Suomen Telelääketieteen ja eHealth seura

Finnish Society of Telemedicine and eHealth

eHealth2021

The 26th Finnish National Conference on Telemedicine and eHealth

"eHealth in a Lifecycle"

7. – 8.10.2021

Oulu

Editors: Elisa Mejías, Pirkko Kouri, Outi Ahonen, Jarmo Reponen

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Suomen telelääketieteen ja eHealth seura ry.
eHealth2021 kansainvälinen konferenssi
XXVI Kansallinen telelääketieteen ja eHealth seminaari

Esipuhe
XXVI Kansallinen, että kansainvälinen Telelääketieteen ja eHealth konferenssi

Outi Ahonen, puheenjohtaja
Suomen telelääketieteen ja eHealth seura ry

Arvoisat kutsuvieraat, hyvät konferenssipäiviin osallistujat, sekä paikan päällä että etänä.

Suomen telelääketieteen ja eHealth seuran puolesta minulla on ilo toivottaa teidät tervetulleeksi eHealth2021 konferenssiin ja samalla 26. vuotuiseen kansalliseen konferenssiimme Ouluun, jonka teemana on "eHealth in a Lifecycle".

Seura on jo vuodesta 1995 edistänyt tieto- ja viestintätekniikan käyttöä terveydenhuollossa. Seuramme tärkein toimintamuoto on koulutustilaisuuksien järjestäminen ja kansalliseen keskusteluun osallistuminen. Seuramme julkaisee nyt yhdettätoista virallista vuosikertaa Finnish Journal of eHealth and eWelfare (FinJeHeW) -lehdestä yhdessä Sosiaali- ja terveydenhuollon tietojen käsittely-yhdistyksen (STTY) kanssa. Vuodesta 2004 alkaen olemme jakaneet vuosittaisen kansallisen eHealth- tunnustuspalkinnon ansiokkaasta toiminnasta telelääketieteen ja eHealthin alueella, joksi katsotaan esimerkiksi telelääketieteen ja/tai eHealth alaan kuuluva väitöskirja tai muu merkittävä seuran tavoitteiden mukainen toiminta kansallisella ja kansainvälisellä tasolla.

Tuemme myös ammatillista jatkokoulutusta eHealth -sektorilla vastaamalla osaltamme lääkäreiden, hammaslääkäreiden ja eläinlääkäreiden terveydenhuollon tietotekniikan erityispätevyysohjelmasta yhdessä Suomen lääkäriliiton ja Suomen hammaslääkäriliiton ja Suomen eläinlääkäriliiton kanssa. Konferenssista myönnetään 10 tuntia teoreettista koulutusta lääkäreiden, hammaslääkäreiden ja eläinlääkäreiden terveydenhuollon tietotekniikan erityispätevyyteen.

Seuramme tukee stipendein suomalaisen eHealth osaamisen näkymistä kansainvälisesti. Seuramme on perustajajäsen pohjoismaisessa Nordic Telehealth Association (NTA) järjestössä sekä toiseksi vanhin jäsen International Society for Telemedicine and eHealth (ISfTeH) järjestössä. Seuramme sihteeri Pirkko Kouri työskentelee ISfTeH:n johtoryhmässä varapuheenjohtajana.

Vuoden 2021 konferenssissa käsitellään teemoja ja tuodaan uusinta tietoa kansainvälisestä, pohjoismaisesta sekä kansallisesta digitaalisen sosiaali- ja terveydenhuollon kehityksestä ja ratkaisuista. Kohtauspaikkana konferenssi tarjoaa tuoretta tietoa niin eri alojen lääkäreille, hoitotyön ja kuntoutuksen eri ammattiryhmille, sosiaalialan toimijoille sekä sosiaali- ja terveydenhuollon digitaalisten palveluiden kehittämisestä kiinnostuneille ammattiryhmille. Koulutus tuo uutta tietoa myös sosiaali- ja terveydenhuollon hallinnosta, suunnittelusta ja koulutuksesta vastaaville toimijoille. Kongressin vierailukohteet tarjoavat näköalapaikan uusien ratkaisujen käytännön soveltamisesta sosiaali- ja terveydenhuoltoon ja ihmisten arkeen. Konferenssimme sisältää englanninkielisen ja suomenkielisen rinnakkaisohjelman. Konferenssimme järjestää tutkijoille ja kehittäjille mahdollisuuden esittää tiivistetysti tuloksiaan.

Suomen telelääketieteen ja eHealth seuran puolesta haluan kiittää kaikkia luennoitsijoitamme korkeatasoista esityksistä. Samoin kiitän kaikkia näytteilleasettajiamme ja demonstraatioiden järjestäjiä. Ilman teidän osallistumistanne konferenssimme ei olisi se oppimisen ja verkostoitumisen paikka, jona se nyt palvelee.

Erityinen kiitos konferenssistamme kuuluu pääyhteistyökumppanillemme Pohjois-Pohjanmaan sairaanhoitopiirille, joka on vastannut viestinnästä, käytännön järjestelyistä ja yhdessä OuluHealthin kanssa paikallisten tutustumiskäyntien organisoinnista. Kiitämme myös Oulun yliopistoa, Oulun Ammattikorkeakoulua, OuluHealthia ja Oulun kaupunkia yhteistyöstä.

Toivon kaikille osanottajille antoisaa konferenssia täällä paikan päällä Oulussa ja virtuaalisesti mukana oleville.

Outi Ahonen

Finnish Society of Telemedicine and eHealth
eHealth2021 International Conference
The 26th Finnish National Conference on Telemedicine and eHealth

Foreword
The 26th Finnish National, and International Conference on Telemedicine and eHealth
Outi Ahonen, President
Finnish Society of Telemedicine and eHealth, Finland

Distinguished invited guests, dear participants in the conference, both on site and remotely

It is my great pleasure to warmly welcome all of you to our eHealth2021 and 26th annual conference to Oulu, of which the theme is "eHealth in a Lifecycle".

Finnish Society of Telemedicine and eHealth (FSTeH) have been promoting the use of information and communication technology in health care since 1995. Our most important activity is to arrange educational events and to participate to the national discussion. Our society also publishes the Journal of eHealth and eWelfare (FinJeHew) together with the Finnish Social and Health Informatics Association (FinnSHIA). Since 2004, we have delivered the annual Finnish eHealth award from the significant accomplishments in the field of telemedicine and eHealth. The required activity can be for example a doctoral thesis in this area or some other important activity in the national or international level supporting the society´s goals.

We are supporting further education and training of health professional in the eHealth sector by coordinating special competence for healthcare information technology to physicians, dentists, and veterinarians together with the Finnish Medical Association, the Finnish Dental Association and the Finnish Veterinary Association. Our conference will contribute 10 hours of theoretical training for Finnish physicians´, dentists´ and veterinarians´ special competence for healthcare information technology.

Our society supports the international visibility of Finnish eHealth expertise by scholarships. Our society is a founding member of Nordic Telehealth Association (NTA) and International Society for Telemedicine and eHealth (ISfTeH). Our society´s secretary Pirkko Kouri holds one of the ISfTeH´s board member seats as ISfTeH´s vice-president.

This year´s conference covers themes from updating the knowledge about International, Nordic eHealth and national digital health trends and solutions. The conference a offers unique meeting place and new information to physicians from versatile fields, nursing and different professional groups in welfare and rehabilitation sector interested in the development of digital health and welfare services. The conference also brings new knowledge to those responsible for the administration, planning and training of health and social care in people´s daily lives. Our conference includes a parallel program in English and Finnish tracks as well as joint plenaries. Our conference organizes sessions and exhibitions for researchers and developers to provide a compact presentation about their research, innovation and development (RDI) results.

On behalf of Finnish Society of Telemedicine and eHealth I would like to express my gratitude to all lecturers and scientific abstract presenters for their valuable contributions. Our sincere thanks belong also to all our exhibitors and demonstrators. Without your support, this conference could not be the networking event it is today.

Our special thanks belong to our fellow organizer, Northern Ostrobothnia Hospital District. They have been responsible for communication, practical arrangements and together with Oulu Health organizing local visits. In addition, we would like to thank the University of Oulu, Oulu University of Applied Sciences, OuluHealth and City of Oulu for their work in the joint organizing committee.

I wish everybody a very successful conference.

Outi Ahonen

Suomen telelääketieteen ja eHealth seura ry.
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eHealth 2021 järjestelytoimikunnan puheenjohtajan tervehdys
Jarmo Reponen, järjestelytoimikunnan puheenjohtaja
Suomen telelääketieteen ja eHealth seura ry

Hyvät konferenssin osallistujat,

On suuri ilo toivottaa teidät tervetulleiksi kokoontumaan yhteen digitaalisen terveyden pariin ja tapaamaan kollegoita pitkän erillään olon jälkeen! Tämä on jotakin, mitä olemme kaivanneet.

Kansallisen ja kansainvälisen eHealth konferenssin järjestäminen on pitkä matka. Tämän konferenssin järjestäminen alkoi jo lähes kolme vuotta sitten, kun neuvotteluja käytiin paikallisen kumppanin löytämiseksi. Sitten keväällä 2019 tiesimme, että tämä konferenssi pidettäisiin Oulussa, väliin mahtuisi kuitenkin vielä joka toinen vuosi järjestettävä laivakonferenssi. Emmepä silloin tienneet, että väliin mahtuisi myös COVID-19 pandemia, joka muuttaisi kaikkia aikatauluja.

