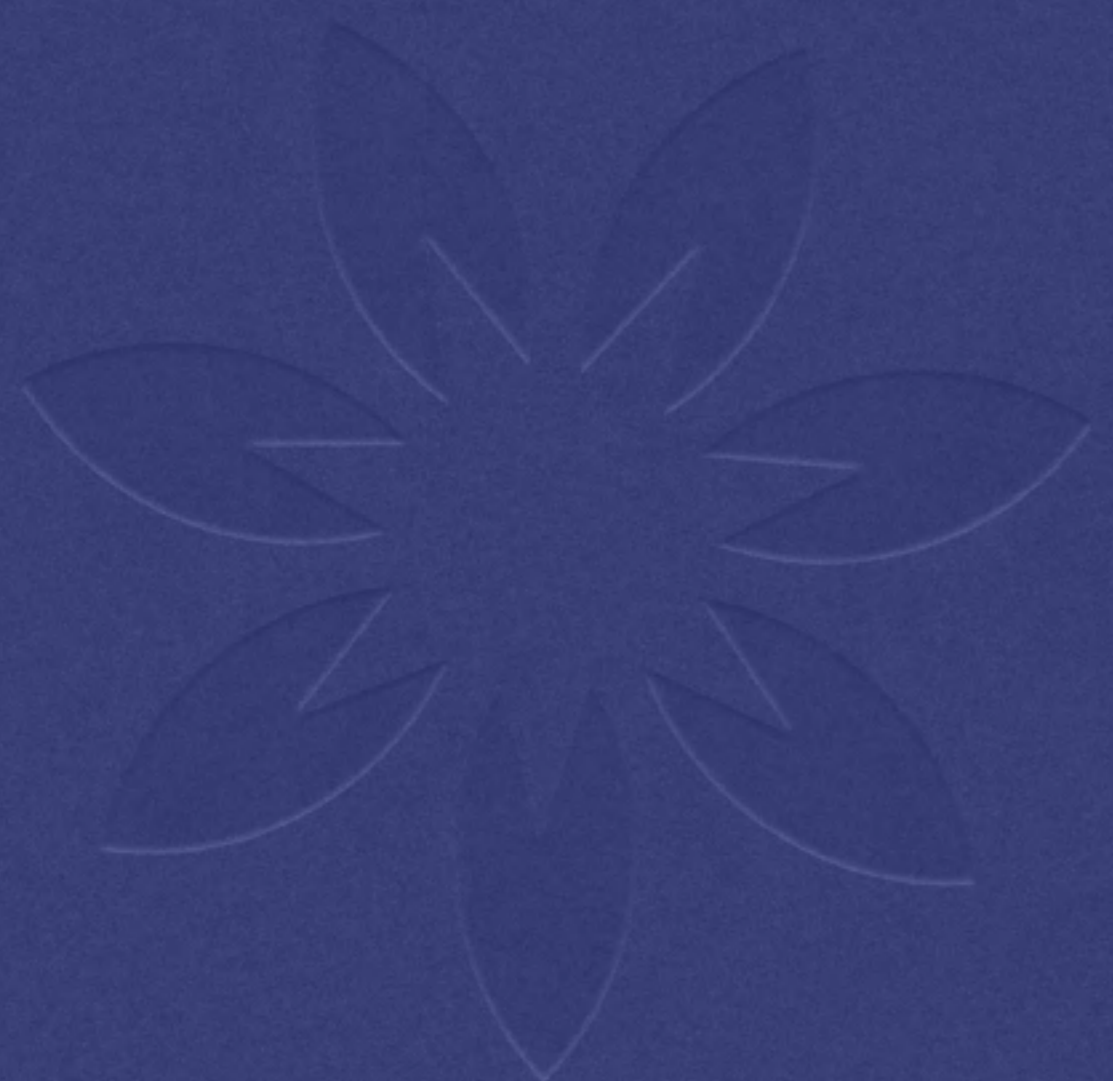


# REMEDY 2022

ANNUAL REPORT





REMEDY - Center for treatment of Rheumatic and Musculoskeletal Diseases is a "Centre for Clinical Treatment Research". It was established in 2022 with funding from the Research Council of Norway (128 million NOK) as a targeted, long-term investment to strengthen and further develop outstanding research and innovation environments to improve treatment. In addition, REMEDY is supported by a generous grant from the Olav Thon Foundation (32 million NOK).

Our aim is to evolve patient care in the field of rheumatology and musculoskeletal diseases, with significant impact on individuals and society. We seek to develop novel therapies and excellent treatment strategies by adopting a comprehensive research approach to the field. We strive to conduct clinical studies that have the potential to change clinical practice.



# CONTENT



<b>01</b>	<b>Introduction</b>	
	Director's comments	08
	Vision and goals	10
	Organization	12
	REMEDY Patient advisory board	16
	Finances and facts	18
	Climate and sustainability	20

<b>02</b>	<b>Center highlights</b>	
	Timeline 2022	24
	The Opening ceremony	28
	The MERINO trial	30
	The SQUEEZE project	32
	The Nor-vaC study	34

<b>03</b>	<b>Work packages</b>	
	Overview of work packages	38
	WP1: Optimized medical interventions	40
	WP2: Phenotyping for personalized medicine	42
	WP3: Pain mechanisms and management	44
	WP4: Managing comorbidities	46
	WP5: Innovative approaches to remote care	48
	WP6: Deciphering long-term outcomes	50
	WP7: Empowering the individual	52

<b>04</b>	<b>Other activities</b>	
	Clinical trial unit	56
	National clinical consortium	58
	Young researcher program	60
	International collaboration	62
	Implementation	66

<b>05</b>	<b>Research projects</b>	
	Overview of research projects	70

<b>06</b>	<b>Outreach and publications</b>	
	Public outreach	80
	Publications	84

DESIGN: Anagram Design  
PHOTOS: Nicolas Tourenc/Diakonhjemmet Hospital,  
unless otherwise credited  
PRINT: Konsis



# 01

## Introduction

Rheumatic and musculoskeletal diseases affect one in four people and are associated with morbidity, reduced quality of life, increased mortality, and severe long-term pain and disability. The large individual and societal impact of these conditions underlines the need for comprehensive and coordinated actions to improve patient outcomes.

# Director's comments



This is the inaugural annual report of REMEDY – Center for treatment of Rheumatic and Musculoskeletal Diseases. As the Director, I am honored to present our results during the first year and our research projects for the years ahead.

I am very grateful to our two main financial sponsors, the Research Council of Norway and the Olav Thon Foundation, for their generous support, enabling us to conduct cutting-edge research in the field of rheumatic and musculoskeletal diseases. Our first year of operation has also depended on contributions from a large number of people. Thank you to the patients who have participated in our research projects, our dedicated work package and project leaders, the Board, the center management group and all REMEDY researchers and support staff for their hard work and dedication.

The achievements during the first year has been made possible by the successful collaboration between the five involved institutions, Diakonhjemmet

Hospital, Oslo University Hospital, the Institute of Clinical Medicine at the University of Oslo, the Norwegian Rheumatism Association, and the MAGIC foundation. This partnership has allowed us to establish a comprehensive approach to treatment research, encompassing a broad range of work packages and research projects that address different aspects of rheumatic and musculoskeletal diseases.

REMEDY has made significant progress in our research projects during our first year of operation. We have established a strong governance structure, set up the REMEDY Patient advisory board, created a unifying graphic profile for the center, developed digital tools for collaboration, and initiated a num-

“Our research is expected to have significant benefits for individuals and society, and we look forward to continuing our work towards developing excellent treatment strategies and novel therapies for rheumatic and musculoskeletal diseases.”

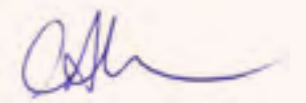
ber of innovative research projects. We have also launched a website ([www.remedy-senter.no](http://www.remedy-senter.no)) and participated in important dissemination arenas nationally and internationally. Additionally, we have received funding for several major studies, including a large grant from the EU to research how existing drugs for rheumatoid arthritis could be better exploited, the SQUEEZE project.

Looking ahead, we are excited to continue our research and innovation projects. We will expand our clinical trials and develop new collaborations with academic and industry partners. We are also committed to investing in our staff, supporting their professional development through our Young researcher program and providing them with the

necessary skills and resources to carry out world-class research. Through our varied approaches, we will ensure the development of novel treatment strategies and comprehensive patient care pathways, contributing to a modern and efficient healthcare service in the field.

In conclusion, I am proud of REMEDY’s achievements during our first year of operation. Our research is expected to have significant benefits for individuals and society, and we look forward to continuing our work towards developing excellent treatment strategies and novel therapies for rheumatic and musculoskeletal diseases. Thank you for your support, and we will continue to update you on our progress in the years to come.



  
Espen A. Haavardsholm  
Professor, MD PhD  
Director of REMEDY

# Vision and goals



## Research area

REMEDY is a Norwegian Centre for Clinical Treatment Research focusing on rheumatic and musculoskeletal diseases. These diseases constitute a heterogeneous group of diseases associated with significant morbidity, reduced quality of life, and increased mortality. The conditions have major consequences for society and the individual.

## Vision

Our vision is to be a world-leading center developing state-of-the-art treatment and management strategies across rheumatic and musculoskeletal diseases, to benefit the individual and society.

## Aims of the center

The overarching aim of the REMEDY center is to improve treatment of rheumatic and musculoskeletal diseases by randomized clinical trials assessing novel treatment and treatment strategies, in combination with research and innovation to untangle the causes and characteristics of these diseases. The seven work packages will approach the knowledge needs within the field from different angles, ensuring that the research results will benefit patients in all stages of the diseases.

# Impact of the REMEDY center

Ground-breaking research which will change national and international treatment recommendation



## For patients

- Increased quality of life
- Work participation
- Improved physical function
- Personalized treatment strategies
- User involvement in research
- Patient empowerment



## For healthcare systems

- Improved treatment
- Fast-track from research to implementation
- Decision support tools and digitalization
- Remote healthcare
- Education of highly qualified researchers and healthcare personnel



## For industry

- Implementation of digital platforms
- One-stop shop for pharmaceutical trials
- Innovative technologies
- Performing phase II-IV trials
- Collaboration

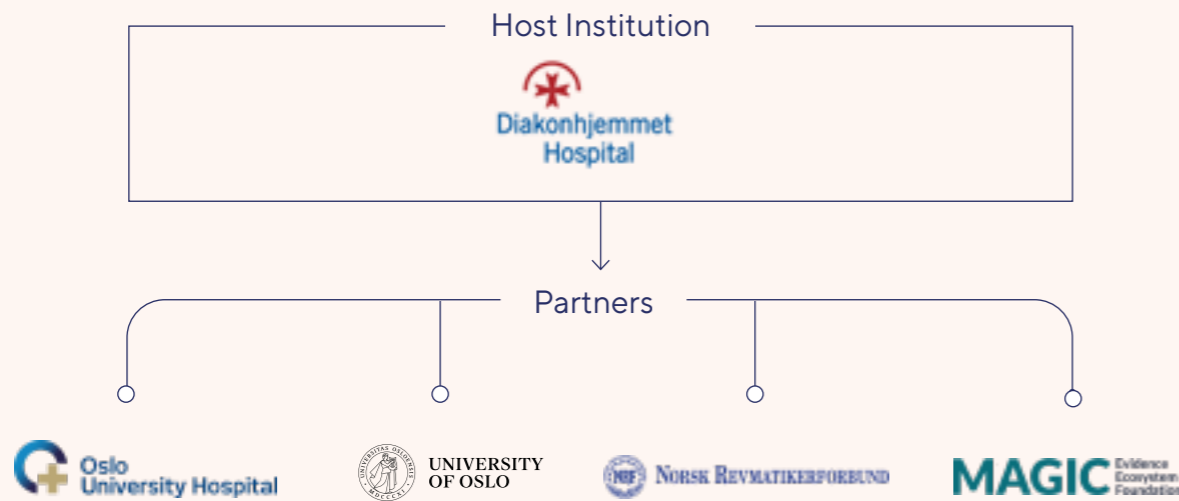


## For society

- Considerable gains for large patient groups
- Rapid implementation of results
- Sustainable healthcare
- Utilization of registry data
- Translational value for other chronic diseases

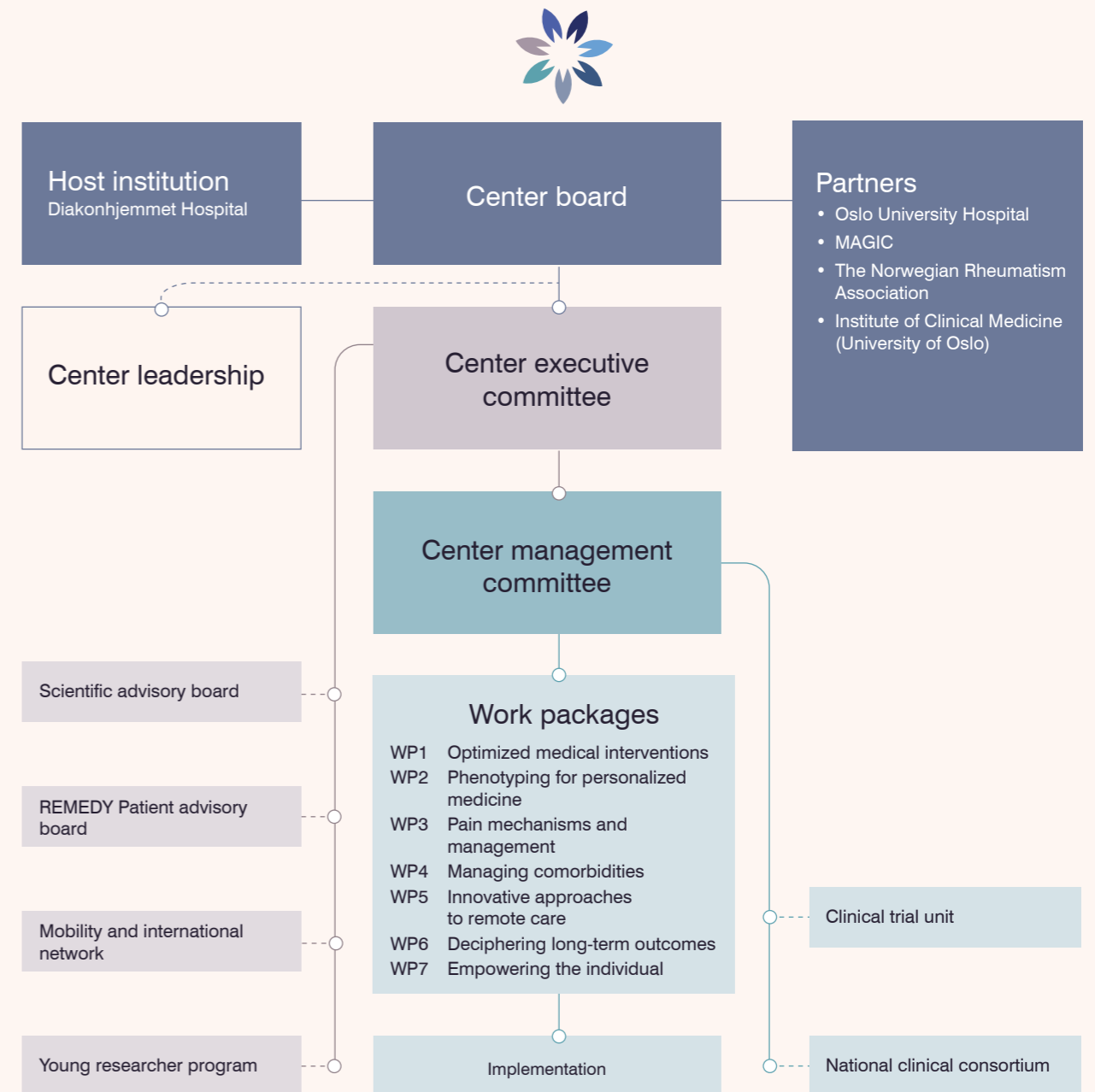
# Organization

Diakonhjemmet Hospital is the host institution for REMEDY, in partnership with Oslo University Hospital, the Institute of Clinical Medicine at the University of Oslo, the MAGIC Evidence Ecosystem Foundation and the Norwegian Rheumatism Association. All partner institutions are actively engaged in the organization, management and research activities conducted within the framework of the center.



## Organization structure

The center is organized to have a clear governance and advisory structure, with active involvement from the host institution, the partner institutions, international collaborators, and users, to ensure oversight and optimal performance of the center.



## Center board

The Center board consists of one member from each of the partnering institutions and is led by the chief executive officer (CEO) at Diakonhjemmet Hospital. The board will assist the center directors in overseeing the operations of the center in an advisory capacity. The board is responsible for the approval of the annual work plan, financial year-end statements, and the annual report. The board met for the first time in November 2022 and will in the coming years have two annual meetings.

## Center executive committee

The Center executive committee (CEC) consists of the center directors, the work package leaders, the leader of the Patient advisory board, the leaders of the Young researcher program and key senior scientific staff members from all the partnering institutions. The CEC is responsible for the development and maintenance of the long-term strategic plan for the center. The CEC held three meetings in 2022.

