Norwegian Centre for
E-health Research

ANNUAL REPORT 2023

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Norwegian Centre for E-health Research.

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Statement from the head of the steering committee

The Norwegian Centre for E-health Research is an important knowledge provider to the health sector and is recognised for its research. The centre's social mission is central: to gather, create and disseminate knowledge that contributes to an evidence-based development of the e-health field. The knowledge will help to support the national initiatives. Knowledge is developed through both research and dissemination, for example through popular science articles, webinars or presentations.

A good example of such knowledge development and sharing is the project: Introduction of artificial intelligence in diagnostic imaging in Vestre Viken Hospital Trust. Here, the researchers have followed the entire process from the start and gathered a lot of knowledge about the implementation process and testing. This knowledge will also be used as an evidence-based foundation for decisions on the use of AI in healthcare in particular, and e-health in general. The researchers have received funding to follow the implementation over the next three years in Northern Norway Regional Health Authority.

It is important to have good research environments, and that research funding is directed towards meeting the need for knowledge. In 2023, the Ministry of Health and Care Services clarified further funding for the Norwegian Centre for E-health Research. This is an essential prerequisite for the further professional development of the centre.

The work of the Norwegian Centre for E-health Research is based on the needs of the health and care sector, national and international health and e-health strategies and general technological and societal developments.

Commissioned by the Ministry of Labour and Social Affairs, researchers at the centre investigated the experiences and consequences of increased digital contact between GPs and patients during the Covid-19 pandemic. The results showed that patients and doctors liked the efficiency and flexibility of communicating digitally about sick leave. As a result of this research, in 2023, the Norwegian Parliament adopted amendments to the National Insurance Act that make it possible to issue sick leave after electronic consultation.

The Norwegian Centre for E-health Research was awarded a high number of external research projects in the years 2019 to 2021. In the following years, a lot of activity has gone into carrying out the assigned research tasks, in addition to which there has been significantly fewer calls for research funding aimed at the centre's research areas. This has led to fewer awards for external projects in 2022 and 2023.

The centre thus faces a financial challenge in the coming years. The Norwegian Centre for E-health Research must continue its efforts to create a balance between research activity within the national mission and activities to secure externally funded research projects. One of the expectations of the centre is to increase the proportion of external funding. This means that the centre must be professional and efficient in its work with applications, so that they are successful in securing funding.

The research and dissemination results from 2023 show continued good development for the Norwegian Centre for E-health Research. It shows that the director, the management team and all the employees are jointly able to solve the tasks and challenges that follow from the important social mission given to the centre.

Erik M. Hansen
Head of the steering committee

The steering committee

The purpose of the steering committee is to help ensure that:

- The centre further develops its expertise and carries out its assignments in research and investigation in the field of e-health in line with the sector's needs and priorities. To the extent that such expertise does not exist at the current centre, it must be acquired and built up. Possibly in collaboration with other relevant centres of expertise. This applies in particular to areas where the health authorities request expertise and services from the centre through annual assignment documents or allocation letters.
- The centre continues to develop its national (and international) role in research and investigation in the field of e-health, and is perceived as useful, relevant and competent for the sector.
- The centre has good quality in its academic activities, support functions and administrative tasks.

The steering committee meets digitally

Members of the steering committee

- Erik M. Hansen, Director of E-health, Western Norway Regional Health Authority (head of the steering committee)
- Bjørnar Alexander Andreassen, Programme Manager National Welfare Technology Programme, Norwegian Directorate of Health
- Egil Rye-Hytten, The Norwegian Federation of Organisations of Disabled People - user representative
- Grete Syrdal, Director of Health and Welfare, Bærum Municipality (replaced Helge Garåsen from the second meeting in 2023)
- Jostein Jensen, Divisional Director Security, Norwegian Health Network
- Anja Schou Lindman, Technical Director, Norwegian Institute of Public Health
- Margunn Aanestad, Professor, University of Agder
- Markus Rumpsfeld, Head of E-Health, Collaboration and Innovation, University Hospital of North Norway
- Nis Johannsen, Head of Department, South-Eastern Norway Regional Health Authority
- Roar Jakobsen, Senior Advisor, Directorate of E-health
- Siv Mørkved, Professor and Assistant Director, Central Norway Regional Health Authority
- Terje Wistner, Head of Department KS
- Tove Klæboe Nilsen, Director of Research, Helse Nord RHF

Observer: Kristian Skauli, Director General, Ministry of Health and Care Services

Health research and collaboration

The municipal health service plays an important role in the Norwegian healthcare system. Municipalities provide a range of services, from preventive care to long-term care programs, serving as the first point of contact for citizens with the health service.

To make municipal health and care services more sustainable, the Ministry of Health and Care Services and the Ministry of Education and Research have allocated NOK 100 million for research and innovation. A key condition for accessing these funds is collaboration between municipalities and research institutions, a measure designed to stimulate research at the municipal level.

Researchers at our centre have extensive experience in conducting research on and with municipalities. We have followed the national welfare technology programme for many years and are developing a research portfolio aimed at digital remote care.

Our centre host a webinar series dedicated to digital remote care. Here, the municipalties themselves are given the opportunity to communicate what they think is important to emphasise. The webinars promote a culture of knowledge sharing, where experiences and lessons learnt can help to inform and improve practice across the organisation. Sharing knowledge also leads to more collaboration, both between institutions and researchers.

We also need to work together internationally and nationally. Norway has its own special characteristics that we need to consider when introducing technology and researching health services. At the same time, we share many of these characteristics with our Nordic neighbours, and there is much to be gained from working more closely together in the Nordic region and within the Nordic welfare model. At the European level there is a lot going on, with the European Commission taking active steps through plans for a common European Health Data Space (EHDS) and the regulation of artificial intelligence. And we need to see ourselves as part of the wider world, which we do through our status as a collaboration centre with the World Health Organization (WHO). Adopting a national-to-global outlook in research not only delivers value and access to new knowledge but also opens opportunities for joint funding with international partners.

The authorities emphasize the importance of fostering cross-sectoral cooperation. We must be able to see our own field in the context of other sectors of society, and how solutions are interrelated. In this complex collaboration, it is important to involve users. By involving citizens, professionals and decision-makers in the research process, we ensure that the knowledge we develop is relevant and valuable to those who will use it.

We recognise that to really make a difference, we need to look beyond the traditional boundaries of health research and work closely with other sectors, including public administration and private industry.

Stein Olav Skrøvseth, Centre Director

Centre Director
Stein Olav Skrøvseth

Who we are

BEHIND THE SCENES: PEOPLE AND FACTS

Number of employees

- 91 people in 77.5 full-time equivalents
- 47 women and 44 men
- 70 permanent employees
- 10 part-time employees
- 11 additional positions
- One new employee in a contract/temporary position.

Where do we come from?

66 people come from Norway, while 25 people come from other countries:

- Canada
- Ethiopia
- Ghana
- Greece
- India
- Iran
- Iceland
- Italy
- China
- Lithuania
- Portugal
- Russia
- Spain
- Sweden
- Czech Republic
- Germany
- USA
- Vietnam
- Zimbabwe

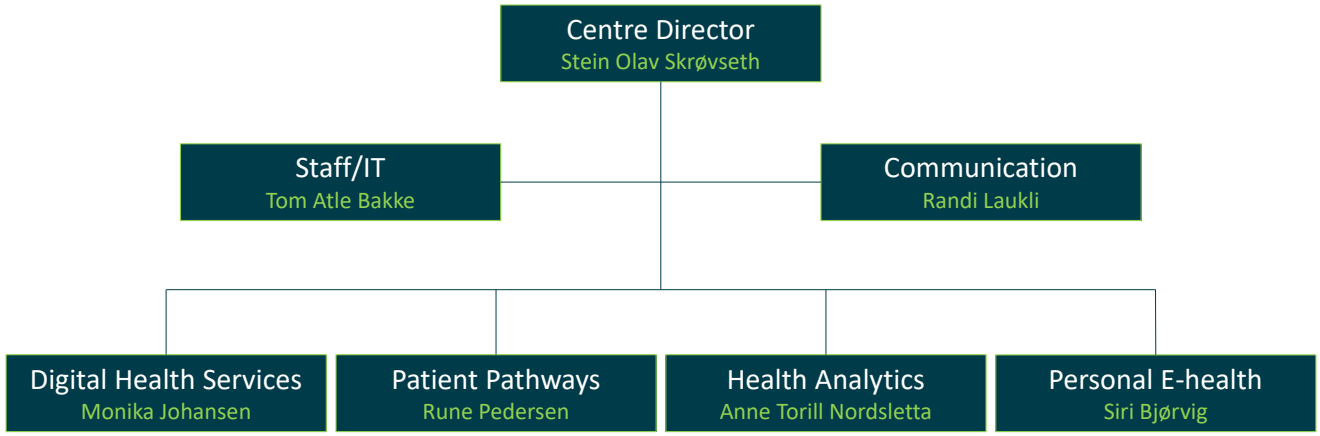
Educational background

- Bioengineer
- Biology
- Pharmacy
- Physics
- Physiotherapy
- Graphic design
- Health sciences
- ICT
- Journalism
- Communication
- Medicine
- Organisation and management
- Pedagogy
- Psychology
- Accounting and auditing
- Social sciences
- Business economics
- Civil engineer
- Degree in economics
- Sociology
- Statistics
- Nursing care
- Technology

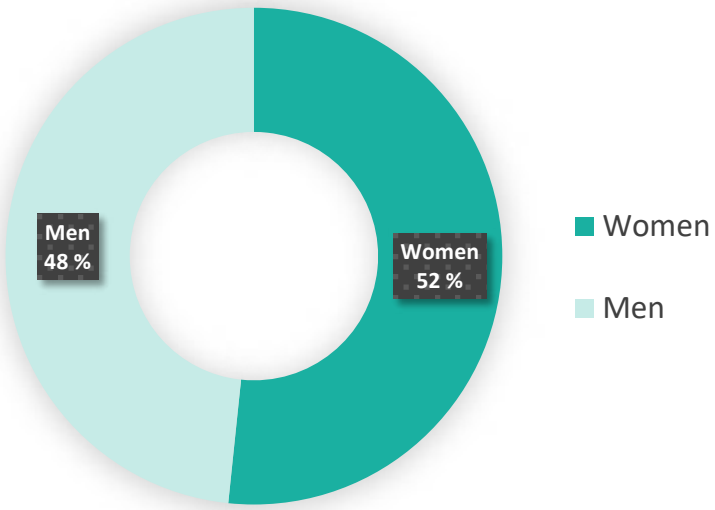
Level of education

- 11 PhD students, eight women and three men.
- 43 with doctoral degrees, 21 women and 22 men

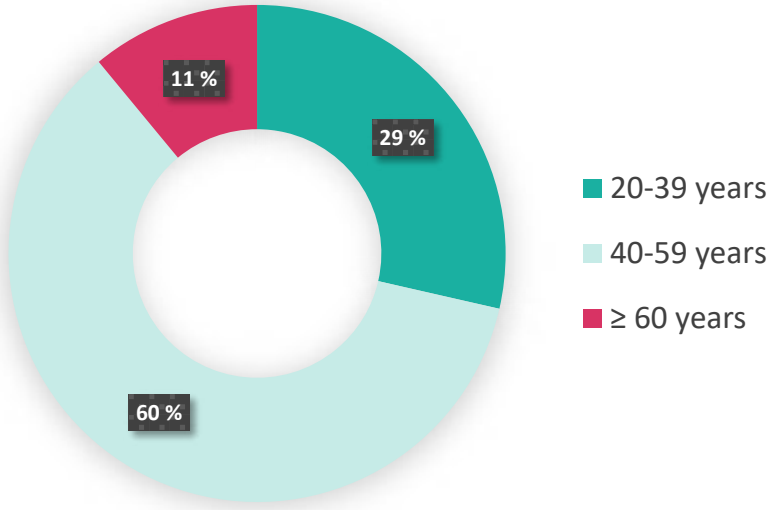
Organisation chart



Gender distribution



Age distribution



Finances

Financial statement for 2023. Figures indicated in millions of Norwegian Kroner.

