



Norwegian Centre for
E-health Research

Annual Report 2017





Norwegian Centre for
E-health Research

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Norwegian Centre for E-health Research.
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Foreword

The Norwegian Centre for E-health Research is now in its second year. The professional activities of the Centre are still affected by the development of research competence in areas requested by the health authorities. The aim is that the sector will find the research results useful.

Looking back at the last year, special mention goes to the knowledge summary on personal connected care technology developed by the Centre in cooperation with the National Welfare Technology Programme. Another work that I would like to mention is highly recognised amongst experts, and IMIA (International Medical Informatics Association) deemed it one of the best international articles on clinical decision support. The article is titled: Publication, discovery and interoperability of Clinical Decision Support Systems: A Linked Data approach.

When the Centre was established in 2016, the Norwegian Ministry of Health and Care Services decided that it would be evaluated in two phases. The Northern Regional Norway Health Authority is responsible for the first phase, which will be completed in 2018. The Steering Committee will play a main role in planning and following up the evaluation.

One of the criterions that will be evaluated is whether the Centre carries out projects that meet national demands for research and studies in e-health. Through the report on national demands for knowledge on e-health, the Norwegian Directorate of eHealth prioritised some research areas. The Steering Committee expects the Centre to play a leading role in gathering this knowledge. Furthermore, the Centre must conduct relevant and prioritised joint research projects with other research institutions.



In addition to national activities, the Centre carries out research projects financed by competitive funding, for example, from the Research Council of Norway, the EU and regional research funds. Such projects shall be based on the core competence of the Centre and cover all national demands for knowledge as much as possible.

It is important to point out that the Centre is completely free to choose the methods it applies and how the results are published. The Centre shall be recognised for providing documented, trustworthy and knowledge-based deliveries.

The Steering Committee looks forward to following the Centre in the future.

*Bjørn Engum,
Steering Committee Chair*

Steering Committee

All the regional health authorities and relevant sectors are members of the Steering Committee and serve for a period of two years. Members can sit on the committee for two periods.

The steering group shall ensure that:

- the Centre develops its expertise and executes assignments within research and investigation on e-health in line with the sector's needs and priorities;
- the Centre develops its national and international role within research and investigation on e-health, and that the sector considers it a useful, relevant and competent actor;
- the Centre's professional activities, support functions and administrative tasks hold high quality.

The Steering Committee held four meetings in 2017. Some of the most important issues were:

Evaluation of the Centre

The Norwegian Ministry of Health and Care Services wants the Centre to be evaluated in two phases. The Northern Norway Regional Health Authority is responsible for the first

phase. The Steering Committee recommends the criteria to be used for the evaluation and will play a main role in completing the report. This also includes recommendations on follow-up initiatives and any adjustment of the Centre's work. Case 6 and 16-2017.

Plan of Action 2017-2020

The Steering Committee oversees that the Centre carries out the assignment of the Norwegian Ministry of Health and Care Services and Northern Norway Regional Health Authority. The plan of action defines the assignment for the period. The plan of action is an excellent tool for the Centre's management team and professional environments involved in the planning and execution of activities. Case 7 and 17-2017.

New national projects in 2018

The Norwegian Ministry of Health and Care Services underlines the importance of the national role of the Centre. It is important that the research support national demands. The Norwegian Directorate of eHealth has identified needs for knowledge on e-health. The steering group expects the Centre to play a main role in planning and executing initiatives to meet the needs. Relevant and prioritised studies will be done in cooperation with other institutions. Case 35-2017.

Johan Gustav Bellika, Professor, Health Data Analytics:

What was the best thing that happened to you in 2017?

The most important thing for me was that the Snow team received support from the Research Council of Norway to establish national infrastructure for research primary health care. It will help future e-health research

on primary health care to improve the quality of studies, reduce the risk of failure and enable studies to be completed much quicker and more cheaply than before.

What do you think will be most the important thing for the Centre in 2018?

It will always be important for a research centre to carry out studies that can be published in highly acclaimed journals.





Bjørn Engum,
Adviser, Northern Norway
Regional Health Authority
(Steering Committee
Chair)



Wenche P. Dehli,
Director of Health and
Social Care, Association
of Local and Regional
Authorities/Kristiansand
Municipality (Vice Chair of
the Steering Committee)



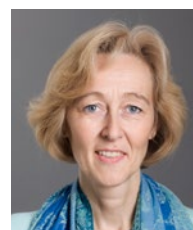
Gun Peggy Knudsen,
Area Director of Health
Data and Digitalisation,
Norwegian Institute of
Public Health



Per Meinich,
Special Adviser in
Technology and E-Health,
South-Eastern Norway
Regional Health Authority



Anne Kristin Kleiven,
Director of Development,
Western Norway Regional
Health Authority



Torbjørn Vanvik,
Project Director/Proprietary
Director, Central
Norway Regional Health
Authority



Finn Henry Hansen,
Director, Northern Norway
Regional Health Authority



Marit Lind,
Vice President,
University Hospital of
North Norway



Henrik D. Finsrud,
Chief Adviser, Norwegian
Association of Local and
Regional Authorities (KS)



Anders Grimsmo,
Professor, Norwegian
Health Network SF/NTNU



Irene Olaussen,
Senior Adviser, Norwegian
Directorate of E-Health
(resigned from the
Committee in the third
quarter)



Robert Nystuen,
Department Director,
Norwegian Directorate
of E-health (became a
member of the Steering
Committee in the fourth
quarter)



Kristin Mehre,
Department Director,
Norwegian Directorate of
Health



Kathrine Myhre,
CEO,
Oslo Medtech



Arntfinn Aarnes,
User Representative, The
Norwegian Federation of
Organisations of Disabled
People



Kristian Skauli,
Deputy Director, Ministry
of Health and Care
Services (observer)

Organisation



Three researchers, a project manager, a doctoral student, a communication adviser, two financial advisers and a department manager were employed in 2017.

Number of employees:

- 66 people in 54 positions
- 35 women and 31 men
- 50 full-time employees
- 16 part-time employees

Age:

- Six between the age of 20-29
- Sixteen between the age of 30-39
- Twenty-three between the age of 40-49
- Sixteen between the age of 50-59
- Six between the age of 60-69

Level of education:

- Eight research fellows - six women and two men
- Thirty with a PhD - twelve women and eighteen men

Educational background:

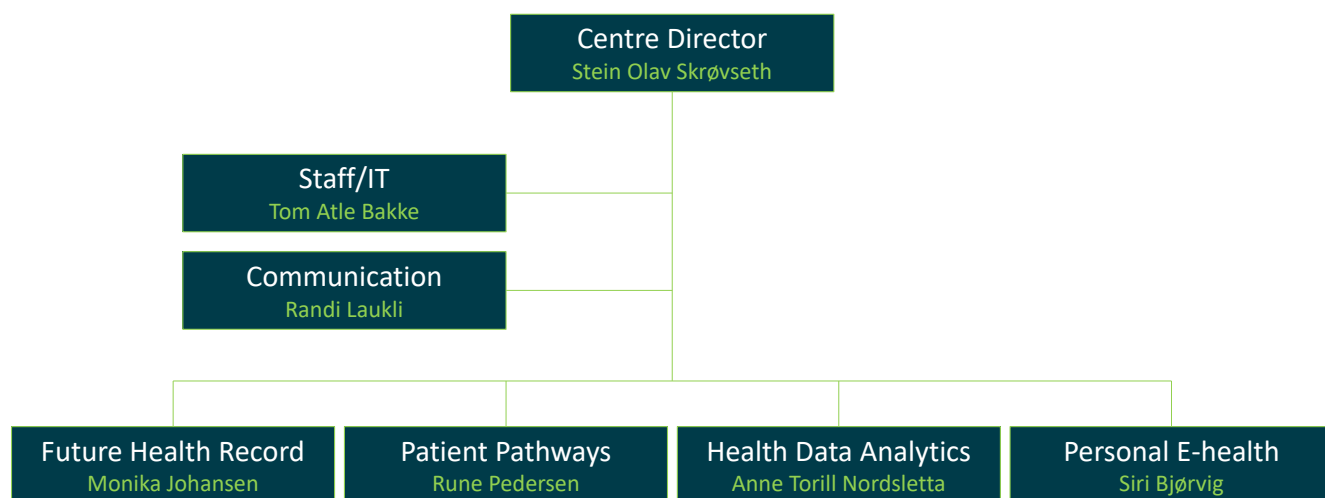
- Nursing
- Social Science
- Technology
- Psychology
- Sociology
- Physics
- ICT
- Socioeconomics
- Education
- Medicine
- Organisation and Management
- Graphic Design
- Pharmacy
- Communication
- Physiotherapy