Tämän takia erityiset kiitokset Pohjois-Pohjanmaan sairaanhoitopiirille, joka toisena pääjärjestäjänä on koko ajan ollut vahvasti sitoutunut konferenssin järjestämisen ja siihen, että voimme kohdata toisemme kasvokkain. Konferenssin ajankohtaa on siirretty yhteisymmärryksessä turvallisempaan ajankohtaan ja alueen paras COVID-19 asiantuntemus on ollut meillä joka kokouksessa käytettävissä tilannekuvan luomiseksi ja tarvittavien päätösten tekemiseksi. Erityisesti arvostan sitä, että sairaanhoitopiirin ja yliopistosairaalan korkeimmat johtajat, mm. vs. johtajaylilääkäri Terhi Nevala ja kehitysjohtaja Pasi Parkkila ovat käyttäneet työaikaansa tämän tapahtuman järjestämiseksi keskellä kansallista hyvinvointialueuudistusta, sisäistä organisaatiouudistusta, uuden sairaalan rakentamisprojektia ja pandemian hallintaa.

Järjestelytoimikunnan puheenjohtajan tehtävä on monesti yksinäistä. Työ alkaa toimikunnan nimittämisestä ja päättyy vasta, kun konferenssin jälkiselvittely ovat valmiit. Puheenjohtaja ei voi olla pois yhdestäkään kokouksesta. Tarvitaan uskoa siihen, että asiat saadaan järjestymään ja tarvitaan välillä nopeita päätöksiä ristiriitaisenkin tiedon varassa. Silloin on kiitollinen niistä kumppaneista, jotka jakavat saman päämäärän ja tavoitteet. Kiitän Suomen telelääketieteen ja eHealth seuran nykyistä puheenjohtajaa Outi Ahosta ja sihteeriä Pirkko Kouria, joiden kanssa monen ongelman ratkaisuvaihtoehtoja on etukäteen mietitty. Tapahtuma ei olisi myöskään ollut mahdollinen ilman käytännön järjestelyitä hoitaneita koordinaattoreitamme Elisa Mejíasta ja Pauliina Hyrkästä Pohjois-Pohjanmaan sairaanhoitopiiristä, jotka ovat käytännössä toteuttaneet yhdessä sovittuja asioita. Yhtä lailla kiitän kaikkia toimikunnan jäseniä, jotka ovat edustaneet pääjärjestäjien lisäksi Oulun yliopistoa, Oulun ammattikorkeakoulua, Oulun kaupunkia ja OuluHealth:ä. On ollut hieno nähdä, miten toimikunta on hitsautunut yhteen valmisteluprosessin aikana. Tämän konferenssikirjan sivuilta selviää, miten laaja joukko valmisteluun on kaiken kaikkiaan osallistunut.

Konferenssin iloisin tehtävä on kiinnostavan ohjelman rakentaminen. On innostavaa miettiä ajankohtaisia teemoja ja tuoda yhteen kutsuluennoitsijoita läheltä ja kaukaa. Hienoa on ollut se, miten mielellään luennoitsijat ovat suostuneet jakamaan tietämystään konferenssin osanottajille. Iloinen saavutus on myös se, että pandemia-ajasta huolimatta tieteellinen ohjelma abstrakteineen on vähintään yhtä laaja kuin aiemmissa konferensseissa. Mielestäni se kuvastaa myös sitä, että digitaalinen terveys on yksi tämän hetken keskeisistä tieteellisistä tutkimusalueista. Ensi vuoden alussa julkaistava Finnish Journal of eHealth and eWelfare -lehden erikoisnumero tuleekin olemaan monipuolisin tämän konferenssisarjan puitteissa julkaistuista lehden numeroista. Suomalainen digitaalisen terveyden osaaminen tulee kansainväliselle yleisölle tutuksi myös nyt ensimmäistä kertaa järjestettävänä hybridi-toteutuksena yhdistäen paikallisen ja verkkokonferenssin.

Monipuolinen ohjelma tuo paikalle myös monipuolisen osallistujajoukon. Tämä konferenssi on järjestetty tarkasti terveysturvallisuusohjeita noudattaen ja saimme paikalle osanottajia niin paljon kuin tiloihin saatoimme kutsua. Tämä on ollut tärkeää myös digitaalisen terveyden alalla toimiville yrityksille, joilla on nyt mahdollisuus tavata kasvokkain terveydenhuollon päättäjiä ja käytännön toimijoita. Yritykset ovatkin rakentaneet hienoja esityksiä sekä näyttelyyn, salien puheenvuoroihin että paikallisiin tutustumiskohteisiin.

Toivon, että osanottajina innostutte tarjolla olevasta ohjelmasta ja mahdollisuudesta tavata toisimme.

Jarmo Reponen

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Welcome words from the chairperson of the eHealth2021 organizing committee

Jarmo Reponen, Chairperson of the Organizing committee

Finnish Society of Telemedicine and eHealth, Finland

Dear participants in the conference

It is a great pleasure to welcome you to get together with digital health topics and meet each other after a long separation! This is something we have been longing for. Organizing a national and international eHealth conference is a long journey. The organization of this conference began almost three years ago, when negotiations were held to find a local partner. Then in the spring of 2019 we knew that this conference would be held in Oulu, but there would still be a biennial ship conference in between. We did not know at the time that there would also be a COVID-19 pandemic that would change all the schedules.

For this reason, special thanks to the Northern Ostrobothnia Hospital District, which, as the second main organizer, has always been strongly committed to organizing the conference and to being able to meet each other face to face. The date of the conference has been moved to a safer time by consensus, and the best COVID-19 expertise in the region has been available to us at each meeting to create a current assessment of the situation and make the necessary decisions. I especially appreciate the fact that the top managers of the hospital district and the university hospital, e.g. Deputy Chief Medical Officer Terhi Nevala and Development Director Pasi Parkkila have spent their working time organizing this event amid challenges of national welfare area reform, internal organizational reform, a new hospital construction project and pandemic management.

The task of the chairman of the organizing committee is often lonely. The work will begin with the appointment of the committee and will not end until the post-conference review is complete. The chairman may not be absent from any meeting. It is necessary to believe that things will be put in order and sometimes quick decisions will be needed even on the basis of conflicting information. Therefore, I am grateful to those partners who share the same goal and objectives. I would like to thank the current president of the Finnish Society of Telemedicine and eHealth Outi Ahonen, and the secretary, Pirkko Kouri, with whom solutions to many problems have been considered in advance. The event would also not have been possible without our practical coordinators Elisa Mejías and Pauliina Hyrkäs from the Northern Ostrobothnia Hospital District, who have practically implemented the jointly agreed agenda. I would also like to thank all the members of the committee who, in addition to the lead organizers, have represented the University of Oulu, the Oulu University of Applied Sciences, the City of Oulu and OuluHealth. It has been great to see how the committee has welded together during the preparation process. The pages of this conference book show all the people who have been participated in preparations.

The most joyful task of the conference is to build an interesting program. It's inspiring to think about current themes and bring together invited speakers from near and far. It has been great how gladly the lecturers have agreed to share their knowledge with the conference participants. Another happy achievement is that, despite the pandemic period, the scientific program with its abstracts is at least as extensive as in previous conferences. I think it also reflects the fact that digital health is one of the key areas of scientific research today. The special issue of the Finnish Journal of eHealth and eWelfare, which will be published at the beginning of next year, will be the most diverse of the issues published within the framework of this conference series. Finnish digital health know-how will also be known to the international public as a hybrid implementation for the first time, combining local and web conferences.

The diverse program also brings a diverse group of participants to the venue. This conference was organized in strict accordance with the health safety guidelines and we got as many participants as we could invite to the premises. This has also been important for companies in the digital health sector, which now have the opportunity to meet face-to-face with healthcare decision-makers and practitioners. The companies have built great presentations for the exhibition, the speeches in the halls and the local visiting attractions.

I hope that as participants you will be enthusiastic about the program and the opportunity to meet each other.

Jarmo Reponen

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Järjestäjät / Organizers

Suomen telelääketieteen ja eHealth seura ry

Suomen Telelääketieteen ja eHealth seura on tieteellinen seura, jonka tarkoituksena on informaatio- ja kommunikaatioteknologian kautta edistää väestön terveyttä ja terveydenhuollollisen asiantuntemuksen levittämistä. Tarkoituksensa toteuttamiseksi seura järjestää seminaareja, luento- ja esitelmätilaisuuksia, kursseja ja symposiumeja, kehittää toimivan sähköisen yhteydenpitojärjestelmän jäsenten välillä, harjoittaa julkaisutoimintaa, tukee alan tutkimustyötä, antaa lausuntoja telelääketieteen kysymyksissä sekä ylläpitää suhteita ulkomaisiin alan järjestöihin. Suomen Telelääketieteen ja eHealth seura on jäsenenä alan kansainvälisissä verkostoissa kuten International Society for Telemedicine and eHealth, Nordic Telemedicine Association, IHE International ja European Connected Health Alliance.

Seuran jäseneksi voi hallitus hakemuksesta hyväksyä henkilöjäseniä sekä kannatus- ja yhteisöjäseniä, jotka toiminnallaan tahtovat edistää seuran tarkoitusta. Jäsenetuihin kuuluvat jäsenkirjeet, joissa tiedotetaan ajankohtaisista telelääketieteen koulutustapahtumista sekä hallituksen toiminnasta. Seuran jäsenille myönnetään alennus osanottomaksuista seuran järjestämiin tilaisuuksiin, sekä eräistä alan kirjallisuuden hankinnoista. Liittymällä jäseneksi Sinulle avautuu verkosto, jossa saat helposti kontaktin muihin asiasta kiinnostuneisiin henkilöihin.

Seura jakaa vuosittain eHealth -tunnustuspalkinnon alan ansioituneelle henkilölle.

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Finnish Society of Telemedicine and eHealth

Finnish Society of Telemedicine and eHealth is an important forerunner in the field of telemedicine and eHealth in Finland as well as internationally. The aims of the Finnish Society of Telemedicine and eHealth are to promote the health of the population through telecommunication and to disperse the expert knowledge within health care. To reach the aims the Society will arrange seminars, lectures and presentations, courses and symposia, develop a functioning electronic communication system between the members, exert publishing activities, supports research within the discipline, formulate statements in issues dealing with telemedicine and have contact with other telemedicine organisations.