Operating income

Helse Nord basic funding	4,7
HOD basic appropriation current year (state budget)	42,6
HOD basic appropriation (from balance budget)	4,8
Contracted competitive funds	26,4
Competitive allocation	45,3
Assignment appropriation	1,2
TOTAL operating income	**98,6**

Operating expenses

Direct project costs	13,4
Salaries and social security costs	71,7
Depreciation and amortisation	0,4
Other operating expenses	11,6
TOTAL operating expenses	**97,1**
OPERATING PROFIT	**1,5**
Transfer of operating profit to the balance sheet	-1,5
ANNUAL PROFIT	**0,0**

Knowledge for better healthcare

The Norwegian Centre for E-health Research will contribute to knowledge-based development in the field of e-health through research and collaboration and communication.

Through interdisciplinary research and knowledge development, we want to contribute to a better health service for citizens. Together with the entire sector, we will achieve the national goal of the patient's health service.

Our ambition is to be a nationally leading and internationally recognised research centre.

Our most important task is to conduct research together with other specialised environments, nationally and internationally. Our research must be independent and maintain high ethical standards.

Knowledge dissemination is a core activity for our center. We are dedicated to publishing all our research openly and transparently, ensuring that it is effectively utilised.

Through our national role, we will build networks and collaborate with the entire sector. Anyone who researches e-health can join us.

Personal e-health

We will be researching how empowerment technology affects healthcare for the elderly, chronically ill people in need of follow-up, people with disabilities and those who actively seek to change their lifestyle.

Digital health services

We will conduct research on the national digital health services and acquire knowledge about the conditions and context that must be present before the services are developed. While the services are being trialled, we will look at what inhibits or promotes their use.

Finally, we will study the effects and consequences of the services in use. Digitisation of the pharmaceutical sector and services offered on Helsenorge.no are important topics.

Holistic patient pathways

We will study how digital solutions can facilitate holistic patient pathways.

The interplay of technology, semantics, and organisational structures presents challenges in healthcare. As part of our research, we will examine patient records as tools for collaboration and study how implementation strategies, standardisation, and workflow processes influence quality.

We will research the conditions for and effects of digitalisation, and we aim to understand the complex interplay between technology and healthcare services.

Health analytics

We will look at how health data can be used to predict, detect and treat disease.

Machine learning algorithms and data mining methods are some of the things we are studying. We will develop methods for analysing data and safeguarding privacy.

A key focus of our work is understanding how the healthcare sector can implement reliable and sustainable algorithms.

Vision and values

Our vision is:
Knowledge for better health services.

Values

Our values are crucial to our success over time and are at the heart of our culture. They motivate us to perform and guide us as to how we should run the centre and cooperate with our stakeholders.

Openness

Openness is one of the most important values in our organisational culture and helps to ensure transparent processes. By making our activities transparent and sharing knowledge and information, we build trust with our partners and society.

Openness demonstrates a desire to learn, to be curious about others and be receptive to new ideas. This also entails the ability to give and receive constructive feedback. We positively encourage different opinions.

Cooperation

E-health is a multi-disciplinary field, and no one is capable of doing everything on their own.

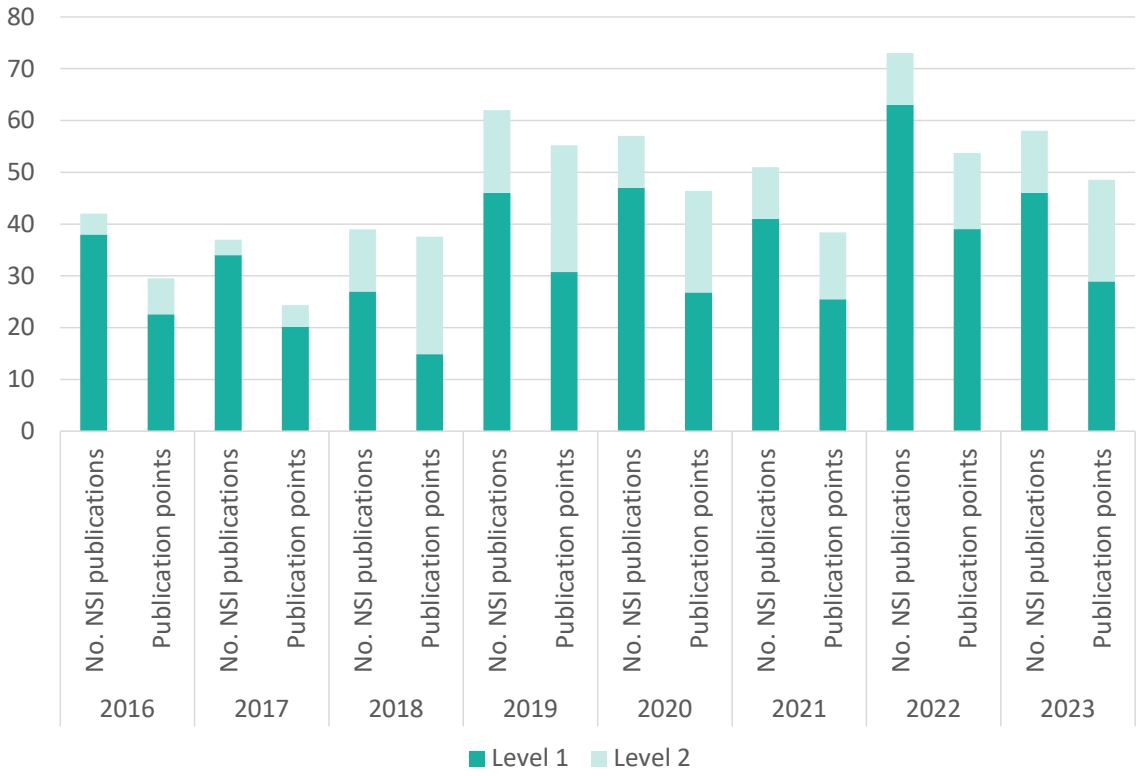
Cooperation is therefore something we hold in high regard. We often cooperate with those we compete with for funding. Trust lies at the heart of any good cooperation. Trust and mutual respect makes working together a pleasant experience. Inclusion is the key to building a community, and being part of a community provides a sense of belonging, friendship and wellbeing. By including others, both internal and external cooperation partners, we work more efficiently towards our common goals.

Integrity

To us at the Norwegian Centre for E-health Research, integrity means being reliable and conducting ourselves properly. We are characterised by doing what we say. We are confident that we want the best for each other and that everyone is doing the best they can. Quality should be the hallmark of what we deliver.

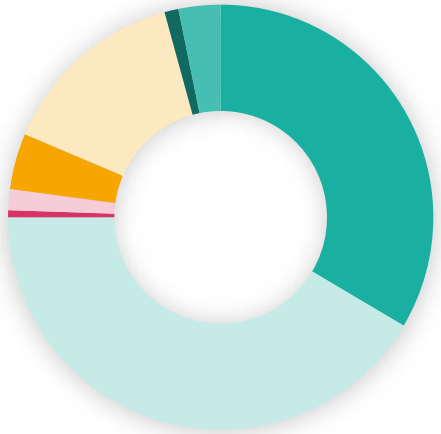
It is important that we fulfill our public mission as best we can, which is why we must set clear expectations for the centre and our co-workers. Our organisation wants autonomous, committed employees who take co-responsibility for the centre's success. We must be able to depend on each other for support, even when we make mistakes.

Our research in numbers



NSI: Norwegian Scientific Index
NSI publications: Publications that earn publication points and are part of the funding schemes in the healthcare, institution and university hospital sector

ACTIVITY



- 63 scientific articles/overview articles
- 78 scientific/academic lectures and poster presentations
- one scientific conference article
- three abstracts
- eight chronicles
- 27 popular science articles
- two popular science lectures
- six reports

Numbers from Cristin

Research partners in Norway

- Akershus University Hospital Trust
- Blå Kors Kompasset
- Diakonhjemmet Hospital
- Norwegian Institute of Public Health
- Helse Bergen HT - Haukeland University Hospital
- Nord-Trøndelag HT
- Helse Vest ICT
- Østfold University College
- Western Norway University of Applied Sciences
- Noklus
- NORCE Norwegian Research Centre AS
- Nord University
- Norwegian University of Life Sciences
- Norwegian University of Science and Technology
- OsloMet - the metropolitan university
- Oslo University HT
- Foundation Centre for Quality in Medical Services (SKIL)
- St Olavs HT
- Sykehusapotek Nord HT
- Sørlandet HT
- UiT The Arctic University of Norway
- University of Bergen
- University of Oslo

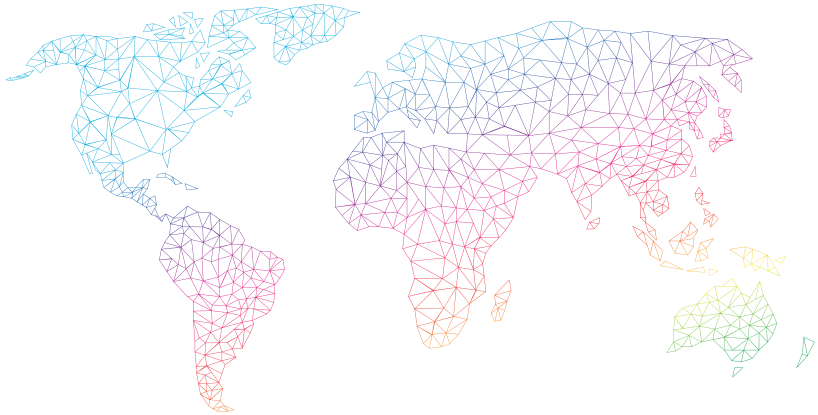
What's important to you?

Nora MacLaren – Senior Adviser, Communication

I embraced my role as the "webinar queen" and continued to shine in 2023!

This year, my primary focus was on our webinar series and the Poland project. It's exciting to explore the diverse aspects of e-health and communicate them through creative and innovative methods. We produced films and webinars, both in studios and at conferences. My favorite project this year was filming in the Arctic University's boat simulator. Let knowledge steer the ship!