## Center leadership

The REMEDY center is led by Professor Espen A. Haavardsholm (MD, PhD) together with the two vice directors and associate professors Siri Lillegraven (MD, MPH, PhD) and Anne Therese Tvetter (physiotherapist, PhD). The center leadership has been responsible for overseeing and coordinating activities in the center and the center committees, as well as being responsible for the reporting to the Research Council of Norway. The center leadership meet weekly.

## Center management committee

The Center management committee (CMC) consists of the center directors, the leaders and co-leaders of the individual work packages, and the leaders of the National clinical consortium. The leader of the Clinical trial unit will also be part of the committee. The CMC is responsible for the ongoing day-to-day implementation of the long-term center strategy. The CMC have had seven meetings in 2022.

## Center board



**Anders Mohn Frafjord**  
Chairman of the board,  
CEO at Diakonhjemmet  
Hospital



**Kjetil Bergsmark**  
Board member,  
Head of Division of Rheuma-  
tology and Research, Diakon-  
hjemmet Hospital



**John-Anker Zwart**  
Board member,  
Head of Research,  
Division of Clinical Neurology,  
Oslo University Hospital



**Shuo-Wang Qiao**  
Board member,  
Deputy Head, Institute  
of Clinical Medicine,  
The University of Oslo



**Bo Gleditsch**  
Board member,  
General secretary, The Norwegian  
Rheumatism Association



**Per Olav Vandvik**  
Board member,  
CEO, MAGIC Evidence  
Ecosystem Foundation

## Center directors



**Espen A. Haavardsholm**  
Center director,  
Professor, MD, PhD



**Siri Lillegraven**  
Vice director,  
Associate professor,  
MD, MPH, PhD



**Anne Therese Tvetter**  
Vice director,  
Associate professor,  
Physiotherapist, PhD



Patient engagement in health research:

# The REMEDY Patient advisory board



**Leader**  
Marianne Skaar  
*Advisor in collaborative research*

In 2007, Diakonhjemmet Hospital established a Patient advisory board. The board has been active since, and is now an integral part of the REMEDY initiative, and aims to facilitate collaboration between patients and researchers in scientific projects. Patient engagement in health research is widely accepted as a way to improve the quality of research. Patients with experiential knowledge can bring different perspectives to the projects and ensure the relevance of the research. Collaborating with aca-

demical researchers can also lead to new research areas and research questions.

The REMEDY Patient advisory board is led by an advisor in collaborative research, Marianne Skaar, who is also a member of the REMEDY Center executive committee. The board has a total of 20 members including patients with rheumatic and musculoskeletal diagnoses, as well as two scientific researchers. The board met five times in 2022 to discuss research projects and share members' experiences.

Each of the seven work packages in REMEDY has funding to include patient research partners at an early stage in the research process to ensure collaboration in the phase where research questions are formulated. Board members were invited to participate in all REMEDY seminars and work package seminars.

The board has been actively involved in dissemination activities in 2022, and

Skaar has given several presentations on user involvement in research and how this is organized in REMEDY, including an oral presentation at the EULAR Congress in Copenhagen. The leader was also involved in assessing research funding applications for the Young researcher program, to ensure a clear focus on user involvement in projects.

The REMEDY Patient advisory board showcase how patient engagement can improve the quality and relevance of health research. By involving patient representatives in all phases of research, researchers can benefit from experiential knowledge and different perspectives. The board's achievements in 2022, including planning courses on user involvement in research, collaborating with the Young researcher program, and recruiting new members, demonstrate its commitment to advancing patient engagement in scientific projects.

The REMEDY Patient advisory board had four main priorities for 2022:



- Develop methods on how to involve patient research partners in all work packages from the early stages of research to secure collaboration and funding
- Collaborate with the Young researcher program to offer guidance for PhD candidates in user involvement in research
- Organize courses in user involvement in research for researchers, PhD candidates, and patient research partners in collaboration with FORMI at the Oslo University Hospital
- Recruit new members to the board

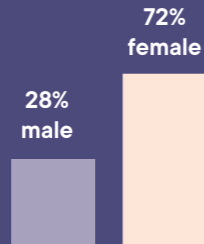
## REMEDY activities (cost in NOK)



## REMEDY employees

76

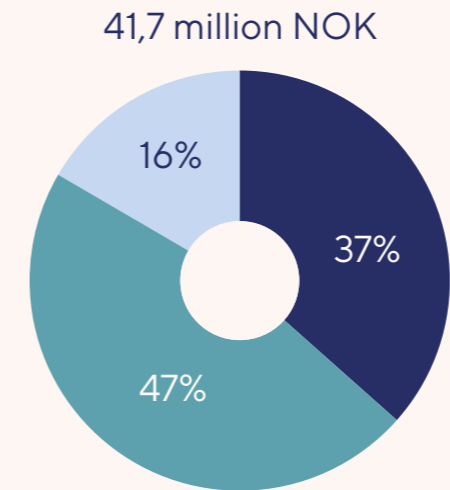
individuals performed work in the center



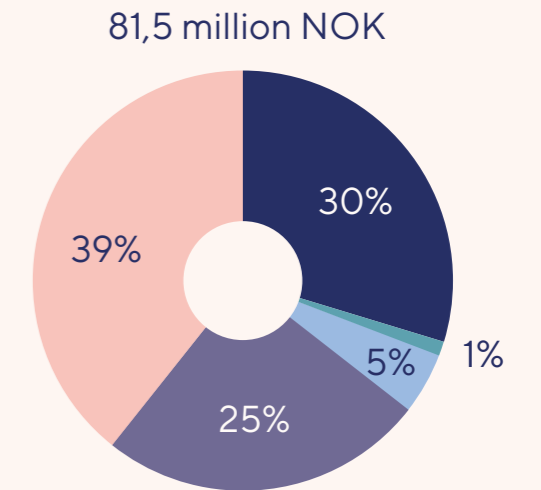
46,3

Mean age (years)

## Facts and figures



- Own financing
- Other financing
- RCN grant (Research Council of Norway)



- Olav Thon Foundation
- South-Eastern Norway Regional Health Authority
- EU Horizon Europe
- Other national funding
- Other international funding

### REMEDY funding 2022

This figure shows the total costs for 2022, and how these costs are funded. Total costs for 2022 are 41,7 million NOK. Own financing includes funds provided by the host institution and partners.

Other financing includes financing secured before 2022 from public funding schemes, mainly from regional health authorities, interregional health authorities, the DAM foundation and other publically available grants.

### Obtained grants in 2022

REMEDY researchers have obtained a substantial amount of grants during 2022 for projects in the coming years (grant period from 2022 up to 2030). Among these grants is the funding from the Olav Thon Foundation (32 million NOK). The total amount of funding obtained during 2022 is 81,5 million NOK.

# REMEDY: Climate and sustainability

REMEDY has been established in a time when human-induced climate change threatens to undermine decades of progress in global health. The recent UN report on climate change has made clear the urgency for large greenhouse gas emissions reductions in all sectors to secure a liveable future.

The healthcare sector is responsible for approximately 5 % of global greenhouse gas emissions. This is more than aviation and shipping combined. Also scientific research has a significant carbon footprint.

REMEDY will take action to combat climate change and its impacts. We aim to decrease the carbon footprint of our research-related activity, but also to conduct studies with potential to shift clinical practice towards low-carbon solutions.

In June 2022, REMEDY was one of the organizers of Green congress (“Grønn kongress”), an annual national conference targeting the Norwegian rheumatology community. The conference summarizes and disseminates current international research and knowledge in our field. The aim of the arrangement is to reduce carbon emissions associated with the extensive travel-

ling to international congresses and at the same time communicate international research results to as many as possible. Furthermore, we aim to increase awareness among healthcare personnel and researchers about the harms of nature- and climate change and solutions to address them. Each year we invite a climate scientist to give a speech. Speaker in 2022 was Julie Sørlie Paus-Knudsen.

We actively work to minimize the carbon footprint of Green congress itself, reducing emissions where possible (such as reducing waste, improving transport efficiencies, using certified carbon neutral products). In 2022 the arrangement received the certificate of an environmental approved event from Foundation for Environmental Education.

The onsite and virtual event was a success. 400 attended the conference and

their feedback was excellent. We were also invited to the specialized health services’ environmental and climate conference in 2022, where we talked about our work with Green congress.

During 2022 REMEDY has started the planning of performing studies that evaluate healthcare-related environmental impacts. We intend to perform life-cycle assessments for quantifying the carbon footprint of different interventions in rheumatic and musculoskeletal diseases. Additionally, innovative remote care projects aim to support the sustainability of the healthcare sector and reduce the carbon emissions associated with travelling to hospital visits.





# 02

Center highlights

# Highlights 2022



The REMEDY center has had an eventful first year since our initiation on April 1<sup>st</sup> 2022. In this section, we present some of our highlights during 2022, including collaborations, awards, network activities, national and international positions of trust, obtained funding and center/network activities. We also present more in-depth coverage of the opening ceremony for REMEDY, the Merino trial, our new Horizon Europe project SQUEEZE and the Nor-vaC study.



MAY

## The Marie Spångberg Award

Siri Lillegraven, vice director of REMEDY, received the Marie Spångberg Award for the publication of the results from ARCTIC REWIND in JAMA. The award recognizes the most valuable original article in Norway by a female medical doctor.



MAY

## The opening of REMEDY

On May 20th, over 160 attendees gathered for the REMEDY opening ceremony. Ole Johan Borge and Henrietta Blankson (the Research Council of Norway) and Olav Thon (the Olav Thon Foundation) outlined the expectations from the two funding sources.

[Read more](#)



MAY

## New professor

In May, Nina Østerås physiotherapist PhD (leader of Norwegian National Advisory Unit on Rehabilitation in Rheumatology and REMEDY WP5) became a professor II at the University of Oslo.

JUNE

## Green congress

The environmentally certified Green congress was held on June 17th, summarizing key points from the 2022 EULAR (European Alliance of Associations for Rheumatology) congress. The event drew 400 attendees, with nearly equal numbers participating in person and virtually. A keynote speech highlighted the urgent issue of climate change.



AUGUST

## Collaboration to provide novel knowledge in psoriatic arthritis

The multi-center NOR-SPRINT trial will assess if treatment regimens incorporating information from imaging assessment of inflammation can improve treatment in the challenging condition psoriatic arthritis. In August, study personnel from 12 study centers, almost all Norwegian rheumatology departments, were gathered in Oslo for a national investigator meeting.

AUGUST

## National and international scientific leadership positions

Three scientists from REMEDY assumed important national and international leadership positions. Center director Espen A. Haavardsholm was elected president of the Scandinavian Society of Rheumatology, WP1 co-leader Silje W. Syversen became the new leader of The Norwegian Society of Rheumatology, the Norwegian professional association for rheumatologists, and Anne-Lene Sand-Svartrud became the new leader of NIOR, an interdisciplinary information network for healthcare professionals working in rheumatology in Norway.



## AUGUST Horizon Europe funding

In August, researchers at Diakonhjemmet Hospital and Oslo University Hospital within REMEDY were awarded more than 2 million euros in EU funding for research on rheumatoid arthritis as part of the European collaboration SQUEEZE. The project aims to investigate how medications already on the market can be used more effectively.

[Read more](#)



## SEPTEMBER Launch seminar for REMEDY

In September, a launch seminar which gathered more than 80 participants from across the center was held at Leangkollen. The seminar focused on communication, dissemination, and REMEDY's project portfolio for the future. Among the invited speakers were Professor Dag O. Hessen and Professor Anne Spurkland, sharing their experiences from participation in the public discourse.



## OCTOBER Dialogue seminar

Nearly 200 patients attended the October 20th seminar organized by the Norwegian Rheumatism Association and REMEDY at Diakonhjemmet Hospital. The center's clinical research leaders discussed how their work will improve treatment for patients with rheumatic and musculoskeletal diseases, and how user participation is vital to the development and conduct of excellent research projects.



NOVEMBER

## The Happy Hands app



In November, the development and initial testing of the Happy Hands app was finished and recruitment in a large multicenter randomized controlled trial was initiated. The app contains videos with information about hand osteoarthritis and demonstration of hand exercises. The research project aims to evaluate the effectiveness and cost-effectiveness of using the app.

DECEMBER

## Research funding

A number of projects received funding from national sources in 2022, including from the South-Eastern Norway Regional Health Authority, Norwegian Women's Public Health Association and the Norwegian Rheumatism Association's research foundation. These grants include funding for five new important randomized clinical trials.



DECEMBER

## New professor

In December, Heidi Zangi RN PhD became professor in nursing at VID Specialized University.



DECEMBER

## Publication from the Nor-vaC study – the most read article in The Lancet Rheumatology

An article presenting results from the Nor-vaC study, which has enrolled 1600 arthritis patients receiving immunosuppressive treatment at Diakonhjemmet, was the most read article in December in the high-ranking journal The Lancet Rheumatology.

[Read more](#)

NOVEMBER

## Awards

In November, WP3 leader Ida Haugen received a researcher award for her contribution to women's health. WP2 co-leader Guro Løvik Goll was recognized as "Clinician of the Year" at the Norwegian Rheumatology Association annual meeting, where also PhD students Hilde Ørbo and Ingrid Jyssum received abstract and poster awards.



DECEMBER

## Kick-off meeting for the National clinical consortium

The National clinical consortium was kicked-off during a virtual meeting on December 5th. A large proportion of the members of the clinical network participated, and were presented to the network and novel research projects open for additional participating centers.



# The opening ceremony for REMEDY

On Friday, May 20th, the opening of REMEDY – Center for treatment of Rheumatic and Musculoskeletal Diseases, took place with over 160 participants in attendance. The event marked a significant milestone in the field of rheumatic and musculoskeletal disease research.

The opening ceremony of REMEDY commenced with a warm welcome from Anders Mohn Frafjord, the Chair of the board of REMEDY, and CEO of Diakonhjemmet Hospital. This was followed by presentations from Ole Johan Borge, the Director of Health Research and Health Innovation at the Research Council of Norway, and Henrietta Blankson, a Senior Advisor at the Research Council of Norway. The speakers expressed their gratitude to researchers at REMEDY for longstanding scientific

contributions, and shared the positive feedback from the expert panel on REMEDY's application. The realistic ambitions and significant impact on treatment of the patient groups were highly praised by the external review panels.

### Made possible through generous funding

REMEDY is one of three new Centres for Clinical Treatment Research (FKB), and as such receive a grant of up to 128 million NOK over eight years from the Research Council of Norway. The FKB program supports outstanding research that leads to better treatment for patients. The Olav Thon Foundation has contributed an additional 32 million NOK, which lays the foundation for research and development of novel treatment and treatment strategies for rheumatic and musculoskeletal conditions.

### Nothing has happened in 100 years

During the opening ceremony, Olav Thon shared his vision for investment

and research in the musculoskeletal field. Having personal experience with arthritis pain, as his father, he believes that there has been little progress in the treatment of patients in this field for the past 100 years. This realization is what inspired his engagement for these conditions. He issued a passionate call to the researchers, urging them to "find new ways" in their quest for breakthroughs. His presence and inspirational message were a testament to his commitment to advancing research in musculoskeletal treatment.

### REMEDY, a Centre for Clinical Treatment Research

Ole Johan Borge and Olav Thon presented the FKB plaque, a visible symbol of the center's FKB status, to Professor Haavardsholm and CEO Frafjord. Center director Espen A. Haavardsholm and vice directors Siri Lillegraven and Anne Therese Tvetter then presented the outline and scope of REMEDY.

Haavardsholm emphasized the center's





vision of conducting research aimed at improving clinical practice for patients, a mission that the host institution and its associated partners are dedicated to achieving. Diakonhjemmet Hospital serves as the host institution for the center, with Oslo University Hospital, the University of Oslo, the MAGIC Foundation, and The Norwegian Rheumatism Association (NRF) as its four associated partners. NRF's involvement in the application process and commitment to user involvement at all levels of the center were highly praised by Bo Gleditsch, the general secretary of NRF, during his speech at the opening.

Heads of Division Kjetil Bergsmark and Magne Flatlandsmo highlighted the importance of integrating clinical research in daily clinical practice, before Chair of the board at Diakonhjemmet Hospital Ingunn Moser closed the opening ceremony.

↑ Anders Mohn Frafjord, Espen A. Haavardsholm, Olav Thon and Ole Johan Borge.

FACTS

## 20th of May

On Friday 20 May 2022, we marked the opening of REMEDY – Center for treatment of Rheumatic and Musculoskeletal Diseases.

## 128 + 32 million NOK

REMEDY is made possible through support from the Research Council (up to 128 million NOK) and the Olav Thon Foundation (up to 32 million NOK).



## Potential treatment for hand osteoarthritis?

# The MERINO trial

Despite being the most common joint disease in the world, current treatment options for osteoarthritis are limited to non-pharmacological interventions, analgesics, nonsteroidal anti-inflammatory drugs, and steroid injections, which are not always effective. Through our research, we hope to gain a better understanding of the individual response to another treatment option and the mechanisms behind the pain associated with this condition.

### Heterogeneous condition

– Our goal is to improve the management of individuals with hand osteoarthritis, a condition characterized by severe pain and impaired quality of life, says study coordinator Alexander Mathiessen. – However, the heterogeneity of the disease must be acknowledged. The involvement of various joint tissues differ across patients and at different disease stages. There are reasons to believe that some persons may benefit from anti-inflammatory treatments, whereas others may benefit from therapies directed at bone or cartilage, central sensitization, or cognitive aspects.