- Business Economics
- MBA
- Journalism
- Biology
- Statistics
- Accounting and Audits
- Civil Engineering

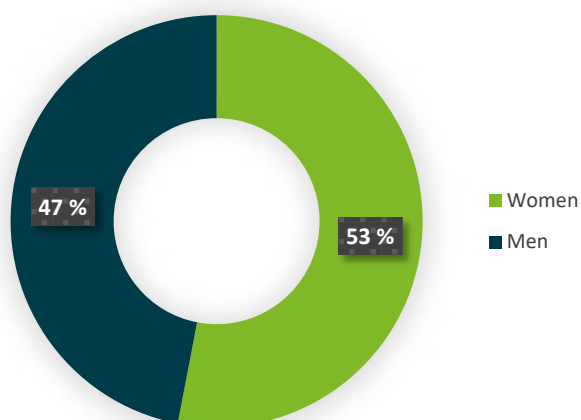
Where are we from?

49 people come from Norway and 17 from:

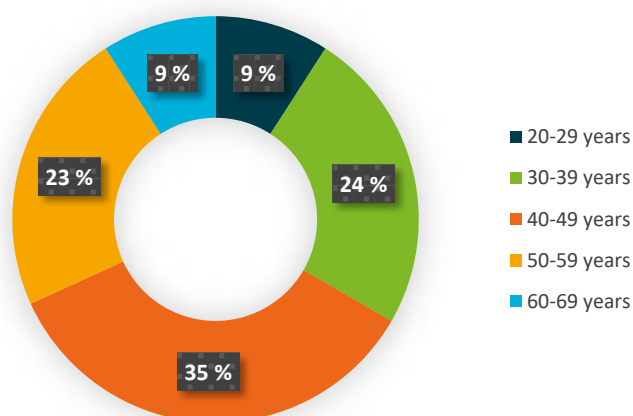
- Greece
- Spain
- Zimbabwe
- Italy
- Germany
- USA
- Lithuania
- Ethiopia
- France
- Russia
- Czech Republic
- Portugal



Gender distribution



Age distribution



Karianne Lind, Research Librarian:

What was the best thing that happened to you in 2017?

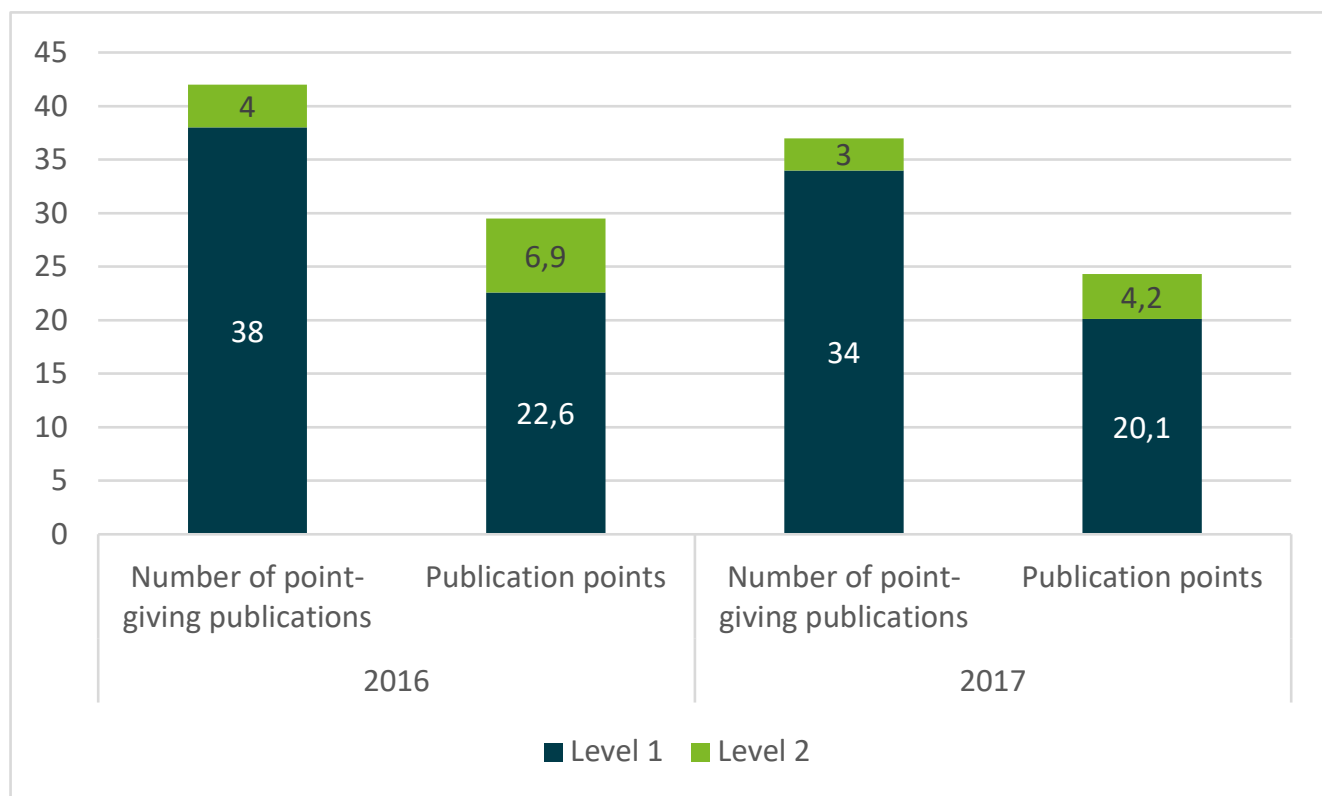
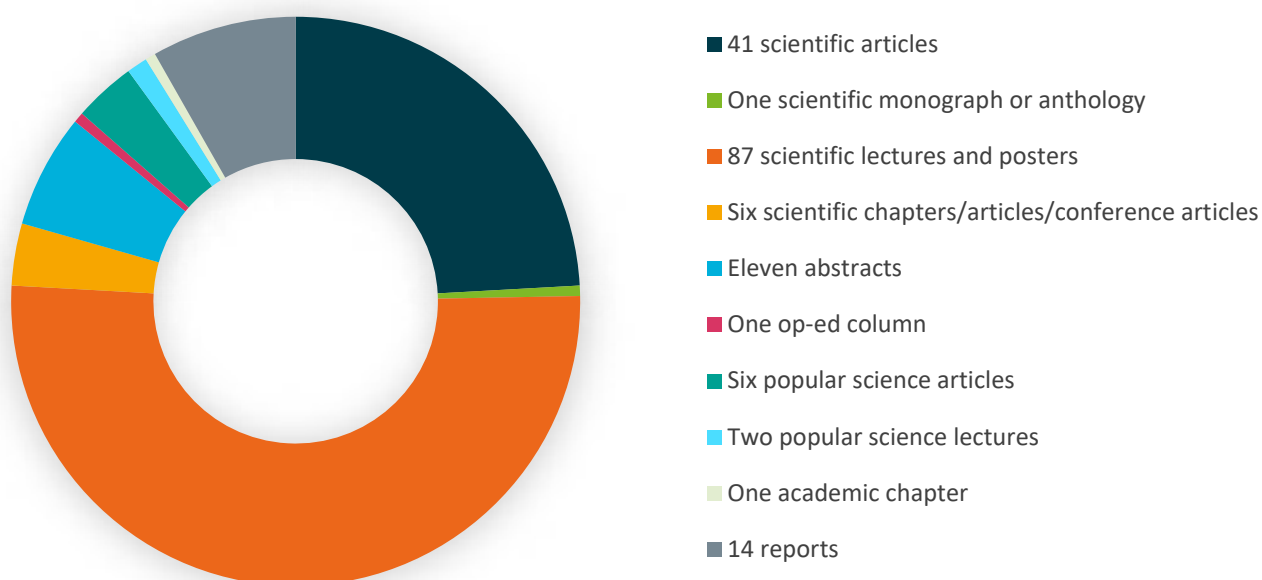
Participation in the Norwegian Institute of Public Health's week-long workshop on knowledge-based practices. It was a very educational week with varied content, and the importance of cross-disciplinary cooperation between researchers and librarians when

preparing systematic reviews was emphasized through work in small groups.