International research partners



Australia
- University of Tasmania
- University of Melbourne

Austria
- Ludwig Boltzmann Institute for Digital Health and Prevention

Canada
- York University
- University of Alberta
- The University of Regina

Czech Republic
- Czech Technical University in Prague
- Charles University
- Motol University Hospital
- Czech Academy of Sciences

Denmark
- University of Southern Denmark
- University of Copenhagen
- Bispebjerg Hospital
- Aalborg University

Estonia
- Tallinn University of Technology
- TTK University of Applied Sciences

Finland
- University of Eastern Finland
- Kela, The Social Insurance Institution of Finland
- Sensotrend Oy
- Aalto University

Germany
- University Hospital Schleswig-Holstein
- Stelar Security Technology Law Research
- Harz University of Applied Sciences

Great Britain and Northern Ireland
- University of Cambridge
- University of Warwick
- The Queen's University of Belfast
- University of Plymouth

Iceland
- University of Iceland

Israel
- Ono Academic College

Italy
- Università degli Studi di Genova

The Netherlands
- Tilburg University
- Netherlands Institute for Health Services Research
- Accare Child Study Center

New Zealand
- University of Otago

Romania
- Carol Davila University of Medicine and Pharmacy
- NETSUN software SRL

South Africa
- Rhodes University

Spain
- Universidad Pública de Navarra
- Instituto de Salud Carlos III
- Insular University Hospital of Gran Canaria
- Idonia
- Universidad de Las Palmas de Gran Canaria
- Universidad Rey Juan Carlos
- Universidad de Sevilla

Switzerland
- University of Bern
- Bern University of Applied Sciences

Sweden
- Karolinska Institute
- Göteborgs University
- Stockholm University
- Linnaeus University
- University of Skövde
- Örebro University
- The academic hospital
- Karlstad University
- Uppsala University

Ukraine
- Aras Shevchenko National University of Kyiv

USA
- IBM Corporation
- Texas A&M University-Corpus Christi
- Mayo Clinic, College of Medicine
- Harvard Medical School

We work together!

National research network for digital remote care

Digital remote care is a national focus area, and a lot is happening in both primary and specialist healthcare in this field.

Numerous research groups in Norway are actively engaged in digital remote care. While some collaborate through specific projects or agreements, we recognize the need for a dedicated research network. Such a network would enhance the overview and insights into ongoing research while fostering broader collaboration across different environments and projects.

That's why we took the initiative to start a research network for digital home monitoring. More than seventy researchers from over twenty institutions gathered for the first time in October.

Nordic eHealth Research Network (NeRN)

The Nordic Network for eHealth Research (NeRN), part of the Nordic Council of Ministers, and researchers from our centre have been involved since its inception in 2012.

In 2023, our researchers contributed to a survey that sheds light on Nordic citizens' experiences, use and attitudes towards digital health systems.

The results of the survey reveal general trends but show that the vast majority of citizens are utilising digital health services. However, the survey shows that around 10 per cent of those who responded say they need help or assistance to use the digital solutions, or that they do not use digital e-health solutions at all.

Reference:

Solbakken Nordheim, Espen. Pedersen, Rune. Lintvedt, Ove mfl. A Nordic survey to monitor citizens use and experience with eHealth. DOI: 10.6027/temanord2023-541

IMIA - International Medical Informatics Association

The IMIA organisation acts as a bridge for knowledge exchange worldwide, connecting professionals and organisations involved in health informatics. IMIA organises conferences, publish scientific articles and collaborate on international projects to advance the field of medical informatics.

Meeting in the National Research Network at the Norwegian Directorate of Health with over seventy researchers present.

EFMI - European Federation of medical informatics is the European Council for IMIA.

Both IMIA and EFMI have working groups and our researchers participate in several of them:

- **EFMI Citizen and Health Data.** Advocates for empowering citizens to leverage their own health data, addressing their role as an underutilised resource in the healthcare system.
- **Participatory Health and Social Media.** This working group aims to promote engagement in health informatics and social media.

Cooperation in the EU

The Norwegian Centre for E-health Research's vision is knowledge for better healthcare. We believe that through interdisciplinary research and knowledge development we can contribute to better healthcare for our citizens.

This means that we also look beyond our national borders and contribute as a partner and participant in various EU projects. We believe that by sharing our knowledge and gaining new knowledge from other partners in Europe, we can provide decision-makers with broad and professional knowledge in the field of e-health.

Our researchers are engaged in numerous international networks across various health domains. Notably, the centre leads and coordinates WARIFA, a four-year research project in partnership with European countries. The project aims to develop a health app to reduce and prevent disease risks. It is funded by the EU's Horizon 2020 research and innovation program.

In 2023, the Norwegian Centre for E-health Research participated in nine EU projects, focusing on health data, citizen services, healthcare professional services, and patient pathways.

Since 1997, the centre has also been an official collaboration centre for the World Health Organisation (WHO) within digital health and telemedicine. In this capacity, the centre advises the WHO and its member countries on ICT in healthcare services.

The Norwegian Centre for E-health Research actively participates in numerous international and national organizations and networks, enhancing opportunities for collaboration. Examples here are: EFMI Citizen and Health Data, DIPEx International, IMIA (International Medical Informatics Association), Nordic Research Network for Health and Welfare Technology, EHTEL (Collaborating for Digital Health and Care in Europe), HTAi (Health Technology Assessment International) and others.

Collaboration in networks provides value, access to new knowledge and the opportunity to find new partners.

"For many years, Norway has been one of the drivers of e-health, contributing significant experience and knowledge at the European level. The Norwegian Centre for E-health

Research aims to support long-term competence building and position its e-health research prominently within Europe.

In 2023, the centre was awarded the EU-funded project EDITHA (European Digital Health Technology Assessment framework work). Over the next four years, we will have the main responsibility for a work package where, in collaboration with DNV and others, we will analyse the changes resulting from the EU's policy related to the European Health Data Space (EHDS). In addition, we will contribute to the development of a European framework for Health Technology Assessment (HTA), which also includes digital solutions.

Participation in important arenas through collaboration with WHO

The collaboration with the World Health Organization (WHO) provided valuable and educational opportunities for the centre's employees on the international stage.

The WHO Regional Office for Europe, headquartered in Copenhagen, oversees 53 countries with nearly 1 billion people. It offers professional and technical support to help countries develop effective health IT systems, optimise the use of health data, and transition towards person-centred health services. Recently, much of the focus has been on Eastern Europe. That's why our centre was asked to organise a four-day workshop in Moldova together with WHO and international experts in June. Over the course of a few hectic months, we planned and executed the project, with the aim of providing Moldovan health authorities with an insight into crucial factors for successful digital transformation.

Our centre was also asked to contribute to WHO Europe's webinar series on how we can promote inclusion in healthcare through the use of new technology. Senior advisor Karianne F. Lind gave a virtual presentation in June, where she talked about how digital follow-up at a distance can provide benefits such as increased accessibility and flexibility, efficient use of resources and more knowledge-based care.

A group of employees were involved in writing work based on a survey on the use of telemedicine conducted by the WHO. We worked on both a report and a draft scientific article.

Another important event was that we contributed to WHO Europe's second symposium on digitalisation in the health sector. A small team participated at the conference, which took place in Portugal in September. The centre manager and WHO coordinator participated in two panels, on artificial intelligence and digital home monitoring. During the opening, the WHO management said that the collaboration with us is valuable for them and the member states.

The main takeaways were that we need to build trust between all stakeholders in the healthcare sector, involve users in development work, scale up useful solutions faster, and find the balance between utilising artificial intelligence while managing risks. The centre's webmaster also contributed by creating the conference page for the symposium on our website. WHO expressed that they were very grateful for this.

Some of those who were in Moldova. From left: Helen Caton-Peters (WHO), Nick Guldemond (Leiden University Medical Centre), Kelly H. Wheeler (presenter), Luis Marco Ruiz (E-health research), Olga Golburean (NTNU), Ove Lintvedt (E-health research), Eva Turk (St. Pölten University), Clayton Hamilton (WHO), Lene Lundberg (E-health research). Photo: WHO

Topics at the conference in Porto included the opportunities and risks of AI, how digital technologies can be used to prevent and treat disease, digital tools for mental health and the utilisation of data for a more efficient health service.

Stein Olav Skrøvseth in a panel debate at the WHO conference in Porto.

What's important to you?

Luis Marco-Ruiz – Senior Researcher, Integrated Patient Pathways

2023 has been an exciting and productive year for my research. The topics I've been working on, are highly relevant for a sustainable future healthcare system.

By standardising data, we can run more powerful phenotyping algorithms. This provides a better understanding of the best way to treat patients with multimorbidity (IMPACT project).

In the Valkyrie project, we use blockchain technology in the patient records to ensure continuity of care across hospitals and GP surgeries.

We've published research that explains the key barriers to adopting AI in the clinic. We've gained unprecedented acceptance from AI researchers and policy makers.

In collaboration with the WHO, we have helped guide Eastern European countries in taking technologies and standards in connection with their national electronic patient record project.
In summary, it has been a highly motivating year with exciting developments and good results.

Sharing e-health knowledge between Poland and Norway

In 2023, we collaborated extensively with the Polish Ministry of Health on the project "Tackling Social Inequalities in Health with the Use of E-Health and Telemedicine Solutions," financed by Norway grants. This has given us great opportunities to develop and share e-health knowledge.

Originally planned before the pandemic, the project intended to include several study trips to Poland and reciprocal visits to Norway. However, the pandemic necessitated a shift to digital engagements.

Siri Bjørvig, department manager for Personal e-health, has been closely involved in the project since the planning phase. She expresses great admiration for the cohesion of the project teams on both the Norwegian and Polish sides.

In 2023, we organised two webinars, so-called "Open Days". The theme in March was artificial intelligence, where researchers shared knowledge about the transition to clinical practice, and how to identify patients who can benefit most from artificial intelligence. In October, the theme was digital inclusion. Here they talked about the importance of giving everyone an equal opportunity to use healthcare services.

In these webinars, our researchers promote their findings to an international audience.

Since we couldn't take our Polish partners on a tour of Norway, we organised a virtual study tour that showcases the diversity of e-health in Norway. Throughout 2023, we compiled over 15 articles and videos highlighting the work of Norwegian research institutions, healthcare services, authorities, and other organisations in e-health.

In October, we finally got to meet our partners from Poland face-to-face in Tromsø! Ten participants from the Polish Ministry of Health and hospitals got to experience our Arctic city; complete with northern lights and delicious fish meals. We had two days packed with knowledge sharing. During their visit to Tromsø, the Polish delegation shared the challenges they face in the healthcare sector with shortage of doctors, an ageing population and bringing e-health solutions to people in the most isolated parts of Poland. Not unlike the challenges we also face in Norway.

Currently, seven e-health and digitalisation models are being tested in Poland, focusing on cardiology, geriatrics, psychiatry, obstetrics, palliative care, and chronic diseases.

Dillys Larbi talks about Fysbot in the film produced by Montevideo Tromsø.

Our researchers have contributed to the development of the health models we are now testing in Poland. This gives us important knowledge about how the models work in practice.

Montevideo Tromsø produced six animated films for the project. The first film was about Dillys Larbi's PhD project: Fysbot. Fysbot is a conversational robot that helps people make healthier choices and be more physically active.

We are working on creating several knowledge summaries in the project. Topics include frail elderly, digital home care and digital inclusion. Last but not least, we are collaborating with the University Hospital of North Norway to create a e-learning platform on patient-centred healthcare teams.

2023 has really been a particularly good year for knowledge dissemination.

A happy group of researchers and healthcare professionals from Norway and Poland.

Philosophy and digitalisation at CRESS in Paris

"Travelling abroad is exciting and exhausting." That's how Professor Gro Berntsen from the Norwegian Centre for E-health Research begins her travelogue about her time as a visiting researcher at CRESS in Paris in 2023.

I'm now working in an epidemiological environment in Paris, at CRESS (Centre of Research in Epidemiology and Statistics). This is the French Cochrane Centre, where they both crunch numbers and make them stand obediently in line.

At CRESS, there is a dedicated unit focused solely on quantitative analyses to identify causal relationships. Methodological choices are carefully scrutinised and debated, fostering an enriching academic environment.