– In the MERINO trial, we will take the heterogeneity of the disease into account by only including persons with inflammatory activity, and explore how person-related factors affect their treat-

ment response, proclaims Mathiessen.

### A call for evidence

Methotrexate is the cornerstone of RA treatment. In clinical practice, methotrexate is occasionally used off-label in osteoarthritis patients with unmanageable pain and inflammation, but the practice is currently not evidence-based. Previous studies (mainly open-label) have indicated a symptomatic effect in patients with knee and hand osteoarthritis, but high-quality RCTs are urgently needed to provide clear evidence in support of or against current practice.

– Based on the high frequency of synovitis in hand OA, especially in erosive disease, and the relationships to pain, there is a significant rationale for testing methotrexate in the management of the phenotype of inflammatory erosive hand

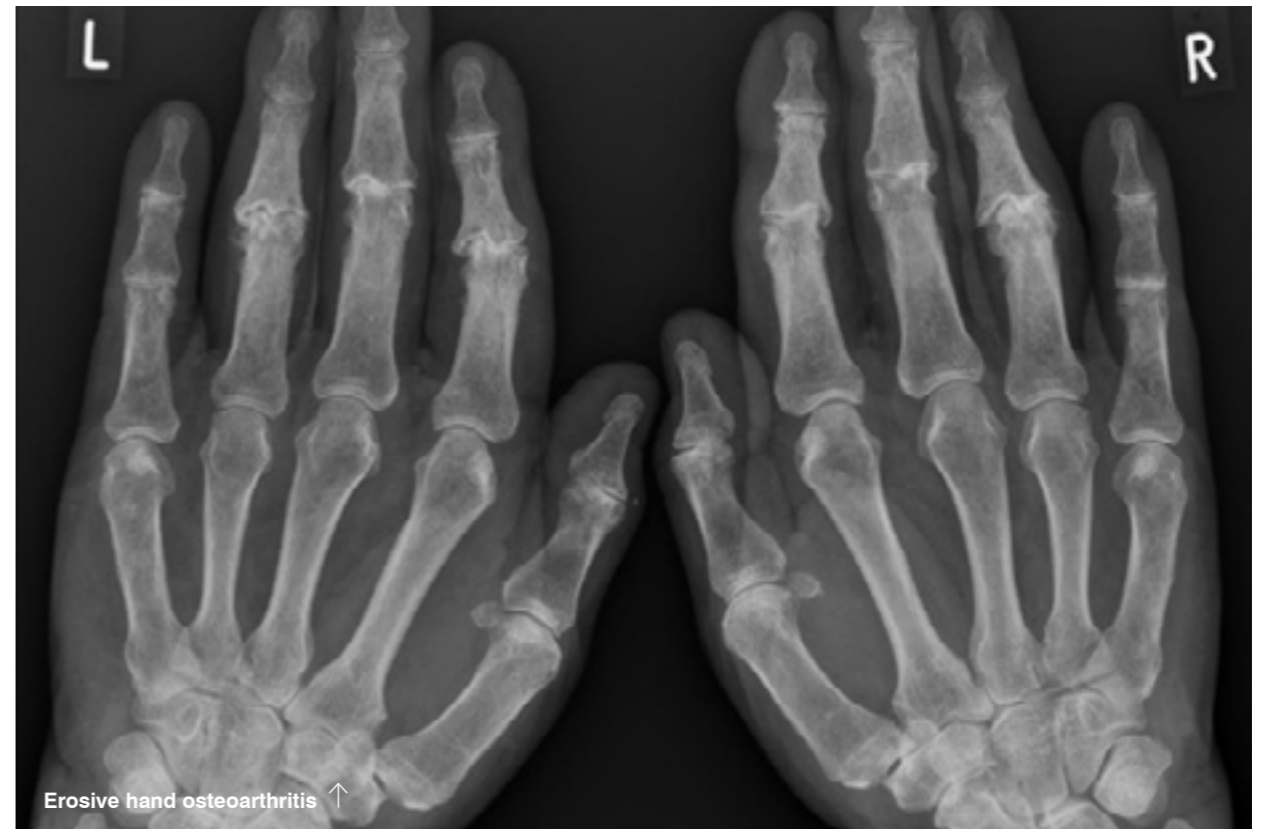
osteoarthritis, according to the principal investigator of the study Ida K. Haugen.

### Study design

– In this large-scale and placebo-controlled randomized trial, we explore the effect of methotrexate on pain, function, and structural outcomes in persons with erosive inflammatory hand osteoarthritis. In total 170 participants will receive methotrexate or a placebo for 12 months and undergo extensive examinations, including clinical assessments by a rheumatologist, quantitative sensory testing, regular ultrasound scans, radiographs, MRI, and blood samples. We will assess pain in the hand, stiffness, hand function, health-related quality of life, emotional and personal characteristics, and cost-effectiveness, says Mathiessen.

### Funding

The MERINO trial is supported by a grant from South-Eastern Norway Regional Health Authority of 8.2 million NOK, as well as grants from Anders Jahre’s Foundation for the Promotion of Science, Grete Harbitz’s Foundation, Pahles Foundation, and Dr. Trygve Gythfeldt and Wife’s Research Foundation summarized to 0.9 million NOK.



## FACTS

# Collaboration across work packages

With its unique and wide data collection, the MERINO trial targets research questions across three of the REMEDY work packages.

### WP1

#### Optimized medical interventions

Exploring the efficacy and safety of methotrexate in erosive hand osteoarthritis, and the role of imaging and soluble biomarkers with regard to prognosis and disease activity.

### WP2

#### Phenotyping for personalized medicine

Joint biopsies will be taken in a sub-study of the MERINO trial, exploring the gene expression of synovium during anti-inflammatory treatment. This will provide novel knowledge of the cellular and molecular processes involved in the pathological changes of osteoarthritis.

### WP3

#### Pain mechanisms and management

With quantitative sensory testing, the study can assess whether pain sensitization can predict treatment responses and whether pain sensitization changes during treatment. It will also explore how person-related factors affect the treatment response.



The search for the right treatment for each patient



# How to SQUEEZE more out of existing drugs

As part of the European SQUEEZE consortium, REMEDY researchers will investigate how existing drugs can be used more effectively to treat patients with rheumatoid arthritis. REMEDY plays a central role, being responsible for a work package on therapeutic drug monitoring of biological drugs (TDM).

## Objective

The SQUEEZE project has in total nine work packages distributed on three main areas:

- Choosing the right medication for the right patient
- Optimizing drug treatment
- Developing an e-health model for patient follow-up

## Ongoing Dosage Adjustments

The main focus of the work package that REMEDY is responsible for is a clinical trial to investigate the effect of TDM using subcutaneous biological drugs. It aims to determine whether adjusting the drug dosage based on measurements of drug concentration in the blood can improve treatment effectiveness.

## Study design

– The design will be a multinational, multi-center study, with a research protocol being developed and performed in close collaboration with the TDM team at Radiumhospitalet, expanding our excellent long-term collaboration on TDM research, says study coordinator Eirik K. Kristianslund.

## Funding

The researchers at REMEDY have been granted in total more than 2 million euros (equivalent to more than 20 million NOK) in EU funding. The funding call sought proposals that would use biomarkers to optimize the treatment of chronic diseases with drugs already on the market. Eirik Klami Kristianslund, Espen A. Haavardsholm, Silje Syversen, Guro Goll, and others were involved in the application.



↑ Espen A. Haavardsholm, Guro Goll, Ingrid Jyssum, Silje Syversen and Eirik Klami Kristianslund will contribute to the SQUEEZE project over the coming years.

## International Recognition

– Earning EU funding is highly regarded. This award is an international recognition of the research expertise and potential in our center. Our research profile aligns well with the goal of researching how to maximize the effectiveness of existing drugs for the benefit of patients, explains Espen A. Haavardsholm, the center director of REMEDY.

## Big Data

The search for the right drug for each individual patient relies mainly on compiling large amounts of clinical and biobank data from clinical trials, treatment registers and journals across Europe.

## The SQUEEZE consortium

The SQUEEZE collaboration has received a total of 10 million euros in funding to research the treatment of arthritis. Led by professor Daniel Aletaha from Vienna the consortium consists of 13 institutions from nine different countries.

### FACTS

#### The SQUEEZE consortium:

- Medizinische Universität Wien (Austria)
- Diakonhjemmet Hospital (Oslo, Norway)
- Oslo University Hospital (Norway)
- Karolinska Institute (Stockholm, Sweden)
- Leids Universitair Medisch Centrum (Leiden, Netherland)
- Queen Mary University of London (UK)
- Humanitas (Milano, Italy)
- Universität Basel (Switzerland)
- Instituto de Salud Muscu-loesquelética (Madrid, Spain)
- EULAR (Zürich, Switzerland)
- Daman (Copenhagen, Denmark)
- PrecisionLife (UK)
- EUTEMA (Vienna, Austria)

# The Nor-vaC study

## Response to Covid-19 vaccines in immunosuppressed patients

This study examines how Covid-19 vaccines affect patients with an impaired immune system. Researchers at Diakonhjemmet Hospital launched the Nor-vaC study to investigate the impact of these vaccines in patients using immunosuppressive drugs due to inflammatory joint- or gastrointestinal diseases. The study provides valuable information for vaccine decisions during the pandemic.

### Joint venture

Led by Guro Løvik Goll, a researcher and consultant in rheumatology at REMEDY and Diakonhjemmet Hospital, the study is a joint venture between rheumatologists, gastroenterologists, and immunologists from Diakonhjemmet Hospital, Akershus University Hospital, and Oslo Univer-

sity Hospital, in collaboration with The Norwegian Institute of Public Health. The study receives its main funding from South-Eastern Norway Regional Health Authority and the Coalition for Epidemic Preparedness Innovations (CEPI).

– Activation of the immune system is crucial for the vaccine to provide protection against disease. Such activation may not happen in patients with very suppressed immune systems. From previous studies, we knew that some vaccines do not elicit the same response in immunosuppressed patients as in healthy people. However, early coronavirus vaccine studies did not include immunosuppressed patients, raising concerns about whether the vaccines would effectively protect this vulnerable population. Given the urgency of the pandemic and the severity of the virus, this research question required prompt attention, according to Goll.

### Clinical study

The Nor-vaC study includes 1,600 patients with arthritis and 700 patients with inflammatory bowel disease. Blood samples are taken before and after each vaccine dose, as well as in the event of a positive Covid-19 test. The study found a tendency towards fewer side effects due to the vaccines in the patient group compared to the control group of healthy healthcare workers.

The majority of the Nor-vaC study patients showed an antibody response, but it was weaker and declined more quickly than in the normal population. However, repeated vaccine doses were found to strengthen the vaccine effect as measured by anti-virus antibodies. Another important part of the immune response, the T-cells, is known to be crucial for maintaining protection against severe Covid-19.

– We have collected T cells from a subset of patients throughout the study. Thus, we can follow both arms of the immune system. The valuable T cell



↑ The Nor-vaC group: From left: Anne Therese Tveter, Hilde S. Sager Ørbo, Silje W. Syversen, Joe Sexton, Ingrid Egeland Christensen, Kristin Isabella K. Espe, Ingrid Jyssum, Guro Løvik Goll and Sella A. Provan

material, the large number of participants and the regular blood sampling puts the Nor-vaC-study in a unique position compared to similar studies, explains Goll.

### International attention

The Nor-vaC study has published five scientific articles so far, with the latest paper appearing in the highly rated medical journal "The Lancet Rheumatology", reporting on the efficacy and safety of the fourth vaccine dose. The study has received much international attention.

– Going forward, the study will investigate the incidence of severe Covid-19 among the study patients and the association between infection and age, drug use, and antibody levels. The study will also investigate how T-cells are triggered by vaccines and how long this cellular activation lasts. The Nor-vaC group is grateful to all the study patients for their participation. The tremendous response from patients has been crucial to our research, emphasises Goll.

### NOR-VAC FACTS

Nor-vaC investigates immunological responses to Covid-19 vaccine in patients on immunosuppressive drugs.

**2.300**



patients with inflammatory diseases of the joints and intestines are included.

Project leader Guro L Goll (REMEDY - Center for treatment of Rheumatic and Musculoskeletal Diseases/ Diakonhjemmet Hospital).

Three important publications from the study:

Bjorlykke, K. H., et al. [Four Sars-Cov-2 Vaccine Doses or Hybrid Immunity in Patients on Immunosuppressive Therapies: A Norwegian Cohort Study](#): *Lancet Rheumatol* (Epub 2022 Nov 16).

Jyssum, I., et al. [Humoral and Cellular Immune Responses to Two and Three Doses of Sars-Cov-2 Vaccines in Rituximab-Treated Patients with Rheumatoid Arthritis: A Prospective Cohort Study](#): *Lancet Rheumatol* 4.3 (2022): e177-e87

Syversen, S. W., et al. [Immunogenicity and Safety of Standard and Third-Dose Sars-Cov-2 Vaccination in Patients Receiving Immunosuppressive Therapy](#): *Arthritis Rheumatol* 74.8 (2022): 1321-32.



# 03

## Work Packages

The seven work packages in REMEDY have a broad interdisciplinary focus on all aspects of rheumatic and musculoskeletal diseases – from epidemiology, pathogenesis and disease mechanisms to factors that promote health and wellbeing.

# Work packages

The overarching aim of the REMEDY center is to improve treatment of rheumatic and musculoskeletal diseases (RMDs) by randomized clinical trials assessing novel treatment and treatment strategies, in combination with research and innovation to untangle the causes and characteristics of RMDs.

The seven work packages approach the knowledge needs within RMD treatment from different angles, ensuring that the research results will benefit patients in all stages of the diseases. This multifaceted construct will result in high quality in all aspects of comprehensive treatment courses. We will conduct clinical trials to test new therapies and treatment strategies. Translational research activities will improve understanding of disease mechanisms and identify potential novel targets for treatment of diseases and pain. Development of precision medicine means that the patient will receive the correct treatment earlier in the disease course, optimizing the chance of treatment response and reducing irreversible damage. Increased knowledge

about how to identify and treat co-morbid conditions is expected to have direct consequences for mortality and morbidity. Use of remote monitoring, supported by artificial intelligence (e.g., through machine learning), will provide more flexible care for the patients, while detecting important changes of disease activity with less use of healthcare resources. Health registries are national assets, giving a unique opportunity for real world data and linkage of health information, and may be used to improve long-term outcomes in patients with RMDs. The development of empowerment-oriented self-management interventions may contribute to reduce variability and ensure health equity for people with RMDs.



Work package 1 

# Optimized medical interventions



**Leader**  
Siri Lillegraven  
associate professor,  
MD MPH PhD



**Co-leader**  
Silje W. Syversen  
senior researcher,  
MD PhD

## Viewpoint

The development of a sustainable knowledge-based healthcare system requires continuous evaluation of treatment and treatment strategies across diseases. Randomized clinical trials are often associated with the assessment of novel drugs. Equally important is the assessment of interventions such as surgical techniques, physical exercise and decision support tools for treatment allocation, including imaging-informed treatment algorithms. This is reflected in the broad range of trials in WP1, with examples such as placebo-controlled drug evaluations for hand osteoarthritis, therapeutic drug monitoring in inflammatory arthritis, drug tapering studies in rheumatoid arthritis and juvenile idiopathic arthritis, and surgical approaches for hip fractures.

Fifteen projects are currently primarily affiliated with the work package. An additional eight studies are associated with WP1, while having a primary affiliation with other work packages. Activities in the work package have focused on developing arenas for knowledge sharing across these studies, collaboration between clinicians and researchers, and development of improved infrastructure. The clinical trial

unit has scientific leadership from WP1, and the leaders of the work package have been centrally involved in the establishment of the new unit.

Four new randomized clinical trials started patient recruitment in 2022, two of these are multicenter studies. Another six large investigator-initiated trials secured full or partial funding, three of these will include centers outside of REMEDY. We are especially happy that the RA-DRUM trial secured EU-funding through the SQUEEZE consortium. At the same time, we have focused on the important task of analyzing and publishing data from projects with completed data collection. A main contribution to this has been the recruitment of several new PhD students and postdocs.

The large-scale randomized clinical trials in WP1 are only made possible through a close collaboration between researchers, patient partners and clinicians - at the host institution, partner institutions, and collaborating centers in multicenter trials. This collaboration is also key to ensure that novel knowledge is disseminated to clinical personnel and patients in an effective manner.

## Highlights of the year

**New studies:** Patient recruitment started in four randomized clinical trials; including patients with psoriatic arthritis (NOR-SPRINT), rheumatoid arthritis (NOR-Flare), hand osteoarthritis (Happy Hands) and carpal tunnel syndrome (NOR-CACTUS).

**Funding:** Six new randomized clinical trials were fully or partially funded (knee osteoarthritis, rheumatoid arthritis, gout, spondyloarthritis, hip fractures, juvenile idiopathic arthritis).

**Awards:** The publication of the results from ARCTIC-REWIND in JAMA was recognized with the Marie Spångberg award for the most valuable original article in Norway by a female medical doctor.

## Key publications

Brun, M. K., et al. [“Risk Factors for Anti-Drug Antibody Formation to Infliximab: Secondary Analyses of a Randomised Controlled Trial.”](#) *J Intern Med* 292.3 (2022): 477-91.

