

Norwegian Centre for
E-health Research

Annual report 2018





Norwegian Centre for
E-health Research

This is a publication by the Norwegian Centre for E-health Research.
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Steering Committee Chair's Statement

The Norwegian Centre for E-health Research was established in 2016 and is now able to look back on its third year. The centre operates under the auspices of the Norwegian Ministry of Health and Care Services and Northern Norway Regional Health Authority.

To ensure that the centre moves in the right direction and is useful to the sector, the department has decided to carry out a two-phase external evaluation. In 2018, the Northern Norway Regional Health Authority completed the first phase. The steering committee has primarily been responsible for the specialist component of the assignment and recommended follow-up measures based on the findings and results identified in the external evaluation.

The Norwegian Ministry of Health and Care Services has on several occasions called attention to the centre's national role in research and investigations in the field of e-health. This also relates to autonomy in terms of choice of methodology and publishing of results. The centre should be recognised for providing documented, transparent and evidence-based deliveries that can be used by health authorities as well as the sector in general.

Accordingly, it is natural that the centre's national role is thoroughly evaluated and has been the object of focus in the steering committee's recommendations. There is a need to clarify and communicate what is expected of a national research centre in this field. Relevance and quality of deliveries are naturally keywords, but a close collaboration with other practitioner and research environments is also crucial for the Norwegian Centre for E-health Research to live up to its national role not only in name, but also in terms of the benefits it provides. The centre should be regarded as a useful partner that adds value to work and results.

The evaluation and steering committee's recommendations also point to the need for closer expert collaboration with the Norwegian Directorate for eHealth, some adjustments to the steering committee's mandate and composition as well as a clearer management structure. These are specific measures that can strengthen the centre's activities and which are not particularly controversial.

The Norwegian Centre for E-health Research relies on securing funding from competitive



sources (EU, Research Council of Norway and Northern Norway Regional Health Authority). An important reason for this is that it will help improve the quality of deliveries and collaboration with other specialist environments. One challenge is that today's research funding is only to a small extent aimed at the major national needs and initiatives. Formative dialogue research and research overviews are particularly in demand. In 2018, the steering committee attended a seminar on funding e-health research. This has later been followed up on, and we have among other things discussed opportunities to establish our own research programme which would to a greater extent follow up on knowledge needs. The need to clarify the funding of e-health research should be followed up on the national and regional level.

Starting in 2019, a new steering committee has been appointed not only because most of the members had been on board from the start, but also because the evaluation highlighted the need for some adjustments. We wish the centre and the new steering committee the best of luck in their efforts towards an evidence-based development of the health sector in the area of e-health. The challenges continue to be both numerous and significant, but the potential benefits - both for patients and healthcare workers - appears to be limitless.

*Bjørn Engum,
Steering Committee Chair*

The Steering Committee

The steering committee is comprised of representatives from every area of Norwegian healthcare.

All the regional health authorities and relevant sectors are represented in the steering committee, and the members serve a period of two years at a time. Members can sit on the committee for two periods.

In 2018, the steering committee convened four times.

The steering committee's purpose is to ensure that:

- the centre further develops its expertise and executes assignments within research and investigation on e-health in line with the sector's needs and priorities.
- the centre further 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 work related to professional activities, support functions and administrative tasks is high quality.

Unn Manskow, Researcher, Future Health Records:

What was the best thing that happened to you in 2018?

The best thing that happened to me was getting a position as a researcher at the Norwegian Centre for E-health Research. I've gotten to know new, talented colleagues and a new environment. To delve into new areas of research is really exciting. Arranging workshops with other researchers in Norway in the field of digital medicine management was a rewarding experience.

It allowed me to meet a lot of new people, get inspired and gave me opportunities for network-building and future collaboration.

What do you think will be the most important thing for the centre in 2019?

Developing our national role in the field of e-health research, where we can all contribute in different arenas and at different levels, but focusing on raising visibility, building networks and encouraging partnerships within the centre, in Norway and internationally are key areas, as I see it.





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



Wenche P. Dehli, Health
and Social Affairs Director,
KS/Kristiansand Municipi-
pality (Vice-Chair)



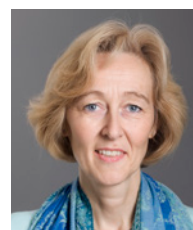
Gun Peggy Knudsen,
Area Director of Health
Data and Digitalisation,
Norwegian Institute of
Public Health



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



Einar Bugge, Head of
Quality & Development,
University Hospital of
North Norway



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



Anders Grimsmo,
Professor,
Norsk Helsenett SF/NTNU



Robert Nystuen,
Department Head,
Norwegian Directorate for
eHealth



Kristin Mehre, Department
Director, Norwegian Direc-
torate of Health



Kathrine Myhre,
CEO,
Norway Healthtech



Grete Müller, User
Representative,
Vice-Chair, Regional Users'
Committee, Western
Norway Regional Health
Authority



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

The organisation



Number of employees:

- 66 with 53 FTEs
- 36 women and 30 men
- 47 full-time employees
- 16 part-time employees
- three additional positions

Age group breakdown:

- four between the age of 20-29
- 15 between the age 30-39
- 24 between the age 40-49
- 17 between the age 50-59
- six between the age 60-69

Level of education:

- nine scholarships - six women and three men
- 31 with a PhD - 15 women and 16 men