What do you think will be most the important thing for the Centre in 2018?

It will be necessary to find and enter into partnerships with relevant actors in order for e-health research to be even better. It will also be good for us to increase expertise in more areas to further develop the Centre.

Research in numbers



NVI: The Norwegian scientific index

NVI-publications: Academic publications given publication points, part of the funding model in the health, institute and higher education sector.

Knowledge goes viral

f The Centre has 1407 followers on Facebook, who have responded to 99 posts more than 13,300 times. Our posts can reach 110,000 people. At @helseforskning we share articles of relevance to e-health in Norway, including self-produced articles and those of others.

t E-health Research has 577 followers on Twitter. The account was opened in 2016. We use @ehealthNORWAY to communicate with a more international audience.

in E-health Research opened a LinkedIn account in 2016 and has 191 followers. The Centre primarily used the account for advertising vacant positions.

E-health Knowledge Bank

Throughout 2017, the communications department has worked with service designers from the Halogen company to develop the ehealthresearch.no web site as a hub for the dissemination and administration of information on e-health.

The Norwegian Centre for E-Health Research shall gather, produce and disseminate information about e-health. This shall benefit society at large. The authorities use research-based knowledge in their reports and investigations. The health trusts need information to implement good solutions and the municipalities need it to initiate suitable welfare technology. Citizens need advice in order to find the best solutions for self-management and for communication with the health service. The industry actors need accessible information and an overview of environments that can help with the various innovation phases of products, services and processes.

Reaching all target groups with the information they need is challenging. Therefore, we want to collect as much as possible in one place.

The objective is that this web site will:

- be the preferred source of national and international information on e-health
- increase the understanding of e-health and why we have e-health
- contribute to the best use of society's shared resources

Workshop about the Knowledge Bank with Halogen. Centre Director Stein Olav talks with Siri Moe Megaard.



Many of our people participated in the workshop.



Finances

Financial statement for 2017. Numbers in million NOK.

PAYROLL EXPENSES

Departments Norwegian Centre for E-health Research

Health Data Analytics.....	9,3
Future Health Record	7,9
Personal E-health	9,2
Patient Pathways	8,5
Wages subtotal	34,9

Support functions Norwegian Centre for E-health Records

Management.....	1,6
Staff and IT	4,3
Communication.....	1,9
Wages subtotal	7,9

TOTAL payroll expenses 42,7

OPERATING EXPENSES

Direct project expenses.....	17,0
Indirect expenses - department operations	1,4
Indirect expenses - administrative services and infrastructure	5,0
Indirect expenses - investment and operations	2,2

TOTAL operating expenses 25,5

TOTAL expenses 68,2

INCOME

Ministry of Health and Care Services (HOD)	34,0
Northern Norway Regional Health Authority base funding.....	4,0
External income (exposed to competition)	29,5
USAM (University Cooperation).....	2,6

TOTAL income 70,2

RESULT

Operating profit.....	2,0
Transfer of positive operating profit to balance sheet.....	2,0

Net result 2017 0,0

Strategy

The Norwegian Centre for E-Health Research shall gather, produce and disseminate information about e-health. It shall also be pioneering and internationally known for research within the focus areas.

Tasks



Research

The Norwegian Centre for E-health Research shall provide research that is useful for the national development of e-health. The research should maintain high scientific quality and be published in international forums. It shall be independent, verifiable and critical in line with good research tradition. Also in cases when research is commissioned by the Government.



Analysis

The Norwegian Centre for E-health Research shall provide knowledge-based investigations that are prioritised by the National Board for E-health. Expertise and experience from previous and existing projects can form the basis for high-quality investigations.



Knowledge management

The Norwegian Centre for E-health Research shall maintain an overview of knowledge and environments in e-health in Norway and internationally. By producing information on e-health, the Centre shall contribute to a sound knowledge-base for national priorities and management of e-health initiatives, quality improvement work in the health sector, research on health services and in public health work.



Dissemination

The Norwegian Centre for E-health Research shall make available all its knowledge on e-health and disseminate that of others where natural to do so. Scientific publication is essential to ensure legitimacy and professionalism. The Centre will publish its results in national and international arenas.



Representation

The Norwegian Centre for E-health Research is part of the national e-health system and represents Norwegian e-health internationally.

Focus areas



Future health record

The aim of e-health research is to provide knowledge that contributes to medical records becoming the e-health tools of the future, especially in terms of interaction, diagnostics and support during patient pathways.



Comprehensive health services

Research on comprehensive health and care services shall study the development of ICT supported organisational models that provide a comprehensive health service for users and patients. This is particularly important to patients with complex and long-term needs.



Personal systems and welfare technology

The Norwegian Centre for E-health Research shall research how and why the population uses welfare technology. This is important in public health work and when building patient-oriented and sustainable health and care services.



Accessibility and analysis of health data

The Norwegian Centre for E-health Research shall work on the accessibility and analysis of health data. Using modern statistical solutions, we can find patterns, and learn programs to understand and predict through historical data, to give a more proactive health service. E-health research shall look at the organisation, management and use of register data for automatic collection and registration, as well as decision-making in medical records.



Stakeholders

E-health research stakeholders are public administration, authorities, decision-makers and other knowledge communities in the field. The Centre shall collaborate with other actors in the sector, including service providers, users, academia, administration, and industry and commerce.



Cooperation and openness in research



*Centre Director
Stein Olav Skrøvseth*

E-health is emerging nationally and internationally and there is no doubt that developments within the field are happening at a rapid pace. The knowledge developed by The Norwegian Centre for E-health Research is needed.

The Centre cannot supply all the information on its own, as the demand is too complex. Therefore, E-health Research will work with all other knowledge actors in the field to distribute the load. Establishment and further development of good partnerships with other environments is paramount for us as a centre and the sector as a whole. It is important to build a culture for cooperation. At the same time we need healthy competition when publishing research, getting funding and doing investigations.

E-health is a multidisciplinary field that requires varied expertise, including medicine, technology, social science, economics and

natural science. Our centre is multidisciplinary, but cannot solve all the demands for knowledge. Therefore, it is important that all environments in Norway join forces and collect and develop knowledge on e-health to best serve society.

To create a good climate for cooperation, knowledge and research must be made available. Openness is crucial. Not only to get results, which are currently made available through publication, but also openness - to the extent possible - about the processes behind the results. Our view is that ideas become better when shared, discussed and managed in union. It gives better results, more transparency and we can produce new knowledge faster. Our centre will work for tighter collaboration and openness, between disciplines, environments and institutions.

Stein Olav Skrøvseth, Centre Director

E-health research in Norway

The Centre shall have a broad active network consisting of international and national partners in e-health.

Norwegian partners

Municipalities:

Risør, Harstad, Sandnes, Horten, Drammen, Odda, Trondheim, Tromsø, Balsfjord, Skibotn, Sør-Varanger, Alta, Bardu, Lenvik, Loppa, Svalbard.

