |
| Plastic Surgery                                    | 10                  | 33                     | 3.3                |
| Psychiatry                                         | 52                  | 306                    | 5.9                |
| Radiology                                          | 17                  | 75                     | 4.4                |
| Surgery                                            | 59                  | 228                    | 3.9                |
| Urology                                            | 14                  | 45                     | 3.2                |
| Vascular Surgery                                   | 11                  | 40                     | 3.6                |

Source CURIS and KUPA. Employees: Clinical Professors (chair), Clinical Professors, Clinical Research Associate Professors, Professor Emeritus/Emerita.

Citation Impact

The impact of IKM's publications can be examined by looking at IKM's Field-weighted citation impact and outputs in top citation percentiles.

Both indicators are field-weighted, which means it takes field differences in citation frequencies into account. A publication is thus benchmarked with other publications from the same research field, publication year and of the same publication type.

The Field-weighted citation impact indicator (FWCI) in SciVal indicates how the number of citations received by an entity's publications compares with the average number of citations

received by all other similar publications in the data universe. A FWCI of more than 1.00 indicates above the global average for similar publications; for example, 2.11 means 111% more than the world average. A FWCI of less than 1.00 indicates below the global average for similar publications; for example, 0.87 means 13% less than the world average.

Outputs in Top Citation Percentiles indicates the extent to which an entity's publications are present in the most-cited percentiles of a data universe (Scopus): how many publications are in the top 1%, 5% and 10% of the most-cited publications?<sup>28</sup>

TABLE 4. FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES<sup>29</sup> 2017-2020

|                          | Number of publications in SciVal | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles | Output in Top 5% Citation Percentiles | Output in Top 10% Citation Percentiles |
|--------------------------|----------------------------------|--------------------------------|---------------------------------------|---------------------------------------|----------------------------------------|
| IKM                      | 12,172                           | 2.29                           | 3.8                                   | 11.6                                  | 19.8                                   |
| SUND                     | 20,873                           | 2.08                           | 3.3                                   | 10.9                                  | 18.9                                   |
| University of Copenhagen | 40,065                           | 1.96                           | 3                                     | 11.1                                  | 19.6                                   |

Includes: Articles, Reviews and Conference articles (2017-2020)

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publication are not included since they have not had the proper amount of time to be cited

28 When field weighting Outputs in Top Citation Percentiles are selected, the Field-Weighted Citation Impact (FWCI) is used for each publication to calculate the percentile thresholds, instead of the publication's citations. For each year, the global publications are extracted from Scopus and ordered from highest to lowest based on their FWCI values. The publications are then split into 100 even percentiles and the citation thresholds are noted

29 The underlying dataset comprises the journal publications IKM's researchers have registered in CURIS, which can be found in Scopus. However, as the publication and citation culture vary across different disciplines, the data would not be comparable across faculties at the University of Copenhagen. The method also precludes comparison to Clinical Medicine departments at other universities, where detailed categorization is unavailable to us



**TABLE 5. FIELD-WEIGHTED CITATION IMPACT AND OUTPUTS IN TOP CITATION PERCENTILES IN THE SPECIALITIES 2017-2020. INCLUDES: ARTICLES, REVIEWS AND CONFERENCE ARTICLES**