For me, it's very useful to have someone to talk to about epidemiology and statistics. I've already learnt a lot!

Philosophising about digital trends

The French love to discuss the philosophical basis of everything, and therefore also of the research we do.

Is artificial intelligence truly intelligent? Intelligence involves applying existing knowledge to new problems and contexts. An algorithm, however, is only as "intelligent" as the data and rules it has been trained on. In new areas, it still fails. So it is not true intelligence.

I've also been introduced to digital health trends that were unfamiliar to me until recently. Have you heard of Just-in-Time Adaptive Interventions (JITAI) or digital pills that report to an app when consumed?

CRESS is also exploring "personomics," variables that provide insights into individual human characteristics. I believe these should be integrated with genomics and proteomics into the algorithms shaping our future predictions.

Traveling and collaborating with people from other cultures is profoundly educational. I would wholeheartedly recommend it to anyone who has the opportunity.

Paris is a fantastic city to cycle around in. Here's Gro in front of the ruins of the cathedral in Larchant, Fontainebleau.

Part of the garden of the Hôtel Dieu, Paris' oldest and only hospital until the Renaissance. The buildings that stand today were erected during Napoleon's reign and Haussmann's modernisation of Paris. Since 1865, no changes have been made to the facades.

Proactive health and welfare technology for Nordic users

How can we make better use of health and welfare technology in the Nordic countries? Some of the answers were presented in a policy brief by the joint Nordic PROTECT project, of which the Norwegian Centre for E-health Research is a part.

Can technology help the region achieve its vision of sustainability and integration by 2030 by improving access to health and welfare services?

The technology encompasses a wide range of solutions, from security alarms to care robotics, aiming to support social participation, independence and communication for the elderly, people with disabilities and professional caregivers.

The policy brief addresses key challenges, such as digital exclusion, the necessity of user involvement, and the safe implementation of technology. It also highlights the importance of interdisciplinary research and the development of a shared language to foster mutual understanding.

The PROTECT project, which brings together researchers from the Nordic countries, contributes to identifying Nordic challenges and knowledge needs at the micro-, meso-, and macro-levels, and emphasises the importance of collaboration, guiding activities, recognition of the diversity among users, and the need for a common understanding of technology-related concepts to promote inclusive and effective use of health and welfare technology.

At the VITALIS conference in Gothenburg, four Nordic professors from the Protect project talked about how we can better utilise health and welfare technology in the Nordic countries. VITALIS is one of the Nordic region's leading conferences and meeting places for e-health and the future of healthcare. From left. Helinä Melkas (FI), Elin Thygesen (NO), Christine Gustafsson (SE), Monika Knudsen Gullslett (NO).

FederatedHealth: the future of health data in the Nordics

Imagine if the millions of patient records scattered across the Nordic region could seamlessly communicate and share critical insights. This vision drives the joint Nordic project FederatedHealth, led by the Norwegian Centre for E-health Research.

Running from April 1, 2023, to October 1, 2025, the project aims to unlock new opportunities for utilising Nordic health data.

Harnessing untapped potential

FederatedHealth seeks to explore the vast potential of health data from Nordic patient records to address significant healthcare challenges. Currently, 40–80% of the information in electronic patient records consists of unstructured data, including doctor's notes, emails, and medical images.

Sharing unstructured data such as clinical text poses significant technical challenges in terms of both privacy and language differences in the Nordic region. This poses particular challenges for the processing of clinical text using data-driven AI algorithms.

Safety and multilingualism in focus

The Nordic region possesses some of the world's best health data that has been systematically collected over many years. FederatedHealth will develop a secure Nordic Health Data Network (NHDS) aimed at secondary use of health data.

The project utilises distributed machine learning, specifically federated learning, to ensure data privacy and ownership. The federated health data network enables secure, distributed training of multilingual clinical language models in Norwegian, Swedish, Danish, Finnish and Estonian, as well as other machine learning models designed to improve patient safety.

Senior Researcher Taridzo Chomutare of the Norwegian Centre for E-health Research stresses the importance of developing privacy-preserving health data networks across borders. "This is not only a critical technological challenge, but also a necessary step to ensure that data-driven innovation can benefit Nordic society and business.

Screenshot from the Nordic Innovation website about FederatedHealth

Collaborative effort across borders

FederatedHealth is run by a consortium of partners from the Nordic and Baltic countries and led by the Norwegian Centre for E-health Research. The collaboration marks a milestone in the use of health data for innovation and patient safety across the Nordic region.

The consortium consists of:

- Norwegian Centre for E-health Research (NO)
- University of Turku (FIN)
- Stockholm University (SWE)
- Östergötland County Council/Linköping University Hospital (SWE)
- DNV (NO)
- University of Copenhagen (DK)
- University of Tartu (EST)
- Omilon (DK)
- Cambio (SWE)

NORDeHEALTH – Nordic experiences with digital access to patient records

The Nordic countries are at the forefront of digital access to health information. The Nordic research collaboration NORDeHEALTH has been investigating the challenges and opportunities of digitising healthcare, especially when national health portals have been implemented to give patients online access to their medical records.

The project has researched everything from technical solutions to user experiences and societal effects. The research has focused on understanding how digital access to patient records can be further developed and optimised so that more people can benefit from this health information in a secure and efficient way.

The Norwegian Centre for E-health Research has been part of the project since its inception in 2021 and has been responsible for researching the experiences of healthcare workers and patients who have adopted electronic access to medical records.

During the course of the project, a comprehensive survey on electronic access to medical records in the Nordic countries was conducted, with responses from almost 30,000 patients from Norway, Sweden, Finland and Estonia. These have provided the researchers with valuable user experiences and demographic knowledge related to digital health information.

Of the 9,094 responses analyzed from Norway, approximately 7,000 were from patients treated for physical illnesses, while 2,000 were from those who had received mental health care.

Two-thirds of respondents stated that they found it beneficial to read their own medical records.

However, Norwegian users who had undergone mental health treatment reported higher rates of perceived errors, omissions, and offensive comments in their electronic health records compared to those treated in other parts of the healthcare system.

While most patients across the Nordic survey expressed positive experiences with accessing their own health information, concerns about security and privacy persist. The findings emphasise a continued need for international collaboration and research to ensure the successful and secure implementation of digital health services.

With the realization of the European Health Data Space (EHDS), patients' abilities to utilize and control third-party access to their electronic health records will likely change significantly.

This will have implications not only within Europe, but also globally as it will likely serve as an example to further push the boundaries of access to and use of electronic health data for primary and secondary use.

To ensure successful, secure and ethical digital access to patient records, we need more international collaboration and research, as well as dedicated funding. This will help us to understand the technical and situational factors that we must take into account.

Partners in NORDeHEALTH:

- Uppsala University (Sweden)
- Örebro University (Sweden)
- Skövde University (Sweden)
- Tallinn University of Technology (Estonia)
- Aalto University (Finland)
- Karlstad University (Sweden)
- Norwegian Centre for E-health Research (Norway)
- OpenNotes (USA)

Project period: 2021 - 2023

NORDeHEALTH project partners from across the Nordic region gathered in Tromsø.

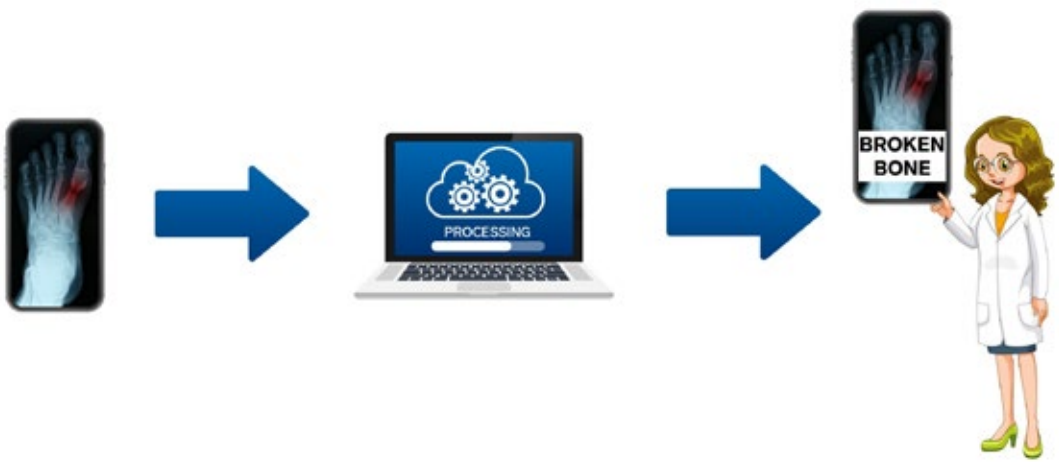
Impact research with success

The research project “Use of artificial intelligence in diagnostic imaging” is collaborating with and conducting follow-up research on Vestre Viken’s implementation project where the country’s first commercial AI solutions for radiology are being used.

The aim of the research project is to produce knowledge about the opportunities and challenges when introducing AI in imaging diagnostics at Vestre Viken. The knowledge can further be used as an evidence-based foundation for decisions on the use of AI in healthcare in particular and e-health in general.

The project has received a lot of media coverage nationally, as Vestre Viken is the first and only one in the country to test artificial intelligence in X-ray analysis. “Our researchers have been involved in this project since its inception and have gained a lot of experience in the implementation process and testing. They have been sharing this knowledge steadily in the form of chronicles, webinars and articles.

Together with Vestre Viken HF, the researchers are now compiling the experiences from the process and the parallel follow-up research into a methodology that can be used by the country’s other hospitals to introduce AI in a responsible and effective way.




Helseministeren berømmer motet i KI-satsingen til Vestre Viken HF

Vestre Viken HF er det første helseforetaket som har tatt i bruk kunstig intelligens i stor skala. Mandag ble KI lansert på Drammen sykehus – og satsingen høster lovord fra helse- og omsorgsminister Ingvild Kjerkol. SE VIDEO!

Sladdet pga opphavsrett

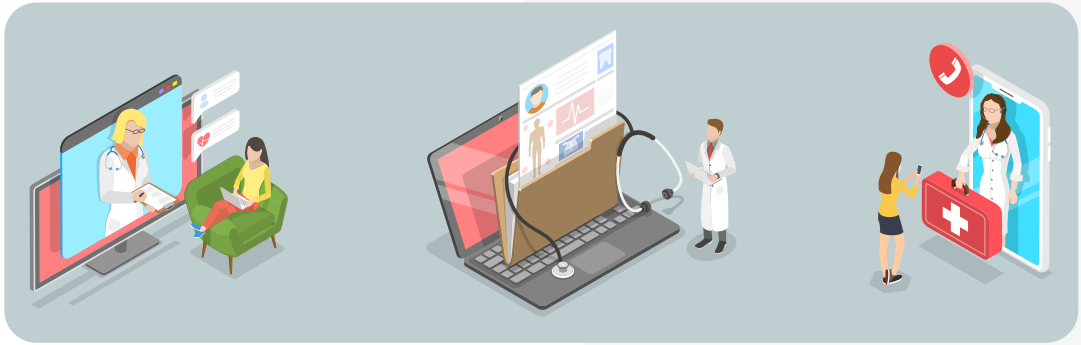
Valkyrie: a new platform that talks to everyone

Imagine if patients who frequently use psychiatric and somatic health services no longer needed to carry their own paper records. What if healthcare professionals could access relevant patient data from municipalities, out-of-hours services, GPs, and specialist health services with a single click?