Health institutions:

Western Norway Regional Health Authority, South-Eastern Norway Regional Health Authority, Central Norway Regional Health Authority, National ICT, ICT Western Norway Regional Health Authority, ICT Northern Norway Regional Health Authority, Akershus University Hospital, Haukeland University Hospital, St. Olavs Hospital, Oslo University Hospital, Stavanger University Hospital, Northern Norway University Hospital, Finnmark Hospital, Nordland Hospital, Sørlandet Hospital, Microbiology Laboratory, Levanger, Microbiology Laboratory, Molde, Microbiology Laboratory, Ålesund, Microbiology Laboratory, Tromsø, Regional Committees for Medical and Health Research Ethics.

Universities, university colleges and research institutions:

The Norwegian Institute of Public Health, the Norwegian Institute of Public Health's Knowledge Centre, University of Agder, University of Oslo, University of Bergen, University of Stavanger, UiT/The Arctic University of Norway, Norwegian University of Science and Technology - NTNU, Norut, the National Center in Research on Complementary and Alternative Medicine - NAFKAM, the Neuromuscular Competence Centre at the University Hospital of Northern Norway, The Centre for Care Research Norway, KoKom - National Centre on Emergency Communication in Health, Western Norway University of Applied Sciences, Western Norway Research Institute, Sintef, Sintef ICT, Sintef Digitak, Sintef Technology and Society, BarnsBeste National Competence Network for Children as Next of Kin, Sørlandet Hospital, the Tromsø Study, the Sami National Centre for Mental Health and Substance Abuse (SANKS).

GP offices:

Skansen legekantor, Tromsø, Sentrum legekantor, Tromsø, Kroken legekantor, Tromsø, Byhagen legekantor, Alta, Hinnatrekanten legesenter, Stavanger, Legene på Høyden, Bergen, Fjellsiden legesenter, Bergen, Kalfaret legesenter, Bergen.

Patient and user organisations:

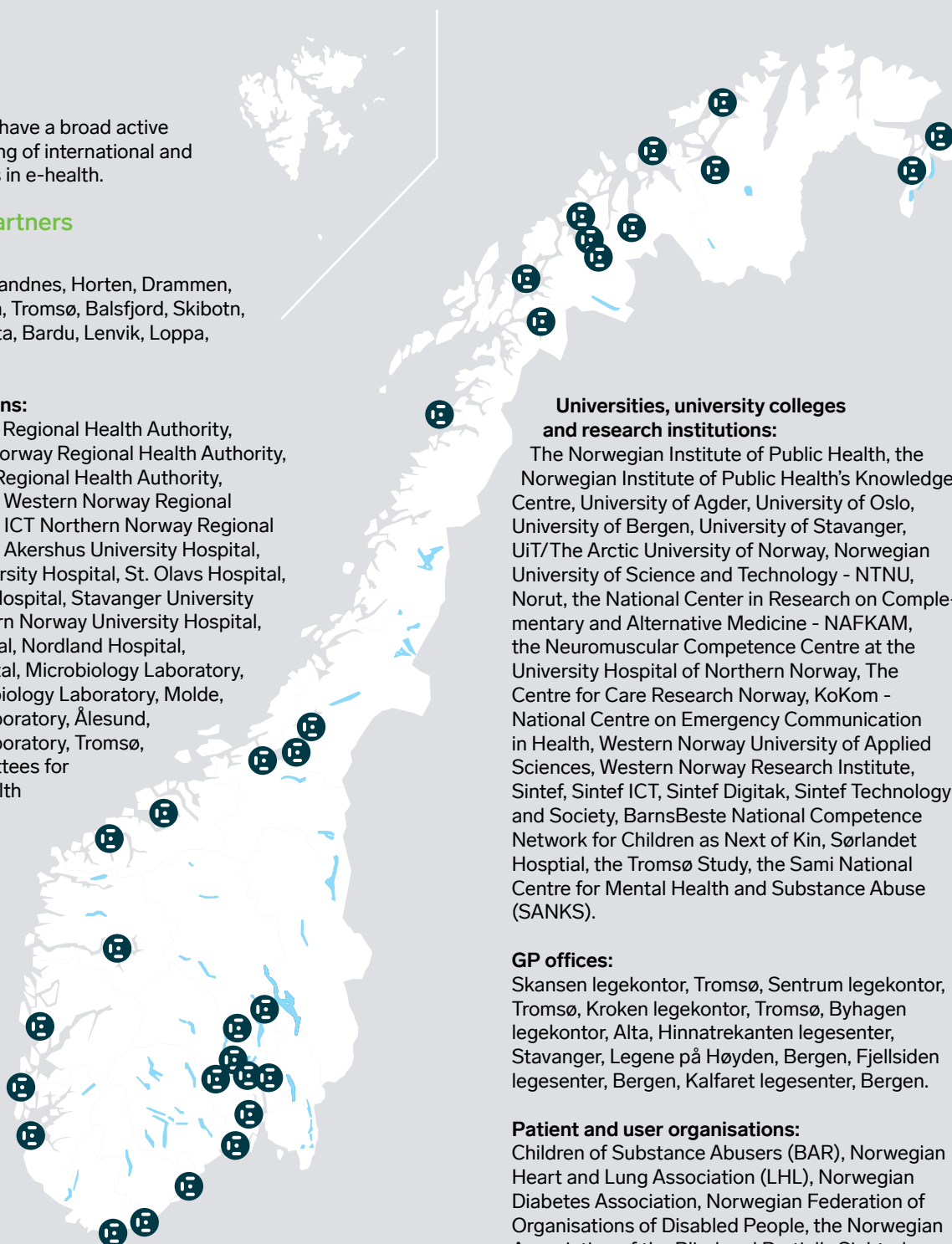
Children of Substance Abusers (BAR), Norwegian Heart and Lung Association (LHL), Norwegian Diabetes Association, Norwegian Federation of Organisations of Disabled People, the Norwegian Association of the Blind and Partially Sighted - NABP, Norwegian Heart and Lung Association (LHL), Norwegian Public Health Association.

Authorities and public actors:

Norinnova, Haugaland Vekst, the Health Platform, Norwegian Directorate of eHealth, Norwegian Directorate of Health, Innovation Norway, Norwegian Board of Technology, State's Children's House (Statens Barnehus), Kristiansand.

Industry actors:

CallMeSmart AS, DIPS ASA, Hove Medical Systems AS, MEDRAVE Software AS, Dr Furst Medisinsk Laboratorium AS, Apotek1, BBach, Infodoc AS, Senter for kvalitet i legekantor AS, Alpha Venturi, Norway Healthtech, Healthcom AS.



Research at EHiN - Norwegian national E-health conference

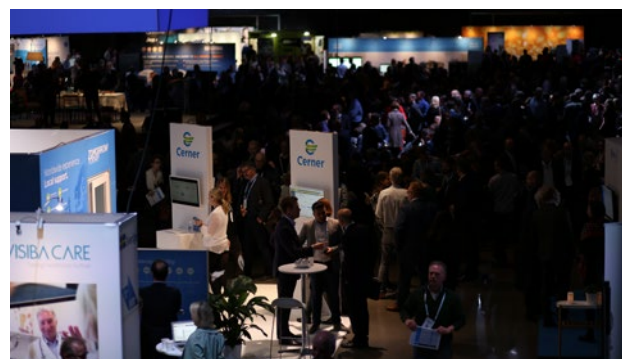
Along with the Research Council of Norway, the Centre organised the research track 'Future Health 2017' at the EHiN. The research track span over two days, included seven sessions and attracted an audience of around 200 people. EHiN is a good arena for meeting the municipalities, authorities and other knowledge actors.



An untraditional opening of EHiN 2017.



Senior Researcher Paolo Zanaboni presents effects of Digital dialog and Patient's online access to health record.



Professor Eirik Årsand and Senior Adviser Astrid Grøttland.