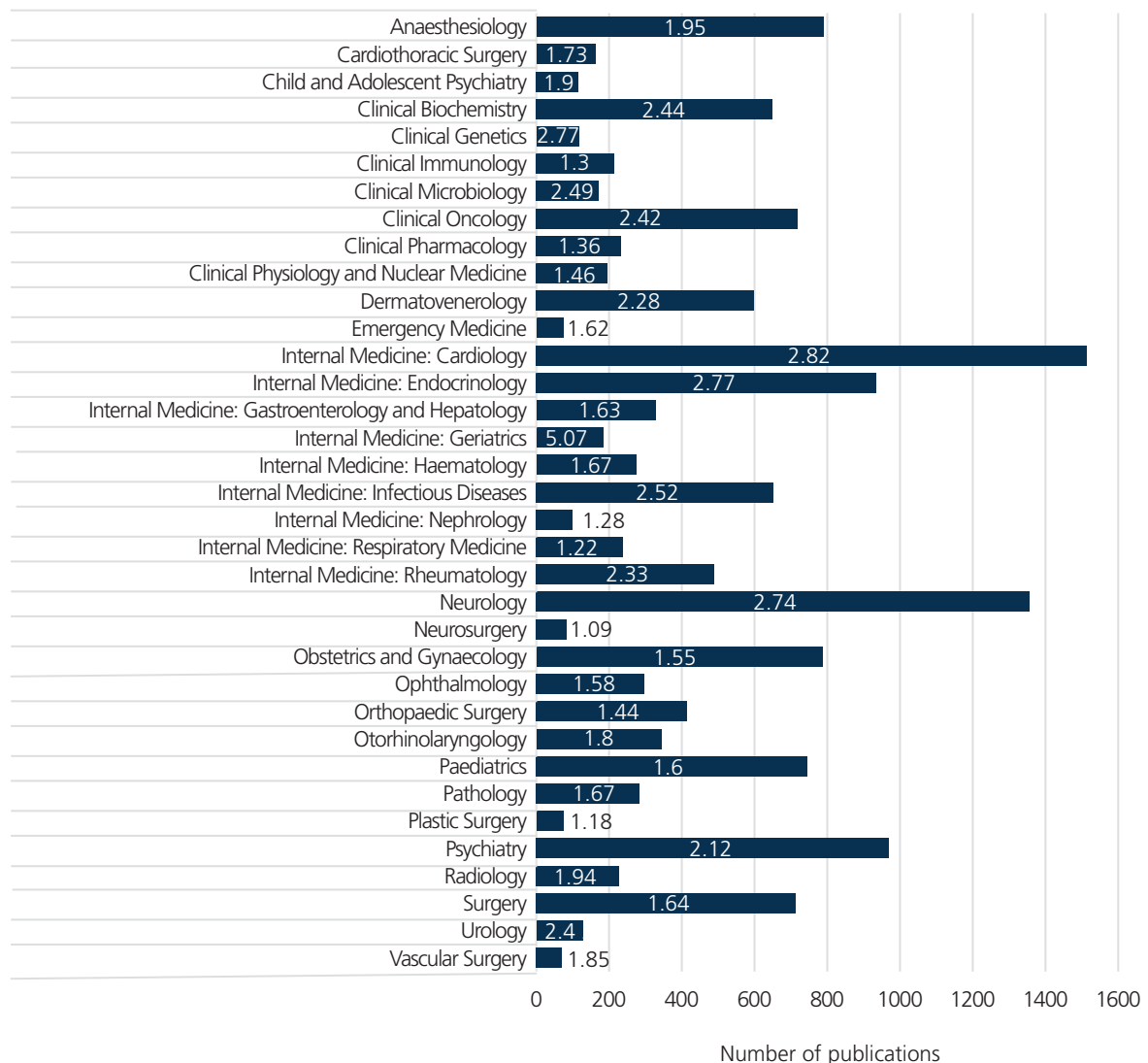
| Speciality                                         | Scholarly Output | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles (field-weighted. %) | Output in Top 5% Citation Percentiles (field-weighted. %) | Output in Top 10% Citation Percentiles (field-weighted. %) | Impact factor 2020 |
|----------------------------------------------------|------------------|--------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|--------------------|
| Anaesthesiology                                    | 789              | 1.95                           | 2.7                                                       | 9.4                                                       | 15.6                                                       | 4.8                |
| Cardiothoracic Surgery                             | 162              | 1.73                           | 1.9                                                       | 7.4                                                       | 19.8                                                       | 4.4                |
| Child and Adolescent Psychiatry                    | 116              | 1.9                            | 2.6                                                       | 8.6                                                       | 18.1                                                       | 5.3                |
| Clinical Biochemistry                              | 650              | 2.44                           | 5.4                                                       | 14.8                                                      | 24                                                         | 9.9                |
| Clinical Genetics                                  | 117              | 2.77                           | 5.1                                                       | 12.8                                                      | 21.4                                                       | 8.9                |
| Clinical Immunology                                | 214              | 1.3                            | 1.9                                                       | 7.5                                                       | 10.7                                                       | 6.6                |
| Clinical Microbiology                              | 171              | 2.49                           | 3.5                                                       | 10.5                                                      | 26.3                                                       | 5.1                |
| Clinical Oncology                                  | 718              | 2.42                           | 3.2                                                       | 9.9                                                       | 18.5                                                       | 8.6                |
| Clinical Pharmacology                              | 233              | 1.36                           | 1.3                                                       | 7.3                                                       | 16.7                                                       | 5.8                |
| Clinical Physiology and Nuclear Medicine           | 195              | 1.46                           | 1.5                                                       | 8.7                                                       | 17.9                                                       | 6.3                |
| Dermatovenereology                                 | 599              | 2.28                           | 5                                                         | 16                                                        | 30.2                                                       | 6.9                |
| Emergency Medicine                                 | 74               | 1.62                           | 2.7                                                       | 6.8                                                       | 9.5                                                        | 5.0                |
| Internal Medicine: Cardiology                      | 1513             | 2.82                           | 5.3                                                       | 14.6                                                      | 23.4                                                       | 8.9                |
| Internal Medicine: Endocrinology                   | 935              | 2.77                           | 5.3                                                       | 13.6                                                      | 21.9                                                       | 9.1                |
| Internal Medicine: Gastroenterology and Hepatology | 328              | 1.63                           | 2.7                                                       | 7                                                         | 14                                                         | 7.0                |
| Internal Medicine: Geriatrics                      | 184              | 5.07                           | 10.9                                                      | 22.3                                                      | 31.5                                                       | 8.7                |
| Internal Medicine: Haematology                     | 274              | 1.67                           | 2.9                                                       | 8.4                                                       | 14.6                                                       | 7.7                |
| Internal Medicine: Infectious Diseases             | 652              | 2.52                           | 4.3                                                       | 12.9                                                      | 20.1                                                       | 7.6                |
| Internal Medicine: Nephrology                      | 99               | 1.28                           | 2                                                         | 8.1                                                       | 16.2                                                       | 4.9                |
| Internal Medicine: Respiratory Medicine            | 239              | 1.22                           | 0.4                                                       | 5.9                                                       | 13.4                                                       | 6.6                |
| Internal Medicine: Rheumatology                    | 489              | 2.33                           | 3.1                                                       | 9                                                         | 18.6                                                       | 7.6                |
| Neurology                                          | 1356             | 2.74                           | 4.4                                                       | 13.3                                                      | 20.4                                                       | 6.8                |
| Neurosurgery                                       | 83               | 1.09                           | 0                                                         | 6                                                         | 10.8                                                       | 3.6                |
| Obstetrics and Gynaecology                         | 787              | 1.55                           | 2                                                         | 9.8                                                       | 16.9                                                       | 5.0                |
| Ophthalmology                                      | 297              | 1.58                           | 2.4                                                       | 9.8                                                       | 19.5                                                       | 5.9                |
| Orthopaedic Surgery                                | 415              | 1.44                           | 1.4                                                       | 10.4                                                      | 18.8                                                       | 4.7                |
| Otorhinolaryngology                                | 344              | 1.8                            | 1.7                                                       | 7.3                                                       | 13.1                                                       | 4.5                |
| Paediatrics                                        | 745              | 1.6                            | 2.3                                                       | 8.7                                                       | 17.9                                                       | 6.7                |