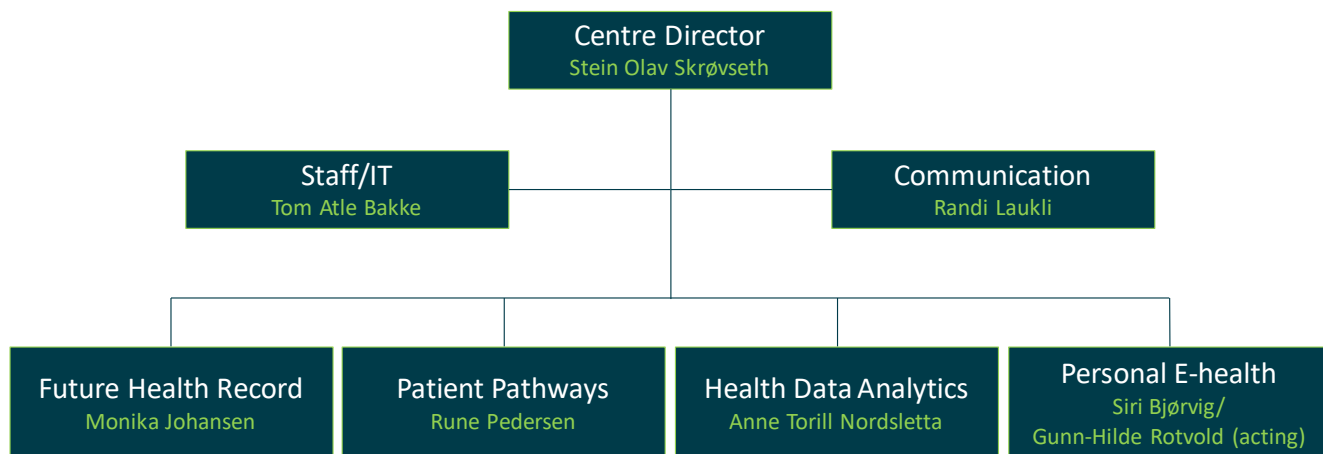
Educational background:

- Nursing
- Social Science
- Technology
- Psychology
- Sociology
- Physics
- ICT
- Socioeconomics
- Education
- Medicine
- Organisation and Management
- Graphical Design
- Pharmacy
- Communication
- Physiotherapy
- Business Economics
- Journalism
- Biology
- Statistics
- Accounting and Audits
- Civil Engineering

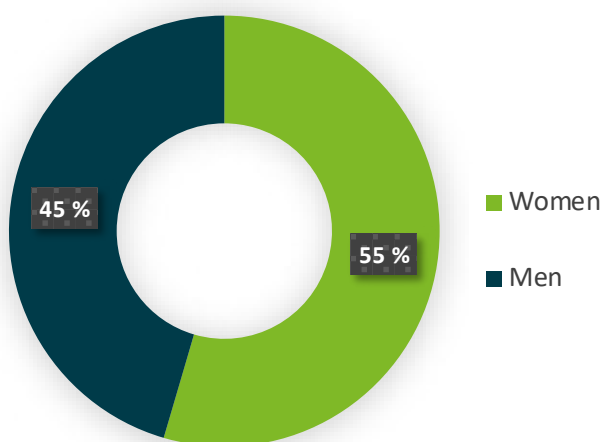
Where are we from?

49 people come from Norway and 17 from:

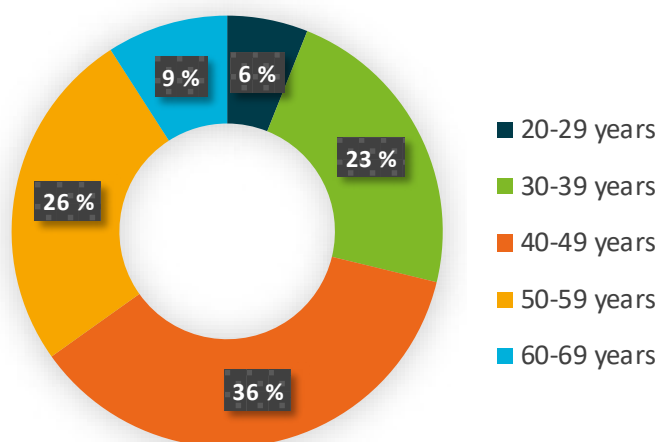
- Greece
- Spain
- Zimbabwe
- Italy
- Germany
- USA
- Lithuania
- Ethiopia
- France
- Russia
- Czech Republic
- Portugal
- Iran



Gender distribution



Age distribution



Elia Gabarron, post doctor,
Personal e-health:

What was the best thing that happened to you in 2018?

As a post doctor, I'm grateful to have the opportunity to research what I really enjoy, namely the use of social media for health promotion. I'm happy to be working with talented colleagues, researchers and patient organisations.

What do you think will be the most important thing for the centre in 2019?

In 2019, we have to improve our participation in both national and international research projects.

Sharing ideas improves them



*Stein Olav Skrøvseth,
Centre Director*

The Norwegian Centre for E-health Research should contribute to evidence-based development in the field of e-health. With the technological developments that are afoot, major national initiatives in this area and the innovation at the local, regional and national level, this is far from being a minor and simple task.

All new technologies change roles, organisations and expectations of the citizens. We need more knowledge to understand both the consequences of the decisions we make, and which decisions will be most conducive to creating effective and integrated health services that take the population's role seriously. There is a tremendous need for original research, follow-up research and reviews of existing knowledge.

The Norwegian Centre for E-health Research has a vision to use knowledge for better health services. We do not build this knowledge alone. We must work with others and create an environment for cooperation and dialogue for everyone in the field of e-health research. While working together with other knowledge fields and administrative organs, we must

maintain the integrity and autonomy that is necessary for us to arrive at results that benefit society. That is important for us in all our projects.

Research never takes place in a vacuum. Disseminating knowledge between researchers as well as beyond research environments is crucial for us to not only do good research, but also ensure that the results find real-world application. As an interdisciplinary centre, we stand between different traditions in the various specialist fields, and our goal is to share knowledge to the greatest possible extent - not least to ensure that public funds we receive is put to the best possible use. Ideas become better when they are shared, discussed and openly critiqued.

In e-health research, we have a long tradition of taking the patients' and users' perspectives into account when pointing out the best use for technology. That is something we will continue to strive for while living up to our values of openness, cooperation and integrity.

Stein Olav Skrøvseth, Centre Director

We are social!



People are finding our centre on social media. We are being liked and followed by individuals and organisations alike, not least healthcare actors and educational institutions. Many in our target group frequent Facebook and other social media several times a day, which means we have to provide updated, useful and varied content.

Facebook:

Our Facebook page has 1907 followers.



Twitter:

950 people are following us on Twitter.