Lend, K. et al. [“Sex Differences in Remission Rates over 24 Weeks among Three Different Biological Treatments Compared to Conventional Therapy in Patients with Early Rheumatoid Arthritis \(Nord-Star\): A Post-Hoc Analysis of a Randomised Controlled Trial.”](#) *The Lancet Rheumatology* 4.10 (2022): e688-e98.

Kolan, S. S., et al. [“Identification of Snps Associated with Methotrexate Treatment Outcomes in Patients with Early Rheumatoid Arthritis.”](#) *Front Pharmacol* 13 (2022): 1075603.

## Aim

The main aim of work package 1 is to develop, assess and implement innovative interventions to optimize patient outcomes in rheumatic and musculoskeletal diseases. This includes investigation of personalized treatment strategies, novel drugs, surgical procedures, imaging guided interventions, and non-pharmacological therapies.

Work package 2 

# Phenotyping for personalized medicine



**Leader**  
Hilde Berner Hammer,  
professor, MD PhD



**Co-leader**  
Guro Løvik Goll,  
senior researcher,  
MD PhD

## Viewpoint

Projects within REMEDY have currently assembled extensive biobanks (full blood, serum, plasma) from well-characterized patients to be used for phenotyping. Such samples provide a unique material for addressing key questions within rheumatic and musculoskeletal diseases, as exemplified by projects tailoring the dose of biologic drugs to the individual patient.

The Nor-vaC study, assessing vaccine response to Covid-19 vaccines in patients using immunosuppressive medication, has gained international recognition on several occasions throughout the year. The data provided by the project has been instrumental in the development of updated vaccination advice for the patient group.

In 2022, major advances have been made to plan biobanks of leucocytes (PBMC and joint fluid) and biopsies from synovial tissue. The BIKE study uses ultrasound to guide biopsies of knee joint synovitis in patients

with rheumatoid arthritis and osteoarthritis. Such samples will give novel opportunities to develop personalized treatment regimens and new treatment targets.

We have also made plans for a ground-breaking study: Early STRatification of patients with acute inflammatory ARThritis (START) with the primary aim to build a platform for identification of markers in early inflammatory arthritis to ensure timely diagnosis and correct initial treatment. The study will include a broad assessment of laboratory variables and genetics in addition to exploration of potential markers in joint fluid and biopsies.

The collaboration between clinicians, clinical scientists and laboratory researchers within the work package facilitate the exchange of results and hypotheses between translational science and the clinics. The contact through the establishment of REMEDY has proven very valuable, and has resulted in a number of new emerging projects.

## Highlights of the year

**Technical development:** A series of expert seminars focused on the implementation of new sampling techniques and the best possible use of the biobank material already collected.

**Biobank:** Development of plans for the optimal scientific use of our present biobank to explore different phenotypes, and planning to extend our biobanks with PBMC and joint fluid.

**Biopsies:** Projects were initiated introducing novel techniques for ultrasound guided biopsies of synovial tissue.

**Early arthritis:** Projects to characterize and stratify very early arthritis have been planned and have received external funding, drawing on the expertise of collaborators within translational science.

## Key publications

Gehin, J. E., et al. [“Assessing Immunogenicity of Biologic Drugs in Inflammatory Joint Diseases: Progress Towards Personalized Medicine.”](#) *BioDrugs* 36.6 (2022): 731-48.

Jyssum, I., et al. [“Humoral and cellular immune responses to two and three doses of Sars-Cov-2 vaccines in rituximab-treated patients with rheumatoid arthritis: a prospective, cohort study.”](#) *Lancet Rheumatol* 4.3 (2022): e177-e87.

Hammer, H. B., et al. [“Urate Crystal Deposition Is Associated with Inflammatory Markers and Carotid Artery Pathology in Patients with Intercritical Gout: Results from the nor-Gout Study.”](#) *RMD Open* 8.2 (2022).

## Aim

The main aim of work package 2 is to identify novel biomarkers, genetic- and epigenetic markers for disease severity and treatment responses, which can be used for characterization and stratification of early rheumatic and musculoskeletal disease, as well as for improvement of treatment response.



## Work package 3

# Pain mechanisms and management



**Leader**  
Ida K. Haugen,  
senior researcher,  
MD, PhD



**Co-leader**  
Kaja Selmer,  
senior researcher,  
MD, PhD

### Viewpoint

Better understanding of the pain etiology is needed for personalized pain management and better care for patients with chronic pain. We want to identify factors outside the joint that clinicians should have in mind when treating patients with pain due to musculoskeletal and rheumatic diseases. Identifying important biopsychosocial factors, such as altered pain modulation in the central nervous system, emotional factors, cognitive functioning and genetic factors, that contribute to pain is of importance. Additionally, the work package will focus on classification of people into different pain phenotypes and endotypes, as these may require different management.

Four studies are affiliated to the work package, including the large ongoing randomized

controlled MERINO trial and three large cohort studies (Nor-Hand study, RehabNytte and NOR-DMARD study). In 2022, we took advantage of the rich data collection in the Nor-Hand study. Our research focused on factors outside the joint that could explain part of the pain experience in people with hand osteoarthritis. As examples, we found that psychological factors as well as overweight and obesity were associated with pain intensity in the hands, which means that pain cannot be fully explained by the joint disease on its own. Results from the Nor-Hand study gained much interest at international conferences in osteoarthritis and rheumatology with oral abstract presentation. In 2022, external funding was received for a PhD using data from the Nor-Hand study, which will allow us to further explore how pain is associated with sleep problems and fatigue.

### Highlights of the year

**New insight:** Analyses of the follow-up data of the Nor-Hand study was initiated, which will give further insight into risk factors for pain over a period of several years in people with hand osteoarthritis.

**New funding:** Physiotherapist Daniel Huseby Bordvik received funding from the Norwegian Women's Public Health Association Hauge-sund research fund to do a PhD on pain, fatigue and sleep problems in people with hand osteoarthritis. He will use data from the Nor-Hand study and will begin in June 2023.


**Outreach:** Elisabeth Mulrooney gave an oral presentation at the international osteoarthritis conference (OARS) in Berlin about how pain differs in its intensity across subgroups of patients with different clinical characteristics such as central pain modulation and psychological factors.

### Key publications

Mulrooney, E., et al. [“The Associations of Psychological Symptoms and Cognitive Patterns with Pain and Pain Sensitization in People with Hand Osteoarthritis.”](#) *Osteoarthr Cartil Open* 4.2 (2022): 100267.

Gloersen, M., et al. [“Associations of Body Mass Index with Pain and the Mediating Role of Inflammatory Biomarkers in People with Hand Osteoarthritis.”](#) *Arthritis Rheumatol* 74.5 (2022): 810-17.

Gloersen, M., et al. [“Associations of Pain Sensitisation with Tender and Painful Joint Counts in People with Hand Osteoarthritis: Results from the nor-Hand Study.”](#) *RMD Open* 8.1 (2022).

**Aim** 

The primary aim of work package 3 is to increase the understanding of the complexity of pain and the variety of different factors that can contribute to pain. Additionally, we aim to identify subgroups of patients with similar characteristics and clinical outcomes.

# Work package 4

## Managing comorbidities



**Leader**  
Anne Grete Semb,  
senior researcher,  
MD PhD



**Co-leader**  
Eirik Ikdahl,  
postdoc researcher  
MD PhD

### Viewpoint

Patients with rheumatic diseases have an increased risk of comorbidities, especially cardiovascular diseases. The impact of improved preventive medicine is incontestable, and the superiority of preventive medicine over curative medicine with regards to resource utilisation is indisputable. Accordingly, strategies that have positive effects on comorbidities in this patient group may also entail substantial health economic benefits.

A main focus area for the work package is cardiovascular diseases and improved cardiovascular prevention in relation to ischemic stroke, exercise related health, heart-friendly diet, lipid lowering medication and antihypertensive treatment. An example is the randomized controlled ExeHeart trial, assessing the effect of high-intensity exercise on cardiorespiratory fitness and cardiovascular risk factors in patients with inflammatory rheumatic disease through a 12-week intervention.

The Norwegian Cardio-Rheuma (NCR) register includes data from the last decade on

the total Norwegian population above 18 years (approx. 4.6 mill individuals) by linkage of several of the national health registries. In 2022, data from this newly established national register were used to describe the risk of pulmonary embolism in patients with inflammatory joint diseases in Norway, and how use of non-steroidal anti-inflammatory drugs affect this risk.

Current activities are based on a collaborative networks nationally and internationally. This is exemplified by NOCAR, a broad national clinical consortium for systematic recording of cardiovascular risk factors, and by the SURF-RA project, examining cardiovascular preventive treatment in 14503 RA patients across 53 centers in 19 countries.

Projects within the work package will also address other important comorbidities such as lung disease, kidney disease, diabetes mellitus, infections, malignancies, osteoporosis, gastrointestinal disease, and depression. Several new projects are under development within these research areas.

### Highlights of the year

**Register establishment:** A Norwegian national register (NCR) was established to assess the prevalence and incidence of inflammatory joint diseases, and examine causes of mortality in this patient group.

**Large-scale international study:** The SURF-RA project is a collaboration across 19 countries, contributing unique international data.

**Completed study inclusion:** The last patient was recruited for the randomized clinical ExeHeart trial, a study that assesses the effect of high intensity training on cardiovascular health in patients with inflammatory joint diseases.

### Key publications

Kerola, A. M., et al. [“All-Cause and Cause-Specific Mortality in Rheumatoid Arthritis, Psoriatic Arthritis and Axial Spondyloarthritis: A Nationwide Registry Study.”](#) *Rheumatology (Oxford)* 61.12 (2022): 4656-66.

Semb, A. G., et al. [“Oral Anticoagulant Treatment in Rheumatoid Arthritis Patients with Atrial Fibrillation Results of an International Audit.”](#) *Int J Cardiol Heart Vasc* 42 (2022): 101117.

Norden, K. R., et al. [“Effect of High-Intensity Exercise on Cardiorespiratory Fitness, Cardiovascular Disease Risk and Disease Activity in Patients with Inflammatory Joint Disease: Protocol for the Exeheart Randomised Controlled Trial.”](#) *BMJ Open* 12.2 (2022): e058634.

### Aim

The main aim of work package 4 is to develop and evaluate strategies for optimal management of comorbidities in patients with rheumatic and musculoskeletal diseases, including prevention of cardiovascular disease and the identification and management of other important comorbidities such as lung diseases and diabetes mellitus.



Work package 5 

# Innovative approaches to remote care



**Leader**  
Nina Østerås,  
professor,  
physiotherapist, PhD



**Co-leader**  
Anne Therese Tveter,  
associate professor,  
physiotherapist, PhD

## Viewpoint

The demographic changes require the health-care sector to rethink current work procedures and develop strategies to work “smarter”. Remote care is nominated a strategic priority for the healthcare services to achieve a sustainable healthcare sector. Technology for remote patient monitoring have progressed rapidly through innovative applications for collection of patient-reported outcomes, which enables testing new follow-up strategies and innovative approaches to remote care. However, evidence on the efficacy and safety of remote care strategies in rheumatic and musculoskeletal diseases are limited, and more research is needed. The goal of the work package is to contribute to test and implement digital solutions that can contribute to sustainable healthcare services.

There are five studies that are primarily affiliated with the work package, and an additional three studies that are associated. In 2022,

the recruitment of 260 patients was started in the NOR-Flare trial while the recruitment of 242 patients were completed in the ReMonit trial. Both trials assess the effect and cost-effectiveness of remote care in patients with rheumatic diseases. A post doc candidate has been recruited for the RemoteUX study. She will assess patients’ and health professionals’ experience with remote care in the two aforementioned trials. External funding was secured to two new trials on remote care – one for patients with gout and one for patients with osteoarthritis.

In addition to the ongoing studies, the activities in the work package have been focused on arranging seminars to learn about the experiences with remote care strategies in other hospitals. The work package leaders have joined a regional network for remote care in specialist healthcare services and has also started developing an international network on remote care. Group members in the work package are also responsible for the update of recommendations for the core treatment of hip and knee osteoarthritis.

## Highlights of the year

**New funding:** Two new randomized clinical trials on remote care received funding grants from the South-Eastern Norway Regional Health Authority; ReMonit Gout (3,7 million NOK) and OA-AID (7,5 million NOK).

**New trials:** ReMonit Gout trial will test a self-management application for patients with gout starting medical treatment to lower their serum uric acid level, while the OA-AID project will test a self-management application for patients with knee osteoarthritis to increase their knowledge on osteoarthritis management prior to, and facilitate shared decision making during the consultation in specialist healthcare services.

**Publication:** One of the work package leaders contributed to a publication on EULAR points to consider for remote care in rheumatic and musculoskeletal diseases.

**Completed study inclusion:** The ReMonit trial completed recruitment of 242 participants in only 9 months.

## Key publications

de Thurah, A., et al. [“2022 Eular Points to Consider for Remote Care in Rheumatic and Musculoskeletal Diseases.”](#)  
*Ann Rheum Dis* 81.8 (2022): 1065-71.

Marques, A., et al. [“Effectiveness of Remote Care Interventions: A Systematic Review Informing the 2022 Eular Points to Consider for Remote Care in Rheumatic and Musculoskeletal Diseases.”](#)  
*RMD Open* 8.1 (2022).

## Aim

The main aim of work package 5 is to determine the feasibility, efficacy, safety, user-satisfaction, and cost-effectiveness of remote care.

Work package 6 

# Deciphering long-term outcomes



**Leader**  
Till Uhlig,  
professor, MD, PhD



**Co-leader**  
Sella Provan,  
professor, MD, PhD

## Viewpoint

To use research information from different sources, such as studies or databases is a main objective for studies that are developed by members of this research group. Several established studies that provide information on diverse diagnoses and situations such as gout or rehabilitation are managed by group members and continue to provide longitudinal data. The merging of these studies to similar studies in other countries and linkage to data registers have provided enriched data. One of the goals of these linkages is to provide information on less frequent manifestations of diseases or treatments, such as comorbidities and drug adverse events. Combining efforts from different studies will give more power to determine trends of disease outcomes.

The work package consists of five studies that are primarily affiliated (NOR-DMARD, NOR-Gout, RehabNytte, SPACE, and NOECON). In NOR-DMARD we have continued to share data with Nordic and European registers and have also explored new opportunities of data-sharing which will further exploit our rich registry data in the GDPR era. In RehabNytte,

a PhD student was employed in 2022, who will examine worker productivity in response to rehabilitation in a national perspective and also compare with a matched Norwegian population drawn from the National Welfare Agency (NAV) register, focusing on work- and benefit status.

The work package aspires to build up competence within health economy throughout and around REMEDY. For this purpose, we announced a postdoc position and had a number of applicants. We are now in the process of employing an experienced health economist who will be an important asset to the group. The candidate will work on NOR-ECON and collaborate with the wider REMEDY group in performing health economic analyses of RCTs. In collaboration with professor Eline Aas, University of Oslo, we will arrange a school in health economic analyses with participants from both Diakonhjemmet Hospital and partnering institutions in REMEDY. Increased competence in health economy will allow further evaluation and analysis in a number of research projects within the research center.

## Highlights of the year

**Registry linkage:** A large data base on the prescription of drugs against inflammatory rheumatic diseases in Norway (NOR-DMARD) has been linked to a number of registers in Norway: the cause of death register, a database used by primary physicians (KUHR), and the Norwegian patient register.

**New findings:** Data from the linkages have shed light on the incidence and risk factors for serious infections and interstitial lung disease in this patient population.

**Publications:** More results from the Norwegian gout study have been published for the 2-year follow-up, finding that the disease burden with deposition of crystals is reduced after successful treatment.

## Key publications

Uhlig, T., et al. [“Two-Year Reduction of Dual-Energy Ct Urate Depositions During a Treat-to-Target Strategy in Gout in the nor-Gout Longitudinal Study.”](#) *Rheumatology (Oxford)* 61.S1 (2022): S181-S185.

Uhlig, T., et al. [“One- and 2-Year Flare Rates after Treat-to-Target and Tight-Control Therapy of Gout: Results from the nor-Gout Study.”](#) *Arthritis Res Ther* 24.1 (2022): 88.

Delcoigne B., et al. [“Do patient-reported measures of disease activity in rheumatoid arthritis vary between countries? Results from a Nordic collaboration.”](#) *Rheumatology (Oxford)* 2022 Nov 2;61(11):4286-4296.

## Aim

The primary aim of work package 6 is to explore long-term efficacy, safety, and health-economic consequences of novel treatment alternatives through linkage of longitudinal registries.

# Work package 7

## Empowering the individual



**Leader**  
Ingvild Kjekken,  
professor, occupational  
therapist, PhD



**Co-leader**  
Anne Therese Tveter,  
associate professor,  
physiotherapist, PhD

### Viewpoint

Empowerment and self-management build on an understanding that the origins of good health are not necessarily the same as the origins of poor health. Effective health promoting interventions need to build on patients' strengths and resources and be adapted to their level of self-efficacy and health literacy, and their social, economic, and cultural milieu. To ensure that patients' needs and experiential knowledge is integrated in the development of new interventions, patient research partners are involved in all new projects, from the initial phase when research questions are developed, to the implementation of results and interventions in clinical practice. Also, even if patient research partners are actively involved in all work packages, the REMEDY Patient advisory board is coordinated by and have their base in work package 7.