We have a close collaboration with other national and international organisations, health care service providers and users. The purpose of the society is to promote education and development in the field of telemedicine and eHealth. Finnish Society of Telemedicine and eHealth is member of international networks such as International Society for Telemedicine and eHealth, Nordic Telemedicine Association, IHE International and European Connected Health Alliance.

The board accepts the members based on application. Membership will be available for individuals or companies and organisations, as well as supporting membership. Foreign and overseas members do not pay an annual fee, if they submit a regular report of the progress of eHealth in their respective countries

Each year, the FSTeH delivers the Finnish National eHealth Award to a distinguished person in the field.
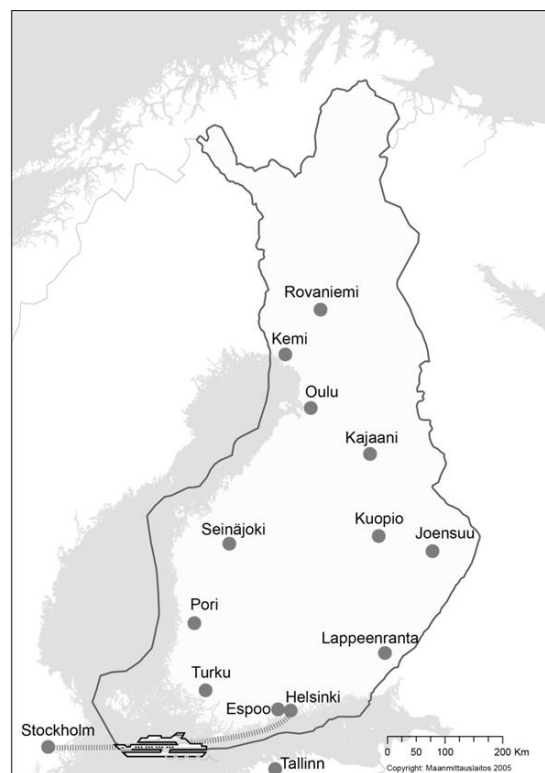
Internet: www.telemedicine.fi
Facebook: www.facebook.com/ehealthfinland
Twitter: www.twitter.com/FSfTeHP

The main activity of the FSTeH is annually organized the Finnish National Conference on Telemedicine and eHealth. The conference rotates between different cities and telemedicine sites to give local organizers the opportunity to promote their achievements

- 2021 – Oulu/hybrid (International)
- 2020 – Online (National)
- 2019 – Kuopio (International)
- 2018 – Cruising Helsinki-Stockholm (International)
- 2017 – Turku
- 2016 – Cruising Helsinki-Stockholm (Nordic)
- 2015 – Espoo
- 2014 – Tallinn, Estonia (International)
- 2013 – Seinäjoki
- 2012 – Cruising Helsinki-Stockholm
- 2011 – Joensuu
- 2010 – Cruising Helsinki-Stockholm
- 2009 – Oulu
- 2008 – Cruising Helsinki-Stockholm
- 2007 – Kuopio
- 2006 – Helsinki, Nordic Congress of eHealth and Telemedicine, NCeHT (International)
- 2006 – Cruising Helsinki-Stockholm
- 2005 – Lappeenranta
- 2004 – Kemi
- 2003 – Cruising Helsinki-Stockholm
- 2002 – Seinäjoki
- 2001 – Rovaniemi
- 2000 – Turku
- 1999 – Kajaani
- 1998 – Pori
- 1997 – Oulu
- 1996 – Kuopio (International)
- 1995 – Turku

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Oulun yliopistollinen sairaala

Pohjois-Pohjanmaan sairaanhoitopiiri (PPSHP) on Pohjois-Pohjanmaan kuntien omistama kuntayhtymä. PPSHP hallinnoi Oulun yliopistollista sairaalaa, joka vastaa yli 400 000 pohjoispohjanmaalaisen erikoissairaanhoidon palveluista ja lähes 750 000 pohjoissuomalaisen erityistason erikoissairaanhoidosta.

OYS on yksi Suomen viidestä yliopistosairaalasta. Parhaillaan rakennamme kokonaan uutta yliopistollista sairaalaa. Tämä takaa, että tilamme vastaavat tuleviin 2020- ja 2030-lukujen erikoissairaanhoidon tarpeisiin ja haasteisiin.

OYS erityisvastuualueeseen kuuluu Pohjois-Pohjanmaan sairaanhoitopiirin lisäksi Lapin, Keski-Pohjanmaan, Kainuun ja Länsi-Pohjan sairaanhoitopiirit. Koulutamme yhdessä Oulun yliopiston ja alueen muiden oppilaitosten kanssa lääkäreitä, hoitohenkilökuntaa ja muita ammattilaisia pohjoisen Suomen tarpeisiin.

OYS 2030 – Maailman älykkäin sairaala

OYS 2030 on uudistamisohjelma, jonka myötä sairaalan toiminta ja tilat uudistetaan vastaamaan tulevaisuuden erikoissairaanhoidon haasteisiin.

Muutosvisiomme on, että vuoteen 2030 mennessä OYS on maailman älykkäin sairaala, jossa uusin teknologia, modernit tilat ja ajantasainen osaaminen takaavat tehokkaan ja vaikuttavan, maailman parhaan hoidon.

OYS lukuina

- 7 117 työntekijää
- 138 529 hoidettua potilasta
- 626 731 avohoitokäyntiä
- 49 762 hoitojaksoa
- 3 434 synnytystä

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Oulu University Hospital

The Northern Ostrobothnia Hospital District (PPSHP) is a consortium of municipalities owned by the municipalities of Northern Ostrobothnia. PPSHP manages Oulu University Hospital, which is responsible for the services of more than 400,000 special medical nurses in northern Ostrobothnia and almost 750,000 special nurses in special care in northern Finland.

OYS is one of Finland's five university hospitals. We are currently building a completely new university hospital. This will ensure that our facilities meet the future needs and challenges of specialist care in the 2020s and 2030s.

In addition to the Northern Ostrobothnia Hospital District, OYS 'special area of responsibility includes the hospital districts of Lapland, Central Ostrobothnia, Kainuu and Western Ostrobothnia. Together with the University of Oulu and other educational institutions in the region, we train doctors, nursing staff and other professionals for the needs of northern Finland.

OYS 2030 - The world's smartest hospital

OYS 2030 is a renovation program that will modernize the hospital's operations and facilities to meet the challenges of future specialist care.

Our vision for change is that by 2030, OYS will be the smartest hospital in the world, where the latest technology, modern facilities and up-to-date know-how guarantee efficient and effective, the best care in the world.

OYS in figures

- 7 117 employees
- 138 529 treated patients
- 626 731 outpatient visits
- 49 762 treatment periods
- 3 434 deliveries

Suomen telelääketieteen ja eHealth seura ry.
eHealth2021 kansainvälinen konferenssi
XXVI Kansallinen telelääketieteen ja eHealth seminaari

DigiHealth Oulu: Creating better health - our digital health know-how

Digital Health (DigiHealth) research programme is part of the University of Oulu's national research profiling actions. It is designed to do world-class interdisciplinary research and strengthen nationally health care services, diagnostics and therapies in the new digital era. The primary aim of DigiHealth is to develop and validate novel digital technologies for data-driven health applications, valorizing University of Oulu's strong expertise in medicine, wireless solutions, big data analytics and business. Novel technologies and technological solutions (*e.g.*, artificial intelligence, internet of things, virtual/augmented/mixed reality, robotics, 5G/6G) are becoming more intelligent and ubiquitous to be utilized for data-driven health applications. Several international breakthroughs are expected within the DigiHealth to predict progression of diseases and offering personalized therapies in a cost-effective and patient-centric way. The program is built on interdisciplinary collaboration providing transformative knowledge aiming to strengthen the health technology ecosystem of Oulu.
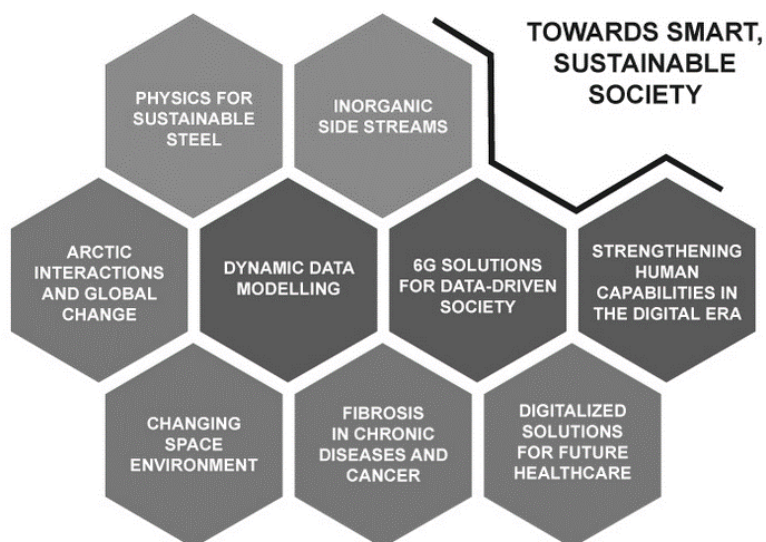
Research in University of Oulu is specified to nine profile fields.

The DigiHealth programme currently includes four faculties (Faculty of Medicine, Faculty of Information Technology and Electrical Engineering, Faculty of Biochemistry and Molecular Medicine, and Oulu Business School) and over 40 Principal Investigators linked to four above-mentioned research areas.