| Speciality       | Scholarly Output | Field-Weighted Citation Impact | Output in Top 1% Citation Percentiles (field-weighted. %) | Output in Top 5% Citation Percentiles (field-weighted. %) | Output in Top 10% Citation Percentiles (field-weighted. %) | Impact factor 2020 |
|------------------|------------------|--------------------------------|-----------------------------------------------------------|-----------------------------------------------------------|------------------------------------------------------------|--------------------|
| Pathology        | 283              | 1.67                           | 1.8                                                       | 9.5                                                       | 18.4                                                       | 6.7                |
| Plastic Surgery  | 74               | 1.18                           | 1.4                                                       | 5.4                                                       | 13.5                                                       | 3.7                |
| Psychiatry       | 970              | 2.12                           | 4.1                                                       | 11.6                                                      | 19.6                                                       | 8.0                |
| Radiology        | 228              | 1.94                           | 4.4                                                       | 11.4                                                      | 20.6                                                       | 6.2                |
| Surgery          | 713              | 1.64                           | 2.2                                                       | 9.1                                                       | 15.7                                                       | 4.4                |
| Urology          | 128              | 2.4                            | 5.5                                                       | 12.5                                                      | 17.2                                                       | 7.4                |
| Vascular Surgery | 70               | 1.85                           | 2.9                                                       | 5.7                                                       | 14.3                                                       | 6.2                |

Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publications are not included since they have not had the proper amount of time to be cited

**FIGURE 4.**

**Impact Factor (2020 – Field-Weighted) in the Specialties compared to number of Journal articles, Letters and Reviews (2020)**



Source: SciVal/Scopus. SciVal only contains certain Journals, so the underlying dataset does not contain all publications in the speciality. 2021 publication are not included since they have not had the proper amount of time to be cited. The number to the right of each column is the Field-weighted Citation Impact.

## FIRST AND LAST AUTHORSHIPS

**TABLE 6.**

**IKM first or last peer-reviewed authorships in 2017 – 2021 – all employees**

|                           |                 | 2017        | 2018        | 2019        | 2020        | 2021        | Total       | Mean        |
|---------------------------|-----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| First author              | Journal article | 152         | 192         | 181         | 165         | 177         | 867         | 1.1         |
|                           | Letter          | 5           | 4           | 6           | 12          | 12          | 39          | 0.0         |
|                           | Review          | 47          | 45          | 39          | 32          | 55          | 218         | 0.3         |
| <b>First author Total</b> |                 | <b>204</b>  | <b>241</b>  | <b>226</b>  | <b>209</b>  | <b>244</b>  | <b>1124</b> | <b>1.4</b>  |
| Last author               | Journal article | 1156        | 1205        | 1265        | 1255        | 1446        | 6327        | 8.0         |
|                           | Letter          | 38          | 41          | 44          | 57          | 65          | 245         | 0.3         |
|                           | Review          | 185         | 157         | 164         | 175         | 250         | 931         | 1.2         |
| <b>Last author Total</b>  |                 | <b>1379</b> | <b>1403</b> | <b>1473</b> | <b>1487</b> | <b>1761</b> | <b>7503</b> | <b>9.5</b>  |
| <b>Total</b>              |                 | <b>1583</b> | <b>1644</b> | <b>1699</b> | <b>1696</b> | <b>2005</b> | <b>8627</b> | <b>11.0</b> |

Source: CURIS. IKM have had 1389 academic employees in this period and among these have 786 employees had these authorships.