A total of 11 studies are primarily affiliated to this work package. Among them are four studies aiming to develop effective interventions for people with osteoarthritis, two studies focusing on improved quality and coordination in rehabilitation, and one exploring involvement of patients in the development and delivery of healthcare services. Development of innovative eHealth interventions is a common focus across studies, and includes testing of web-based exercise programmes, follow-up delivered through a virtual training app, and a self-management app for people with hand osteoarthritis. Through this, we build important expertise to meet future needs for flexible, sustainable, and cost-effective interventions.

### Highlights of the year

**Thesis completed:** PhD student Anne-Lene Sand-Svartrud defended her thesis "The quality of rehabilitation services for patients with rheumatic and musculoskeletal diseases".

**New funding:** The SPARK-trial received funding for a PhD-student (South Eastern Norway Regional Health Authority).

**Professor:** Researcher Heidi Zangi was appointed professor in health and rehabilitation.

**Honorary Lecture:** Professor Kjekken held the Honorary Lecture at the 7th National congress in occupational therapy; "Future focus in occupational therapy research".


**Innovation:** The development of the Happy Hands app was finished and patient recruitment was initiated in the Happy Hand randomized controlled trial.

### Key publications

Bennett, S. E., et al. "[Assessing Acceptability and Identifying Barriers and Facilitators to Implementation of the Euler Recommendations for Patient Education in Inflammatory Arthritis: A Mixed-Methods Study with Rheumatology Professionals in 23 European and Asian Countries.](#)"  
*Ann Rheum Dis* 81.10 (2022): 1348-57.

Sagen, J., et al. "[Organisation, Influence, and Impact of Patient Advisory Boards in Rehabilitation Institutions-an Explorative Cross-Sectional Study.](#)"  
*BMC Musculoskelet Disord* 23.1 (2022): 738.

Sand-Svartrud, A. L., et al. "[Associations between Quality of Health Care and Clinical Outcomes in Patients with Rheumatic and Musculoskeletal Diseases: A Rehabilitation Cohort Study.](#)"  
*BMC Musculoskelet Disord* 23.1 (2022): 357.

**Aim** 

The primary aim of work package 7 is to empower patients and enhance their ability and self-efficacy to deal with medical, role and emotional management of their disease.



# 04

## Other Activities

# Clinical trial unit



**Leader**  
Siri Lillegraven,  
associate professor  
MD MPH PhD



**Co-leader**  
Silje W. Syversen,  
senior researcher  
MD PhD

## Viewpoint

Clinical Trials Units (CTUs) are specialist units that provide the expert methodological advice and coordination required to undertake successful clinical studies, both investigator-initiated and pharmaceutical trials.

The establishment of a CTU is central for the conduct of the research within REMEDY. The decision made by Diakonhjemmet Hospital in 2022 to establish the CTU as a separate unit within the hospital organization was a major milestone to secure the success of the CTU. This organizational change will be implemented from 2023. The unit receives additional funding from the NorTrials initiative through the hospital.

One of the tasks of the CTU is to ensure that randomized clinical trials involving investigational medicinal products have to be performed in compliance with the EU Directive for Clinical Trials and International Conference on Harmonisation (ICH) good clinical practice (GCP). In 2022, a substantial effort has been made by the CTU to prepare for the first

of our trials to enter the new Clinical Trials Information System (CTIS) implemented by the European Medicines Agency. The CTU collaborates with the Regional Clinical Trial Unit and the NorCRIN network, especially with regards to external monitoring of trials. A collaboration has also been established with NorTrials with regards to participation in pharmaceutical clinical trials.

A number of biobanks are associated with REMEDY. Several initiatives have been made in 2022 to ensure that these biobanks will be optimized for future use and collaborative projects. The organization of the samples has been restructured, and plans have been made for potential upgrades in biobank premises and technical solutions.

Research coordinators, statisticians, study nurses, administrative personnel and a biobank coordinator is currently organized within the CTU. A dedicated leader for the unit has been recruited and further expansions of the personnel are planned for 2023.

## Highlights of the year

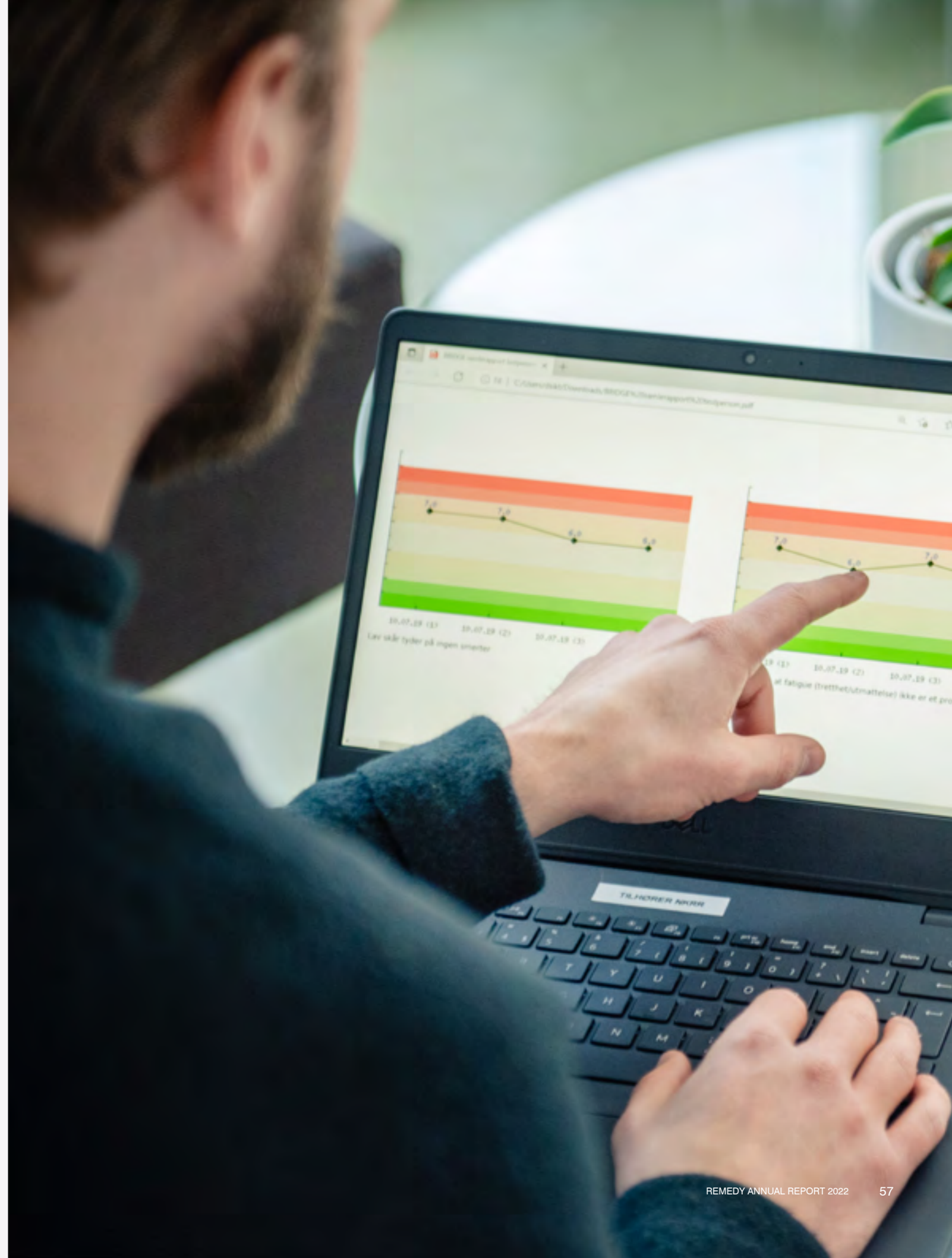
**Organization:** The decision was made by Diakonhjemmet Hospital to establish the clinical trial unit as a unit within the hospital organization

**Hiring processes:** Highly qualified staff members has been recruited to the unit

**Biobank:** Reorganization and planning of potential new biobank premises and technical solutions

### Aim

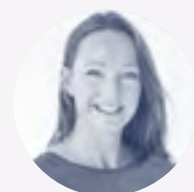
To provide the support necessary to design, conduct, analyze and publish clinical trials in an efficient manner.



# The National clinical consortium



**Leader rheumatology**  
Marte Schrumpf Heiberg,  
senior researcher,  
MD, PhD



**Leader rehabilitation**  
Rikke Helene Moe,  
senior researcher,  
physiotherapist, PhD

## Viewpoint

Over the past years, cross-regional collaboration within rheumatic and musculoskeletal disease research has been strengthened. With REMEDY, the national collaboration has been extended and formalized by the establishment of a National clinical consortium. All rheumatology hospital departments as well as rheumatologists in private practice and several rehabilitation institutions are represented in the consortium. The infrastructure of REMEDY is available for the consortium members.

A new digital communication platform (Induct.net) has been established. The platform enables consortium members to identify potential research partners, exchange project ideas and share information about future and ongoing research, meetings and webinars. A digital initiation meeting for the National clinical consortium was held in December 2022 with approximately 45 attendees. Consortium meetings will be held annually.

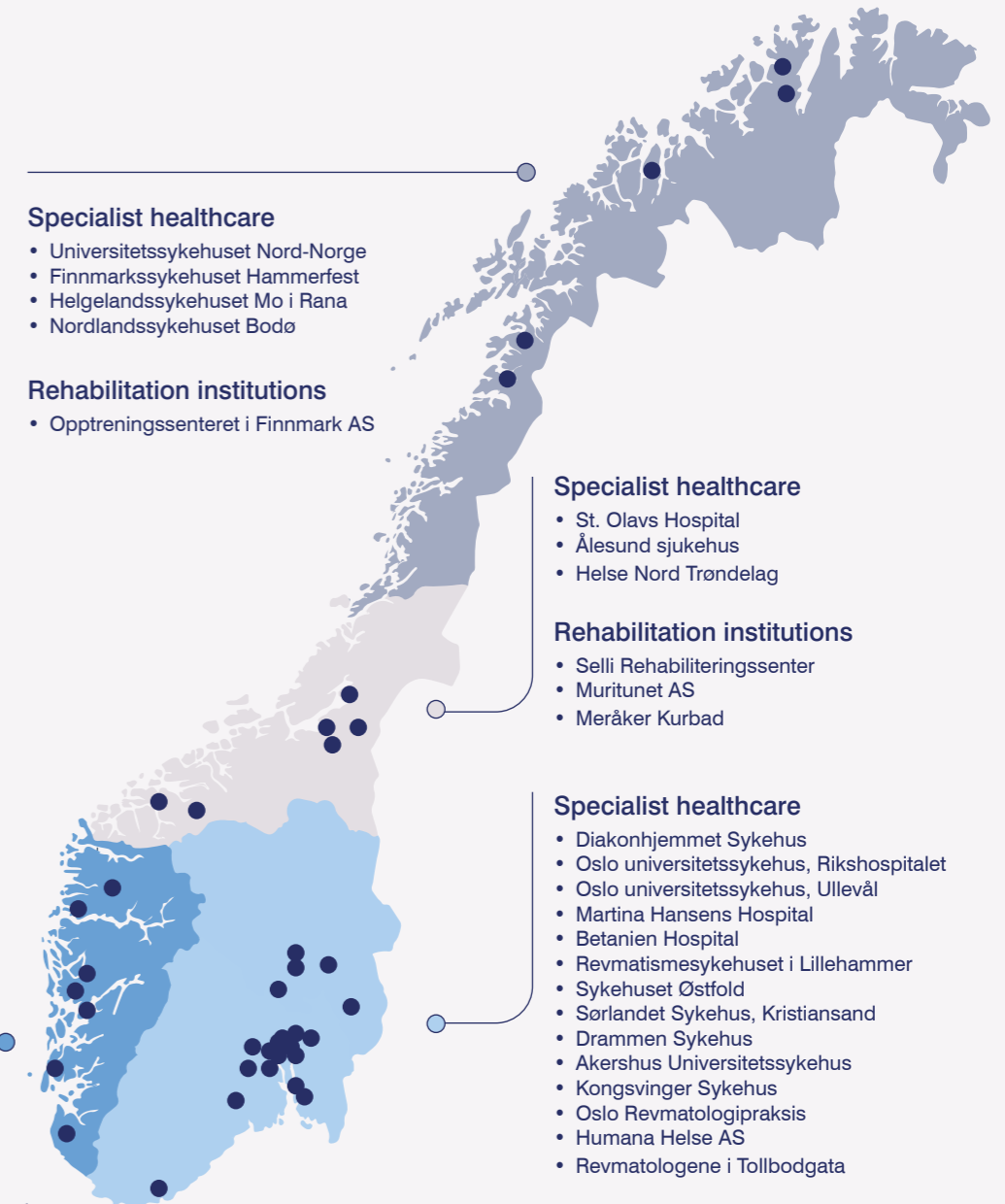
A one-day hybrid congress is arranged in Oslo every year, reviewing the latest news within international rheumatic and musculoskeletal disease research. The congress has a green profile and a strong focus on climate and sustainability. The Green congress in June 2022 was a great success with altogether 400 on-site and virtual attendees.

## Aim

The aim of the National clinical consortium is to promote and facilitate national multicenter trials, thereby securing equal opportunities for healthcare providers and patients in Norway to participate in clinical trials.

## Highlights of the year

- Induct digital communication platform was established
- Green congress was arranged 17th of June
- The first annual meeting in the National clinical consortium was held the 5th of December



# Young researcher program

## Aim

To provide excellent training and support for early career researchers within REMEDY.

## Successful applicants were:

**Siri Opsahl Hetlevik;** granted 150 000 NOK to develop a project examining if it is possible to reduce or end treatment with immunosuppressants in children and adolescents successfully treated for juvenile idiopathic arthritis. The main aim for this period is to produce successful applications for funding of the full project.

**Alexander Fraser;** granted 150 000 NOK for a project that examines surgery to reduce pain and improve function in damaged shoulders and elbows. This funding will allow him to continue research as he awaits his public PhD defence which is required to take up a post doc position.

**Johanna Gehin;** granted 75 000 NOK for research time and cost required to investigate optimal blood levels of certain immunosuppressant treatments, which may be used to monitor treatment ensuring effective treatment without excessive side effects. This project will strengthen her international standing and collaborations.

**Maria Dehli Vigeland;** granted 75 000 NOK to complete her PhD project regarding how genetic factors relate to symptoms, MRI findings and novel treatments in patients with chronic low back pain.

**Ingrid Bånerud;** granted 50 000 NOK to perform a high-quality translation into Norwegian of a tool for evaluation of user-involvement in medical research. The translation will allow research regarding effective user-involvement and could be the basis for a future PhD project.

## Viewpoint

REMEDY has an ambitious agenda for career development and training of early career researchers. We have established a working group consisting of members at different stages of their career and representing the relevant partners that will set the agenda of educational and career developing activities of the center. Activities in 2022 included a joint seminar on user-involvement in research and the planning of a seminar in March 2023. The seminar will cover topics such as mentoring, building a research group, writing of successful grant applications, practical advice for study logistics, and international exchange.

One of the aims of the program is to stimulate career development through funding of early career researchers for a limited period at critical project stages. We announced a call for applications in October 2022, and received 12 project proposals. A committee reviewed the applications for scientific quality, originality, feasibility, potential impact and user-involvement as well as career impact for the applicants. The applications were overall of very good quality, and ultimately five projects received grants of a total of 500 000 NOK.



**Leader**  
*Karen Minde Fagerli,*  
postdoc, MD PhD



**Co-leader**  
*Alexander Mathiessen,*  
postdoc, MD PhD



# International collaboration

## #ScienceForUkraine

#ScienceForUkraine is a grass-root initiative run by an international community of volunteer scholars and students since the beginning of Russia's war in Ukraine in February 2022.

The mission of the initiative is to support the Ukrainian academic community in surviving the war and to help ensure the continuity of Ukraine's science and strengthen its presence in the international science arena.

Shortly after we posted information about this opportunity on the ScienceForUkraine website and on Twitter, we were contacted by a Ukrainian researcher, Valeria Melokhina, MD PhD, who came to Norway in fall 2022 to join the REMEDY center as a visiting researcher.

Valeria Melokhina is a rheumatologist, and her areas of expertise include the treatment of rheumatoid arthritis, psoriatic arthritis, and spondyloarthritis. As a co-investigator, she has participated in various clinical trials related to rheumatic diseases. Melokhina is currently working on the early arthritis aspect of the ARCTIC trial. We are excited to have her on board and look forward to her contributions to our research efforts.



Private photo

## The TRACTION project



Network on Trials for Health Care Interventions (TRACTION) is an initiative aimed at facilitating non-pharmacological research in Portugal, specifically in the field of rheumatic and musculoskeletal diseases (RMDs). It is a collaborative effort between the University of Lisbon and REMEDY, with the original project committee consisting of Ricardo Ferreira and Gisele Câmara from Portugal, and Nina Østerås, Rikke Helene Moe, and Espen A. Haavardsholm from Norway.

The reason for initiating the collaborative project is due to the lack of non-pharmacological research in the field of RMDs in Portugal. There is a need to establish a research environment where health

professionals other than medical doctors can initiate and conduct studies.

REMEDY researchers have been working for over 20 years to strengthen non-pharmacological research in the field of RMDs. In recent years, the project group has participated in several meetings with this theme. In 2022, the collaboration was formalized, with a desire to establish an international collaboration between health professionals and researchers with different backgrounds and expertise.