There are four specific research areas of the DigiHealth and we have recently recruited new tenure professors and postdocs in order to enforce those research topics:

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1) Next-generation data for digital healthcare focusing on bioinformatics and novel biosensors

(New recruitments: Tenure Assistant professor Jianan Huang, Tenure Associate Professor Valerio Izzi)

**2) Wireless system level architectures for future digital healthcare**

(New recruitment: Tenure Assistant Professor Erkki Harjula)

3) AI-based solutions to support personalized clinical diagnostic or therapeutic decisions

(New recruitment: Tenure Associate Professor Mourad Oussalah)

4) Systematic impact creation and health technology assessment

(New Recruiment: postdoc, Adj.Prof. Miia Jansson, postdoc Irina Atkova)
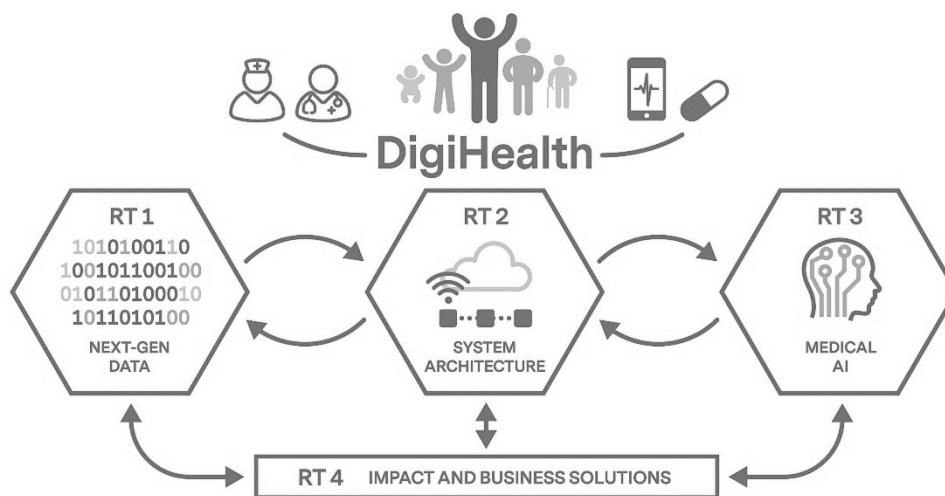
The linkages between the DigiHealth research topics

For many decades, OULU was the only university in Finland hosting both Medicine and Engineering, which has enabled the development of a unique environment for DigiHealth not as readily available elsewhere in Finland. Moreover, the Kontinkangas Health Campus is an exceptionally interactive and multidisciplinary environment with two faculties (Medicine & Biochemistry and Molecular Medicine), the university hospital, the Biobank Borealis, the birth cohorts' management and 3 ESFRI nodes in biomedicine. This transdisciplinary combination makes it possible to combine basic and clinical research for the benefit of innovative digital health applications.

https://beta.oulu.fi/en/creating-better-health-our-digital-health-knowhow

Contact:
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Prof. Jarmo Reponen
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Kiitokset / Acknowledgements

Kiitämme lämpimästi seuraavia yhteistyökumppaneita ja näytteilleasettajia tuesta konferenssin järjestämiseksi / We warmly thank the following institutions and enterprises for their support:

City of Oulu
www.ouka.fi

OuluHealth
www.ouluhealth.fi

Oys TestLab and Oys2030 Project office
www.oys2030.fi

University of Oulu
www.oulu.fi

Oulu University of Applied Sciences
www.oamk.fi

PrintoCent
www.printocent.net

Nokia Garage
www.nokia.com/innovation/innovate-with-nokia/oulugarage/

Polar
www.polar.com

Haltian
www.haltian.com

Topcon
www.topconhealth.eu

ESKO systems Ltd
www.eskosystems.fi

Medanets
www.medanets.com

Intersystems
www.intersystems.com/fi

Ninchat
www.ninchat.fi

MediConsult
www.mediconsult.fi

Duodecim
www.duodecim.fi

Monidor
www.monidor.com

NE Device SW
www.nedevicesw.com

Heart2Save
www.heart2save.com

Prowellness
www.prowellness.com

Solita
www.solita.fi

Nutri-Flow
www.nutri-flow.fi

Innokas Medical
www.innokasmedical.fi

BeeHealthy
beehealthy.com

Special thanks to the Oulu University of Applied Sciences students for conference arrangements.

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Program

TORSTAI 7.10.2021 (Finnish track)

Paikka: Oulun yliopisto, Kontinkankaan kampus

8.30   **Ilmoittautuminen avautuu**

Sessio 1 – eHealth in a Lifecycle (sessio englanniksi)   Auditorium 101A
Chair President, Principal lecturer Outi Ahonen, Finnish Society of Telemedicine and eHealth, Laurea University of Applied Sciences

9.30   **Finnish Society of Telemedicine and eHealth opening words**
President Outi Ahonen
Finnish Society of Telemedicine and eHealth

9.35   **Oulu University Hospital opening words**
Deputy Director of the North Ostrobothnia hospital district Juha Korpelainen
Oulu University Hospital

9.40   **Greeting from the Ministry of Social Affairs and Health, Finland**
Minister of Family Affairs and Social Services, Krista Kiuru
Ministry of Social Affairs and Health, Finnish Government

10.00   **Ilkka Winblad Honorary Lecture: Interoperability in Health Information Systems**
Professor Bernd Blobel
Medical Faculty, Universität Regensburg, Germany

10.30   **Delivery of eHealth awards**

10.45   **Kahvitauko ja näyttelyyn tutustuminen**

(Side column: Posterit | Näyttely)

Sessio 2A: Digitaalisen terveyden menetelmien arviointi ja e-tutkimus (Session in Finnish)   Auditorium 101A
Puheenjohtaja Tutkimus- ja arviointiylilääkäri Miia Turpeinen, OYS ja Oulun yliopisto

11.05   **Puheenjohtajan johdatus aiheeseen**

11.10   **e-Tutkimuksen monet näkökulmat**
Professori Kaija Saranto
Itä-Suomen yliopisto

11.25   **Digitaalisen terveyden ratkaisujen arviointi**
Jari Haverinen, DI, TtM
Oulun yliopisto

11.40   **Digihoitopolkujen vaikutukset potilaan hoitoon ja ammattilaisen toimintaan**
Kehittämispäällikkö Pia Liljamo
PPSHP

11.55   **Tutkimus-, kehitys- ja innovaatiotoiminnan kumppanuusverkostot vauhdittamassa digitaalisen terveyden uudistumista**
Johtaja, työelämäprofessori Maritta Perälä-Heape
CHT, Oulun yliopisto

     5 min rapid scientific presentation

12.10   **O-1: Digi-HTA, Assessment process for digital healthcare services and products: information security and data protection in health technology – initial experiences**

12.15   **O-2: Patient initiated symptom assessment with an electronic symptom checker. Study for clinical validation**

12.20   **O-3: Ethical evaluation in digital health contexts: voting with the Saari triangle**

12.25   **Presentations from exhibition**
- **Ninchat**
- **Medanets**

12.35   **Lounas**

(Side column: Sessio 2B (English) | Posterit | Näyttely)

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Program

THURSDAY October 7th 2021 (English track)

Venue: University of Oulu, Kontinkangas Campus

8.30 **Registration opens**

Session 1 – eHealth in a Lifecycle (session in English)	**Auditorium 101A**
Chair President, Principal lecturer Outi Ahonen, Finnish Society of Telemedicine and eHealth, Laurea University of Applied Sciences	

9.30 **Finnish Society of Telemedicine and eHealth opening words**
President Outi Ahonen
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Medical Faculty, Universität Regensburg, Germany

10.30 **Delivery of eHealth awards**

(side columns: Posters | Exhibition)

10.45 **Networking break, coffee, exhibition and posters**

Session 2B: Novel digital solutions for healthcare (Session in English)	**Auditorium F101**
Chair Terhi Nevala, Deputy Chief Medical Officer, Oulu University Hospital	

11.05 **Chair's introduction to the topic**

11.10 **Future possibilities of Medical AI in disease detection and characterization**
Professor Simo Saarakkala
University of Oulu

11.25 **How AI will revolutionize usage of clinical information**
Professor Janne Liisanantti
Oulu University Hospital

11.40 **eCoaching in the management of chronic coronary syndromes**
Associate Chief Physician Kari Kaikkonen
Oulu University Hospital

11.55 **What are the benefits of future regional electronic health record systems for users**
Chief physician Eila Erkkilä
City of Oulu

5 min rapid scientific presentation

12.10 **O-4: Adapting ETSI SmartBAN to eHealth**

12.15 **O-5: Cancer prediction using graph-based gene selection and explainable classifier**

12.20 **O-6: Distributed network and service architecture for future digital healthcare**

12.25 **Presentations from exhibition**
- **Duodecim**
- **BeeHealthy**

(side columns: Session 2A (Finnish) | Posters | Exhibition)

12.35 **Lunch**

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TORSTAI 7.10.2021 (Finnish track)

Sessio 3A: Innovaatiotoiminta, testialustat ja terveysdata (Session in Finnish)	**Auditorium 101A**
Puheenjohtaja Kehitysjohtaja Pasi Parkkila, PPSHP	