Instagram:

We have 305 followers on Instagram.



LinkedIn:

We have 431 people following us on LinkedIn.

mation about e-health. This knowledge should benefit all of society. The authorities use research-based information in their reports and investigations. The health trusts need information to implement good solutions and the municipalities need information to initiate the most suitable welfare technology. Citizens need information in order to find the best solutions for self-management and for communication with the health service. The industry actors need easily accessible information and an overview of the environments that can help with the various innovation phases of products, services and processes.

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

Our goal is to

- 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 towards the appropriate use of society's shared resources.

A knowledge bank for e-health

The Norwegian Centre for E-health Research aims to gather, produce and disseminate infor-

Screenshot of the centre's Facebook page.



Finances

Financial statement for 2018. Figures indicated in million NOK.

SALARY COSTS

Departments Norwegian Centre for E-health Research

Health analytics	8,7
Future patient record.....	8,6
Personal e-health.....	8,5
Patient pathways	8,9
Sub-total salary costs	34,7

Support services Norwegian Centre for E-health Research

Centre management	1,3
Administration & IT.....	4,3
Communication.....	2,4
Sub-total salary costs	8,1

TOTAL salary costs 42,8

OPERATING COSTS

Direct project costs.....	14,0
Indirect costs - department operations	1,4
Indirect costs - administrative services and infrastructure UNN.....	5,0
Indirect costs - investments and joint operations	2,7

TOTAL operating costs 23,1

TOTAL all costs 65,9

FUNDING

Norwegian Ministry of Health and Care Services.....	33,8
Northern Norway Regional Health Authority basic funding.....	4,6
External funding (competitive)	27,5
USAM	2,0

SUM all funding..... 67,8

RESULT

Operating result	1,9
Operating profit transferred to balance sheet.....	1,9

Profit/loss for 2018 0,0

Strategy

The Norwegian Centre for E-health shall gather, produce and disseminate information relevant to e-health. The centre should be a national leader and internationally recognised for research within its focus areas.

Tasks



Research

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



Investigations

The Norwegian Centre for E-health Research should provide evidence-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

Norwegian Centre for E-health Research should maintain a general overview of e-health knowledge and research environments in Norway and abroad. Through collecting and producing information on e-health in Norway, 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 should make available all its knowledge on e-health and disseminate that of others where natural to do so. Scientific publication is essential to maintain 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 system for e-health and represents Norwegian e-health abroad.

Focus areas



Medical records of the future

The purpose of research in this area is to create knowledge that contributes to medical records becoming the e-health tool of the future, particularly in terms of coordination, diagnostics and support during patient pathways.



Integrated healthcare services

Research on integrated healthcare and nursing services will investigate the development of ICT-supported organisational models that make health services appear integrated for users and patients. This is particularly important for patient groups with complex and long-term needs.



Personal systems and welfare technology

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



Accessibility and analysis of health data

The Norwegian Centre for E-health Research should work on analysing health data and making health data accessible. Using modern statistical solutions, we can find patterns and teach programs to understand and predict based on historical data, resulting in a more proactive health service. E-health research should examine 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 include administrations, authorities, decision makers and other knowledge environments within this field. The centre should collaborate with other actors in the sector, including service providers, users, academia, administrative bodies and businesses.

Vision and values

Our vision is the following:
Knowledge for better health services.

Values

Values are crucial to our success over time and form the core of our culture. Our values motivate us to perform and serve as guidelines for how to operate the centre and work together with our stakeholders.

Transparency

Transparency is one of the most important values in our organisational culture and help keep our processes transparent. By publishing our activities and promoting sharing of knowledge and information, we are building relationships of trust between ourselves and our partners, as well as society in general.

Openness constitutes a desire to learn, be curious of others and receptive to new ideas. This also entails an ability to give and receive constructive feedback. We encourage different opinions.

Collaboration

E-health is an interdisciplinary field, and no one is capable of doing it all on their own. Collaboration is accordingly something we hold in high regard. We often join forces with the same actors with whom we compete for research funds. Trust lies at the heart of any good collaboration. Trust and respect for one another makes working together a joyful experience.

Inclusion is the key to building a community, and being part of a community means trust, a

sense of belonging, friendship and well-being. By including others, both internal and external partners, we work more effectively 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 our actions matching our words. We trust that we want the best for each other and that everyone is doing what they can. Quality should be the hallmark of what we deliver.

It is important to us to perform our public mission as best we can, which is why we must set clear expectations for the centre and our employees. Our organisation wants independent, committed employees who take accountability for the centre's success. We must be able to depend on one another for support - even when we make mistakes.



Q&As

Randi Laukli, Head of Communications, Communications Department:

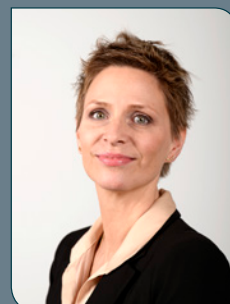
What was the best thing that happened to you in 2018?

I'm passionate about research dissemination. Popularisation helps make research more accessible to more people. Making research accessible to as many people as possible helps create engagement. Research depends on public funding, and it's important to us that the public has a good understanding of our field of research.

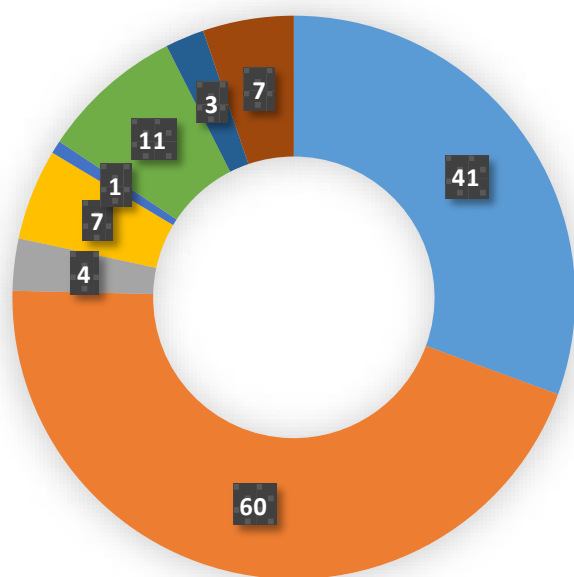
2018 was a good year for research communication where several of our brilliant researchers opened their eyes for science communication.