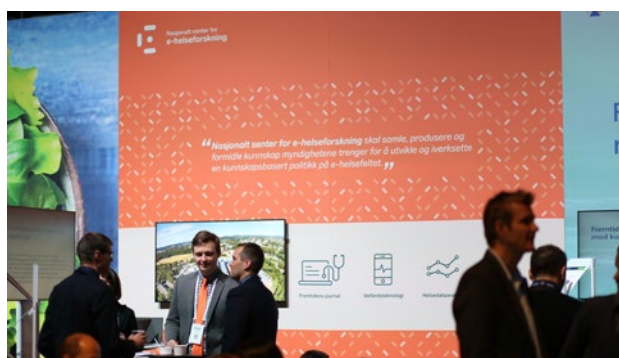
Senior Researcher Trine Bergmo presents findings from a study of e-multidose.



Centre Director Stein Olav Skrøvseth and Professor Gro Berntsen.



Senior Researcher Kari Dyb presents a study of use of summary care record in hospitals.



How and why do research on the Health Platform and One Citizen – One Health Record? Senior Researcher Anne Granstrøm Ekeland, E-health Research, Professor Arild Faxvaag, NTNU, Senior Researcher Hege Kristin Andreassen, E-health Research and NTNU, Professor Margunn Aanestad, UiO.

E-health research globally



Guests from Portugal – all dressed in orange scarves and ties: Micaela Monteiro, Director, Patricia Loureiro, Diego Martins, Arlete Monteiro, Ana André. In addition, developer Miroslav Musny, Centre Director Stein Olav Skråvseth, Head of Communication Randi Laukli and Director Patient Pathways Rune Pedersen.

Exchange of knowledge between Portugal and Norway

In May 2017, the Centre welcomed a delegation from SPMS - Shared Services from the Portuguese Ministry of Health. During the two-day visit, they received a thorough introduction into our research and national e-health strategies.

SPMS - Shared Services is part of the administration of the Portuguese Ministry of Health and Ministry of Finance, whose aim is to provide services that centralise, optimise and rationalise the procurement of goods and services within the national health services. The delegation that visited Norway is responsible for the development of enhanced information and communication systems, and has been assigned the task of building up a centre for telemedicine in Portugal. www.spms.min-saude.pt

In my opinion

Anne Torill Nordsletta, Director Health Data Analytics:

What was the best thing that happened to you in 2017?

That our employees have contributed with national health reports important to national decision-making and that our researchers have been allocated funds for research on important spheres within e-health.

What do you think will be most the important thing for the Centre in 2018?

The most important thing for the Centre is to contribute with knowledge in the cooperation with other national and international actors.



Visitors to the centre

- Workshop, digital dissemination of qualitative research about the experiences of patients and relatives in relation to health problems. Visited from the University of Oxford, UK
- Implementation Research (Sociology), NTNU
- Full patient pathway. Host: 3P. 3P learning network meeting, 7th-8th Nov 2017 in Stavanger.
- HTA Workshop, Laval University, Quebec, Canada
- Various visitors to NSE (NTNU, Poland, Czech Republic, etc.)
- General information about the Centre, SPMS - Shared Services, Portuguese Ministry of Health
- Workplace Research (Sociology), Norwegian Directorate of eHealth
- Participatory Action Research (Sociology), University of Southampton
- Organisers of international seminars in cooperation with the University of Tromsø - National Center in Research on Complementary and Alternative Medicine (NAFKam): Person-centered care – why are we not succeeding? Sommarøy Island 20th -22nd Nov.
- Implementation Research (Multidisciplinary), Western Norway Research Institute
- Narratives, University of Oxford, UK

Visits to others

- Study trip to Barcelona arranged by VerDig with multiple participants from various environments in Norway and Denmark, 18th - 19th October 2017
- Health Experiences Research Group, University of Oxford, UK
- UiT/The Arctic University of Norway
- University of Oslo
- Badalona Serveis Assistencials (BSA), Barcelona
- Laval University, Quebec, Canada
- University of Manchester
- THL i nFinland, HTA
- Sintef Digital, Oslo
- The Research Council of Norway, Oslo
- McGill University, Montréal, Canada
- Barcelona Open University
- Umeå University
- Ålborg University
- Badalona Serveis Assistencials (BSA)
- Norwegian University of Science and Technology - NTNU, Trondheim
- University of Copenhagen
- Open University Catalonia, e-Health Center
- Western Norway Research Institute, Sogndal
- Statistics Norway
- Det Norske Veritas
- Université Laval, Quebec City, Canada
- University of Victoria, Canada
- Centre for Primary Care, University of Manchester, UK
- University of Colorado Denver, USA & WHO, Geneva, Switzerland
- Badalona Serveis Assistencials (BSA), Open University of Catalonia (UOC)



Eirik Årsand, Professor, Personal E-Health:

What was the best thing that happened to you in 2017?

In 2017, my research group and I witnessed that mobile health (m-health) was finally recognised as a field with potential for all actors within the health service. Our competence on both m-health and personal health will be crucial when researching and imple-

menting good tools and solutions within the health service.

What do you think will be most the important thing for the Centre in 2018?

It is important for us to contribute with relevant research within all our focus areas both nationally and internationally. To spread knowledge about our expertise and research results is essential.

- EHiN, Oslo
- Munin Conference, Tromsø
- MCCSIS 2018, Lisbon
- Medinfo, Hangzhou, China
- MCCSIS 9th International Conference on e-Health, Lisbon
- NORM Conference
- Arctic Light E-Health Conference 1st - 2nd February 2017 in Luleå, Sweden
- 2017 Paediatric Dermatology Symposium: Get Ready for the Atopic March, Hong Kong
- International Society for Quality in healthcare (ISQUA) – London
- Health Platform Search Conference, Trondheim
- ATTD 2017
- National Research Conference in Health Service Research, Trondheim
- HIMMS 2017, Orlando
- Les Trophées de la santé mobile, Paris
- DIPEX international 2018, Mount Gabriel, Canada
- CSHI, Hong Kong
- EAACI Congress 2017, Helsinki
- International Foundation for Integrated Care (IFIC) – Dublin

- Université d'été de la e-sante, Castres
- Digital Health & Big Data @ Transatlantic ICT Forum
- 9th European Innovation Summit, Brussel, Belgium
- HL7 Foundation, European Federation of Medical Informatics (EFMI)
- WHINN - Week of Health and INNOvation, Odense, Denmark
- British Sociological Association, Medical Sociology Annual Conference, York, UK
- Advanced seminar on critical qualitative health inquiry, Montreal, Canada
- ICT Proposers day 2017, Budapest
- WHO: Global Consultation on Integrated Care for Older People - Integrated Care for Older People - the path to Universal Health Coverage, Berlin
- HIMSS Europe E-health Week, Malta
- HTAI Annual Meeting, Workshop HTA, Rome
- 3P, Learning Conference, Stavanger
- HIMSS Europe, Tallinn
- MiE Workshop, Manchester
- 7th RCRC Roundtable, Copenhagen
- Kick-off Meeting, Welfare Technology for Children and Young People with Disabilities, Directorate of E-Health/ Directorate of Health, Oslo

Board, committees, bodies

- Leader, National Researcher Network for Children as the Next of Kin, BarnsBeste
- UiT, IPL Mentor of Doctoral Students
- Fagnettverk Hud (professional skin network), Regional Centre for Asthma, Allergy and Hypersensitivity
- Expert evaluator on the Assessment Committee - Central Norway Regional Health Authority Liaison Committee - Research Funds in 2016/17
- Associate Professor, Institute for Clinical Medicine, Faculty of Health Sciences, UiT/ The Arctic University of Norway
- Editorial Board of JDST (journal)
- Programme Committee, Nordic Delegation HIMSS17 and 18
- Dipex International
- Expert Panel, Research Council of Norway - Innovation Projects in the Public Sector - Feb 2017
- Physical Activity and Public Health Research Group, Faculty of Sports, Tourism and Social Work, UiT/The Arctic University of Norway
- R&D Board, the Sami National Centre for Mental Health and Substance Abuse (SANKS).