Researchers at the Norwegian Centre for E-health Research are looking for a solution to this problem through the Valkyrie project. The project is funded by the Research Council of Norway, Helse Vest RHF and the Norwegian Centre for E-health Research. The project started in 2021 and runs until 2027.

This groundbreaking initiative, involving both national and international partners, seeks to enhance the coordination of healthcare services by developing a platform with an innovative ICT architecture. Its primary goal is to ensure seamless data flow across different levels of the healthcare system, with the patient at the core.

By leveraging Context Awareness and Blockchain technology, the Valkyrie platform will provide secure and efficient access to critical health data for healthcare professionals. This will not only enhance healthcare delivery but also improve quality of life, optimise treatment pathways, and reduce mortality.



Those patients who are heavy consumers of health services, are the ones who benefit most from information being more accessible. We have several examples of patients walking around with their own medical history in a plastic bag, with old medical records and printouts to justify and document what they have been through. This is because the data is not available across the systems.

The project has a number of partners, including Helse Vest ICT, Helse Nord ICT, Nord University, Nordland Hospital, Bodø Municipality, DIPS, City EHR - Seven informatics among others.

Popular knowledge dissemination

In collaboration with municipalities, hospitals, authorities and other research organisations, we produce webinars in different series. Each series takes a deep dive into a current topic within e-health.

In 2023 we had three series: E-medicine management, Digital homecare and Patient pathways.

Our webinars are free and open to anyone who can benefit from the knowledge and experiences shared. They are aimed at the field of practice, especially counsellors and managers at mainly municipalities and hospitals. The series on digital medication management appeals especially to pharmacists.

All webinars are recorded and sent out to all registered participants afterwards, as well as being published on our YouTube channel and as a podcast. This ensures that the topics covered continue to live on and remain relevant after the broadcast.

In April 2023, we set a record for the number of registrants for a webinar with 646 registered!

In September, E-medicine management celebrated its 50th episode. We have shared the latest knowledge about systems and apps for medication management since autumn 2020. The anniversary was celebrated with an article in the paper *Dagens medisin* and marked at the centre.

E-medicine management:

- Number of webinars: 16
- Number of participants: 2411
- Average participants per webinar: 151
- Number of views on YouTube: 3262

Digital homecare:

- Number of webinars: 13
- Number of participants: 2940
- Average participants per webinar: 226
- Number of views on YouTube: 3702

Patient pathways:

- Number of webinars: 15
- Number of participants: 2475
- Average participants per webinar: 165
- Number of views on YouTube: 4096

Dementia was a significant focus in 2023, reflected in the engagement at our webinars. Pictured here are Project Manager Eirin Rødseth, alongside speaker Mina Gerhardsen from the National Association for Public Health, and committee member Anne Kari Minsaas from Pensjonistforbundet.

50 webinars on E-medicine management. That's definitely a reason to celebrate!


DAGENS Medisin

DM Debatt DM Arena Stilling ledig DM+ Logg inn

DIGITALT: I ren desperasjon, startet vi en webinarserie om digital legemiddelhåndtering og inviterte til virtuell kaffe annenhver fredags morgen høsten 2020, skriver innleggsforfatterne.

Tre år med digital kunnskapsdeling om legemiddelhåndtering

Vil vi tilbake til papirresepter og journaler på foldeark? Neppe! Men vi har behov for å snakke sammen om hvordan vi kan få til de beste løsningene.

Anne Gerd Granås m.fl.

PROFESSOR, NASJONALT SENTER FOR E-HELSEFORSKNING OG UNIVERSITETET I OSLO

Editorial in Dagens medisin on the occasion of 50 episodes about E-medicince management.

What's important to you?

Alexandra Makhlysheva – Senior Adviser, Health Data Analytics

For me, the whole of 2023 was characterised by the hottest topic at the moment: artificial intelligence (AI). Firstly, together with the team, I researched what it takes to successfully implement AI in the healthcare sector. Our work caught the attention of the entire sector.

I also focused on the privacy aspects of using AI in healthcare, examining the opportunities and challenges associated with federated learning technology. This knowledge has been instrumental in our work on the FederatedHealth project—a Nordic Federated Health Data Network focused on distributed analysis of multilingual free-text data.

Social media

Knowledge dissemination is a core activity for us. We are present on social media to spread our knowledge and present it in an interesting way, and it is an important channel for dissemination.

Through platforms such as YouTube, LinkedIn and Facebook, we reach a wide audience. We adapt complex e-health research to social media to make it engaging and easy to use.

We're seeing an increase in engagement from our followers, confirming our belief that our research is not only relevant, but also valued by society.

Number of followers:

Facebook: 3 543

Instagram: 875

LinkedIn: 6361

Youtube: 349 subscribers

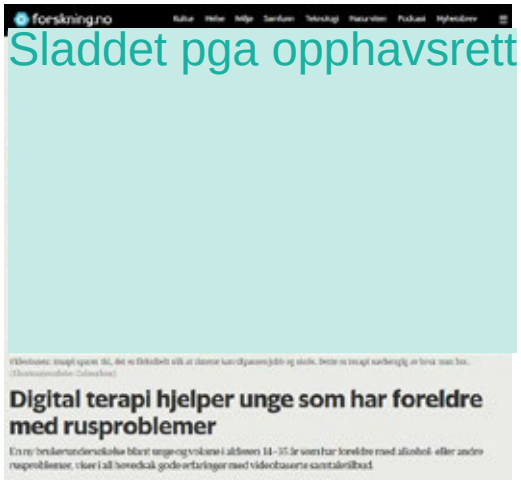
Media coverage

In 2023, we received significant media attention:
- 74 articles about us.
- 14 published articles on forskning.no
- We were featured in 40 unique media outlets.

The so-called “snus-case” that we published in January became an NTB story and was widely disseminated throughout the country’s local and national media.

Top 10 where we were mentioned

Forskning.no	14
Journal of the Norwegian Medical Assoc.	5
Dagens Medisin	4
iTromso.no	4
Nordlys	3
TV2	3
Folkebladet	3
Adresseavisen	2
Aftenposten.no	2
iHarstad	1




forskning.no Kultur Helse Miljø Samfunn Teknologi Naturviten Podcast Nyhetsbrev

Sladdet pga opphavsrett

For å kunne gi likeverdige helsetjenester til alle må vi få kunnskap om så mange i samfunnet som mulig. (Illustrasjonsfoto: Colourbox)

Helseforskerne kan ikke bare lytte til de mest ressurssterke

En ny studie viser at endringer må til for å sikre at helsetjenesten er tilpasset alle – også de mest sårbare menneskene i Norge.


2 Nå

Siste nytt

3. jan. 2023 12:33 Oddvar Sagbakken Saanum

Sladdet pga opphavsrett

Det å bytte ut røyken med snus, gjør det mindre sannsynlig å lykkes med røykeslutt, ...

What's important to you?

Roger Skog - PhD student, Digital health services

As a PhD student in the WARIFA project, my main focus in 2023 has been to lay the foundation for my first research articles, in parallel with relevant courses at UiT. This role has pushed me into entirely new areas, as part of an exciting project involving participants from diverse disciplines and several European countries.

WARIFA's focus on preventive health using modern technology includes a number of exciting tasks, and it can at times be an effort to manage to stay focused on my own research tasks, and not just immerse myself in one of the many exciting technical challenges in the project.

The most important thing for me at work is to meet talented and friendly colleagues, who lift me up even further, and through my experience, I am able to do the same for them. E-health research is a truly fascinating field. Working in such a multicultural and interdisciplinary environment means I am constantly learning something new!

GLIMPSES FROM THE E-HEALTH YEAR

COPD patient Gro received home training

“My fitness improved, I was able to do more, developed better habits, lost weight and felt cared for. The training led to as much as 40 per cent fewer admissions for patients with COPD.”

“We think this is a fantastic result. Exercise has a very positive impact on these patients,” says Professor Paolo Zanaboni.

COPD, or chronic obstructive pulmonary disease, is a major burden for both patients and society.

Researchers have now investigated two low-threshold measures. Both resulted in equally strong reductions in hospital admissions for patients with COPD.

The measures also resulted in better health and greater exercise capacity.

“My fitness improved, I was able to do more, developed better habits, lost weight, and felt cared for,” says Gro Hjertnes Bærøy, one of the COPD patients who participated in the iTrain pilot study.

Cheap measures

New measures can have major effects for patients with this disease, according to the latest research findings.

Paolo Zanaboni, professor of telemedicine and e-health at the Norwegian Centre for E-health Research, has spearheaded the work.

“The findings are particularly important because Norway and many other countries have far too poor a rehabilitation programme for COPD patients in terms of accessibility,” he says.

According to Zanaboni, a reduction in hospitalisations similar to that achieved by the researchers could have an enormous impact on the healthcare system.

“The measures we trialled are relatively inexpensive. Most importantly, fewer hospitalisations mean patients experience a better quality of life,” he adds.

Equally good

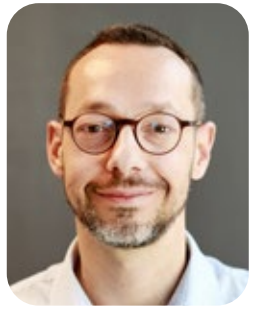
To the researchers’ surprise, self-training and telerehabilitation worked equally well.

“This may be an expression of the great need among COPD patients. It may also be related to the fact that the patients had a high level of intrinsic motivation, which means that little is needed to achieve a great effect,” says Zanaboni.

Because the supply is so poor, many of the patients are desperate.

“They have a strong desire to get help to get better. When they get an offer, they jump at it,” says the professor.

Zanaboni believes that the reduction in hospital admissions could be even greater if the rehabilitation programme were tailored to each patient’s specific needs.



Professor Paolo Zanaboni

"Some patients are quite independent, while others may struggle with managing home exercises on their own and require closer follow-up," explains Professor Zanaboni.

A fantastic result

A total of 120 COPD patients from Norway, Denmark and Australia participated, randomly and equally divided between the three groups. The two-year follow-up is unique in this field, as previous studies have typically monitored patients for no longer than one year.

Both self-training and telerehabilitation resulted in as many as 40 per cent fewer hospital admissions in the period, compared with the control group. This is in line with what is documented in the research literature for regular pulmonary rehabilitation.

"The key difference is that the effect of regular rehabilitation usually lasts for only 6–12 months. In contrast, the benefits of our programme were sustained over the entire two-year period," says Professor Zanaboni.

The two programmes also improved health status for one year and increased exercise capacity throughout the two-year period.

– For me, it's important that both the physical and psychological aspects of rehabilitation are taken care of, says Gro Hjertnes Bærøy.
Photo: Private

“We need to educate people on how to use digital technology in care”

We urgently need to create societies that are good to live in for everyone. People are now being trained for new health technology jobs. These jobs of the future hardly exist yet, but are already important.

We often hear or read that something will happen in the future. That we need to get ready for something that’s going to happen, that we “need to rig ourselves” to handle future challenges.

But what if the future is already here? And the challenge is that we can’t change fast enough?

“We need to think creatively. Now more than ever, it’s crucial that we collaborate to build strong communities and healthcare systems, supported by technology.”

That’s according to Professor Artur Serrano at NTNU, the Norwegian University of Science and Technology.

He works at the Department of Neuromedicine and Movement Science. He has been involved in research and innovation for over thirty years. For several years he worked at the Norwegian Centre for E-health Research in Tromsø.