13.50	**Puheenjohtajan johdatus aiheeseen**	
13.55	**Innovointia alueiden yhteistyönä – Pohjois-Pohjanmaan soten yhteiskehittämismalli** Innovaatiokoordinaattori Pauliina Hyrkäs *PPSHP*	
14.10	**Testaustoiminta yritystoiminnan katalyyttinä** Testaustoiminnan päällikkö Timo Alalääkkölä *PPSHP*	
14.25	**Case Buddy Healthcare: Hoitopolku OYS Testlabista Eurooppaan** Toimitusjohtaja Jussi Määttä *Buddy healthcare Ltd*	
14.40	**European Health Data Space, TEHDAS-hanke** Vanhempi neuvonantaja Tapani Piha *Sitra*	
	5 min rapid scientific presentations	
14.55	**O-7: Review on Data Processing and Analysis of Wearable-based eHealth Data**	
15.00	**O-8: A proof of concept for in-body implants for longevity and selfcare**	
15.05	**O-9: Usability of virtual reality (VR) in the care home context**	
15.10	**Presentations from exhibition** • **NE Device SW** • **Prowellness**	
15.30	**Networking break, coffee, exhibition and posters**	

Side column: Session 3B (English) · Posterit · Näyttely

Sessio 4A: Kansalaisen osallistaminen (Session in Finnish)	**Auditorium 101A**
Puheenjohtaja Minna Storm, Suomen telelääketiede ja eHealth seura	

16.00	**Puheenjohtajan johdatus aiheeseen**	
16.05	**Asiakkaat osallisina sote-palveluissa sekä eHealth-ratkaisujen käyttäjinä ja kehittäjinä** Osallisuusasiantuntija Liisa Jurmu *Oulunkaaren kuntayhtymä*	
16.20	**Kaikki mukaan sähköisiin terveyspalveluihin käyttäjäkeskeisen suunnittelun avulla** Sari Kujala *Aalto Yliopisto/DigiIn*	
16.35	**Lapset ja nuoret digitaalisten palveluiden kehittämisen keskiössä** Palvelumuotoilija Anna-Maija Ohlsson *Pelastakaa Lapset Ry, Vincit*	
16.50	**Eettiset näkökulmat sosiaali- ja terveydenhuollon sähköisten palveluiden kehittämisessä kansalaislähtöisesti** Lehtori, projektipäällikkö Sari Sarlio-Sintola *Laurea, Shapes*	
	5 min rapid scientific presentations	
17.05	**O-13: Health counceling chat service as a part of the online health couceling services**	
17.10	**O-14: Predictive "maintenance" of citizens with digital twins**	
17.15	**O-15: Engaging aging individuals in co-creation for care-related decision making**	
17.20	**Presentations from exhibition** • **Nutri-Flow** • **MediConsult (10 min)**	

Side column: Session 4B (English) · Posterit · Näyttely

19.30	**Illallinen** Hotelli Lasaretti (Kasarmintie 13B, Oulu)

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THURSDAY October 7th 2021 (English track)

Session 3B: eHealth skills (Session in English)   **Auditorium F101**
Chair: Liisa Klemola, PhD, Savonia University of Applied Sciences

13.50	**Chair's introduction to the topic**
13.55	**Competencies to developed eHealth services in multidisciplinary groups** Principal lecturer Merja Männistö *Oulu University of Applied Sciences*
14.10	**eHealth skills for Finnish physicians** University lecturer Timo Tuovinen, MD *Faculty of Medicine, University of Oulu*
14.25	**Reality of Digital Care in students' healthcare** Chief Medical Officer in Digital affairs Aleksi Schrey *Finnish Student Health Service*
14.40	**Ethical aspects in Digital Health** Lecturer Päivi Sanerma, PhD *HAMK University of Applied Sciences*
	5 min rapid scientific presentations
14.55	**O-10: UUDO – Multidisciplinary competencies in developing digital Health competence and social care services, specialization education.**
15.00	**O-11: Health care professionals' perceptions of digital health competence and competence development; qualitative descriptive study**
15.05	**O-12: The Global Public Health – online Master's joint programme**
15.10	**Presentations from exhibition** • **Medanets** • **Solita**

(right margin columns: Session 3A (Finnish) · Posters · Exhibition)

15.30	**Networking break, coffee, exhibition and posters**

Session 4B: Recent evaluation results of the Finnish health and social care information systems (Session in English)   **Auditorium F101**
Chair Professor Jarmo Reponen, University of Oulu, Vice President of FSTeH

16.00	**Chair's introduction to the topic**
16.05	**STEPS 3.0 National health and social care information system monitoring** Research manager Tuulikki Vehko *Finnish Institute of Health and Welfare*
16.20	**Are physicians satisfied with their information systems** Peppiina Saastamoinen, MSc, PhD *Research services, Finnish Medical Association*
16.35	**How current ICT systems serve workflows in nursing?** Professor Kaija Saranto & Researcher Maiju Kyytsönen *University of Eastern Finland, Finnish Institute of Health and Welfare*
16.50	**First user experience survey results of social care information systems** Doctoral candidate Susi Salovaara *University of Lapland*
	5 min rapid scientific presentations
17.05	**O-16: Non-Kanta regional information Exchange for public health care in Finland: a national survey**
17.10	**O-17: Digital support for socially marginalized people: what works?**
17.15	**O-18: Lower back pain detection using deep learning-based method**
17.20	**Presentations from exhibition** • **Duodecim** • **InterSystems**

(right margin columns: Session 4A (Finnish) · Posters · Exhibition)

19.30	**Dinner** Nordic Art Hotel Lasaretti (Address: Kasarmintie 13b, Oulu, Finland)

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PERJANTAI 8.10.2021 (Finnish track)

Vierailut

8.30   **Linja-auto kuljetus vierailuihin**
HUOM! Vierailukohteissa rajallinen määrä osallistumispaikkoja.

1. Oys TestLab and Oys2030 Future Hospital Project Office
2. OAMK Simlab
3. PrintoCent
4. Nokia Garage
5. Polar
6. Haltian
7. Topcon
8. Esko Systems Oy
9. KOTAS keskus

10.30   **Kahvitauko ja näyttelyyn tutustuminen**

Sessio 5A: Mitä uutta digitaalisuudesta ennaltaehkäisyyn ja kuntoutukseen (Session in Finnish) Auditorium 101A
Puheenjohtaja Marja Äijö, Gerontologian ja kuntoutuksen yliopettaja, Savonia

11.00   **Puheenjohtajan johdatus aiheeseen**

11.05   **Teknologiaan pohjautuva kuntoutus**
Kuntoutusylilääkäri Kauko Pitkänen
Vetrea-Neuron

11.20   **Puettava teknologia pienten lasten synnynnäisten kehityshäiriöiden tunnistamisessa ja kuntouttamisessa**
Post-doc tutkija Elina Ilen
Aalto yliopisto

11.35   **Tieto ja prosessirakenteet aktiivisessa ja terveellisessä ikääntymisessä – kuvaus kaatumisten ehkäisystä**
Professori Patrik Eklund
Uumajan yliopiston

11.50   **Teknologia tukemassa ikääntyneen toimintakykyä ja kotona asumista; oululaisten ikääntyneiden kokemuksia**
Palveluesimies Marjaana Teerikangas
KOTAS keskus

5 min rapid scientific presentations

12.05   **O-19: eHealth needs among rehabilitation in Northern Savonia**

12.10   **O-20: Designing and developing virtual escape game for vocational rehabilitation**

12.15   **O-21: The experiences and effectiveness of coucelling mobile/internet interventions for adults with chronic pain in health care: a mixed method systematic review**

12.20   **Presentations from exhibition**
- **Heart2Save**
- **Intersystems**

Sidebar (vertical): Session 5B (English) | Posterit | Näyttely

12.30   **Lounas**

Sessio 6: Future and Visions (sessio englanniksi)   **Auditorium 101A**
Chair Annette Kainu, FSTeH

14.00   **Chair's introduction to the topic**

14.05   **Development of Digital Health in Europe**
Policy officer Konstantin Hyppönen
European Commission

14.30   **Use of Digital Health to mitigate the impacts of COVID-19 in the WHO European Region**
Regional Adviser Clayton Hamilton
WHO Europe

14.55   **Digitalization as means of growth of health sector and of better health and wellbeing for individuals**
Senior specialist Sari Palojoki
Ministry of Social Affairs and Health

15.20   **Summary and closing words**
President Outi Ahonen
Finnish Society of Telemedicine and eHealth

15.30   **Farewell**

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FRIDAY October 8th 2021 (English track)

Site visits

8.30 Bus transportation to site visits
Note! Site visits have limited seats available.

1. Oys TestLab and Oys2030 Future Hospital Project Office
2. OAMK Simlab
3. PrintoCent
4. Nokia Garage
5. Polar
6. Haltian
7. Topcon
8. Esko Systems Ltd
9. KOTAS Centre

10.30 Networking break, coffee and exhibition

Session 5B: Nordic Health: Patient Accessible Electronic Health Records (Session in English)   Auditorium F101
Chair: Chief Specialist Vesa Jormanainen, Finnish Institute for Health and Welfare

11.00 Chair's introduction to the topic

11.05 1177.se in Sweden
Andreas Leifsson
Inera

11.17 The role of the national health platform sundhed.dk during the COVID-19 pandemic in Denmark – pushing the agenda towards developing digital solutions based on the users' needs
Therese Kjellerup Thorstholm, User Consultant
Sundhed.dk, Denmark

11.29 Helsenorge.no in Norway
Ole Bryøen
Norwegian Directorate of eHealth

11.41 The Role of the National Citizen Health Portal during COVID-19
Guðrún Auður Harðardóttir, National Project Manager
National Centre for eHealth, Iceland

11.53 My Kanta Pages in Finland
Vesa Jormanainen, Chief Specialist
Finnish Institute of Health and Welfare

5 min rapid scientific presentations

12.05 O-22: Crossnational telemedical services in ENT (Poland, Kyrgystan, Kazakhstan)

12.10 O-23: CATHCHAT: a telemedicine platform for paediatric interventional cardiac catheteriacation in Africa

12.15 O-24: Maturity of health care testbeds – A survey from Nordic countries

12.20 Presentations from exhibition
- **Monidor**
- **Innokas Medical**

Session 5A (Finnish) | Posters | Exhibition

12.30 Lunch

Session 6: Future and Visions (Session in English)   Auditorium 101A
Chair Annette Kainu, FSTeH