**TABLE 7.**

**IKM first or last peer-reviewed authorships in 2017 – 2021 – Clinical Professors (Chair)**

|                           |                 | 2017       | 2018       | 2019       | 2020       | 2021       | Total       | Mean        |
|---------------------------|-----------------|------------|------------|------------|------------|------------|-------------|-------------|
| First author              | Journal article | 14         | 21         | 18         | 19         | 13         | 85          | 1.1         |
|                           | Letter          | 1          | 2          |            | 3          | 2          | 8           | 0.1         |
|                           | Review          | 9          | 11         | 8          | 7          | 10         | 45          | 0.6         |
| <b>First author Total</b> |                 | <b>24</b>  | <b>34</b>  | <b>26</b>  | <b>29</b>  | <b>25</b>  | <b>138</b>  | <b>1.8</b>  |
| Last author               | Journal article | 297        | 302        | 300        | 264        | 303        | 1466        | 18.8        |
|                           | Letter          | 7          | 4          | 7          | 10         | 16         | 44          | 0.6         |
|                           | Review          | 54         | 42         | 38         | 48         | 65         | 247         | 3.2         |
| <b>Last author Total</b>  |                 | <b>358</b> | <b>348</b> | <b>345</b> | <b>322</b> | <b>384</b> | <b>1757</b> | <b>22.5</b> |
| <b>Total</b>              |                 | <b>382</b> | <b>382</b> | <b>371</b> | <b>351</b> | <b>409</b> | <b>1895</b> | <b>24.3</b> |

Source: CURIS. IKM have had 99 Clinical Professors (chair) in this period and among these have 78 had these authorships.

**TABLE 8.****IKM first or last peer-reviewed authorships in 2017 – 2021 – Clinical Professors**

|                           |                 | 2017       | 2018       | 2019       | 2020       | 2021       | Total       | Mean        |
|---------------------------|-----------------|------------|------------|------------|------------|------------|-------------|-------------|
| First author              | Journal article | 55         | 66         | 62         | 53         | 59         | 295         | 1.3         |
|                           | Letter          | 2          | 1          | 1          | 5          | 2          | 11          | 0.0         |
|                           | Review          | 20         | 20         | 14         | 13         | 24         | 91          | 0.4         |
| <b>First author Total</b> |                 | <b>77</b>  | <b>87</b>  | <b>77</b>  | <b>71</b>  | <b>85</b>  | <b>397</b>  | <b>1.7</b>  |
| Last author               | Journal article | 512        | 542        | 622        | 670        | 712        | 3058        | 13.5        |
|                           | Letter          | 15         | 18         | 16         | 22         | 25         | 96          | 0.4         |
|                           | Review          | 82         | 75         | 74         | 81         | 119        | 431         | 1.9         |
| <b>Last author Total</b>  |                 | <b>609</b> | <b>635</b> | <b>712</b> | <b>773</b> | <b>856</b> | <b>3585</b> | <b>15.8</b> |
| <b>Total</b>              |                 | <b>686</b> | <b>722</b> | <b>789</b> | <b>844</b> | <b>941</b> | <b>3982</b> | <b>17.5</b> |

Source: CURIS. IKM have had 235 Clinical Professors in this period and among these have 227 employees had these authorships.

**TABLE 9.****IKM first or last peer-reviewed authorships in 2017 – 2021 – Clinical Research Associate Professors**

|                           |                 | 2017       | 2018       | 2019       | 2020       | 2021       | Total       | Mean       |
|---------------------------|-----------------|------------|------------|------------|------------|------------|-------------|------------|
| First author              | Journal article | 33         | 32         | 32         | 25         | 25         | 147         | 1.3        |
|                           | Letter          | 1          | 1          | 2          | 1          | 2          | 7           | 0.1        |
|                           | Review          | 11         | 5          | 6          | 4          | 4          | 30          | 0.3        |
| <b>First author Total</b> |                 | <b>45</b>  | <b>38</b>  | <b>40</b>  | <b>30</b>  | <b>31</b>  | <b>184</b>  | <b>1.6</b> |
| Last author               | Journal article | 178        | 145        | 136        | 147        | 170        | 776         | 6.7        |
|                           | Letter          | 15         | 8          | 5          | 6          | 7          | 41          | 0.4        |
|                           | Review          | 31         | 13         | 34         | 23         | 29         | 130         | 1.1        |
| <b>Last author Total</b>  |                 | <b>224</b> | <b>166</b> | <b>175</b> | <b>176</b> | <b>206</b> | <b>947</b>  | <b>8.2</b> |
| <b>Total</b>              |                 | <b>269</b> | <b>204</b> | <b>215</b> | <b>206</b> | <b>237</b> | <b>1131</b> | <b>9.8</b> |

Source: CURIS. IKM have had 131 Clinical Research Associate Professors in this period and among these have 116 employees had these authorships.