The first physical collaboration meeting between Portugal and Norway took place in Oslo in November 2022, and



Specialist nurse in chronic diseases, Ricardo Ferreira (PhD) (to the right), and specialist in health information and international health, Paulo Jorge Nogueira (PhD) (to the left), presented the Trac-tion project which aims to establish a research network for clinical studies for RMDs in Portugal. They come from Escola Superior de Enfermagem de Lisboa (ESEL) and CIDNUR research center. Photo: Diakonhjemmet Hospital

will continue with a meeting and an educational course for PhD students at the Faculty of Nursing at the University of Lisbon in May 2023. The aim of these meetings is to learn more about the projects being proposed in Portugal and to explore opportunities to further develop the cooperation and network.





## The Nordic RA (NORA) project

The NORA project is a Nordic collaboration founded by NordForsk. The overarching goal of the NORA project is to develop a much-needed personalized medicine approach to the management of rheumatoid arthritis (RA), both by the development of new prediction tools and by digital tools to bring these new insights to patients and the healthcare service.

The approach taken represents an advancement in state of the art of personalized medicine approaches in RA and includes the availability and analyses of data across different domains (genomics, biomarkers, clinical data, patient-reported data, register-linkage data), new biomarker assays, the inclusion of patient-centric outcomes (e.g., pain) rather than composite and insensitive outcome metrics. The anticipated outcomes are better and earlier treatment of RA paired with the development of products that can be used for cost-efficient improvement of treatment results for patients.

### International project leader:

Professor/senior physician Johan Askling, Karolinska Institute

### REMEDY project leader in NORA:

Professor/senior physician Hilde B. Hammer, REMEDY, Diakonhjemmet Hospital

### Norwegian team representing REMEDY:

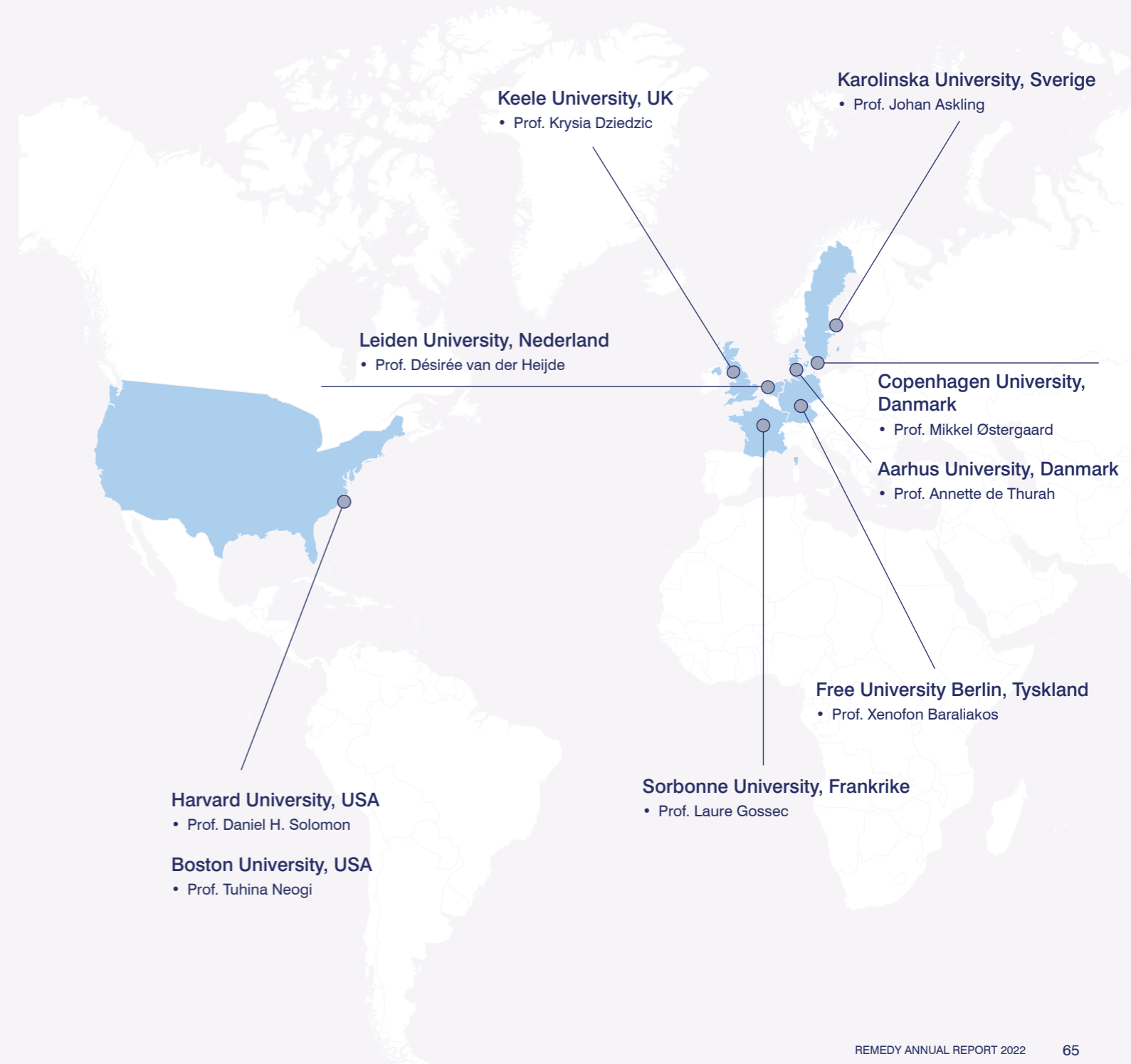
Espen A Haavardsholm, Joe Sexton, Tore K Kvien, Bitte Stenvik, Siri Lillegraven, Till Uhlig and Eirik Klami Kristianslund

### Highlights 2022:

- Exchange of biological material and clinical data across borders
- First results from genetic and biomarker analyses

## Main international collaborators

The main international collaborators in the map below represent major institutions across the globe that significantly strengthen the research conducted in the REMEDY center:



# Implementation



**Leader**  
Per Olav Vandvik,  
Professor,  
MD PhD



**Co-leader**  
Leticia Kawano-Dourado,  
Senior researcher,  
MD PhD



**Co-leader**  
Eirik Klami Kristianslund,  
Postdoc researcher,  
MD PhD

## Aim

To translate new research findings to clinical practice through BMJ Rapid Recommendations, including adaption for national use and implementation.

Furthermore, we see the current BMJ Rapid Recommendation as an opportunity to provide a global audience with trustworthy, accessible, and timely recommendations within the field of personalized medicine.

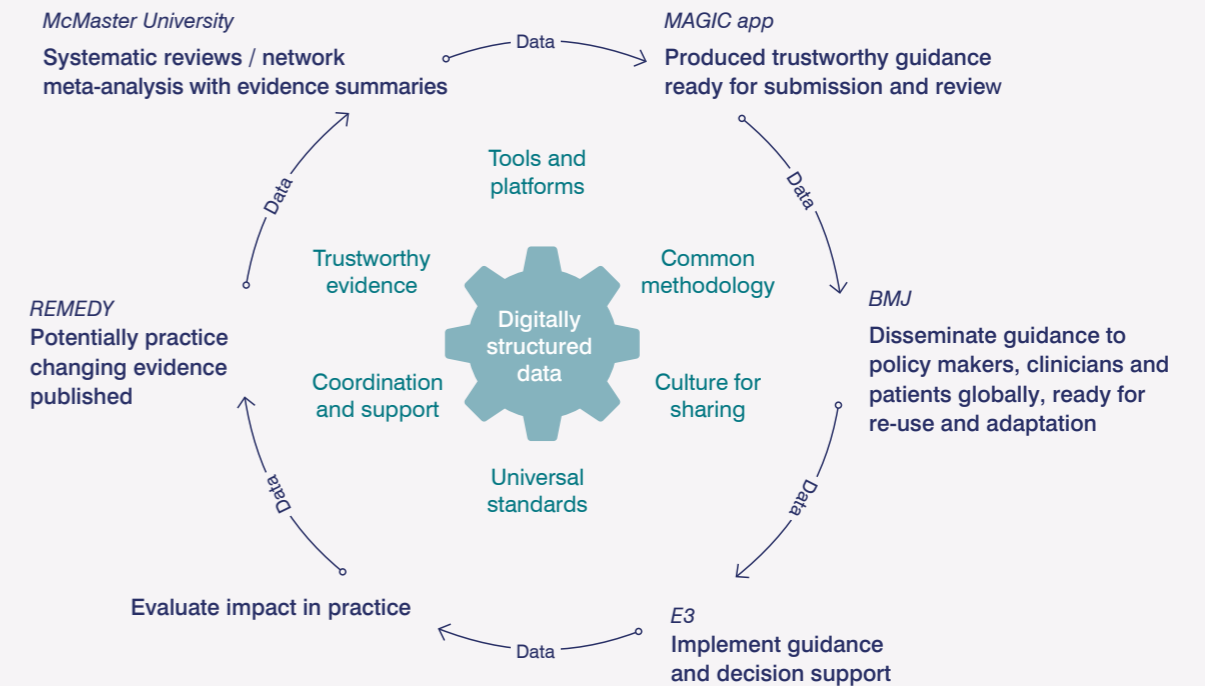
## Viewpoint

REMEDY is dedicated to contributing to the implementation of the findings from our clinical research program. Partners Diakonhjemmet Hospital, Norwegian Rheumatism Association and MAGIC develop treatment recommendations originating from the high-quality clinical trials of the research center, in collaboration with the BMJ. A total

of four BMJ Rapid Recommendations are planned, using advanced standards and methods to create trustworthy guidelines. These recommendations are triggered by potential practice-changing results from randomized controlled trials. Further implementation in Norwegian clinical practice guidelines will be ensured with a collaboration with the Norwegian Rheumatology Association.

The development of the first REMEDY BMJ Rapid Recommendation, guiding proactive therapeutic drug monitoring of biologic drugs in autoimmune diseases was initiated in 2022 and will help to resolve the current inconsistency among published guidelines. Dose adjustments of biological drugs based on regular assessments of drug levels, namely proactive therapeutic drug monitoring (TDM), has been suggested to improve the management of patients with autoimmune diseases due to sub-optimal drug levels. Two recently completed randomized controlled trials (NOR-DRUM A and B), published in the medical journal JAMA in 2021, hold the potential to change practice regarding TDM. The development of recommendations will optimize evidence-based decision making in the field and hopefully contribute to an implementation of a personalized medicine approach to treatment with biologic drugs.

## The digital and trustworthy Evidence Ecosystem



**Figure 1:** The figure illustrates the Digital and Trustworthy Evidence Ecosystem, where the ultimate goal is to increase value and reduce waste in healthcare and research by facilitating the flow (arrows) from producing, synthesizing, disseminating and implementing evidence into practice.



## Highlights of the year

- REMEDY and MAGIC teams met in person in Oslo in June 2022
- The process to create the first REMEDY BMJ Rapid Recommendation on TDM of biologic drugs for autoimmune diseases officially started in September 2022
- Preparatory meeting for the systematic review on efficacy in October 2022
- Panel composition work in November and December 2022
- Preparatory meetings to the first panel meeting held in November and December 2022



# 05

Research projects

# Overview of research projects

The REMEDY project portfolio represents the broad approach to assessment of rheumatic and musculoskeletal disease treatment. More information about the specific projects can be found at [remedy-senter.no](http://remedy-senter.no)



## AktiWeb

Active with web-based peer support

A feasibility study assessing the use of a web-based and peer-supported exercise program for patients with hip and knee osteoarthritis



## ALERT

Health literacy in immigrants with inflammatory joint disease

A qualitative study exploring health literacy in immigrants with inflammatory joint disease



## ARCTIC FORWARD

10-year follow-up of patients with rheumatoid arthritis receiving early treat-to-target treatment

The project aims to explore the long-term consequences of current recommended treatment



## ARCTIC REWIND

Treatment strategies in rheumatoid arthritis after achieving long-term disease control

A randomized controlled trial comparing tapering /discontinuation of disease-modifying drugs to stable treatment



## BIKE

Biopsies of synovitis from the knee joint of RA or OA patients

A study aiming to establish good methods for ultrasound-guided biopsies of synovitis in joints



## BRIDGE

Continuity and quality in the rehabilitation of patients with musculoskeletal diseases

A multicenter randomized controlled trial to improve continuity and quality in rehabilitation of people with rheumatic and musculoskeletal diseases



### Care pathway

Development of a treatment pathway for patients with hand osteoarthritis

A randomized controlled trial and a qualitative study assessing the effect and experience with task shifting in osteoarthritis treatment



### DigiOA

Digital osteoarthritis treatment

A randomized controlled trial comparing an exercise program provided through an app with regular follow-up with a physiotherapist in patients with hip or knee osteoarthritis



### EULAR OA rec

EULAR recommendations for treatment of hip and knee osteoarthritis

A EULAR task force aiming to update of the EULAR recommendations for non-pharmacological core management of hip and knee osteoarthritis



### Hip fracture database

Diakonhjemmet hip fracture database

A database with over 7000 hip fracture patients collected since 2006



### MERINO

Methotrexate in the treatment of erosive hand osteoarthritis

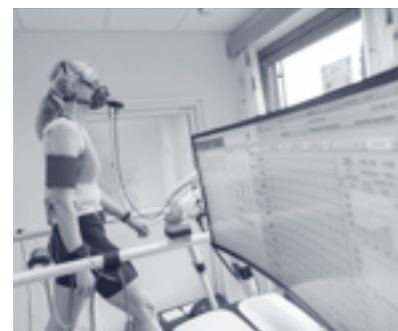
A randomized controlled trial on the efficacy of methotrexate on pain in people with hand osteoarthritis



### MyJIA

Strategies towards personalised treatment in juvenile idiopathic arthritis (JIA)

A multicenter randomized controlled trial investigating different treatments in patients with juvenile idiopathic arthritis



### ExeHeart

Improved cardiovascular health for patients with inflammatory joint disease

A randomized controlled trial investigating whether 12-week high-intensity training improve cardiovascular health and provide better risk factor control than current practice



### Happy Hands

An app for digital self-management of hand osteoarthritis

A multicenter randomized controlled trial assessing the efficacy, cost-effectiveness and experiences with use of the Happy Hands app



### HIFSAT

Hip fracture surgical approach trial

A randomized controlled trial comparing two different surgical procedures in patients with hip fracture



### NCR

The Norwegian Cardio-Rheuma register

A register on the incidence, prevalence and mortality of cardiovascular disease in patients with inflammatory joint disease



### NOECON

Health economics in the treatment of patients with inflammatory joint disease

A register study assessing the health economics of treat-to-target treatment in patients with inflammatory joint disease



### NOR-CACTUS

Comparison of treatment strategies for carpal tunnel syndrome

A multicenter randomized controlled trial comparing injection treatment and surgery in patients with carpal tunnel syndrome



### NOR-DMARD

The Norwegian Antirheumatic Drug Register

An observational study of patients with inflammatory joint disease treated with biological drugs in clinical practice



### NOR-DRUM

The Norwegian therapeutic drug monitoring study

A randomized controlled trial investigating the effectiveness of therapeutic drug monitoring in achieving remission in patients receiving infliximab treatment



### NORD-STAR

The Nordic rheumatic disease strategy trials and registries study

A multicenter randomized trial in the Nordic countries investigating the effect of active conventional treatment compared three different biologic drugs in early rheumatoid arthritis



### NOR-SPRINT

Follow-up of newly diagnosed patients with psoriatic arthritis with and without imaging

A randomized controlled trial assessing whether structured imaging contributes to significantly improved disease control in patients with psoriatic arthritis



### Nor-vaC

Immunological response to Covid-19 vaccine in patients on immunosuppressive therapy

A large cohort study evaluating the immunological response to Covid-19 vaccines in people on immunosuppressive treatment due to chronic gastrointestinal or inflammatory joint disease



### PICASSO

Painful inflammatory CMC1 OA treatment with intraarticular steroids, saline or occupational therapy

A three-armed randomized controlled trial assessing the effect of cortisone injections, saline injections and non-pharmacological treatment



### NOR-Flare

Remote monitoring of patients with rheumatoid arthritis

A randomized controlled trial comparing remote monitoring to standard follow-up at the hospital in patients with rheumatoid arthritis



### NOR-Gout

Gout in Norway

A cohort study investigating outcomes after intensive treatment with the objective to lower serum urate in gout patients



### Nor-Hand

Longitudinal observational study of people with hand osteoarthritis

An observational study of people with hand osteoarthritis aiming for increased understanding of pain



### OA-AID

Decision aids and remote monitoring to support shared decision-making

A randomized controlled trial evaluating a self-management app to increase knowledge and facilitate shared decision-making in patients with knee osteoarthritis



### QI-HOA

Quality indicators for hand osteoarthritis

Development and testing of a questionnaire to assess patient-reported quality of hand OA care



### RehabNytte

Specialised rehabilitation in patients with musculoskeletal diseases

A longitudinal multicenter study aiming at better and more efficient rehabilitation services



### ReMonit

Follow-up of patients with spondyloarthritis

A randomized controlled trial comparing two new remote follow-up strategies with standard follow-up at the hospital



### ReMonit Gout

Remote monitoring and self-management of gout

A randomized controlled trial investigating a self-management app for patients with gout starting medical treatment to lower their serum uric acid level



### RemoteUX

User experience with remote monitoring for patients with inflammatory joint diseases

A qualitative study assessing patients' and health professionals' experiences with remote care from the ReMonit trial and the NOR-Flare trial



### SQUEEZE

Maximising impact of prescription drugs in rheumatoid arthritis

A large European consortium comprising several projects addressing different approaches to rheumatoid arthritis treatment



### START

Stratification of acute inflammatory arthritis

An observational study of patients with new-onset arthritis with the aim of identifying markers for rapid diagnosis and personalised treatment



### SURF-RA

Survey of risk factors in rheumatoid arthritis

Survey of cardiovascular disease and risk factor management in patients with rheumatoid arthritis across world regions



### RIMRA

Rheumatic immune-related adverse events in patients treated with immunotherapy

A study aiming to describe the clinical presentation and disease course of rheumatic immune-related adverse events in patients treated with immunotherapy



### SPACE

Spondyloarthritis caught early

A study examining outcomes of spondylarthritis from early disease onset



### SPARK

Spondyloarthritis kondis

Development and evaluation of a personalised digital exercise intervention in patients with spondyloarthritis in a randomized controlled trial



### Tankegods

Understanding and coping with chronic illness

A study aiming at increased knowledge and improved communication among patients and health professionals.