What do you think will be the most important thing for the centre in 2019?

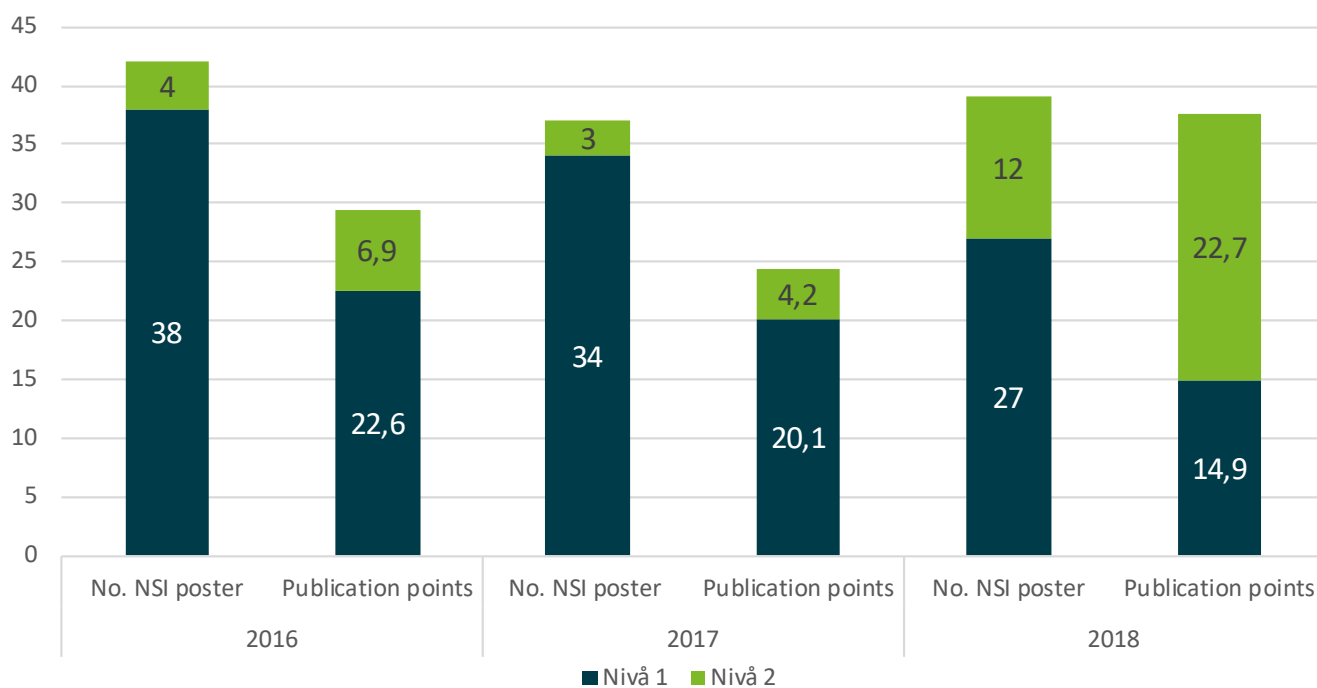
In 2019, we will disseminate even more of our knowledge through the website ehealth-research.no. We will let other research organisations disseminate their research here too. This will be great!



Research figures



- 41 scientific articles/overview articles
- 60 scientific/academic talks and poster presentations
- Four scientific chapters/articles/conference articles
- Seven abstracts
- One feature article
- 11 popular science articles
- Two popular science talks
- Seven reports



NSI: Norwegian Scientific Index

NSI publications: Publications that earn publication points and which are part of the funding schemes in the health, institute and university hospital sector



Research collaborations

Europe

Belgium

- Innovation Departement
Point Hamont
- Department of Public Health
and Primary Care
- KU Leuven
- Aan de Beverdijk
- Vulpia Vlaanderen
- Médecins Sans Frontières

Denmark

- Aalborg Universitet
- Syddansk Universitet

Estonia

- Tallinn University of Technology

Finland

- University of Oulu
- National Institute for Health and Welfare
- Duodecim, Scientific Society of Finnish
Physicians
- Department of Internal Medicine, Tampere
University Hospital

France

- University Hospital Trust
- Tenon Hospital, Paris
- Paris Descartes University
- Université Pierre et Marie Curie

Iceland

- Directorate of Health

Italy

- Restech s.r.l., Milano
- Politecnico di Milano

Norway

- Norges teknisk-naturvitenskapelige
universitet
- University Hospital of North Norway
- UiT Norges arktiske universitet
- Høgskolen i Molde - Vitenskapelig høgskole
i logistikk
- Apotek 1
- OsloMet - storbyuniversitetet
- Universitetet i Oslo
- Balsfjord Municipality
- Oslo Universitetssykehus HF
- MAGIC non-profit research and innovation
programme
- Folkehelseinstituttet
- Sykehuset Innlandet HF
- Nordlandssykehuset HF
- Odda Municipality

Portugal

- Lisbon Holy House of
Mercy MHIH

Romania

- University of Medicine
and Pharmacy "Carol
Davila" Bucharest
- Compexin SA, Research
& Development Department

Slovenia

- Hospital of Sezana

Spain

- El Centro de Investigación
Biomédica en Red de
Enfermedades Respiratorias
- Hospital Clínic de Barcelona
- Universitat de Barcelona
- Universidad de Sevilla
- Médecins Sans Frontières

United Kingdom

- University of Surrey
- National Health Service
- University of Lincoln
- University of Liverpool
- Seven Informatics Ltd, Banbury
- The London School of Hygiene and Tropical
Medicine
- University of Southampton

Switzerland

- Médecins Sans Frontières
- World Health Organization (WHO)