**TABLE 10.****IKM first or last peer-reviewed authorships in 2017 – 2021 – Clinical Associate Professors**

|                           |                 | 2017       | 2018       | 2019       | 2020       | 2021       | Total       | Mean       |
|---------------------------|-----------------|------------|------------|------------|------------|------------|-------------|------------|
| First author              | Journal article | 50         | 72         | 69         | 65         | 79         | 335         | 0.8        |
|                           | Letter          | 1          |            | 3          | 3          | 6          | 13          | 0.0        |
|                           | Review          | 7          | 9          | 9          | 7          | 17         | 49          | 0.1        |
| <b>First author Total</b> |                 | <b>58</b>  | <b>81</b>  | <b>81</b>  | <b>75</b>  | <b>102</b> | <b>397</b>  | <b>1.0</b> |
| Last author               | Journal article | 154        | 204        | 203        | 170        | 255        | 986         | 2.4        |
|                           | Letter          | 7          | 11         | 16         | 19         | 17         | 70          | 0.2        |
|                           | Review          | 16         | 27         | 18         | 20         | 37         | 118         | 0.3        |
| <b>Last author Total</b>  |                 | <b>177</b> | <b>242</b> | <b>237</b> | <b>209</b> | <b>309</b> | <b>1174</b> | <b>2.9</b> |
| <b>Total</b>              |                 | <b>235</b> | <b>323</b> | <b>318</b> | <b>284</b> | <b>411</b> | <b>1571</b> | <b>3.9</b> |

Source: CURIS. IKM have had 943 Clinical Associate Professors in this period and among these have 408 employees had these authorships.

**TABLE 11.****Top 10 journals with the highest number of articles****Includes: Articles, Letters, Reviews and Conference articles**

| Journal                             | Number of articles 2017-2021 | Journal Impact Factor 2021 <sup>30</sup> |
|-------------------------------------|------------------------------|------------------------------------------|
| Ugeskrift for læger                 | 447                          | -                                        |
| PLoS ONE                            | 247                          | 3.752                                    |
| Acta Anaesthesiologica Scandinavica | 214                          | 2.274                                    |
| BMJ Open                            | 197                          | 3.017                                    |
| Scientific Reports                  | 172                          | 4.996                                    |
| Acta Oncologica                     | 144                          | 4.311                                    |
| Danish Medical Journal              | 135                          | 1.865                                    |
| Cephalalgia                         | 123                          | 6.075                                    |
| Acta Ophthalmologica                | 112                          | 3.988                                    |
| European Heart Journal              | 109                          | 35.855                                   |

Source: SciVal and JCR

30 The annual JCR impact factor is a ratio between citations and recent citable items published. The impact factor of a journal is calculated by dividing the number of current year citations to the source items published in that journal during the previous two years. It is important to note, that impact factors vary a great deal from research area to research area, since research areas have different citations patterns. This means, that an impact factor of e.g. 3 may be considered high in one area and lower in another.

## COLLABORATION DATA

**TABLE 12.**

**Collaboration 2017-2021**

**Includes: Articles. Letters. Reviews and Conference articles**

|                                      | Overall | Scholarly Output | Citations per Publication | FWCI |
|--------------------------------------|---------|------------------|---------------------------|------|
| International collaboration          | 48.8%   | 7956             | 31.9                      | 3.21 |
| Only national collaboration          | 28.1%   | 4578             | 11.9                      | 1.36 |
| Only institutional collaboration     | 22.3%   | 3633             | 10.4                      | 1.12 |
| Single authorship (no collaboration) | 0.7%    | 118              | 27.8                      | 1.99 |