A diversity of prototypes

More and more universities are offering courses and entire degrees in health technology and health innovation. The opportunities offered by technology must be utilised and employees need new skills, not least because there is a shortage of labour in the healthcare sector.

The Norwegian University of Science and Technology (NTNU) has developed a course focused on creating innovative societies with future welfare technology. Here, students get to think creatively prototyping new technological services.

Serrano emphasises that innovation is needed in the healthcare sector.

“The diversity of expertise is important. It gives participants the opportunity to think creatively. The way we interpret needs is different, and this is something we explore. The goal is to come up with many different solutions,” says Serrano.

Innovation across disciplines

The healthcare services that are created must be sustainable. How do you get hold of the people, how does the organisation get ready, and who will pay for the new solutions?

Expertise in digitalisation and social robots is being built among researchers, healthcare workers and citizens. Ties must be forged between academia and technology companies.

“We need to work with innovation across disciplines if we are to succeed in realising the benefits of social robots,” says Artur Serrano.

“We are developing strategies and collaborations between industry, universities and non-governmental organisations. We need to work with innovation across disciplines if we are to succeed in realising the benefits of social robots. We look at the whole of society, ethics and legislation. The starting point is always the user’s needs,” says Serrano.

Sensory stimuli that are customised

Dementia is becoming increasingly prevalent worldwide, primarily because people are living longer and enjoying better overall health.

The SENSE-GARDEN project, which started in 2016, has explored how technology can improve the quality of life of people with dementia and their caretakers.

By creating physical sensory spaces, individuals are exposed to images, films, and music that hold personal meaning and evoke memories. These sensory experiences can elicit emotions that help reconnect them to reality.

Serrano explains that they are studying how sensory stimuli affect the amygdala, which in turn affects memory. The amygdala is a part of the brain that is particularly important for learning, memory and social behaviour.

“Dementia is one of the biggest health challenges. That’s why it’s important to find out what can improve cognitive function and quality of life,” says Serrano.

The research shows, among other things, that healthcare professionals at care institutions felt that they got to know the patients and their needs better by doing activities in the sensory garden.

“Now we want to gain more knowledge through further studies,” says Serrano.

Mastery, meaning and joy is important for everyone.

Will there be more artificial intelligence in Norwegian healthcare?

Researchers have investigated what it takes to introduce artificial intelligence in the Norwegian healthcare system. They recommend that there should be more of it.

Artificial intelligence, or AI for short, has great potential to benefit patients, healthcare professionals and Norwegian society in general.

Researchers at the Norwegian Centre for E-health Research know that only a few of the many existing artificial intelligence projects are adapted to the healthcare sector.

So, what's stopping AI from finding its way from research to the clinic?

This was one of the questions researchers asked themselves in a comprehensive study on the implementation of artificial intelligence in the health service. The study is now the basis for a report with the researchers' recommendations.

"The aim of the report has been to examine these barriers and identify the actions that need to be taken to facilitate the transition of AI from research to clinical practice," says project manager and researcher Maryam Tayefi at the Norwegian Centre for E-health Research.

AI can also make mistakes

There is an ongoing discussion about the ethical, clinical and economic advantages and disadvantages of using artificial intelligence and algorithms to treat patients.

Artificial intelligence has the potential to provide new insights and simplify the handling of health data by healthcare organisations and patients, but it can also pose significant risks in terms of privacy, ethics and medical errors.

Balancing the risks and benefits of AI in healthcare will require a joint effort from technology developers, policy makers, healthcare organisations and patients.

Sustainable introduction of AI

The report provides a comprehensive description of the phases in the introduction of AI, from planning to implementation. The report also contains suggestions and recommendations for the authorities.

The knowledge is based on interviews, summaries of existing research, strategies and reports.

Recommendations to Norwegian health authorities

The researchers believe that Norway has many prerequisites for the successful introduction of AI in the healthcare sector. We have several large health data registers with data collected over many decades, a large number of available IT specialists, expert research groups in the field and acceptance of new technology in general.

Senior Researcher Maryam Tayefi

However, more action is needed at national level and in healthcare organisations to achieve widespread use in the healthcare system.

Collaboration and good digital infrastructure

Patients and healthcare professionals need to be on the same page if artificial intelligence is to be implemented in the Norwegian health service.

The report shows that close collaboration between different disciplines, technologists and clinicians is equally important. And it is crucial to have a digital infrastructure that facilitates technological development in health services.

Here are recommendations for authorities and health organisations:

1. Increase knowledge about AI among healthcare personnel and citizens.
2. Focus on needs and patient perspectives in the implementation process.
3. Collaboration across disciplines and sectors is important to coordinate initiatives.
4. Regulations must be adapted to the new technology.
5. Improve funding opportunities and ensure distribution of medical and computer science resources for AI implementation
6. Improve data challenges such as quality, access, storage and exchange.
7. Upgrade current ICT infrastructure.
8. Standardise procurement implementation and procedures.
9. Ensure clinical approval before implementing AI systems in the healthcare service. And ensure maintenance for systems that are introduced.

The Norwegian Centre for E-health Research has conducted an extensive study on implementation of artificial intelligence in healthcare.

Digital medication lists at pharmacies: increased security but more work

Paper solutions and faxes have been replaced, but pharmacy staff are still not completely satisfied with the digital multi-dose system.

Multidose is common in homecare services in Norway. There are currently around 100,000 users. Multidose is the automatic packaging of medicines in bags for people who need help dosing and remembering to take their medicines.

Anette Vik Jøsendal is a researcher at the Norwegian Centre for E-health Research and the University of Oslo. She has now analysed experiences with the introduction of electronic multidose.

The goal is to determine the most effective way to implement electronic multi-dose solutions nationally, ensuring quality and patient safety in medication management.

More work with new system

Since 2014, a new electronic multidose system has been trialled in Norway. Today, only around 2,500 patients are using the system out of a potential 80,000 users.

Pharmacists find the system more time-consuming. Particularly due to the increased need for clarification of prescriptions and an increased proportion of pharmacist checks.

This finding emerged from interviews with pharmacy employees conducted as part of the research project Evaluation of Electronic Multidose 2018–2023.

No capacity

Researchers have observed a significant increase in the proportion of pharmacist checks. Under the paper-based system, only 13% of prescriptions required pharmacist verification at each dispensing. In contrast, with the electronic system, 46% of patients now require a pharmacist check every two weeks.

“Currently, only 2,500 people use the system, but if all 80,000 multi-dose users in Norway switch to the new system, this would result in over 600,000 additional pharmacist checks annually. We simply don’t have the capacity for that,” says Jøsendal.

Jøsendal says that the figures are in line with what the pharmacists themselves say. “It’s a lot more work for them. Especially with controls.

Although these checks are important to ensuring that patients receive the correct medicine at the proper dose, the significant increase is concerning for pharmacy staff. They are eager to explore whether some of the checks can be reduced without compromising quality and patient safety.”

Researcher Anette Vik Jøsendal

Can the system be improved?

The researchers therefore ask whether it is possible to do something about the process or systems at GPs that can simplify the work with the medication list and ensure that enough medicines are prescribed.

Or whether something can be done about the legislation that determines when and how often a pharmacist check should be carried out.

The researchers continue to work on reducing the workload in pharmacies by investigating what leads to all these changes.

They will also take a closer look at the medical changes - are they relevant to the patient and is the new system safer for the patient?

A new electronic system for multi-dose dispensing has been in testing since 2014. Today, only around 2,500 patients use the system out of a potential 80,000 users.

Digital therapy for progeny of parents that struggle with addiction

A recent user survey among individuals aged 14–35, who have parents with alcohol or substance abuse issues, reveals predominantly positive experiences with video-based counseling services.

Growing up in a home with alcohol or other substance abuse problems has an impact on children and young people's life situation and daily life, both socially, emotionally, health-wise and practically.

Researchers estimate that each year in Norway, between 90,000 and 150,000 minors grow up with a parent who has alcohol problems. They also believe there are significant unreported cases.

In addition, an unknown number of minors have a parent who abuses drugs and illegal substances. They may also have siblings and close family members with a substance abuse problem.

Digital help

What most people have in common is that a family life characterised by substance abuse causes children and young people a great deal of stress, worry and insecurity in their everyday lives.

That's why it's important to make sure they get help and support early on and are not left alone in their difficulties.

Digital services have great potential. Help centres become more accessible and can lower the threshold for children and young people to seek help.

Since 2020, the Norwegian Centre for E-health Research and Blå Kors Kompasset have been collaborating on a research project on a video-based talk therapy service for young people whose parents have alcohol or other substance abuse problems.

A survey answered by 129 users of Kompasset's services gave the researchers insight into the users' experiences of the programme. Most were satisfied.

Good results

"Most participants found video-based therapy to be helpful, safe, and practical. They reported building a good relationship with the therapist through video sessions, feeling supported and respected," says Unn S. Manskow, Senior Researcher at the Norwegian Centre for E-health Research.

She explains that video-based therapy saves time, it's flexible so that the sessions can be adapted to work and school. This is therapy regardless of where you live.

Users experienced few technical challenges with the video solution.

On the other hand, the youngest users felt that video-based therapy was less safe, more uncomfortable and more difficult to have undisturbed conversations compared to older users. This may be related to the fact that they still live at home with their parents.

Senior researcher Unn Sollid Manskov

Senior researcher Marianne Vibeke Trondsen

Many will recommend online therapy

Over two-thirds of participants would recommend online therapy to others, while half prefer a combination of physical and video-based therapy.

The study shows that the offer should be broad and flexible, both physically and digitally, to accommodate individual preferences, needs, and circumstances.

Creating a comfortable and safe environment for video-based sessions is particularly crucial, especially for younger users.

Video-based therapy saves time, it's flexible so that appointments can be adapted to work and school. This is therapy regardless of where you live.

Older people appreciate sending messages directly to the doctor

Patients write directly to their GP to get quick clarification and avoid waiting.

Many Norwegian GPs currently offer a type of e-consultation. Patients can then write to them in free text. These text consultations go straight to the doctor's inbox.

"The older individuals I've spoken to value this service, primarily because they often perceive the doctor's office as inaccessible," says researcher Eli Kristiansen at the Norwegian Centre for E-health Research.

She recently published findings from interviews with 16 users, all aged 65 and older. The participants expressed satisfaction with the service, stating that it helped them better manage their health and illnesses in their daily lives.

Found the service themselves

Elderly individuals are currently the least likely patient group in Norway to use e-consultations with their GP. However, they are also the group that most frequently requires healthcare services.

"I wanted to understand how older people use the service and identify ways to make it more accessible to a broader audience," says Kristiansen.

She is concerned about the lack of information about the service. None of the individuals she interviewed had received information about e-consultations. Instead, they discovered the option on their own, often while renewing prescriptions online.

Shock implementation

Offering e-consultations with text or video has always been voluntary for GPs. Before the corona virus hit the country in the winter of 2020, these accounted for less than three per cent of all consultations.

Kristiansen estimates that around 60 per cent of Norwegian GPs currently offer text consultations. This means that there are still quite a few patients who do not have this option.

Researcher Børge Lønnebakke Norberg and senior adviser and PhD candidate Eli Kristiansen

According to a report to the Ministry of Health and Care Services, the Norwegian Directorate of Health had anticipated a gradual increase in e-consultations, aiming for up to 30% adoption by 2028. However, the pandemic and infection control measures prompted a rapid, unforeseen implementation.

“In just a few weeks, the use of e-consultations surged to over 30%. This high level of usage has persisted even after the pandemic,” says Kristiansen.