14.00 Chair's introduction to the topic

14.05 Development of Digital Health in Europe
Policy officer Konstantin Hyppönen
European Commission

14.30 Use of Digital Health to mitigate the impacts of COVID-19 in the WHO European Region
Regional Adviser Clayton Hamilton
WHO Europe

14.55 Digitalization as means of growth of health sector and of better health and wellbeing for individuals
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15.20 Summary and closing words
President Outi Ahonen
Finnish Society of Telemedicine and eHealth

15.30 Farewell

Finnish Society of Telemedicine and eHealth
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Session 1: eHealth in a Lifecycle

Chair: President, Principal Lecturer Outi Ahonen

Thursday 7th of October 2021

9:30 – 10:50

1-1   **Finnish Society of Telemedicine and eHealth opening words**
Outi Ahonen, President
Finnish Society of Telemedicine and eHealth

1-2   **Oulu University Hospital opening words**
Juha Korpelainen, Deputy Director
Northern Ostrobothnia Hospital District

1-3   **Greeting from the Ministry of Social Affairs and Health, Finland**
Krista Kiuru, Minister of Family Affairs and Social Services
Ministry of Social Affairs and Health, Finnish Government

1-4   **Ilkka Winblad Honorary Lecture: Interoperability in Health Information Systems**
Professor Bernd Blobel
Medical Faculty, University of Regensburg, Germany

1-5   **Delivery of eHealth Awards**

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Finnish Society of Telemedicine and eHealth opening words
Outi Ahonen, President
Finnish Society of Telemedicine and eHealth (FSTeH)

Biography Outi Ahonen

Outi Ahonen Dr of Health and Human Services Informatics, PhD, MHSc, RN works a as principal lecturer in master's degree Digital unit at Laurea University of Applied Science (UAS). She coordinates the research theme of digitalization and information management in society at Laurea UAS. She has been the project manager in many projects, were developed digital competencies. She was the project manager in SotePeda 24/7 (2018-2020) national project where developed competences for eHealth and eWelfare Services in multiprofessional teams. Currently she is the vice project manager in special education to eHealth and Welfare Services, in the UUDO-project where there are 14 universities of applied sciences. Her main research interest is multidisciplinary competences in developing digital services in eHealth and welfare. She is also a member of the Council of the Finnish Nursing Association. She has been second time the chair of expert the team developing the eHealth Strategy for the Finnish Nursing Association.

This year we are having our annual Finnish National Conference on Telemedicine and eHealth for the 26th time. The theme of the Conference is eHealth in a Lifecycle.

This is the third time our annual conference is arranged in Oulu. Already the first one in 1997 included an international section where EU commission and Nordic telemedicine projects presented their views via videoconference connection. A hybrid conference already then. In the second conference in Oulu in 2009 this international section included presentations form European Space Agency and latest eHealth developments from Japan, with a strong support from the International Society for Telemedicine and eHealth (ISfTeH). These traditions are followed, when we are now presenting a full English language parallel track in our conference.

Looking back at what was written in the congress book in 2009, Oulu had already then a long tradition in developing telemedicine and eHealth services. Today, it is almost a quarter century since the first telemedicine and eHealth conference in Oulu and a little bit more than establishing our Finnish telemedicine and eHealth society. Our society has thus a long record in organizing the national conferences, and bringing people together. One of the key persons in our society is vice president and founding member, professor Jarmo Reponen from University of Oulu, who has acted as the president of the organizing committee. I thank him for this effort and similarly I thank all the members of various committees. With the collaboration between our board members and our partner organizations like Northern Ostrobothian Hospital District, University of Oulu, Oulu University of Applied Sciences, City of Oulu, OuluHealth and Business Oulu, we have the possibility to bring our members information about the effects of digitalisation in the areas of social and health care.

As same time when our social and health care is changing with digitalized and technology also our society is changing how people are able to take part of discussions via different kinds of networks and platforms. Our Society is willing to be one of these networks and platforms to our members who are interested in taking part of the exchange and innovate ideas around digital health care in multidisciplinary context. Our Society will contact its members during this autumn 2021 through different ways to understand the needs of the members. Our board is using service design methods to find out new ways of working with the topic of digital health.

The City of Oulu gives a great environment to the conference, which brings together top experts, researchers, large and small companies both regionally, nationally, and internationally; decision-makers from both the public and private sectors and, of course, start-ups and young future health and welfare professionals. In the sessions, practical examples and experiences are shared by more than 40 lecturers from Finland and abroad. Conference includes nine different site-visits offering unique possibility to get hands-on experiences in solutions for better and more effective healthcare.

I wish everybody a very fruitful conference and I hope you will also have time to experience City of Oulu!

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The 3rd Finnish National Conference was organized in Oulu in 1997, under is the notice in the member newsletter in Finnish

Kansallinen telelääketieteen seminaari pidetään tänä vuonna Oulussa, lääketieteellisen tiedekunnan auditoriossa, ajankohta on ke 17.9.1997. Järjestäjinä ovat Duodecim-seura, Pohjois-Pohjanmaan sh-piiri ja Suomen telelääketieteen seura. Pääteema on telelääketieteen arviointi, tilaisuus on samalla FinOHTA:n rahoittamien arviontitutkimuksien väliraporttitilaisuus. Seminaarissa on myös käytännön demonstraatioita koti- ja ulkomailta. Tilaisuus nivoutuu 18. - 19.9.1997 samoissa tiloissa järjestettävään "Radiologiaa - uutta ja vanhaa" - tapahtumaan ja näyttelyyn.

Underneith a capture from the 14th Finnish National Conference Proceedings Book, the second time the conference was organized in Oulu.

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Oulu University Hospital opening words
Juha Korpelainen, Medical Director
Oulu University Hospital, Finland

Biography Juha Korpelainen

Juha Korpelainen (born 1959), was graduated MD in 1985 and a specialist in neurology in 1992, in University of Oulu, Finland. Korpelainen received his PhD in 1993, and was nominated as a docent of neurology at the University of Oulu in 1999. He also has an eMBA and a special qualification in social and health care management, and in medical rehabilitation. Juha Korpelainen has worked as a Medical Director in the Oulu University Hospital since 2017, and before that as a Chief Administrative Physician since 2007 and as a clinical neurologist since 1993. Korpelainen has a long experience in research, development and innovation activities in social and health care, and he is particularly interested in the utilization of technology in hospitals. Academic activities: 97 scientific articles, supervisor of 8 doctoral and 14 master theses.

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Greeting from the Ministry of Social Affairs and Health, Finland
Krista Kiuru, Minister of Family Affairs and Social Services
Ministry of Social Affairs and Health, Finnish Government

Biography Krista Kiuru

Ms. Krista Kiuru is Finland's Minister of Family Affairs and Social Services. She has been Member of Parliament since 2007. She has previously served as Minister of Housing and Communications from 2011 to 2013 and as Minister of Education from 2013 to 2014 and as Minister of Education and Communications from 2014 to 2015. She holds a Master's degree in Social Sciences.

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Ilkka Winblad Honorary Lecture: Interoperability in Health Information Systems.

Bernd Blobel, Prof. Dr. habil., FACMI, FACHI, FHL7, FEFMI, FIAHSI

Medical Faculty, University of Regensburg, Germany
First Medical Faculty, Charles University Prague, Czech Republic
eHealth Competence Center Bavaria, Deggendorf Institute of Technology, Germany

Biography Bernd Blobel

Prof. Dr. habil. Bernd Blobel studied mathematics, theoretical physics, technical cybernetics and electronic engineering, medicine, informatics and medical informatics at the universities of Magdeburg, Halle, Berlin, Leipzig and Dresden. He earned a PhD with the interdisciplinary thesis "About the mechanism of information processing and energy transformation in bio-receptors – a general and membrane structure related transducer model", combining bio-cybernetics, neuro-physiology, mathematics, informatics and theoretical physics. He performed a confer qualification as a university professor (Habilitation) in medicine and in medical informatics. He was long-term CIO and Founding Head of the Medical Informatics Department of the University of Magdeburg Medical Center, Founding Head of the Fraunhofer Health Telematics Group as well as Founding Head of the German National eHealth Competence Center.

He was

- *Co-Founder and long-term Vice-Chair/Chair of HL7 Germany*
- *Co-Chair of the Security WG at Object Management Group (OMG)*
- *Co-Chair of Working Groups on Security and on Personnel Management as well as Co-Chair of the International Council at HL7 International*
- *Co-Chair Healthcare Chapter of IFIP/Unesco World IT Forum (WITFOR)*
- *Chair of the CEN/ISSS eHealth Standardization Focus Group*
- *Vice-Chair/Chair of the Working Group "Security, Safety and Ethics" and Founder/Chair of the Working Group "EHR" at EFMI*
- *Vice-Chair Working Group "Security in Health Information Systems" at IMIA*
- *Chair of the ISO/CEN Health Informatics Mirror Group at DIN*

He is Fellow of

- *American College for Medical Informatics (ACMI)*
- *HL7 International*
- *Australasian College of Health Informatics*
- *International Academy of Health Sciences Informatics (IAHSI)*

He is Honorary Fellow of

- *European Federation of Medical Informatics (EFMI)*
- *EuroMISE Mentor Association*
- *Czech Society for Biomedical Engineering and Medical Informatics*
- *HL7 Germany*

Bernd Blobel is Professor at the University of Regensburg, Medical Faculty, and Visiting Professor at the First Medical Faculty at Charles University Prague, Czech Republic.