- NorWit
- NeRN (Nordic e-Health Research Network)
- Chair of CallMeSmart AS
- UiT, Faculty of Health Examiner
- Board Member, International Dermoscopy Society
- Resource group for 'Pilot for Oppfølgingsteam' (Monitoring Team Pilot) - Norwegian Directorate of Health 2017
- Associate Editor, BMC Medical Informatics and Decision Making
- Norwegian Diabetes Association, technological expert group
- Board Member of HIMSS Europe Governing Council
- Université d'été de la e-santé, Scientific Committee

EU projects:

- RemoAge
- Clinical Trials for Elderly Patients with Multiple Disease (CHROMED) (EU project)
- Mastermind project
- eCAP
- Long-Term Integrated Telerehabilitation of COPD Patients. A multi-centre randomised controlled trial (iTrain) (Research Council of Norway, Northern Norway Regional Health Authority)
- USECARE project
- SenseGarden

21



Marianne Trondsen, Senior Researcher, Personal E-Health:

What was the best thing that happened to you in 2017?

We completed two interesting, meaningful and innovative projects. One addressed the use of welfare technology for children and young people with disabilities, a cooperation with the Norwegian Directorate for E-health/ Directorate of Health and two municipalities. The other was the VIDEOCARE project when we looked at the experiences of using video conferencing in emergency psychiatric treatment, which was a cooperation with UNN. A report was written on the first project and we

published two scientific international articles in 2017 on the other project. Personally, I also stayed at the University of Oxford as part of my postdoctoral project, which was both educational and inspiring.

What do you think will be most the important thing for the Centre in 2018?

We must establish our role as a leading national centre for e-health research with international importance. This means maintaining our activity in research and the publishing of scientific articles both nationally and internationally. We must also apply for new projects, as this will generate knowledge to develop health services of the future that will best serve users.



Dipex international, University of Southampton, England, University of Liverpool, Liverpool, England, University of Lincoln, England, University of Oxford, England, University of Surrey, England, University of Manchester, England, University of Strathclyde, Glasgow, Scotland, Centre for Rural health, University of Aberdeen, Scotland, Digital Health and Care Institute (DHI), Scotland, University of Stirling, Scotland, University of Copenhagen, Denmark, Aalborg University, Denmark, Stockholm University, Sweden, Stockholm School of Economics, Sweden, Karolinska Institutet, Sweden, Örebro University School of Business, Sweden, Umeå University, Sweden, Uppsala University, Sweden, Luleå University of Technology, Sweden, University of Turku, Finland, University of Eastern Finland, Finland, University of Oulu, Finland, Tallinn University of Technology, Tallinn, Estonia, National Centre for Scientific Research 'DEMOKRITOS', Greece, Eurescom, Germany, Politecnico di Milano University, Milan, Italy, Castres-Mazamet Technopole, France, University Claude Bernard Lyon 1, Villeurbanne, France, Agency for Health Quality and Assessment of Catalonia (AQuAS), Spain, Open University of Catalonia, Barcelona, Spain, University of Sevilla, Sevilla, Spain, University San Pablo, Madrid, Spain, Open University Barcelona, Spain, University of Barcelona-IDIBAPS, Barcelona, Spain, Charles University in Prague, Tsjeckia, Carol Davila University of Medicine and Pharmacy, Romania, IMEC, Belgia, University of Amsterdam, The Netherlands, Bern University of Applied Sciences, Bern, Switzerland, Kalaidos University of Applied Science, Zürich, Switzerland, Inonu University – Malatya, Turkey, University of Auckland, New Zealand, University of Melbourne, Victoria, Australia, Australian Institute of Health Innovation, Macquarie University, Sydney, Australia, La Trobe University, Melbourne, Australia, UNSW, Sydney, Australia, University of Toronto, Canada, Laval University, Quebec, Canada, Université du Québec en Abitibi-Témiscamingue, Quebec, Canada, Weill Cornell Medical College, USA, University of Michigan, USA, IBM TJ Watson Research Centre, USA, University of Colorado Denver, USA.

Norrbottnen Regional Association of Local Authorities, Sweden , Norrbotten County, Sweden, National Association of Municipalities in the Faeroes Isles (Föroya Kommunufelagid), Færøylene, ICT and Health Centre Foundation (TicSalut), Spain, West of England Academic Health and Science Network, England, NHS24 Scotland, Scottish Government, Scotland, NHS Western Isles, Scotland, National Health and Medical Research Council, Australian Government, Australia.



Hospitals and health service providers:

Slagelse Hospital, Denmark, Odense University Hospital, Denmark, University Hospital Bispebjerg and Frederiksberg, Denmark, Kuopio University Hospital, Finland, University Hospital Oulu, Finland, East Tallinn Central Hospital, Diagnostic Clinic, Tallinn, Estonia, University Hospital Aintree, Liverpool, UK, Barcelona Clinic, Spain, Badalona Hospital, Spain, Hospital of Sežana, Sežana, Slovenia, NHS Shetland, Scotland, Assuta Medical Center, Tel Aviv, Israel, Hong Kong Paediatric and Adolescent Dermatology Society, e-Point, Belgium, Vulpia Vlaanderen Belgium.

Organisations, companies and networks:

HIMSS Europa, Cochrane Review, Salumedia Tecnologias, Sevilla, Spain, World Health Organization (WHO), Business Oulo, Finland, Knowledge4Innovation, Belgium, European Medical Network EMN, Kilchberg, Switzerland, Centre for Global eHealth Innovation, Toronto, Canada, Restech s.r.l., Milan, Italy, Elettronica Bio Medica S.p.a., Foligno, Italy, European Connected Health Alliance (EChAlliance), Compexin S.A, Romania.



Important with good IT training for the elderly

New research shows that training is useful to help the elderly maintain and strengthen their social network.

Studies show that using technology strengthens social support, social contact, quality of life and welfare amongst the elderly. Nonetheless, not all use the available technology to the same extent.

The results from a research project show that suitably adapted training is needed to get seniors to use technology more.

Several voluntary organisations currently offer ICT training for the elderly. Researchers from the Norwegian Centre for E-health Research have investigated how these services affect this group.

Online banking course

Researchers looked at four different services from voluntary organisations:

The Norwegian Association for the Hard of Hearing focuses on tablet devices to nurture and create social networks. The Norwegian Pensioners' Association held courses on how to use platforms for social contact and online

banking. The Norwegian Red Cross focused on preventing and reducing loneliness amongst the elderly through the use of technological tools, whilst Seniorsaken wanted to teach them how to use social media and Cura Guard - a solution to activate social micro-networks developed by Facebook.

"Such training enables more old people to learn how to use mobile telephones and tablet devices, consequently, they have started using the technology in social relationships," says Siri Bjørvig, Department Manager at the Norwegian Centre for E-health Research.

Included in society

A positive effect is that the elderly feel more included in society when they can master digitalised systems, for example, bank services and tax returns.

The requirements of society is a topic that comes up when talking to interviewees. Various social welfare schemes require computer skills in order to use them. As one interviewee in the study said: "I've always thought that it was necessary to learn computer skills when you get older. Once you start using the Internet, everything becomes automatic after a while."



Director Personal E-health Siri Bjørvig

What will be the most important thing to conduct e-health research on in years to come?

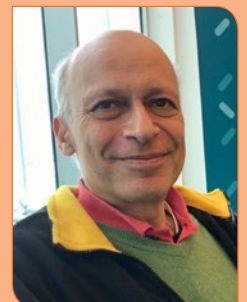
Today, many skilled doctors and nurses produce a large volume of medical records with details of diagnosed diseases and treatments. Digital medical records that are stored in databases contain much knowledge that is not reused.

If this knowledge was reused, the world could be a better place and the work of clinical

personnel could be facilitated in the best interests of the patient.

Through clinical text and data mining, this knowledge can be compared and reused. For example, to find known and unknown side effects of drugs, and to detect and predict diseases, like cancer.

Hercules Dalianis, Professor, University of Stockholm





Social media can seem cold and impersonal, which is something the course participants expressed. Nonetheless, they were grateful for what they had learned and 93 per cent of the respondents wanted to continue using the technology.