# 06

## Outreach and publications



# Public outreach



82

Scientific publications



3

Books/  
book chapters



46

Conference proceedings



25

Public communication



17

Mainstream media



June

## EULAR Congress News: Covid-19 in rheumatic patients

The Nor-vaC study was on the front page of EULAR Congress News. At EULAR, Ingrid Jyssum presented the results from the Nor-vaC study, where they investigate the efficacy and long-lasting protection of the Covid-19 vaccine in individuals who are receiving immunosuppressive treatment due to rheumatic disease.



August

## VG: Rheumatism and exercise

A two-page article about rheumatology research that covered several of REMEDYs studies was published in VG. A special focus was put on high intensity training to reduce the risk of cardiovascular disease in patients with rheumatic disease.



August

## Dagens Medisin: Funding of large EU project

SQUEEZE was awarded approximately 20 million NOK (2 million euros) from the Horizon Europe programme. The main purpose of the project is to maximise the impact of prescribing drug treatment in rheumatoid arthritis.



October



November



November



November



December



December

### VG: Early signs of rheumatic disease

Researcher and medical doctor, Inger Jorid Berg, explained how the disease can be detected, what treatments are available and what the patient can do themselves. Kjerstin, a young patient with ankylosing spondylitis, provides the personal story by sharing her experience with the diagnosis.

### Dagens Medisin: Safety of repeated covid vaccination

The Nor-vaC study's conclusion on the safety of repeated covid vaccination in patients on immunosuppressive medication was discussed in Dagens medisin

### VG: Recommended treatment for osteoarthritis

Four pages, and a large cover story, were devoted to osteoarthritis in VG. Professor Nina Østerås, emphasized that even if the joints are characterized by osteoarthritis, movement and tailored exercise will lead to better joint health.

### Allers: Evidence-based recommendations for patients with osteoarthritis

Researcher Rikke Helene Moe gave research-based advice for living with osteoarthritis. Organized exercise, weight control and quit smoking are the most important advice to reduce the pain.

### VG: Elite level athletes with rheumatic disease

National team wrestler Felix Baldauf struggled with unexplained back pain for over ten years before learning that he has ankylosing spondylitis. Skier Sjur Røthe and football player Sigurd Rosted have the same diagnosis. All three were able to continue as elite level athletes after proper treatment.

### VG: Hand osteoarthritis and exercise

The importance of exercise in patients with hand osteoarthritis was highlighted in this four-page article, in addition to the cover page. The new and innovative Happy Hands app was also presented.

# Publications:



**B**

Bardan, I., Fagerli, K. M., Sexton, J., Kvien, T. K., Bakland, G., Mielnik, P., Hu, Y., Lien, G., Flato, B., Molberg, O., Kristianslund, E. K., & Aga, A. B. (2022). Treatment response to tumor necrosis factor inhibitors and methotrexate monotherapy in adults with juvenile idiopathic arthritis: Data from NORDMARD. *J Rheumatol*. <https://doi.org/10.3899/jrheum.220645>

Bennett, S. E., Zangi, H. A., Larsson, I., Beauvais, C., Bostrom, C., Domjan, A., van Eijk-Hustings, Y., Van der Elst, K., Fayet, F., Ferreira, R. J. O., Fusama, M., Geneva-Popova, M., Herrero Manso, M. D. C., Hoepfer, K., Jones, B., Kukkurainen, M. L., Gladys Kwok, S. K., Minnock, P., Nava, T., Primdahl, J., Rawat, R., Sierakowska, M., Stoffer-Marx, M., van Tubergen, A., & Ndosi, M. (2022). Assessing acceptability and identifying barriers and facilitators to implementation of the EULAR recommendations for patient education in inflammatory arthritis: a mixed-methods study with rheumatology professionals in 23 European and Asian countries. *Ann Rheum Dis*, 81(10), 1348-1357. <https://doi.org/10.1136/annrheum-dis-2022-222253>

Bjorlykke, J., Fraser, A. N., Wagle, T. M., Kleven, L., Lien, O. A., Eilertsen, L., Mader, K., Apold, H., Larsen, L. B., Madsen, J. E., & Fjalestad, T. (2022). A cost-effectiveness analysis of reverse total shoulder arthroplasty compared with locking plates in the management of displaced proximal humerus fractures in the elderly: the DelPhi trial. *J Shoulder Elbow Surg*, 31(10), 2187-2195. <https://doi.org/10.1016/j.jse.2022.05.022>

Bjorlykke, K. H., Jahnsen, J., Brynskov, J., Molander, P., Eberhardson, M., Davidsdottir, L. G., Sipponen, T., Hjortswang, H., Goll, G. L., Syversen, S. W., Langholz, E., Jorgensen, K. K., & Steenholdt, C. (2023). Therapeutic drug monitoring in inflammatory bowel disease: implementation, utilization, and barriers in clinical practice in Scandinavia. *Scand J Gastroenterol*, 58(1), 25-33. <https://doi.org/10.1080/00365521.2022.2108684>

Bjorlykke, K. H., Orbo, H. S., Tveter, A. T., Jyssum, I., Sexton, J., Tran, T. T., Christensen, I. E., Kro, G. B., Kvien, T. K., Jahnsen, J., Munthe, L. A., Chopra, A., Warren, D. J., Mjaaland, S., Haavardsholm, E. A., Grodeland, G., Provan, S. A., Vaage, J. T., Syversen, S. W., Goll, G. L., & Jorgensen, K. K. (2023). Four SARS-CoV-2 vaccine doses or hybrid immunity in patients on immunosuppressive therapies: a Norwegian cohort study. *Lancet Rheumatol*, 5(1), e36-e46. [https://doi.org/10.1016/S2665-9913\(22\)00330-7](https://doi.org/10.1016/S2665-9913(22)00330-7)

Brun, M. K., Goll, G. L., Jorgensen, K. K., Sexton, J., Gehin, J. E., Sandanger, O., Olsen, I. C., Klaasen, R. A., Warren, D. J., Mork, C., Kvien, T. K., Jahnsen, J., Bolstad, N., Haavardsholm, E. A., & Syversen, S. W. (2022). Risk factors for anti-drug antibody formation to infliximab: Secondary analyses of a randomised controlled trial. *J Intern Med*, 292(3), 477-491. <https://doi.org/10.1111/joim.13495>

Buttgereit, F., & Kvien, T. K. (2022). Controversies in rheumatology: maintenance therapy with low-dose glucocorticoids in rheumatoid arthritis. *Rheumatology (Oxford)*, 62(1), 35-41. <https://doi.org/10.1093/rheumatology/keac355>

**C**

Christensen, I. E., Jyssum, I., Tveter, A. T., Sexton, J., Tran, T. T., Mjaaland, S., Kro, G. B., Kvien, T. K., Warren, D. J., Jahnsen, J., Munthe, L. A., Haavardsholm, E. A., Vaage, J. T., Grodeland, G., Lund-Johansen, F., Jorgensen, K. K., Syversen, S. W., Goll, G. L., & Provan, S. A. (2022). The persistence of anti-Spike antibodies following two SARS-CoV-2 vaccine doses in patients on immunosuppressive therapy compared to healthy controls—a prospective cohort study. *BMC Med*, 20(1), 378. <https://doi.org/10.1186/s12916-022-02587-8>

Christensen, I. E., Lillegraven, S., Mielnik, P., Bakland, G., Loli, L., Sexton, J., Uhlig, T., Kvien, T. K., & Provan, S. A. (2022). Serious infections in patients with rheumatoid arthritis and psoriatic arthritis treated with tumour necrosis factor inhibitors: data from register linkage of the NOR-DMARD study. *Ann Rheum Dis*, 81(3), 398-401. <https://doi.org/10.1136/annrheum-dis-2021-221007>

Cohen, H. P., Hachaichi, S., Bodenmueller, W., Kvien, T. K., Danese, S., & Blauvelt, A. (2022). Switching from One Biosimilar to Another Biosimilar of the Same Reference Biologic: A Systematic Review of Studies. *BioDrugs*, 36(5), 625-637. <https://doi.org/10.1007/s40259-022-00546-6>

Cordtz, R. L., Askling, J., Delcoigne, B., Smedby, K. E., Baecklund, E., Ballegaard, C., Isomaki, P., Aaltonen, K., Gudbjornsson, B., Love, T. J., Provan, S. A., Michelsen, B., Sexton, J., Dreyer, L., & Hellgren, K. (2022). Haematological malignancies in patients with psoriatic arthritis overall and treated with TNF inhibitors: a Nordic cohort study. *RMD Open*, 8(2). <https://doi.org/10.1136/rmdopen-2022-002776>

**D**

de Thurah, A., Bosch, P., Marques, A., Meissner, Y., Mukhtyar, C. B., Knitza, J., Najm, A., Osteras, N., Pelle, T., Knudsen, L. R., Smucrova, H., Berenbaum, F., Jani, M., Geenen, R., Krusche, M., Pchelnikova, P., de Souza, S., Badreh, S., Wiek, D., Piantoni, S., Gwinnutt, J. M., Duftner, C., Canhao, H. M., Quartuccio, L., Stoilov, N., Prior, Y., Bijlsma, J. W., Zabotti, A., Stamm, T. A., & Dejaco, C. (2022). 2022 EULAR points to consider for remote care in rheumatic and musculoskeletal diseases. *Ann Rheum Dis*, 81(8), 1065-1071. <https://doi.org/10.1136/annrheumdis-2022-222341>

**F**

Fuggle, N., Bere, N., Bruyere, O., Rosa, M. M., Prieto Yerro, M. C., Dennison, E., Dincer, F., Gabay, C., Haugen, I. K., Herrero-Beaumont, G., Hilgsmann, M., Hochberg, M. C., Laslop, A., Matijevic, R., Maheu, E., Migliore, A., Pelletier, J. P., Radermecker, R. P., Rannou, F., Uebelhart, B., Uebelhart, D., Veronese, N., Vlaskovska, M., Rizzoli, R., Mobasher, A., Cooper, C., & Reginster, J. Y. (2022). Management of hand osteoarthritis: from an US evidence-based medicine guideline to a European patient-centric approach. *Aging Clin Exp Res*, 34(9), 1985-1995. <https://doi.org/10.1007/s40520-022-02176-y>

**G**

Garratt, A., Sagen, J., Borosund, E., Varsi, C., Kjekken, I., Dagfinrud, H., & Moe, R. H. (2022). The Public and Patient Engagement Evaluation Tool: forward-backwards translation and cultural adaption to Norwegian. *BMC Musculoskelet Disord*, 23(1), 556. <https://doi.org/10.1186/s12891-022-05514-3>

Gehin, J. E., Goll, G. L., Brun, M. K., Jani, M., Bolstad, N., & Syversen, S. W. (2022). Assessing Immunogenicity of Biologic Drugs in Inflammatory Joint Diseases: Progress Towards Personalized Medicine. *BioDrugs*, 36(6), 731-748. <https://doi.org/10.1007/s40259-022-00559-1>

Glintborg, B., Di Giuseppe, D., Wallman, J. K., Provan, S. A., Nordstrom, D., Hokkanen, A. M., Osterlund, J., Kristianslund, E., Kvien, T. K., Gudbjornsson, B., Hetland, M. L., Michelsen, B., Jacobsson, L., Askling, J., & Lindstrom, U. (2022). Is the risk of infection higher during treatment with secukinumab than with TNF-inhibitors? An observational study from the Nordic countries. *Rheumatology (Oxford)*. <https://doi.org/10.1093/rheumatology/keac358>

Gloersen, M., Steen Pettersen, P., Neogi, T., Jafarzadeh, S. R., Vistnes, M., Thudium, C. S., Bay-Jensen, A. C., Sexton, J., Kvien, T. K., Hammer, H. B., & Haugen, I. K. (2022). Associations of Body Mass Index With Pain and the Mediating Role of Inflammatory Biomarkers in People With Hand Osteoarthritis. *Arthritis Rheumatol*, 74(5), 810-817. <https://doi.org/10.1002/art.42056>

Gloersen, M., Steen Pettersen, P., Neogi, T., Slatkowsky-Christensen, B., Kvien, T. K., Magnusson, K., Hammer, H. B., & Haugen, I. K. (2022). Associations of pain sensitisation with tender and painful joint counts in people with hand osteoarthritis: results from the Nor-Hand study. *RMD Open*, 8(1). <https://doi.org/10.1136/rmdopen-2021-001774>

Gray, B., Eyles, J. P., Grace, S., Hunter, D. J., Osteras, N., Quicke, J., Schiphof, D., & Bowden, J. L. (2022). Best Evidence Osteoarthritis Care: What Are the Recommendations and What Is Needed to Improve Practice? *Clin Geriatr Med*, 38(2), 287-302. <https://doi.org/10.1016/j.cger.2021.11.003>

Gwinnutt, J. M., Wiecezorek, M., Cavalli, G., Balanescu, A., Bischoff-Ferrari, H. A., Boonen, A., de Souza, S., de Thurah, A., Dorner, T. E., Moe, R. H., Putrik, P., Rodriguez-Carrio, J., Silva-Fernandez, L., Stamm, T., Walker-Bone, K., Welling, J., Zlatkovic-Svenda, M. I., Guillemin, F., & Verstappen, S. M. M. (2022). Effects of physical exercise and body weight on disease-specific outcomes of people with rheumatic and musculoskeletal diseases (RMDs): systematic reviews and meta-analyses informing the 2021 EULAR recommendations for lifestyle improvements in people with RMDs. *RMD Open*, 8(1). <https://doi.org/10.1136/rmdopen-2021-002168>

**H**

Hammer, H. B., Rollefstad, S., Semb, A. G., Jensen, G., Karoliussen, L. F., Terslev, L., Haavardsholm, E. A., Kvien, T. K., & Uhlig, T. (2022). Urate crystal deposition is associated with inflammatory markers and carotid artery pathology in patients with intercritical gout: results from the NOR-Gout study. *RMD Open*, 8(2). <https://doi.org/10.1136/rmdopen-2022-002348>

Hellgren, K., Secher, A. E., Glintborg, B., Rom, A. L., Gudbjornsson, B., Michelsen, B., Granath, F., & Hetland, M. L. (2022). Pregnancy outcomes in relation to disease activity and anti-rheumatic treatment strategies in women with rheumatoid arthritis: a matched cohort study from Sweden and Denmark. *Rheumatology (Oxford)*, 61(9), 3711-3722. <https://doi.org/10.1093/rheumatology/keab894>

Hernandez Alava, M., Wailoo, A., Chrysanthou, G., Barcelos, F., van Gaalen, F. A., Santos, H., Fagerli, K. M., Gago, L., Margarida Cunha, M., van de Sande, M., Couto, M. C., Bernardes, M., Ramonda, R., Exarchou, S., Carvalho, P. D., van der Heijde, D., & Machado, P. M. (2022). Measuring quality of life of patients with axial spondyloarthritis for economic evaluation. *RMD Open*, 8(1). <https://doi.org/10.1136/rmdopen-2021-001955>

**J**

Jones, B., Bennett, S., Larsson, I., Zangi, H., Bostrom, C., Van der Elst, K., Fayet, F., Fusama, M., Herrero Manso, M. D. C., Hoepfer, J. R., Kukkurainen, M. L., Kwok, S. K., Frazao-Mateus, E., Minnock, P., Nava, T., Pavic Nikolic, M., Primdahl, J., Rawat, R., Schoenfelder, M., Sierakowska, M., Voshaar, M., Wammervold, E., van Tubergen, A., & Ndosi, M. (2022). Disseminating and assessing implementation of the EULAR recommendations for patient education in inflammatory arthritis: a mixed-methods study with patients' perspectives. *RMD Open*, 8(1). <https://doi.org/10.1136/rmdopen-2022-002256>

**B**

Joseph, K. L., Dagfinrud, H., Hagen, K. B., Norden, K. R., Fongen, C., Wold, O. M., Hinman, R. S., Nelligan, R. K., Bennell, K. L., & Tveter, A. T. (2022). The AktiWeb study: feasibility of a web-based exercise program delivered by a patient organisation to patients with hip and/or knee osteoarthritis. *Pilot Feasibility Stud*, 8(1), 150. <https://doi.org/10.1186/s40814-022-01110-3>