Frustrating waiting

The participants in Kristiansen’s survey are fed up with the long waiting times at doctors’ office. Especially when they try to call them. Some also use text consultation as a shortcut to bypass the health secretary. The secretary otherwise acts as a kind of gatekeeper at the doctor’s office.

Get a quick answer

The users Kristiansen has spoken to are used to and expect quick responses to text consultations. They have found that they get answers within a day.

Expect more

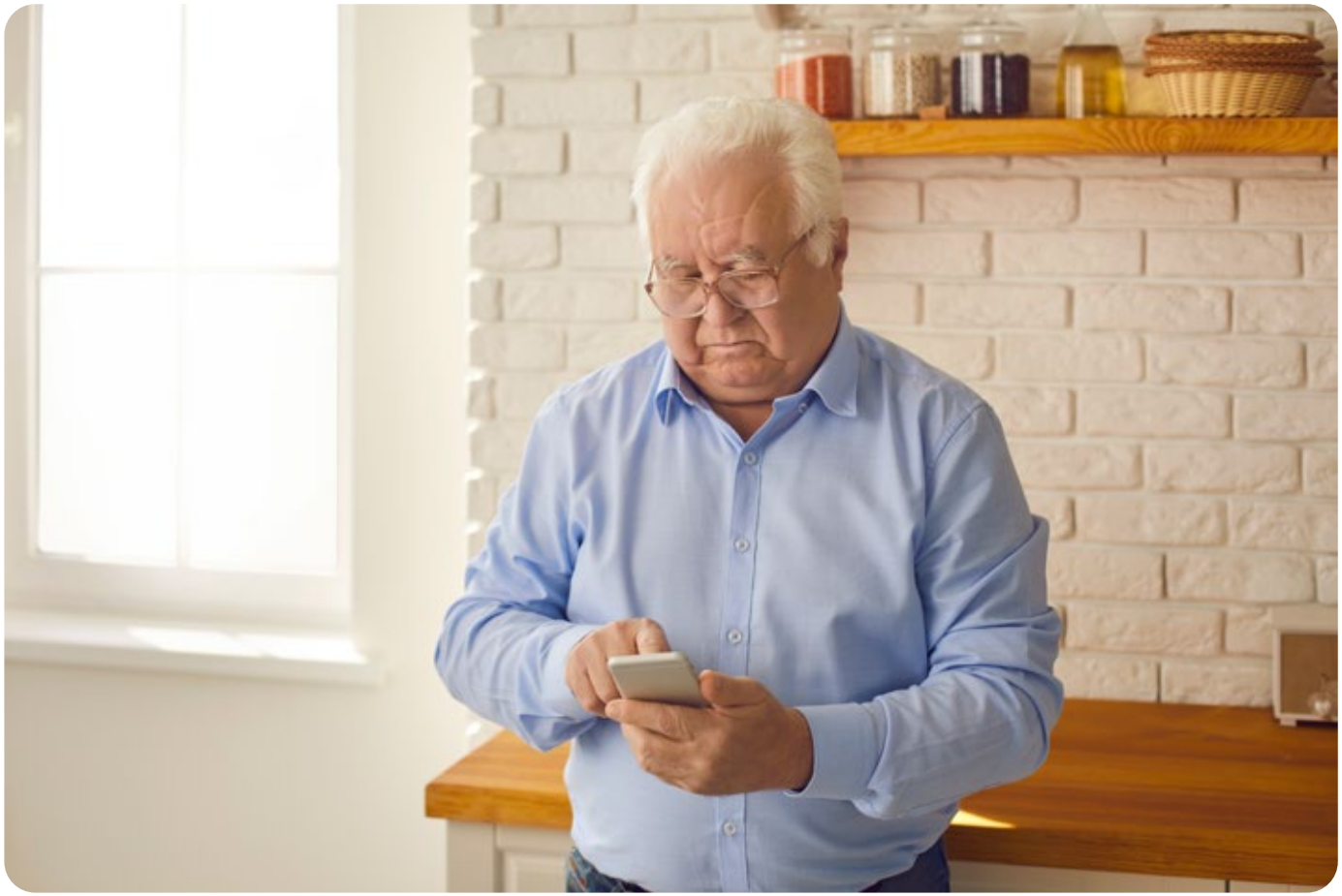
Among GPs themselves, opinions on text consultations have been divided. Many feel that the service increases, rather than alleviates, their workload.

Børge Lønnebakke Norberg is an experienced GP in Trondheim. He is also researching e-consultations. He is co-author of Kristiansen’s research article.

“The perception of doctors’ offices as inaccessible is tied to broader societal trends,” he explains. “Both elderly and younger patients have rising expectations of their doctors, and the threshold for contacting the healthcare system is becoming lower.”

For a GP system already in crisis, this creates a downward spiral: more patients attempting to reach their GP leads to overworked doctors, making it harder to secure both regular and emergency appointments. As a result, GP offices become even less accessible.

“Text consultations can feel like a shortcut past the entire queue directly to the doctor,” Norberg observes. “I believe this service is valuable for patients who fall between those requiring urgent care and those needing routine appointments but can wait for a thorough examination.”



Older people avoid telephone queues by Texting with their GP.

Electronic access to patient records: a blessing or a worry for the mentally ill?

When electronic access to patient records was introduced for the mentally ill in Norway, it caused great concern among healthcare professionals. The fear was that access could have negative consequences for patients with serious diagnoses. However, a new study shows that these concerns were exaggerated, although some challenges still exist.

"In this study, we wanted to find out what electronic access to medical records has done to the relationship between patients and therapists in psychiatry. In addition, we've tried to find out if and how often clinicians use the deny access feature," says Paolo Zanaboni.

He is project manager for Psychic Insight and professor of telemedicine and e-health at the Norwegian Centre for E-health Research.

They have also investigated whether the way of documenting changed after the journal became more accessible.

Electronic access

Electronic access to patient records allows patients to read their own hospital records via helsenorge.no. This includes a log of which healthcare professionals have accessed their documents and gives patients immediate access to new medical record documents.

The Northern Norway Regional Health Authority gave patients electronic access to their medical records back in 2015. The goal is for all patients in the country to have access to the service. The Central Norway Regional Health Authority is the last health region that is in the process of putting this in place.

Concerns among healthcare professionals

Prior to the introduction of electronic access, mental health professionals expressed great concern. They feared that access could be harmful, especially for patients with severe mental illnesses. There was a concern that the relationship between patient and therapist in psychiatry could deteriorate and that healthcare professionals would have to change their documentation methods.

Professor Paolo Zanaboni

The study that changed the perspective

A study conducted by the Norwegian Centre for E-health Research reveals that electronic access to medical records has, in many cases, enhanced transparency and dialogue in treatment. Healthcare professionals report positive experiences with this access, noting that it has become a valuable tool for promoting discussion and reflection between patients and therapists. While access is rarely denied, there are specific cases where it may be restricted to protect the patient.

Challenges and improvements

Although electronic access has largely been well received, there are still situations that require careful consideration, especially when it comes to patients with a high suicide risk or in cases of suspected abuse. Healthcare professionals now pay more attention to how they formulate themselves in the medical records, and emphasise clear and patient-friendly communication.

The way forward

Research is continuing to further evaluate the impact of electronic access to patient records. With an increasing number of patients utilising the service, future studies will shed light on the long-term effects of this transparency in mental health care.

“We are in the process of recruiting between 20 and 30 patients, who will allow us to analyse the content of their patient records. The criterion is that they have been a patient before and/or after electronic access came into force,” says Zanaboni.

Some therapists gave patients the task of reading their own journal and reflecting on what was documented. This could often be the starting point for the next conversation between the two.

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Health researchers can't just listen to the resourceful ones

A new study shows that changes are needed to ensure that the health service is adapted to everyone - including the most vulnerable people in Norway.

Who are the people we rarely hear from in health and technology research? This is what researchers at the Norwegian Centre for E-health Research have investigated.

The study shows that recruiting informants is a complicated and time-consuming process. An informant is a person from whom the researchers obtain information or data.

"As in all fields of research, informants are very important to us in health and technology research. And for the population to benefit from the knowledge developed in research, informants with all kinds of backgrounds must be recruited. Unfortunately, there are some groups that are rarely represented," says researcher Meghan Bradway.

Those we rarely hear from

In order to be able to provide equal health services to everyone, we need to gain knowledge about as many people in society as possible.

"We found that those who are rarely represented in health research are also those who fall outside the health service. These are people with low socioeconomic status, minority groups, women and people living in rural areas," says Bradway.

She goes on to say that in order to recruit informants from hard-to-reach groups, you have to use creative recruitment methods that are also more time-consuming.

Why is it important?

For the research to be of the best possible quality, it is essential to include a more diverse and varied sample of participants.

Henriette Lauvhaug Nybakke, researcher at the Norwegian Centre for E-health Research, highlights that the perspectives of individuals who are harder to recruit are often absent from research.

"We need to make a collective effort to create projects that amplify the voices of underrepresented groups. More knowledge is essential to achieve the goal of equitable health services," says Nybakke.

The inequalities in the Norwegian healthcare system became particularly apparent during the coronavirus pandemic. People became isolated and access to healthcare services was reduced. More healthcare services were digitised, and digital exclusion became more apparent.

Postdoctoral fellow Meghan Bradway

PhD candidate Henriette Lauvhaug Nybakke

Must take responsibility

The researchers are encouraging colleagues in health research to take responsibility - precisely to reduce social inequality in health.

They fear that if research does not include the perspectives of underrepresented groups, it will become more challenging to adapt both digital and analogue solutions to ensure safe and effective healthcare for all.

"The consequences of excluding these groups from research are that we risk designing technology, follow-up systems, and treatment programs that do not meet their needs," explains Nybakke.

Researchers agree that research should be done for, and benefit, everyone in society, not just the most resourceful ones.

In order to be able to provide equal health services to everyone, we need to gain knowledge about as many people in society as possible.

Artificial intelligence makes it easier and cheaper for doctors to diagnose patients

Radiologists and doctors at Vestre Viken are among the first in Norway to use artificial intelligence to interpret X-ray images.

The use of artificial intelligence will contribute to even better diagnostic imaging for patients. The Norwegian Centre for E-health Research will conduct follow-up research on the project.

The goal is to enhance healthcare and free up radiologist resources, allowing them to focus on more advanced examinations where timely intervention can be critical for patient outcomes.

The use of artificial intelligence (AI) for this purpose could improve healthcare for half the population of Norway within a short time.

Big data

With the new AI solution, X-rays taken at the hospital will be sent to a cloud service.

Here, the images are analysed by algorithms, and the AI response is sent back to an image storage system.

This will help ensure both quality and efficiency in patient pathways and radiologists' workflows.

Researchers need to start early

It is important for the healthcare sector to adopt AI, but research is also needed into the opportunities and challenges that arise with the medical use of artificial intelligence.

Researchers at the Norwegian Centre for E-health Research have been involved in the project from the outset. They are currently conducting follow-up research, which involves monitoring the testing of artificial intelligence over time at the Department of Diagnostic Imaging at Vestre Viken.

"We're looking at procurement, implementation and benefits, and will continually feed our findings back to the project team so that they can make corrections along the way," says Silsand.

Expectations and challenges

Artificial intelligence for radiology has the potential to handle an ever-increasing volume of imaging examinations.

Now that artificial intelligence is being tested as a work tool for radiologists at Vestre Viken HF, there are high expectations of what they want to achieve.