**Sweden**

- Uppsala universitet
- Karolinska Institutet
- Linköpings universitet

Czech Republic

- Charles University, Prague

Germany

- Kiel University

North America**Canada**

- Department of Health Sciences, Université du Québec en Abitibi-Témiscamingue, Rouyn Noranda
- Université Laval
- University of Victoria
- McMaster University
- Médecins Sans Frontières

USA

- Louisiana State University
- University of Colorado Health Sciences Center
- Analytic Measures Inc., Palo Alto

Asia**United Arab Emirates**

- Health Science Department, Khawarizmi International College (KIC)
- Department of Applied Science, College of Arts and Sciences, Public Health Program, Abu Dhabi University

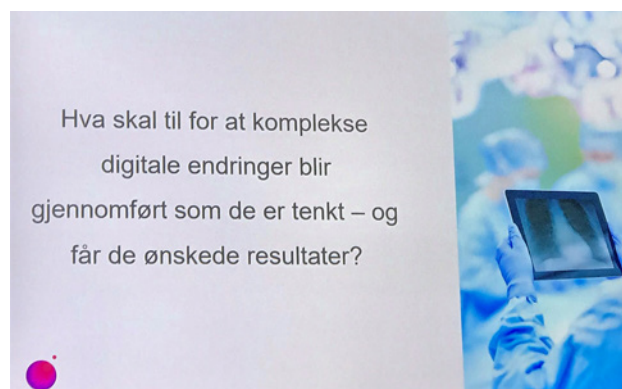
Oceania**Australia**

- University of New South Wales

Research at EHiN (E-Health in Norway)



Deede Gammon



18



Debate at EHiN: Fabian Bolin, Tale Maria Krohn Engvik (aka Helsesista), Bent Høie, Fredrik Gulowsen and Karen Dolva



Johan Gustav Bellika



Gunn-Hilde Rotvold



Our stand at EHIN

WHO collaboration

In June 2018, the centre's professor Gro Berntsen held a talk at WHO's strategic conference in Budapest to launch their new strategy: Towards a roadmap for the digitalization of national health systems in Europe.

Our centre has also contributed knowledge to the WHO project Be He@lthy, Be Mobile, the scope of which includes several countries and areas of e-health. Eirik Årsand (researcher), Meghan Bradway (doctorate student), Konstantinos Antypas (researcher, University of Oslo) as well as Per Hasvold, Jennifer Lee and Natalia Wroblewska all contributed to the report 'Review of mHealth Assessment Frameworks'.

Department Head Anne Torill Nordsletta attended the conference AI For Good in Geneva in May and held the talk 'Artificial Intelligence based on real-world data'.

Senior advisor Per Atle Bakkevoll attended an autumn seminar on artificial intelligence in Geneva. ITU Focus Group on AI for Health (AI4H) is a partnership between the WHO and the International Telecommunication Union (ITU), aimed at building a framework for standardising evaluation and validation of AI algorithms.

We worked all of autumn 2018 on planning a conference in Copenhagen for February 2019 which WHO organised in collaboration with us. The conference was called The WHO/Europe Symposium on the future of digital health in the European Region. You can find more information about the conference at ehealthresearch.no/WHOisdigital.



Anne Torill Nordsletta, Department Head of Health Analytics. Photo taken at the conference AI For Good in Geneva, May 2018.

The Norwegian Centre for E-health Research has been working with the WHO - World Health Organisation - since 1997, when the WHO asked the University Hospital of North Norway to become a partnership centre, the first of its kind in the field of telemedicine and e-health. The partnership was formalised a few years later. We are now in the fifth agreement term, which lasts until 2022.

Q&As

Rune Pedersen, Department Head, Patient Pathways:

What was the best thing that happened to you in 2018?

Our workshop on Helseplattformen [the Health Platform] in November was important. We want to coordinate processes that lead to major formative dialogue research processes in collaboration with a broad national e-health environment. I feel like this was a success; with more than 50 attendees from research insti-

tutions, authorities and Helseplattformen, we have laid the groundwork for more initiatives to get funding for major projects.

What do you think will be the most important thing for the centre in 2019?

We're currently in the process of gathering researchers at the national level. Three major initiatives are about to be launched in collaboration with Helseplattformen. We will also be conducting formative dialogue research and writing grant applications.





Group photo at WHO symposium in Copenhagen. Photo: WHO



Conceição Granja, Senior Researcher, Future health record:

What was the best thing that happened to you in 2018?

In 2018, we received recognition for our many years of hard work. I'm part of a great team, and collectively, we possess a lot of knowledge about e-health. One of our publications turned our world upside-down and opened the door to what we've always wanted to do: help people! It was a year with a lot of national collaborations which has the potential to

change the way e-health research is done, as well as international collaborations which can impact the application of e-health globally.

What do you think will be the most important thing for the centre in 2019?

The centre has knowledge as well as expertise in the field of e-health, which is clearly evident from the quality of research. For 2019, it's important for the centre to build on this knowledge, expertise and research quality to achieve a leading role in the national e-health arena.



Home monitoring of COPD patients can result in fewer admissions

A new technology allows patients to independently take tests that show whether their condition has worsened or not.

A lot of COPD patients face difficulties with having to travel to the hospital for check-ups and frequent admissions. But new research has discovered good results from using a device that allows the patient to monitor their own condition from the comfort of their own home.

The test cannot be done alone, however, as the healthcare worker must also measure lung capacity as the test is being carried out. It can be challenging for patients who live alone and who have to monitor their own condition.

“Resmon Pro is less demanding since the patient doesn’t need to do the forceful exhalations. They can take the test on their own in their living room,” said Zanaboni.

The device, Resmon Pro, can help the most severely affected COPD patients stay home longer and also reduce the number of hospital admissions.

“Our research shows that Resmon Pro can help the most severely affected patients”, said Zanaboni, Senior Researcher at the Norwegian Centre for E-Health Research.

He has evaluated the effects of the technology together with his colleague Trine Bergmo and Italian colleagues. The study was part of a major EU project.

Exhalation testing at home

Typically, COPD patients must visit the hospital to undergo an exhalation test, where they inhale as hard as possible, and healthcare workers measure how forcefully they are able to blow.