Source: SciVal/Scopus

**TABLE 13.**

**List of top 10 academic author collaborators according to number of joint publications**

**Includes: Articles. Letters. Reviews and Conference articles**

| Rank | Collaborator                   | Country        |
|------|--------------------------------|----------------|
| 1    | University of Southern Denmark | Denmark        |
| 2    | Aarhus University              | Denmark        |
| 3    | Aalborg University             | Denmark        |
| 4    | Harvard University             | United States  |
| 5    | Karolinska Institutet          | Sweden         |
| 6    | Lund University                | Sweden         |
| 7    | University College London      | United Kingdom |
| 8    | University of Oslo             | Norway         |
| 9    | King's College London          | United Kingdom |
| 10   | University of Amsterdam        | Netherlands    |

Source: SciVal/Scopus

**TABLE 14.****List of top 10 corporate author collaborators according to number of joint publications**

| Rank | Collaborator         | Country        |
|------|----------------------|----------------|
| 1    | Novo Nordisk A/S     | Denmark        |
| 2    | H. Lundbeck A/S      | Denmark        |
| 3    | AstraZeneca          | United Kingdom |
| 4    | deCODE Genetics      | Iceland        |
| 5    | Novartis             | Switzerland    |
| 6    | Fimlab Laboratories  | Finland        |
| 7    | Merck                | United States  |
| 8    | Pfizer               | United States  |
| 9    | Eli Lilly            | United States  |
| 10   | Nordic Bioscience AS | Denmark        |

*Source: SciVal/Scopus*



## OPEN ACCESS PUBLICATIONS

**TABLE 15:**

**Share of Open Access publications<sup>31</sup>**

**Includes: Peer reviewed Articles. Letters. Reviews. Conference articles and Conference articles in proceedings**

| <b>IKM</b>             | <b>2017</b>  | <b>2018</b>  | <b>2019</b>  | <b>2020</b>  | <b>2021</b>  |
|------------------------|--------------|--------------|--------------|--------------|--------------|
| Number of publications | 2963         | 3212         | 3290         | 3415         | 4002         |
| Open                   | 997          | 1097         | 1615         | 1864         | 2187         |
| Closed                 | 1966         | 2115         | 1675         | 1551         | 1815         |
| <b>Share of OA %</b>   | <b>33.6%</b> | <b>34.1%</b> | <b>49.1%</b> | <b>54.5%</b> | <b>54.6%</b> |

Source: CURIS

| <b>SUND</b>            | <b>2017</b>  | <b>2018</b>  | <b>2019</b>  | <b>2020</b>  | <b>2021</b>  |
|------------------------|--------------|--------------|--------------|--------------|--------------|
| Number of publications | 5003         | 5192         | 5754         | 6196         | 6803         |
| Open                   | 1987         | 2050         | 3197         | 3842         | 4375         |
| Closed                 | 3016         | 3142         | 2557         | 2354         | 2428         |
| <b>Share of OA %</b>   | <b>39.7%</b> | <b>39.5%</b> | <b>55.6%</b> | <b>62.0%</b> | <b>64.3%</b> |

Source: CURIS

| <b>UCPH</b>            | <b>2017</b>  | <b>2018</b>  | <b>2019</b>  | <b>2020</b>  | <b>2021</b>  |
|------------------------|--------------|--------------|--------------|--------------|--------------|
| Number of publications | 9246         | 9562         | 9924         | 10311        | 11125        |
| Open                   | 3901         | 4060         | 5732         | 6594         | 7349         |
| Closed                 | 5345         | 5502         | 4192         | 3717         | 3776         |
| <b>Share of OA %</b>   | <b>42.2%</b> | <b>42.5%</b> | <b>57.8%</b> | <b>64.0%</b> | <b>66.0%</b> |

Source: CURIS

31 The Danish OA strategy is green; i.e. self-archiving of post prints is encouraged, thereby saving costs for making publications OA. As post prints typically have an embargo period of 12-24 months, the OA numbers for 2021 can appear lower.

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