He was and is still engaged in national and international R&D and standardization at ISO, CEN, HL7, OMG, IEEE in the areas of EHR, security, privacy and ethics, eHealth architectures, interoperability, personalized medicine, translational medicine, telemedicine, biomedical engineering, formal languages, knowledge representation and management, ontologies, etc.

In many countries from all over the world, he taught at acknowledged university and supervised about 80 PhD students, and he acted as international expert of their national EHR or eHealth Programs.

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Health systems globally undergo a transformation towards personalized, participative, preventive, predictive precision medicine. The replacement of traditional empirical or evidence-based approaches by a holistic scientific approach requires strong cooperation of actors from multiple disciplines and policy domains including the subject of care, supported by advanced technologies. In such environment, exchanging information or even just data based on communication standards and protocols has to be extended towards knowledge sharing between multiple domains with their specific languages, terminologies and ontologies, but also actors at different skills levels. This requires an interoperability and integration platform mapping between existing and emerging health and social care ecosystems.

Organizational, methodological and technological paradigm changes for health transformation and the necessary evolution of interoperability are introduced in some detail. Thereafter, representation, management and mapping of knowledge using domain ontologies and top-level ontologies are explained. The solution is a mathematically and philosophically sound, system-theoretical, architecture-centric, ontology-based, policy-driven reference model and framework for designing and managing advanced health and social care ecosystems. The approach – meanwhile standardized as ISO 23903 – is deployed for interoperability between, and integration of, existing and emerging standards, specifications and projects without requiring their revision. Principles and details of ISO 23903 as well as their exploitation in practical projects are demonstrated, thereby also covering security, privacy, trust and ethical issues.

References

Blobel B. Challenges and Solutions for Designing and Managing pHealth Ecosystems. Front. Med. 2019; 6: 83. doi: 10.3389/fmed.2019.00083

Blobel B, Oemig F. Solving the Modeling Dilemma as a Foundation for Interoperability. European Journal for Biomedical Informatics, 2018; 14,3: 3-12.

Blobel B, Ruotsalainen P, Oemig F. Why Interoperability at Data Level Is Not Sufficient for Enabling pHealth? Stud Health Technol Inform. 2020; 273: 3-19.

About the Ilkka Winblad honorary lecture:

In order to honor the memory of Adjunct Professor Ilkka Winblad from University of Oulu, a former vicepresident of the society, who passed away in 2011, The Finnish Society of Telemedicine and eHealth decided to start in 2012 a series of honorary lectures, asking a prominent person in the international eHealth field to summarize his/her experience. According to the plan, this keynote lecture will be in the conference program at least every second year, especially on cruising conferences which by their nature are already international meetings.

As Ilkka Winblad was the first de facto professor of clinical telemedicine and eHealth in Finland during his years at FinnTelemedicum, University of Oulu, and had built the basis for new research directions and education in the field, also the keynote is expected to reveal an extended perspective and future targets. The first ever honorary lecture was given by Professor Richard Wootton from United Kingdom in 2012.

The successive lectures have been given by Professor Christian Nohr from Denmark in 2014, Professor Stanton Newman from United Kingdom in 2015, Associate Professor Piotr Henryk Skarzyñski from Poland in 2017 and Global Strategist Lucien Engelen from Netherlands in 2019.

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Lifetime Achievement Award to Professor Jarmo Reponen

International Society for Telemedicine and eHealth award is delivered by Vice-President of ISfTeH and Presicent of the Finnish Society of Telemedicine and eHealth.

The Board of the International Society for Telemedicine (ISfTeH) and eHealth delivers the Lifetime Achievement award for the fifth time. The *Prof. Louis Lareng Award* is based on significant work and achievements in the field of telemedicine and eHealth. The required achievements are realized over the years, minimum period 20 years. Jarmo Reponen, MD, PhD has more than 30 years of experience with telemedicine and digital radiology projects and electronic patient record system development in national and international level.   He is currently professor of Healthcare Information Systems in the University of Oulu, Finland.

His voluntary work shows deep interest in developing telemedicine and eHealth. He is one of the founders of the Finnish Society of Telemedicine (FSTeH) of which he was the President between 1997-2015, he has been the Vice-President since 2015, Member of the board 1995 to present. He was in the ISfTeH, board member 2003-2009; vice president in Nordic Telemedicine Association, NTA, 2007, 2004-2005, president 2005-2007, board member 2000 onwards. Currently, at FinnTelemedicum, he and his collaborators have published the results of a comprehensive national survey following 16 years of medical information and communication technology (ICT) dissemination and utilization in Finnish health care. In this theme, the collaboration with the National Institute for Health and Welfare (THL) continues. This has led to further international collaboration in Nordic level (Nordic eHealth Research Network, NeRN) and discussions with EU and WHO. During his career, Jarmo Reponen, has had the ability to bring multidisciplinary professionals in the field together to create innovative solutions, which have been important and meaningful. He has living co-operation with the existing governmental level. He has a great influence and impact both in research and education, especially realizing his doctoral dissertation along with his clinical practice work. In his educational work prof. Reponen has initiated eHealth education to medical doctors in their basic curriculum in Finland through his work at the Faculty of Medicine, University of Oulu since 2016. Furthermore, he has created the post graduation education: Finnish special competence for healthcare information technology, which produces the Special eHealth competence for medical doctors, dentists, and veterinarians, one of its kind. He is hardworking and operates without sparing himself for important things in telemedicine and eHealth. He participates the public debate on the significance of telemedicine and eHealth and wants to promote innovations for better health and wellbeing.

He has published on the topics of telemedicine, teleradiology, mobile communication and patient record systems and he is a frequent speaker at international forums. Total number of his publications is more than 160, including peer reviewed publications (original journal articles, chapters in refereed scientific books and refereed conference proceedings), publications in non-refereed scientific volumes and research reports or other professional publications. During over two decades he has been an invited speaker in numerous international and national conferences and seminars.

ISfTeH has rewarded earlier the following people: Prof. Louis Lareng (France) in 2012; Prof. Ronald Merrell (USA) in 2013; Prof. György Miklos Böhm (Brazil) in 2015; and Dr. Prathap C Reddy (India) in 2017.

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Finnish National eHealth Award

Finnish National eHealth award is delivered by President and Secretary of the Finnish Society of Telemedicine and eHealth.

The Board of Finnish Society of Telemedicine and eHealth delivers annually national eHealth award. The award is based on significant accomplishments in the field of telemedicine and eHealth. The required activity can be for example a doctoral thesis in this area or some other important activity in the national or international level supporting the society's goals. The award is delivered during annual Finnish national conference on telemedicine and eHealth. In the year 2021, Finnish national eHealth award is delivered for the 18th time.

eHealth award for life-long work

The Board of Finnish Society of Telemedicine and eHealth decided to deliver during the 26th Finnish National Telemedicine and eHealth Conference one eHealth award emphasizing the recipient´s life-long work for the benefit of telemedicine and eHealth:

Ph.D., radiographer and former Principal lecturer Anja Henner has made a major contribution to the education and research of telemedicine and digital health. During her career she has been responsible for the R&D in the Degree program of Radiography and Radiotherapy in Oulu University of Applied Sciences (OUAS) since year 1998. She has supervised Bachelor, Masters and Doctoral thesis studies in various topics. She has encouraged students to combine their education to practical implementations and shown a path from present applications to future innovations. She established one of the first digital radiography simulation laboratories to support education and is among the pioneers of distance learning since 1990s.

Her research and development interests are in radiation protection and digital imaging, dose optimization, quality assurance as well in telemedicine and eHealth. She is one of all time most active Finnish participants in European Congress of Radiology, presenting her research topics in multiple scientific presentations, invited lectures and workshops. She has always encouraged her students to participate in international collaboration, showing her own example through EU funded R&D projects.

Anja Henner has been a member of Finnish Society of Telemedicine and eHealth right from the beginning and has served in the society´s board a period of approximately ten years, most of the time as treasurer. During her years in the board, she has been responsible for the practical details in the yearly conferences and started the tradition of offering students a possibility to join the conference team. Most important has been her contribution in the early phases of the cruising seminars between Finland and Sweden.

On these grounds, Finnish Society of Telemedicine and eHealth presents Anja Henner with the year 2021 eHealth Award in recognition of extensive life work.

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Sessio 2A: Digitaalisen terveyden menetelmien arviointi ja e-tutkimus / Evaluation of digital health methods and e-research

Puheenjohtaja: Tutkimus- ja arviointiylilääkäri, Professori Miia Turpeinen, Oulun yliopisto ja Oulun yliopistollinen sairaala

Chair: Chief Medical Officer in research and evaluation, Professor Miia Turpeinen, University of Oulu and Oulu University Hospital

Torstai 7.10.2021 - Thursday 7th of October 2021

11:05 – 12:35

2A-1 e-Tutkimuksen monet näkökulmat
Kaija Saranto, Professori
Itä-Suomen yliopisto

2A-2 Digitaalisen terveyden ratkaisujen arviointi
Jari Haverinen, Erikoissuunnittelija
Kansallinen HTA-koordinaatioyksikkö FinCCHTA

2A-3 Digihoitopolkujen vaikutukset potilaan hoitoon ja ammattilaisen toimintaan
Pia Liljamo, Kehittämispäällikkö ja ICT projektipäällikkö
PPSHP

2A-4 Tutkimus-, kehitys- ja innovaatiotoiminnan kumppanuusverkostot vauhdittamassa digitaalisen terveyden uudistumista
Maritta Perälä-Heape, Johtaja, Työelämäprofessori
CHT, Oulun yliopisto

5 min rapid scientific presentations

O-1 Digi-HTA, assessment process for digital healthcare services and products: information security and data protection in health technology
Jari Jääskelä[1] MSc. (Tech.), Teemu Tokola[1] MSc. (Tech.), Kimmo Halunen[1] DSc. (Tech.)
Prof., Juha Röning[1] DSc. (Tech.), Prof.
[1]University of Oulu, Biomimetics and Intelligent Systems Group