Young people had to break the code

There was a broad age range amongst the informants, with the oldest being 90 and the youngest 13. Many of the assistant teachers on the courses were very young. Several of the respondents appreciated the help they received from them, but in some ways the age gap presented problems.

“Some of the young teachers forgot to let the course participants try themselves; they were a bit too enthusiastic and failed to remember who the target group was. It was just as difficult for the young volunteer teachers to break the code, as it was for the course participants,” says Bjørvig.

Reference:

Johnsen, E.: *Sosial, digital kontakt: Opplæring av eldre - erfaringer fra 2016 (Social and Digital Contact: Teaching the Elderly - Experiences from 2016)*. Norwegian Centre for E-Health Research Report (2017)

Receives psychological therapy via Skype

Patients who could talk to a psychologist via Skype were positive towards receiving therapy in their own homes. Some patients also found that conversations were more open.

Patients reported that the communication was more in-depth and open. They got to the point quicker. "Obviously, it's good to talk in the safe surroundings of one's own home," says Nils Kolstrup from the Norwegian Centre for E-health Research.

"Some patients find it difficult to attend a psychiatric outpatients clinic. Therefore, it's better to receive therapy at home," says Kolstrup.

Positive feedback

Specialist Psychologist, Jane Kjoterøe, has been in charge of most of the project's

therapist-client conversations and has carried out more than 150 Skype consultations with a total of 15 patients.

"Of course, the sample is too small to draw conclusions, but the feedback is positive," she says.

The participants concluded that the dialogue between specialists and general practitioners improved, and the patient and therapist communicated efficiently online.

Equal services

Sometimes online communication was even better than face-to-face at the therapist's office.

The objective of the research project was to test solutions that make it possible to offer equal services, regardless location, and to



*Project manager
Erlend Bønes*

What will be the most important thing to conduct e-health research on in years to come?

Within my discipline, which is mental health, the effect of mentored online therapy for adults with anxiety and depression is relatively well documented. Based on this research, national clinical guidelines are now recommending online therapy for this group. However, we do not know as much about the effect of mentored online therapy for children, young people and the elderly. So, it will be important to research the impact on these age groups.

In addition, there is considerable optimism about the use of sensor data to understand mental conditions and therapy. More specifically, this could be GPS data from a mobile phone or wearables that alert a new episode of depression at an early stage. If we manage to replicate this, the data can trigger individualised feedback. Many questions still need

to be answered about security, ethics, validity, reliability and acceptance of this with the field of research.

The biggest challenge we have today is the lack of e-infrastructure for research, innovation and patient care in health services. Even though planned for many years, it is still not in place. As a result, projects around the country continue to develop local e-health solutions. This does not bring us closer to the goal of integration and scalability. We work on this in the Intromat (www.intromat.no) project. The aim is to develop infrastructure based on national and international standards that give industry partners and others the opportunity to develop technology that can be used in the health service.

Tine Nordgreen, Specialist Psychologist and Associate Professor at the University of Bergen. Founder of the eMeistring Clinic.





facilitate good communication between specialists and GPs. Three GP offices and around 20 GPs in Tromsø participated in the project.

Experts who participated believe that therapy via Skype can be extended to treat both physical illnesses/diseases and mental health conditions. It can even out differences in health services.

Less physical contact

One disadvantage of using Skype is the loss of physical contact, i.e. having a hand to hold or someone to offer a tissue if tears fall. Apart from that, the specialists cannot find anything particularly negative about the method.

“The feedback we’ve received is that Skype improves both the quality and availability of therapy for mental health conditions. The patient can ‘meet’ the therapist in their own living room and GPs get professional guidance from specialists via video conferencing,” says Geir Øyvind Stensland from the Mental Health and Substance Abuse Clinic at UNN.

GPs receive guidance

The hospital also held online guidance meetings with the GPs. In this way, doctors have the opportunity to give better treatment. Doctors often work with many complicated cases without any support. The intention behind this trial project, is that only a little extra support is needed.

The participants in the project receive access to the online self-help tool, MoodGym, which patients can use independently or with their GPs. The specialist psychologist can then be connected via Skype and the GP can be connected with the patient, if desired.

About Mastermind

Mastermind was an EU-funded project that tested Skype conversations with psychologists. Norwegian researchers and experts at the Norwegian Centre for E-health Research and the University Hospital of Northern Norway (UNN) partnered up for the project.

Technology helped disabled children

Researchers asked children and young people with disabilities to test watches and special smartphones. The technology can contribute to daily living with more play and entertainment.

Children and adolescents with disabilities are often very limited in their daily lives. Many cannot go anywhere without a parent or other companion.

Now something as simple as a watch with a GPS and ringing feature can help them explore the world on their own for the first time.

Over 20 families involved

Researchers, Marianne Trondsen and Undine Knarvik from the Norwegian Centre for E-health Research say that 22 children and young people with disabilities in a total of 21 families in Horten and Drammen have tested welfare technology.

The children had everything from ADHD and autistic spectrum disorder to cerebral palsy, Down syndrome and Asperger syndrome.

They documented the experiences each family had with the technology and the conclusions that can be drawn. Then, they did thorough interviews with 19 parents.

Smartphones and tablets

The young people were given technological tools that might benefit them based on their

challenges in daily life. Some need help with language and communication, others with having control over what will happen, or remembering possessions or appointments.

A lot is about using smartphones and tablets with apps. For example, calendar features, an alert system for chores, navigation system and social communication tools. Ten different technologies and software programs were tested.

More independence

"When testing this technology, many families experienced things for the very first time that we take for granted. Several children, who did not previously have the opportunity to do things on their own, have become more independent, and others enjoy more overview, active communication, and are more confident and social than before," explains Trondsen.

Parents' stories:

"He visited a friend on his own. I dropped him off at the door and he went in and telephoned when he wanted picking up. It was great!"

"He's started sending text messages on his telephone. This is fantastic for us. It's just like Christmas!"

"This study verified how easy it is for children to accept technology and many used it to teach other children skills that were not originally thought of," says Knarvik.



Senior Researcher
Marianne Trondsen



Senior Adviser
Undine Knarvik

What will be the most important thing to conduct e-health research on in years to come?

More research on artificial intelligence and data systems is required in the health service. How can clinicians give the best care based on knowledge-based practices, integrated with existing systems? At the same time, it is important to protect the patient.

Patients are often experts on their own illness or disease. How can we assimilate patients with treatment and decisions? In terms of telemedicine and remote follow up, two-way communication needs to be improved by enabling clinicians to follow patients up at home, so patients do not have to visit the treatment site.

Berglind Smaradottir, Postdoctoral Fellow at the University of Agder and Researcher at Sørlandet Hospital Trust.





Further research should be conducted
“The field still needs researching and we will benefit from the generation of knowledge at many levels, i.e. within technology development, practical trials, evaluation and research.

The research was conducted in cooperation with the Norwegian Directorate for E-Health and the Norwegian Directorate of Health's Welfare Technology Programme.

Reference:

Marianne V. Trondsen and Undine Knarvik: *Velferdsteknologi for barn og unge med funksjonsnedsettelse (Welfare Technology for Children and Youths with Disabilities). Erfaringer med utprøving av velferdsteknologi i kommunene Drammen og Horten (Experiences with Testing Welfare Technology in the Municipalities of Drammen and Horten). Norwegian Centre for E-Health Research Project Report 2017. ISBN 978-82-8242-074-7*

Helpful video conversations

The following is an excerpt from an article on pingvinavisa.no.

A video conversation service has been developed for children and youths who need to talk to a therapist. Help is suddenly just a couple of keystrokes away!

"The objective is to make easier and quicker for patients to get help. In the worst case scenario, long-distant travel can make vulnerable patients more ill," says Elin Breivik, Project Manager for eCAP at the Norwegian Centre for E-health Research.