At the same time, the use of AI creates new challenges related to ICT security, data quality, personal protection, ethics and organisation.

Big savings

"Implementing AI solutions in our operations in Vestre Viken is a demanding ambition. It will affect how we work and relate to our profession. This takes us into a very exciting future that will be even more interesting for our professionals, and which I am absolutely sure we will be able to achieve," says Jon Haakon Malmer-Høvik, Head of department at Diagnostic Imaging in Vestre Viken HF.

With the new solution, X-ray images taken at the hospital will be sent to a cloud service.

Senior Researcher Line Silsand

Nordic countries introduce digitally shared medication lists

Patients can expect less medication errors.

The Nordic countries of Denmark, Finland, Norway and Sweden are at different stages of introducing systems for digitally shared medication lists (SML).

The aim is to provide healthcare professionals with up-to-date and correct information about the patient's medication. This will improve patient safety and reduce medication errors.

The systems in the Nordic countries are similar, but also have some differences.

Researchers from the Norwegian Centre for E-health Research and the other Nordic countries have now compared the systems for shared medical lists in the Nordic region. The findings are summarised in a scientific article.

Nordic differences

Denmark and Finland have already introduced digitally shared medication lists. Norway and Sweden are in the process of trialling and introducing their systems.

The goal of introducing the system has been virtually the same in all countries:

- Up-to-date and correct medication lists available between the municipal health service, GPs and hospitals.
- Reduce medication errors and increase patient safety.

All countries have had e-prescription for over ten years. Despite this, researchers have realised that even this is not good enough to provide up-to-date information on patients' use of medicines.

In Norway, Reseptformidleren serves as a national database accessible to all doctors and pharmacies. It contains all active prescriptions but does not offer a complete overview of a patient's prescribed medications.

"Prescriptions expire after one year. Then they will no longer appear in the Prescription Finder. However, this does not necessarily mean the patient should stop taking the medication. This is where the current system proves inadequate," explains Anette Vik Jøsendal, pharmacist and researcher at the Norwegian Centre for E-health Research.

The patient's medication list

In Norway, a system has now been developed for digitally shared medication lists, called "Pasientens Legemiddelliste" (PLL). This shows all medicines prescribed by the doctor, regardless of whether the patient has a prescription for the medicine or not.

PLL has been tested and trialled in Bergen since 2021. A national roll-out is planned to start in 2024.

One of the key differences between the solutions in the Nordics is what information is available in the list.

The Norwegian and Danish solutions use doctor's orders, known as prescriptions, as the basis for the lists. Finland and Sweden are based on prescriptions.

Researcher Anette Vik Jøsendal

Senior Researcher Unn Sollid Manskow

In addition, the extent to which previous drug treatments can be viewed in the various systems varies.

As of today, none of the systems include information about medicines administered during hospitalisation, nor do they allow patients direct access to update or comment on their own medication lists.

Patients need to be more involved

These systems have the potential to increase access to information and reduce discrepancies between medication lists. However, there are challenges related to updating and involving patients.

Healthcare professionals do not always update such a system correctly, and patients do not currently have the opportunity to edit or state their compliance with the medications in the lists.

"Ultimately, it is the patient who decides which medicines they actually take. If we want the medication list to reflect a complete picture of the patient's medication use, patients must be involved and given the opportunity to add information themselves," says researcher Unn Sollid Manskow from the Norwegian Centre for E-health Research.

You cannot edit the list yourself

None of the SML solutions in the Nordic countries provide fully updated information on medication use during hospitalisation.

Citizens have access to view their digitally shared medication list, but none of the solutions allow citizens to edit or provide feedback to prescribers about the actual use of medication.

To ensure an accurate and complete medication list, it will therefore be necessary to involve patients more.

Many countries are developing solutions for digital shared medication lists, but knowledge about the effects of the systems is still limited.

This study uses a common terminology to describe the systems in the Nordic countries.

This will make it easier to compare the effects of such systems across countries in the future.

The researchers recommend that further work should explore advanced technology, the patient perspective and privacy issues associated with SML systems.

The systems for digitally shared medication lists in the Nordic countries are similar, but also have some differences.

Radical change will save us from the “silver tsunami”

The sharp increase in the number of elderly people and the shortage of healthcare professionals require new digital solutions for health and care services.

By 2030, there will be more elderly people than children in many countries and regions in Europe. The increase in the number of elderly people and the shortage of healthcare professionals means that municipalities will have to adapt dramatically in order to deliver health and care services to everyone.

The warning signs have been flashing for years, yet few municipalities have implemented significant restructuring programs to prepare for the ageing population.

A well-publicised crisis

More and more people are saying that we are already witnessing a municipal collapse, especially in rural areas. This particularly affects the oldest and most vulnerable who are in great need of help and care. But it also has negative consequences for people of all ages who need support from the public sector.

The significant challenges in the healthcare sector are what we call a well-publicised crisis.

Digitalisation in healthcare

The municipalities are responsible for providing good and responsible services to everyone. This means that municipalities play a leading role in driving innovation, implementing change, and enhancing competence.

But they can’t do it alone. They need to cooperate with each other and with other social actors.

“An incredible amount is happening in the field of e-health. Digitalization in health and care is a key tool, especially as municipalities face financial constraints and challenges in recruiting professionals. We emphasize the citizen’s perspective, ensuring that services are holistic, coordinated, and coherent.”

So says Kristin Standal. She is responsible for and project manager for welfare technology and digital home follow-up at KS.

Lack of a common national system

And it’s not easy. This is partly because the development of technology, services and regulations for municipalities is not coordinated.

There is still no national, functioning digital system for collaboration that provides access for healthcare professionals in primary or specialist health services.

KS and the health authorities want municipalities to adopt welfare technology and what is known as digital home follow-up on a large scale. The technology and knowledge must reach everyone.

Head of the department for Personalised e-health Siri Bjørvig

Researchers are going to look at what’s happening

Digitalisation networks have been established in the country’s regions. The regions are responsible for coordinating digitalisation work.

Researchers will also look at the results of digital home monitoring.

“Among other things, we want to study what happens during implementation and what effects it has on the recipient’s health and well-being, consumption of healthcare services and costs over time.”

That’s according to Siri Bjørvig, head of department for personalised e-health at the Norwegian Centre for E-health Research.

The researchers will use various research methods to collect and analyse available data. This will help to strengthen the knowledge base about the importance of and models for digital home follow-up.

The warning lights have been flashing for years without many municipalities having prepared for the ageing population.

Using other nicotine products reduces your chances of quitting smoking

A common factor among those who fail to quit smoking is their use of snus.

Many people who attempt to quit smoking replace it with snus (nicotine pouches). However, researchers have found that using snus significantly increases the likelihood of failing to quit smoking.

Professor Inger Torhild Gram at the Norwegian Centre for E-health Research has studied almost 4,500 smokers who participated in an internet-based smoking cessation programme.

Smokers should be warned against snus

"It's important to inform people that using snus reduces their chances of successfully quitting smoking. This is the exact opposite of what we've been told for many years," says Professor Inger Torhild Gram.

She is one of the driving forces behind the smoking cessation app slutta.no, which is now a service on Helsenorge.no.

"Our results showed that those who used snus were more likely to be unable to quit smoking compared to those who did not use snus," explains the professor.

This finding applied to both men and women. The results suggest that smokers should be warned that using snus may hinder successful smoking cessation.

What characterises those who succeed?

"Our research shows that women and individuals with a higher level of education are more likely to maintain smoking cessation six months after quitting compared to men and those with lower levels of education," says Gram.

Students are more likely to fail than full-time employees, while people with high nicotine dependence are less likely to succeed than those who score low on nicotine dependence.

Professor Inger Torhild Gram

First study

This study is the first to investigate the relationship between snus use and smoking cessation among smokers who want to quit, with such a large sample size and a follow-up period of six months.

Even in Sweden, where snus is widespread, no such surveys have been conducted.

We need to “hear” the patient’s voice in the medical record

Elderly patients with multiple diagnoses often require support from various organisations within the municipal and specialist health services. The joint effort must be coordinated, but where is the patient’s voice in the medical record?

Person-centred care is essential for delivering the best possible treatment and follow-up. Decisions should be based on the question “What is important to you?”.

The user’s voice should be at the centre of the treatment so that everyone works together towards meaningful goals.

“Although there is agreement on the importance of good coordination, a gap remains between the ideal and what happens in practice. One reason for this is the numerous demands and challenges healthcare personnel face. They often work under significant time pressure, yet they must assess patients’ conditions, identify needs, ensure follow-up, and document everything. Finally, they must share these assessments and follow-up plans across organizational boundaries.”

This is according to researcher Line Silsand at the Norwegian Centre for E-health Research.

Have to tell their story again and again

Together with colleagues, she has been searching for the patient voice in electronic patient records.

“The challenge with today’s digital patient records is that they primarily contain information required by healthcare professionals to make informed clinical decisions,” says Silsand.

The patient’s point of view is rarely documented in the medical record. As a result, patients often have to tell their story over and over again. She adds that current medical records are rooted in a tradition where they serve as a working tool to ensure accurate medical treatment in hospitals, doctors’ offices, and nursing homes.

The patient becomes a passive recipient

In this tradition, the healthcare professionals are the experts and the patient is a rather passive recipient.

Highlighting the patient’s needs, values, and preferences in medical records facilitates better co-creation of care processes. This approach also improves patient follow-up and enhances the coordination of healthcare services.

The researchers recruited nine patients with long-term health conditions and their relatives for the study. Additionally, patient-centred healthcare teams shared their experiences. These teams work in an interdisciplinary, patient-focused manner across municipalities and hospitals, providing care for patients with complex and long-term needs in Troms and Ofoten.

Senior Researcher Line Silsand

Senior Researcher Gro-Hilde Severinsen

"Patient-centred care involves co-creating the patient pathway together with the patient and their next of kin, based on what matters most to the individual. The patient takes the role of host, guide, and facilitator for all treatment," explains Silsand. Patients have the right to choose what they want to eat, what procedures they want to agree to or what kind of lifestyle they want.

To be successful, treatment must fit in with patients' lives and values. This enables them to make good health choices.

A comprehensive view of challenges and opportunities

The researchers conducted what they call a co-creative process. This includes interviews, workshops, discussions and observations of clinical practice.

"It was incredibly valuable to hear what patients emphasised when describing their lives and wishes. We also asked healthcare professionals how they accessed patient information in the medical record and how the process of documenting this information could be improved," says researcher Gro-Hilde Severinsen from the Norwegian Centre for E-health Research.

A template with questions

The study resulted in a template of questions. They address current needs, long-term goals and important events based on the patient's perspective. Healthcare professionals enter the answers in the patient record. Some patients may also be asked to provide input themselves. This can save time for clinicians and empower the patient's voice.

Culture change is needed

Improving co-operation between municipal services and the specialist health service is not something that happens overnight. The health service is good at diagnoses and illnesses, but this is sometimes at the expense of "seeing the whole person", especially for those with chronic illnesses.

"A digital tool that describes the life journey is a step in the right direction. But we know from experience that a digital solution is not the only answer to achieving good interaction. To achieve person-centred healthcare, both specialist and primary care must give healthcare professionals the flexibility to develop new ways of working. This requires a cultural change," says Silsand.

Patients and carers expressed a desire for their health and life stories to be clearly presented to healthcare professionals, either as text or video. They emphasized that the digital summary should focus on their entire life journey, not just their illness.

APPENDICES

Appendices

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