The purpose of the device is to prevent the disease from worsening. Some COPD patients experience symptoms of worsening too late, after which they can be difficult to describe. But instead of having to answer how they feel, the device measures the patient’s actual condition.



*Senior Researcher
Paolo Zanaboni*

Kristin Skeide Fuglerud, Head Researcher and Norwegian Computing Center and Associate Professor at University of South-Eastern Norway

I’m really interested in inclusive design through the development of new health technology. We have to consider the diversity of society, especially groups with poorer health services than others, such as persons with disabilities or complex needs. On the one hand, there are enormous possibilities in this technology, while on the other, there is also the danger of

reinforcing and creating new divisions. We can make information accessible and understandable, as well as taking things that matter to each person seriously. The technology must be flexible in terms of its presentation, interaction mechanisms and perhaps also motivation mechanisms. I’m thrilled that I’ve been given the opportunity to collaborate with the Norwegian Centre for E-Health Research on those exact issues through the network Innsikt [Insight] which receives funding from the Research Council of Norway’s Programme on Health, Care and Welfare Services Research.





The sickest patients

The study was carried out with 330 patients randomly divided into two groups. The patients had several conditions in addition to COPD such as chronic heart failure, sleep disorders or high blood pressure.

The patients in the home observation group had to use the machine every day. The readings were sent to the hospital, and the data was used by the researchers to measure the effect. The patients in the control group only received the normal follow-ups.

Alerted health personnel

If the values fell as the patients exhaled into the device, an alert was transmitted to the health personnel. This allowed them to see whether the patient's condition was worsening. They called the patient, asked him to take his medicine (or not) and when relevant, recommended that he/she be admitted on the basis of the test results.

Reference:

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Help from family members is often not the best solution

Seniors need courses that permit them to ask the “stupid” questions, according to researchers.

Several organisations have offered courses to teach seniors about technology.

The researchers Inger Marie Holm and Asbjørn J. Fagerlund at the Norwegian Centre for E-health Research have completed a qualitative study on course participants and course leaders to learn more about the effects of the training.

The objective was to find out whether such courses help seniors maintain their social networks to prevent loneliness. They also wanted to investigate what barriers existed that prevented seniors from using technology.

Arriving at a conclusion was, however, difficult. The seniors who participated in the courses were a diverse group.

“Many of them are very technology-oriented and up-to-date with Skype, Facebook and online banking, yet others do not have any relation to technology at all,” said Inger Marie Holm.

Fewer telephone calls

Despite this, the researchers found some main characteristics. Many seniors say they became lonelier after society took a sharp technological turn. Fewer people telephone each other, as they prefer text messaging and Facebook. Those who do not use these channels may end up losing touch with society.

“On the other hand, there are seniors who are tired of having so much contact with people. They would rather use technology for their own interests such as photo editing,” said Holm.

Bitten Barman-Jenssen, a pensioner, recognises herself very much in this statement. The 81-year-old is an active member of her community and has chaired the senior citizens council in the municipality. She believes that many people are happy to live without social media.

“I have Facebook, but I don’t think technology contributes to reducing loneliness. In my experience, seniors would prefer to have someone to talk to one-on-one.”

Drop-in help from children

It is common that children and grandchildren help when the computer crashes or when grandad wants to open a Facebook account. But it is not always beneficial.

Many seniors found it negative and said that family members are often impatient and lack teaching skills. Among other things, many of the seniors had been given an e-mail account with random passwords that were impossible to remember.

Seniors should take courses from people who can teach and where it is OK to ask the “stupid” questions. Often a lack of interest in technology is also about fear.

Individual follow up and repetition are important. The rule of having to hear information seven times before it is remembered, also applies to seniors.

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*Researcher
Inger Marie Holm*



*Researcher
Asbjørn Johansen
Fagerlund*



*Inger Marie Holm and
Bitten Barman-Jenssen*



Anne Kristin Vie, Senior Public Services and Health Advisor, Norwegian Consumer Council (Forbrukerrådet)

Digitalisation of the national public health service is a revolution, and we are seeing the contours of a more consumer-led national public health service. The consumer is offered a huge variety of new digital products and services which also facilitate this development, e.g. digital health tools and apps, home testing kits and doctor's appointments via apps and video calls.

Norwegian GPs play an important role in this context, which is why it is central that they

are organised so they can use new digital tools that benefit the consumer in the best way. The GP should be up to date in terms of knowledge of digital tools and be able to advise consumers how to use it. It must be easy getting in touch with your doctor, and it has to happen through channels people are used to communicating in. That is why we are working on ensuring that the national public health service is able to offer video consultations to patients who want that option and where appropriate.

In order for consumers to benefit from new digital tools and feel comfortable using them, quality assurance that both consumers and health personnel trust is necessary.



More Norwegian municipalities using personal connected care

An ever-growing number of municipalities in Norway are trying out personal connected care. In fact, over half of Norway's municipalities are experimenting with this technology today.

Connected care is an umbrella term for technology aimed at providing everyday assistance to people who need it. For example, this includes GPS watches that tell the user where they are, remote control safety alarms or sensors that trigger an alert if a person falls. It can also include smartphone apps that help children learn a language and communicate better.

This type of technology can help people with chronic illnesses master and control their symptoms. It can also help seniors remain at home longer.

A new report from the Norwegian Centre for E-Health Research shows that a growing number of municipalities have tried out and employed new technologies in their municipal services. More than 200 connected care projects were active in the period between 2013-2016.

"We discovered that the number of projects had doubled in that period compared to the previous one. In some areas, the number had tripled or quadrupled. Just over half of the municipalities had projects underway in that period. This is a positive development," said Undine Knarvik, Project Manager at the Norwegian Centre for E-Health Research.

Holistic approach necessary

Researchers at the centre have authored a knowledge overview of how personal connected care is used in Norway. The report was written in cooperation with the Norwegian Directorate for E-Health and the Norwegian Directorate of Health's Connected Care Programme.

The researchers examined how Norwegian municipalities use this technology, especially in relation to seniors or people with chronic illnesses.