Safe technology

The breakthrough came in spring 2017. The Northern Norway Regional Health Authority approved Skype for Business as a safe technology to carry out therapist-client conversations. As a result, therapists can talk with patients where they are. All that is needed is a computer with a web camera and network, and a room where the patient can trust that no third party can see or hear the conversation.

The therapist only needs to lock the office door. Skype for Business has now been installed on therapists' workstations in the

Child and Adolescent Psychiatry Department (BUPA) at the University Hospital of Northern Norway. The technical barrier is removed.

Therapy can be combined

"In some cases, therapy will only be given via Skype and video conferencing, but generally it will be combined with face-to-face therapy. The services have been developed in close cooperation with the children's families, primary health service, health personnel, schools, child welfare service and other clinics," explains Eirin Rødseth, Project Manager for eCAP at the University Hospital of Northern Norway.

In addition to the technical, some legal questions had to be resolved and BUPA has developed a description of the method used for therapy via Skype. Longyearbyen, Karlsøy and Balsfjord are the current cooperating municipalities in the project. However, in theory, therapy via Skype can be offered to patients in all municipalities connected to UNN.

Few limitations

Experts say almost all diagnoses can be treated via Skype.

What will be the most important thing to conduct e-health research on in years to come?

I'm glad that we've established a separate research centre for e-health. The Ministry is aware that individual centres cannot bear responsibility for all creation of knowledge within this field. Nonetheless, the establishment of the Norwegian Centre for E-health Research marks an opportunity to strengthen expertise within the field, and the required knowledge base to develop national e-health.

Since technology is always changing, it is important to learn from the experiences of others and build a shared understanding of what is effective for health personnel, patients and citizens.

I look forward to learning more about the Centre through developed research and dialogue in the future.

Lars Bjørgan Schrøder, Director General of the Norwegian Ministry of Health and Care Services, E-health department.





From left: Elin Breivik (Project manager eCap, Norwegian Centre for E-health Research), Eirin Rødseth (Project manager eCap, UNN), Oda Kjærvi (user representative and member of UNN's Youth Council), Erlend Bønes (UNN), and Lene Danielsen (UNN).

"We are currently drawing a line at emergency psychiatric treatment, where it is necessary to meet the patient in order to adequately assess the right action. But who knows? Perhaps it will eventually be possible to make such assessments in cooperation with local health personnel, who meet patients and have a specialist on Skype. Today is the beginning of the future and it's looking good," says Lene Danielsen, Section Manager of Child and Adolescent Psychiatric Polyclinic Services (BUP).

The eCAP project is financed by the EU and includes partners from Scotland, Finland, Sweden and Norway. eCAP wants to make access to specialist psychiatric treatment easier for patients in rural areas. The Norwegian Centre for E-health Research has headed the work in Norway, which started in 2015.

Obtain access, maintain personal data protection

With the aid of a computer program, researchers can analyse information in a patient's medical records without compromising personal data protection.

Many common health problems can be fought by researching information on illness from GP surgeries and community nursing. Two of three Norwegians saw their GP at least once in 2015. Patients leave behind a large volume of data relating to symptoms and diseases that might be relevant to research.

Nonetheless, little research is conducted on this group in Norway due to personal data protection laws making it difficult to access data. Only two to four studies are conducted in Norway each year. In comparison, around 60 studies are conducted annually by researchers in Scotland. However, this might change soon.

Duty of confidentiality guaranteed

Kassaye Yitbarek Yigzaw at the Norwegian Centre for E-health Research has developed a method that gives researchers the information they need, whilst protecting the patient's personal data.

He has developed a data program that retrieves information from GPs' medical records without disclosing the details of the patients and health personnel who have provided data for the analysis results.

"The data program makes it impossible to trace the data back to the GP from where it comes. This is how GPs can guarantee that their duty of confidentiality will be maintained, whilst making data in medical records available," explains Yigsaw.

Patients can opt out

By moving from manual and time-consuming data collection with many gapholes in security, we have now acquired a process that can provide statistical data in real time, whilst complying with all security standards. Kassaye is doing more research to further develop the functionality of the software. To use data in medical records for research purposes, the patient's consent is required, but patients can always opt out.

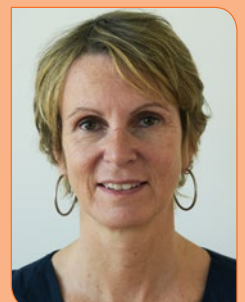
What will be the most important thing to conduct e-health research on in years to come?

GPs carry out 15 million consultations each year with their patients, providing a large volume of data that could be used for research, but which at present is practically unused.

Since primary health care is a decentralised service, digitalisation is crucial for research in

this sector. The possibility to collect data in a safe and transparent way, whilst protecting personal data, is paramount. In the PraksisNett research network, we use Snow for IT infrastructure and we have high hopes that both epidemiological and clinical research will be enhanced in primary health care.

Guri Rørtveit, University of Bergen





It is difficult for researchers to get access to health data from EHRs. Kassaye Yitbarek Yigzaw has developed a computer program that give access and at the same time preserves privacy.

“There are approximately 1,500 GP practices in Norway. If they all use the data program, we can continually update statistics in many disciplines,” he says.

Reference:

Kassaye, Y.Y. Towards Practical Privacy-Preserving Distributed Statistical Computation of Health Data. Doctoral Thesis, UiT/The Arctic University of Norway (2016)

A new approach towards clinical decision support

Doctors want more clinical decision support, to give patients the best treatment. However, the development of such IT systems is costly and it is difficult to use them across all GP offices and hospitals. All the same, e-health researchers have found a solution through the use of artificial intelligence.

For example, let's say that you are feeling ill and you make an appointment to see your GP. Your GP starts asking many questions and examines you, writes down the symptoms and connects the information to his/her knowledge, and previous experience with symptoms and observations.

If your GP could also look up symptoms and other relevant information in various health systems, he/she will probably be able to find the right diagnosis and treatment for you quicker.

Can only be used locally

A clinical decision support system allows health personnel to access the most recent scientific results when needed to choose the

treatment option for the patient. However, it is extremely costly to implement clinical decision support systems, therefore it is necessary to share the systems at national level.

Most decision support systems cannot currently be used by all GP surgeries or hospitals. The different types of electronic health records (EHR) do not 'talk' with each other. Doctors cannot access valuable information about diagnoses, treatment or medication that will assist them in helping patients in the best possible way.

"The fact that doctors don't have access to more clinical decision support is problematic, as it would contribute greatly to best practices and compliance with clinical guidelines," says Luis Marco-Ruiz, Postdoctoral Fellow at the Norwegian Centre for E-health Research.

Improved patient care

Clinicians want to gain insight into the practices of other clinicians to improve their own. Researchers say they are about to solve the problem.



Health care professionals want to learn from other clinicians' practice, to improve their own practice, says Researcher Luis Marco-Ruiz.

"Such systems can already communicate with each other when using standardised solutions and archetype-based systems. Nonetheless, our systems must be searchable for all clinicians, regardless of the institution or region in which they work," says Marco-Ruiz.

After talking to many doctors, he believes that this will help them access key information that is necessary to provide the best clinical practice and patient care.

"Each time doctors meet a patient, they can use a broad spectrum of clinical information from reliable and evidence-based data recorded over many years," he says.

High-quality expert articles

Along with other researchers, Luis Marco-Ruiz and his colleague, Johan Gustav Bellika, wrote a research article on how all clinicians can access and use clinical decision support.

The article is titled 'Publication, discovery and interoperability of Clinical Decision Support Systems: A Linked Data approach'.

In the autumn, the International Medical Informatics Association (IMIA) ranked the article as one of the best expert articles on computerized clinical decision support.

You can read the scientific article at [PubMed.gov](https://pubmed.ncbi.nlm.nih.gov/).

Appendix

Journal publications

Marco-Ruiz, Luis; Bønes, Erlend; de la Asuncion Gonzalez, Estela; Gabarron, Elia; Solis, Juan Carlos Aviles; Lee, Eunji; Traver, Vicente; Sato, Keiichi; Bellika, Johan Gustav.

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OUS UiO UNN VV

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