Jyssum, I., Kared, H., Tran, T. T., Tveter, A. T., Provan, S. A., Sexton, J., Jorgensen, K. K., Jahnsen, J., Kro, G. B., Warren, D. J., Vaage, E. B., Kvien, T. K., Nissen-Meyer, L. H., Anderson, A. M., Grodeland, G., Haavardsholm, E. A., Vaage, J. T., Mjaaland, S., Syversen, S. W., Lund-Johansen, F., Munthe, L. A., & Goll, G. L. (2022). Humoral and cellular immune responses to two and three doses of SARS-CoV-2 vaccines in rituximab-treated patients with rheumatoid arthritis: a prospective, cohort study. *Lancet Rheumatol*, 4(3), e177-e187. [https://doi.org/10.1016/S2665-9913\(21\)00394-5](https://doi.org/10.1016/S2665-9913(21)00394-5)

**K**

Kaski, J. C., Semb, A. G., & Savarese, G. (2022). Advancing medical education—a brief report by the ESC Working Group on Cardiovascular Pharmacotherapy. *Eur Heart J Cardiovasc Pharmacother*, 9(1), 6-7. <https://doi.org/10.1093/ehjcvp/pvac057>



Pombo-Suarez, M., Sanchez-Piedra, C., Gomez-Reino, J., Lauper, K., Mongin, D., Iannone, F., Pavelka, K., Nordstrom, D. C., Inanc, N., Codreanu, C., Hyrich, K. L., Choquette, D., Strangfeld, A., Leeb, B. F., Rotar, Z., Rodrigues, A., Kristianslund, E. K., Kvien, T. K., Elkayam, O., Lukina, G., Bergstra, S. A., Finckh, A., & Courvoisier, D. S. (2022). After JAK inhibitor failure: to cycle or to switch, that is the question - data from the JAK-pot collaboration of registries. *Ann Rheum Dis*. <https://doi.org/10.1136/ard-2022-222835>

Roemer, F. W., Jansen, M., Marijnissen, A. C. A., Guermazi, A., Heiss, R., Maschek, S., Lalande, A., Blanco, F. J., Berenbaum, F., van de Stadt, L. A., Kloppenburg, M., Haugen, I. K., Ladel, C. H., Bacardit, J., Wisser, A., Eckstein, F., Lafeber, F., Weinans, H. H., & Wirth, W. (2022). Structural tissue damage and 24-month progression of semi-quantitative MRI biomarkers of knee osteoarthritis in the IMI-APPROACH cohort. *BMC Musculoskeletal Disord*, 23(1), 988. <https://doi.org/10.1186/s12891-022-05926-1>

Rollefstad, S., Ikdahl, E., Wibetoe, G., Sexton, J., Crowson, C. S., van Riel, P., Kitas, G. D., Graham, I., Dahlqvist, S. R., Karpouzas, G., Myasoedova, E., Gonzalez-Gay, M. A., Sfrikakis, P. P., Tektonidou, M. G., Lazarini, A., Vassilopoulos, D., Kuriya, B., Hitchon, C. A., Stoenoiu, M. S., Durez, P., Pascual-Ramos, V., Galarza-Delgado, D. A., Faggiano, P., Misra, D. P., Borg, A., Mu, R., Mirrakhimov, E. M., Gheta, D., Myasoedova, S., Krougly, L., Popkova, T., Tuchyčová, A., Tomcik, M., Vrablik, M., Lastuvka, J., Horák, P., Medková, H., & Semb, A. G. (2022). An international audit of the management of dyslipidaemia and hypertension in patients with rheumatoid arthritis: results from 19 countries. *Eur Heart J Cardiovasc Pharmacother*, 8(6), 539-548. <https://doi.org/10.1093/ehjcvp/pvab052>

Rysstad, T., Grotle, M., Aasdahl, L., Dunn, K. M., & Tveter, A. T. (2022). Identification and Characterisation of Trajectories of Sickness Absence Due to Musculoskeletal Pain: A 1-Year Population-based Study. *J Occup Rehabil*. <https://doi.org/10.1007/s10926-022-10070-7>

Sagen, J., Borosund, E., Simonsen, A. E., Habberstad, A., Kjekken, I., Dagfinrud, H., & Moe, R. H. (2022). Organisation, influence, and impact of patient advisory boards in rehabilitation institutions-an explorative cross-sectional study. *BMC Musculoskeletal Disord*, 23(1), 738. <https://doi.org/10.1186/s12891-022-05678-y>

Sand-Svartrud, A. L., Berdal, G., Azimi, M., Bo, I., Dager, T. N., Eppeland, S. G., Fredheim, G. O., Hagland, A. S., Klokkeide, A., Linge, A. D., Sexton, J., Tennebo, K., Valaas, H. L., Mjosund, K., Dagfinrud, H., & Kjekken, I. (2022). Associations between quality of health care and clinical outcomes in patients with rheumatic and musculoskeletal diseases: a rehabilitation cohort study. *BMC Musculoskeletal Disord*, 23(1), 357. <https://doi.org/10.1186/s12891-022-05271-3>

Semb, A. G., Ikdahl, E., Kerola, A. M., Wibetoe, G., Sexton, J., Crowson, C. S., van Riel, P., Kitas, G., Graham, I., Rollefstad, S., & collaborators, S.-R. (2022). A Clinical Audit of Cardiovascular Risk Factors and Disease in Patients with Rheumatoid Arthritis - SURF-RA. *Mediterr J Rheumatol*, 33(2), 201-217. <https://doi.org/10.31138/mjr.33.2.201>

Semb, A. G., Rollefstad, S., Sexton, J., Ikdahl, E., Crowson, C. S., van Riel, P., Kitas, G., Graham, I., & Kerola, A. M. (2022). Oral anticoagulant treatment in rheumatoid arthritis patients with atrial fibrillation results of an international audit. *Int J Cardiol Heart Vasc*, 42, 101117. <https://doi.org/10.1016/j.ijcha.2022.101117>

Smedslund, G., Kjekken, I., Musial, F., Sexton, J., & Osteras, N. (2022). Interventions for osteoarthritis pain: A systematic review with network meta-analysis of existing Cochrane reviews. *Osteoarthritis Cartil Open*, 4(2), 100242. <https://doi.org/10.1016/j.ocarto.2022.100242>

Smedslund, G., Kotar, A. M., & Uhlig, T. (2022). Sarcoidosis with musculoskeletal manifestations: systematic review of non-pharmacological and pharmacological treatments. *Rheumatol Int*, 42(12), 2109-2124. <https://doi.org/10.1007/s00296-022-05171-8>

Smolen, J. S., Landewe, R. B. M., Bergstra, S. A., Kerschbaumer, A., Sepriano, A., Aletaha, D., Caporali, R., Edwards, C. J., Hyrich, K. L., Pope, J. E., de Souza, S., Stamm, T. A., Takeuchi, T., Verschueren, P., Winthrop, K. L., Balsa, A., Bathon, J. M., Buch, M. H., Burmester, G. R., Buttgerit, F., Cardiel, M. H., Chatzidionysiou, K., Codreanu, C., Cutolo, M., den Broeder, A. A., El Aoufy, K., Finckh, A., Fonseca, J. E., Gottenberg, J. E., Haavardsholm, E. A., Iagnocco, A., Lauper, K., Li, Z., McInnes, I. B., Mysler, E. F., Nash, P., Poor, G., Ristic, G. G., Rivellesse, F., Rubbert-Roth, A., Schulze-Koops, H., Stoilov, N., Strangfeld, A., van der Helm-van Mil, A., van Duuren, E., Vliet Vlieland, T. P. M., Westhovens, R., & van der Heijde, D. (2023). EULAR recommendations for the management of rheumatoid arthritis with synthetic and biological disease-modifying antirheumatic drugs: 2022 update. *Ann Rheum Dis*, 82(1), 3-18. <https://doi.org/10.1136/ard-2022-223356>

Stuge, B., Sorensen, H., Acharya, R. S., & Tveter, A. T. (2022). Prevalence of Antenatal Depressive Symptoms and its Associated Factors among Pregnant Nepalese Women with and Without Low Back- and/or Pelvic Girdle Pain. *J Nepal Health Res Council*, 19(4), 784-791. <https://doi.org/10.33314/jnhrc.v19i04.3849>

Sumpter, N. A., Takei, R., Cadzow, M., Topless, R. K. G., Phipps-Green, A. J., Murphy, R., de Zoysa, J., Watson, H., Qasim, M., Lupi, A. S., Abhishek, A., Andres, M., Crisan, T. O., Doherty, M., Jacobsson, L., Janssen, M., Jansen, T. L., Joosten, L. A. B., Kapetanovic, M., Liote, F., Matsuo, H., McCarthy, G. M., Perez-Ruiz, F., Riches, P., Richette, P., Roddy, E., Stiburkova, B., So, A., Tausche, A. K., Torres, R. J., Uhlig, T., Major, T. J., Stamp, L. K., Dalbeth, N., Choi, H. K., Vazquez, A. I., Leask, M. P., Reynolds, R. J., & Merriman, T. R. (2022). Association of Gout Polygenic Risk Score with Age at Disease Onset and Tophaceous Disease in European and Polynesian Men with Gout. *Arthritis Rheumatol*. <https://doi.org/10.1002/art.42393>

Syversen, S. W., Jyssum, I., Tveter, A. T., Sexton, J., Christensen, I. E., Tran, T. T., Bjorlykke, K. H., Mjaaland, S., Warren, D. J., Kvien, T. K., Chopra, A., Kro, G. B., Jahnsen, J., Munthe, L. A., Haavardsholm, E. A., Grodeland, G., Vaage, J. T., Provan, S. A., Jorgensen, K. K., & Goll, G. L. (2022). Immunogenicity and safety of a three-dose SARS-CoV-2 vaccination strategy in patients with immune-mediated inflammatory diseases on immunosuppressive therapy. *RMD Open*, 8(2). <https://doi.org/10.1136/rmdopen-2022-002417>

Syversen, S. W., Jyssum, I., Tveter, A. T., Tran, T. T., Sexton, J., Provan, S. A., Mjaaland, S., Warren, D. J., Kvien, T. K., Grodeland, G., Nissen-Meyer, L. S. H., Ricanek, P., Chopra, A., Andersson, A. M., Kro, G. B., Jahnsen, J., Munthe, L. A., Haavardsholm, E. A., Vaage, J. T., Lund-Johansen, F., Jorgensen, K. K., & Goll, G. L. (2022). Immunogenicity and Safety of Standard and Third-Dose SARS-CoV-2 Vaccination in Patients Receiving Immunosuppressive Therapy. *Arthritis Rheumatol*, 74(8), 1321-1332. <https://doi.org/10.1002/art.42153>

Tiulpin, A., Saarakkala, S., Mathiessen, A., Hammer, H. B., Furnes, O., Nordsletten, L., Englund, M., & Magnusson, K. (2022). Predicting total knee arthroplasty from ultrasonography using machine learning. *Osteoarthritis Cartil Open*, 4(4), 100319. <https://doi.org/10.1016/j.ocarto.2022.100319>

Uhlig, T., Eskild, T., Karoliussen, L. F., Sexton, J., Kvien, T. K., Haavardsholm, E. A., Dalbeth, N., & Hammer, H. B. (2022). Two-year reduction of dual-energy CT urate depositions during a treat-to-target strategy in gout in the NOR-Gout longitudinal study. *Rheumatology (Oxford)*, 61(SI), SI81-SI85. <https://doi.org/10.1093/rheumatology/keab533>

Uhlig, T., Karoliussen, L. F., Sexton, J., Kvien, T. K., Haavardsholm, E. A., Perez-Ruiz, F., & Hammer, H. B. (2022a). Fluctuation and change of serum urate levels and flares in gout: results from the NOR-Gout study. *Clin Rheumatol*, 41(12), 3817-3823. <https://doi.org/10.1007/s10067-022-06416-4>

Uhlig, T., Karoliussen, L. F., Sexton, J., Kvien, T. K., Haavardsholm, E. A., Perez-Ruiz, F., & Hammer, H. B. (2022b). One- and 2-year flare rates after treat-to-target and tight-control therapy of gout: results from the NOR-Gout study. *Arthritis Res Ther*, 24(1), 88. <https://doi.org/10.1186/s13075-022-02772-3>

van de Stadt, L. A., Haugen, I. K., Felson, D., & Kloppenburg, M. (2022). Prolonged morning stiffness is common in hand osteoarthritis. *Osteoarthritis Cartilage*. <https://doi.org/10.1016/j.joca.2022.10.022>

van Helvoort, E. M., Jansen, M. P., Marijnissen, A. C. A., Kloppenburg, M., Blanco, F. J., Haugen, I. K., Berenbaum, F., Bay-Jensen, A. C., Ladel, C., Lalande, A., Larkin, J., Loughlin, J., Mobasheri, A., Weinans, H. H., Widera, P., Bacardit, J., Welsing, P. M. J., & Lafeber, F. (2022). Predicted and actual 2-year structural and pain progression in the IMI-APPROACH knee osteoarthritis cohort. *Rheumatology (Oxford)*, 62(1), 147-157. <https://doi.org/10.1093/rheumatology/keac292>

Veronese, N., Cooper, C., Bruyere, O., Al-Daghri, N. M., Branco, J., Cavalier, E., Cheleschi, S., da Silva Rosa, M. C., Conaghan, P. G., Dennison, E. M., de Wit, M., Fioravanti, A., Fuggle, N. R., Haugen, I. K., Herrero-Beaumont, G., Horvo, G., Laslop, A., Matijevic, R., Migliore, A., Mobasheri, A., Pelletier, J. P., Prieto Yerro, M. C., Radermecker, R. P., Rannou, F., Rizzoli, R., & Reginster, J. Y. (2022). Multimodal Multidisciplinary Management of Patients with Moderate to Severe Pain in Knee Osteoarthritis: A Need to Meet Patient Expectations. *Drugs*, 82(13), 1347-1355. <https://doi.org/10.1007/s40265-022-01773-5>

Wieczorek, M., Verstappen, S. M., Putrik, P., Gwinnett, J. M., Balanescu, A., Bischoff-Ferrari, H. A., Boonen, A., Cavalli, G., de Souza, S., de Thurah, A., Dorner, T. E., Moe, R. H., Rodriguez-Carrio, J., Silva-Fernandez, L., Stamm, T., Walker-Bone, K., Welling, J., Zlatkovic-Svenda, M., & Guillemin, F. (2023). Association of vocational interventions and work-related factors with disease and work outcomes in people with RMDs: A systematic review. *Semin Arthritis Rheum*, 58, 152135. <https://doi.org/10.1016/j.semarthrit.2022.152135>

Wirth, W., Maschek, S., Marijnissen, A. C. A., Lalande, A., Blanco, F. J., Berenbaum, F., van de Stadt, L. A., Kloppenburg, M., Haugen, I. K., Ladel, C. H., Bacardit, J., Wisser, A., Eckstein, F., Roemer, F. W., Lafeber, F., Weinans, H. H., & Jansen, M. (2022). Test-retest precision and longitudinal cartilage thickness loss in the IMI-APPROACH cohort. *Osteoarthritis Cartilage*. <https://doi.org/10.1016/j.joca.2022.10.015>

Aanesen, F., Grotle, M., Rysstad, T. L., Tveter, A. T., Tingulstad, A., Lochting, I., Smastuen, M. C., van Tulder, M. W., Berg, R., Foster, N. E., Wynne-Jones, G., Sowden, G., Fors, E., Bagoien, G., Hagen, R., Storheim, K., & Oiestad, B. E. (2023). Effectiveness of adding motivational interviewing or a stratified vocational advice intervention to usual case management on return to work for people with musculoskeletal disorders: the MI-NAV randomised controlled trial. *Occup Environ Med*, 80(1), 42-50. <https://doi.org/10.1136/oemed-2022-108637>

The REMEDY center is funded by a large grant (128 million NOK) from the Research Council of Norway and generous funding (32 million NOK) from the Olav Thon Foundation.



The individual research projects conducted within the REMEDY center are wholly or partly funded by:

- Research Council of Norway (different programs/grants)
- South-Eastern Norway Regional Health Authority
- Program for Clinical treatment research (KLINBEFORSK)
- Horizon Europe
- The Coalition for Epidemic Preparedness Innovations (CEPI)
- DAM Foundation
- Norwegian Health Association
- Diakonhjemmet Hospital research fund
- Norwegian Women's Public Health Association (NKS)
- Norwegian Rheumatism Association Research Fund
- Anders Jahre's Foundation for the Promotion of Science
- Dr. Trygve Gythfeldt and Wife's Research Foundation
- Pahles Legacy
- Grethe Harbitz Legacy
- Karen Fossum Legacy
- NordForsk
- EULAR
- Scandinavian Rheumatology Research Foundation
- The EuroSpA Coordinating Centre
- Klaveness Innovation Support
- Pharmaceutical IIR grants (Novartis Norway AS, Galapagos Biopharma Norway AS, Pfizer AS, Boehringer Ingelheim Norway KS, Bristol-Myers Squibb SARL)
- Own contribution from the Host and Partner institutions