— The municipalities are obligated to provide a wide variety of services to their citizens. Among other things, they must provide care for a growing number of seniors and people with



Senior Adviser
Undine Knarvik

Ole Jakob Mengshoel, NTNU Norwegian Open AI Lab

At the Norwegian Open AI Lab (see <https://www.ntnu.edu/ailab>), we have several fruitful collaborative projects taking place in the intersection between medicine and AI. We believe that artificial intelligence and machine learning is an area with considerable potential for digital transformation for better healthcare and e-health services.

In Norway, we have seen a lot of exciting and unique medical datasets, and it is important that these sets will be made available for data analysis and machine learning. We look forward to continuing our collaboration between the medicine and artificial intelligence research environments, which will allow existing and new medical data to benefit the Norwegian population through better treatment options and medical services.





chronic illnesses, which requires funds, more employees and good, innovative solutions. It is in such a context that connected care solutions can help solve these challenges.

First and foremost, it is important to think holistically, noted Knarvik.

– “It is easier to succeed if the municipality sees the use of technology as part of its overall strategy for digitalisation of municipal services. It should be part of a bigger effort.”

Small municipalities face more challenges

Researchers conducted a number of studies and interviews to find out what hinders Norwegian municipalities from using connected care.

“Small municipalities face challenges implementing the technology. This can be due to a lack of expertise, resources or infrastructure. The smallest municipalities depend on working together with neighbours in their region. The interview subjects in the small municipalities noted that they see cooperation as a strength,” said Knarvik.

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Video games to help children tackle diabetes

“It’s no use offering children something they have to play because they have a disease. It has to be something so appealing, that they will want to play it again and again,” said the researcher behind the game.

Inside the virtual world on the PC monitor, the child enters a distant future; one where everyone on Earth has diabetes but does not automatically get medicines and treatment. The gamers have to fight for that.

In order to make their in-game characters strong enough, the children have to make smart choices on food, medicine and training as they make their way through the game. The players who are the best at mastering their disease make it the furthest.

Keeping your character healthy

“The main target group is children in rural areas between the ages of 8-12 who have type 1 diabetes. The game is meant to make the process of getting used to your disease easier. The goal is to give the player an intuitive understanding of the relationship between food intake, activity and blood sugar,” explained Svein-Gunnar Johansen.

Johansen is a researcher at the Norwegian Centre for E-Health Research, where he is taking a doctorate in informatics on developing this educational video game. According to Johansen, one of the most successful games in the so-called “serious games” market is a game by another Norwegian developer that teaches children algebra.

– “It’s no use offering children something they have to play because they have a disease. It has to be something so appealing to them that regardless of their diagnosis, they will want to play it again and again,” said Johansen.

And it is certainly not an easy group to target. Today’s children and young live in a world where thousands of new video games are published every day. The researchers therefore sought advice from children and young people with diabetes to figure out how to make the game as appealing as possible.

Social platform

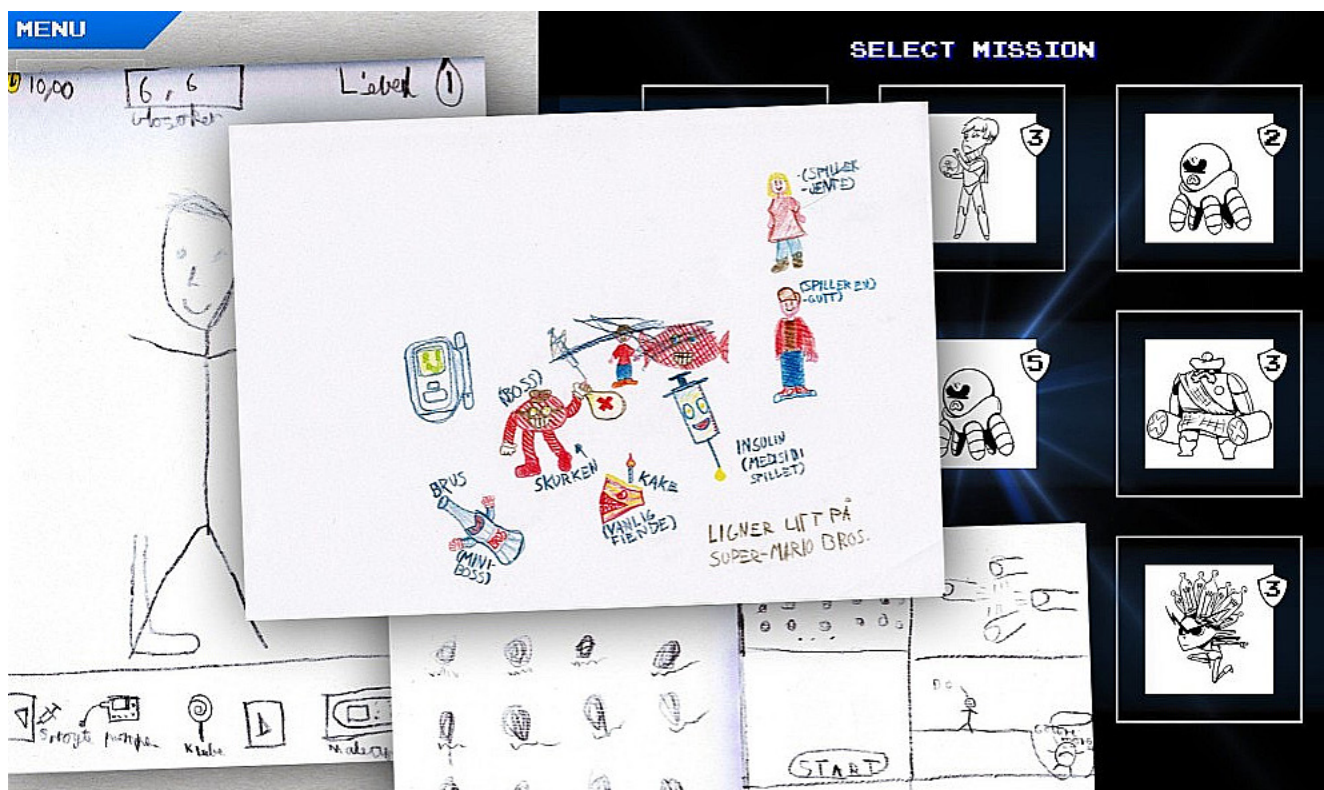
The diabetes project has been underway for several years, and the development of a video game is only one component of the larger project. They are also creating an online social platform. The goal is fourfold: They want children with diabetes to learn from the game, but also their family and friends. In addition the online community can be a support for children so they feel less alone when dealing with their diagnosis.

The age range of the target group has not been chosen at random.

– In the ages 8 to 12, your parents do not have as much of an influence on your choices over the course of the day. This means you have to take more responsibility for yourself, while at the same time being too young to fully understand the consequences of not doing what you’re supposed to,” said Johansen.



*Researcher
Svein-Gunnar Johansen*



Getting friends into the game can break down barriers and make it easier talking about the disease. Many find it unpleasant to check their blood sugar and take insulin shots over the course of the school day. A game can reduce the stigma.

Once the game is launched, the inevitable question will be: Is it helping? The researchers aim to answer that by having one group of children learn via the game and one group without the game, which will allow them to compare later how each group manages to regulate their blood sugar.

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Liselotte Lunde, Manager of Public Affairs, KRY

There is not enough documented research today on how the use of e-consultations can replace physical consultations and relieve the burden on the national public health service. There is agreement that e-consultations are suited for solving medical issues that patients need urgent treatment for and which are neither acute (life-threatening) or require a physical consultation.

However, we are lacking impartial and documented research on what happens to the patients following an e-consultation. Did they get the help they needed or did they have to visit a GP in person anyway? And what does it mean that the patient received help? Is it up to the GP to determine that or should it be up to the patient?

Doctors not using the summary care record as intended

Norwegian doctors are not using the summary care record (in Norwegian: Kjernejournal) to find critical information such as allergies. Instead, they use the record to look up the patient's prescriptions.

There are a lot of indications that Norwegian doctors do not use the summary care record as intended by the authorities, according to a new study by researchers at the Norwegian Centre for E-Health Research.

In 2017, all citizens and health personnel in Norway got access to the summary care record. It gives all health personnel access to the same information regardless of whether they are working as a GP, in a hospital or outpatients' clinic.

In 2016, 25 doctors in Trondheim were asked what they thought about the record and how they use it. The doctors worked in outpatient care, hospital emergency wards or as GPs. Trondheim is the region in Norway where this record has been used the longest.

"We were somewhat taken aback by their responses, as there was a gap between what the authorities wanted it to be used for and the functions that were the doctors' favourites," said Kari Dyb, Senior Researcher at the

Norwegian Centre for E-Health Research. The results of the study were published in the international scientific journal BMC Health Services Research.

Prescriptions are the favourite

The researchers discovered that most of the doctors interviewed mainly only used one of the six functions in the summary care record.

"Most of the doctors we spoke to said that they use it to see what medication the patient has been prescribed. They consider this important, as giving the patient the wrong medication can have potentially fatal consequences," said Dyb.

However, the doctors were not very keen on using the function the authorities considered among the most important, namely critical information. This could include information about allergies or implants, for instance.

The summary care record contains the following functions:

- Overview
- About the patient
- Prescriptions
- Critical information
- Past visits
- Settings



Senior Researcher
Kari Dyb



Senior Researcher
Line Lundvoll Warth



From left: Line Lundvoll Warth and Kari Dyb

Three types of patients

The findings also revealed that the doctors mainly used the record for three patient groups: the elderly, drug addicts and the unconscious.

“If you’re unconscious, you obviously can’t communicate with the doctor. When it comes to senior patients, they are often on several different medications, and many of them have chronic illnesses. A patient with drug problems might attempt to obtain drugs for abuse,” said Senior Researcher Line Lundvoll Warth.

Most often, the doctors used the summary care record in emergency situations. In the study, many of the doctors also said that they do not have time to make manual entries in the record.

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Patients can share important information via their mobile phones

The advantage of the technology is that patients can report their health status, regardless of where they are.

Whereas diabetes patients previously had to travel to a hospital or GP clinic for a check-up, they can now record information in their current location with the aid of apps and other smart technological tools.

The data they collect and share can tell more about their health. Health personnel who receive the information can thus better advise the patient.

“Examples of such tools are insulin pens with communication, smart watches and armbands such as Fitbit, as well as apps that record physical activity. For example, the popular Runkeeper app,” says Alain Giordanengo from the Norwegian Centre for E-health Research.

He recently published a scientific article on the subject.

Information from missing information

The system they have developed makes it possible to extract more information from the data which is shared. The data is systematised and could result in health personnel giving patients better advice and treatment.

“The patient can quite simply feel better when the technology detects, for example, the situations in which the patient has low blood sugar,” he said. “The possibilities are there, but we must be realistic.”

Other research has shown that much of the information about a patient’s health is hidden in the data diabetes patients collect themselves. The advantage of the technology is that people can report their health status, regardless of where they are.

Hopefully fewer visits to the doctor

Hans-Henrik Hamrebø, a diabetes patient, is positive towards more direct sharing of health data.

“For example, I currently share data on glucose levels whenever I go for a check-up with the diabetes nurse. It takes some time, but not too much, for the nurse to upload the data. With direct sharing, more data will become available and form the basis for better recommendations from health personnel,” said Hamrebø.

“For those of us who live an hour’s drive from a city or town, three hours are soon saved for each check-up. If more data is shared instead of attending hospital check-ups, doctors, nurses and patients will have more freedom,” he said.



*PhD-student
Alain Giordanengo*



Hans-Henrik Hamrebo

A challenge is that it is time-consuming for doctors to go through so much information in order to personalise treatment.

"GPs may not have time to prepare themselves properly. They have too much to do and sorting data for each patient will be an additional task for them," said Giordanengo.

"An app doesn't work on its own. It's essential to look at how the collected data can be used in the simplest and best possible way," he added.

*Project name: Full Flow of Health Data
Between Patients and Health Care Systems*

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