O-2 Patient initiated symptom assessment with an electronic symptom checker. Study for clinical validation
Ville D. Liu[1] BM, Minna Kaila[2,3] MD, PhD, Professor, Tuomas Koskela[4,5] MD, PhD, Professor
[1]Helsingin yliopisto, Helsinki;
[2]Clinicum, Lääketieteellinen tiedekunta, Helsingin yliopisto;
[3]HUS Yhtymähallinto, Helsinki;
[4]Lääketieteen ja terveysteknologian tiedekunta, Tampereen yliopisto, Tampere;
[5]TAYS Perusterveydenhuollon yksikkö, Tampere

O-3 Ethical evaluation in digital health contexts: voting with the Saari triangle
Jaakko Hakula[1], GP, Entrepreneur
[1]Student in Health and Human Services Informatics, Faculty of Social Sciences and Business Studies, University of Eastern Finland

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Digitaalisen terveyden menetelmien arviointi ja e-tutkimus
Miia Turpeinen, Tutkimus- ja arviointiylilääkäri, Professori
Oulun yliopistollinen sairaala, Oulun yliopisto

Biografia Miia Turpeinen

Miia Turpeinen toimii kliinisen farmakologian ja lääkehoidon professorina Oulun yliopistossa ja tutkimus- ja arviointiylilääkärinä Oulun yliopistollisessa sairaalassa, jossa hän johtaa kansallista HTA-koordinaatioyksikköä (FinCCHTA). Hänellä on useiden vuosien kokemus terveydenhuollon menetelmien arvioinnista, terveydenhuollon laatu- ja potilasturvallisuustyöstä sekä rationaalisen lääkehoidon edistämisestä. Turpeisen tutkimuskohteita ovat erityisesti vähähyötyisten menetelmien karsinta sekä yksilöllistetty lääkehoito. Hän on verkostoitunut aktiivisesti tiedeyhteisössä ja sen ulkopuolella ja toimii aktiivisesti useissa kansainvälisissä ja kansallisissa toimielimissä, mm. Kelan lääkejaoksen puheenjohtajana ja Terveydenhuollon Palveluvalikoimaneuvoston jäsenenä.

Evaluation of digital health methods and e-research
Miia Turpeinen, Chief Medical Officer in research and evaluation, Professor
Oulu University Hospital, University of Oulu

Biography Miia Turpeinen
Miia Turpeinen is a Professor of Clinical Pharmacology and Pharmacotherapy at the University of Oulu, Senior Medical Officer at the Oulu University Hospital and Director of Finnish Coordinating Center for Health Technology Assessment (FinCCHTA). She is a renowned clinical pharmacology researcher with several years of experience in health technology assessment, quality and patient safety work and promotion of rational drug prescribing. Her research is focused on disinvestment of low-value care, deprescribing and personalized pharmacotherapy. Professor Turpeinen has several prominent national and international positions, e.g., as a chair of the National Drug Reimbursement Committee, member of Council for Choices in Health Care in Finland and she has a wide network of collaborators also beyond academia.

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eHealth - the various aspects of research in eHealth

Kaija Saranto[1], PhD, RN

[1]*University of Eastern Finland*

Biography Kaija Saranto

Dr Kaija Saranto acts as a full professor in Health and Human Services Informatics (HHSI), University of Eastern Finland. Currently, she is the program director for master (first "IMIA accredited") and doctoral degree programs in HHSI. She is leading research groups focusing on health data analytics, shared decision making and virtual care as well as patient safety in cooperation with national and international colleagues. She is an elected Fellow of the American College of Medical Informatics (ACMI), the American Academy of Nursing (AAN) and an Inaugural Fellow of the International Academy of Health Sciences Informatics (IAHSI). She is the past president of the Finnish Health Informatics Association under IMIA and has served as the International Taskforce Liaison for HIMSS TIGER Committee. Currently, she is the chair of the WG Education of EFMI and is actively engaged with the international curriculum development of health informatics for the digital society.

Background

More than 20 years ago, Gunther Eysenbach published his classic paper on how to define eHealth, stating that we should think about the "e" from various aspects, not only electronic but also nine other important areas (e.g., education, ethics, and evidence-based) [1]. Some years after Eysenbach's paper, a review revealed 51 unique definitions of eHealth that showed a wide range of themes but no clear consensus about the meaning of the term. From those definitions, two universal themes (health and technology) and six less general themes (commerce, activities, stakeholders, outcomes, place, and perspectives) were identified [2].

The wide range of themes has also caused a lack of consistency in defining and using terms related to eHealth research, as the terms are not a keyword in all databases. More importantly it is difficult to operationalize eHealth due to context or discipline specific definitions [3]. The purpose of this presentation is to provide examples of the broad variation of eHealth research found in the Scopus database.

Main content of the presentation

In this presentation, the search strategies of relevant publications in eHealth research will be briefly discussed. Further, Scopus, an expertly curated abstract and citation database, will be used as the basis of information retrieval and an analysis of the search results based on the terms "ehealth or e-health" [4]. The focuses of interest are the number of publications over the years, the variation in publications per country or affiliation, and the research themes. Some examples of eHealth research will be presented and discussed.

Recommendations for future research

Based on the findings of the information retrieval from the Scopus database, gaps in research themes will be shared.

References:

[1] Eysenbach, G. What is e-health? J Med Internet Res. 2001 Apr-Jun; 3(2): e20.

[2] Oh, H, Carlos Rizo, C, Enkin, M and Jadad, A. What Is eHealth (3): A Systematic Review of Published Definitions J Med Internet Res. 2005 Jan-Mar; 7(1): e1.

[3] Shaw, T, McGregor, D, Brunner, M, Keep, M, Janssen, A and Barnet, S. What is eHealth (6)? Development of a Conceptual Model for eHealth: Qualitative Study with Key Informants. J Med Internet Res. 2017 Oct; 19(10): e324.

[4] Kokol, P, Saranto, K, Blazun Vosner, H. eHealth and Health Informatics competences: A systematic analysis of literature production based on bibliometrics. Kybernets 47 5, 1018-1030, 2018.

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Assessment of Digital Health Solutions

Jari Haverinen, Senior Planning Officer, MSc, MHSc,

Finnish Coordinating Center for Health Technology Assessment, Oulu, Finland
FinnTelemedicum, Research Unit of Medical Imaging, Physics and Technology, Faculty of Medicine, University of Oulu, Finland

Biography Jari Haverinen

Mr. Jari Haverinen, received his M.Sc. in Electrical Engineering (1999) and M.H.Sc. (2018) degrees from the University of Oulu, Finland. He has 18 years background in the telecoms industry before his career in digital health field. His current job role is Senior Planning Officer in the Finnish Coordinating Center for Health Technology Assessment (FinCCHTA). He's main responsibility in FinCCHTA is the development and implementation of the new Digi-HTA assessment method. Digi-HTA has been developed to perform health technology assessments (HTA) for novel digital healthcare technologies such as mobile apps, AI and robotics in Finland. He also works as a Doctoral researcher at the Faculty of Medicine of the University of Oulu. His research area is the development of new HTA methods for digital health solutions as well as eHealth research.

Introduction: The introduction of more and more digital health solutions also requires evidence-based information regarding the benefits of products. To this need, a new health technology assessment (HTA) criteria and associated process called Digi-HTA have been created in Oulu in cooperation with the Finnish Coordinating Center for Health Technology Assessment (FinCCHTA) and the Faculty of Medicine at the University of Oulu [1]. Digi-HTA is a general-purpose HTA framework whose aim is to support HTA activities for all kinds of digital health solutions such as mHealth, digital platforms, artificial intelligence (AI) and robotics [1]. To assess data security and protection, the Digi-HTA process uses a list of information security and data protection requirements for social and healthcare sector procurements developed under the Cyber Health project [2].

Main content of the presentation: Digi-HTA is currently implemented as part of FinCCHTA's operations, and published Digi-HTA recommendations are available on FinCCHTA's website [3]. Recommendations are available for different kinds of digital health solutions such as medicine dispensation and rehabilitation robotics as well as an intelligent symptom navigator and digital service platform. This indicates that with Digi-HTA criteria, assessments for different kinds of digital health products can be performed.The biggest challenges for the companies that have participated in the Digi-HTA assessment process so far have been to demonstrate the effectiveness of products and meet the accessibility requirements set by the Act on the Provision of Digital Services [4]. Data security vulnerabilities have also been identified in some products, and companies have withdrawn from the assessment process to fix those problems. Digital health is a challenging industry, and not all new companies entering the industry are accustomed to all the key requirements for digital health products. According to health technology companies, the Digi-HTA criteria can be used to guide the development of digital technologies in the healthcare field and anticipate further development and market access. Despite that, Finland has no formal process in place to utilise Digi-HTA recommendations as part of a healthcare decision-making process. There is an increasing number of health technology companies that are willing to participate in the assessment process. They stated that Digi-HTA recommendations allow them to objectively demonstrate to decision-makers the suitability of their products for healthcare use.

Conclusion: A new HTA criteria and associated process called Digi-HTA have now been implemented to support HTA activities for all kinds of digital health solutions in Finland. New ways of working are required to enable health technology companies to increasingly produce research data on the effectiveness of their products in the future. Usability and accessibility as well as data security and protection of digital health technology products should be at the level required by healthcare. Digi-HTA can be used as a tool for supporting product development in a digital health field.

References

[1] Haverinen J, Keränen N, Falkenbach P, Maijala A, Kolehmainen T, Reponen J (2019) Digi-HTA: Health technology assessment framework for digital healthcare services. Finnish Journal of eHealth and eWelfare, 11(4), 326–341. https://doi.org/10.23996/fjhw.82538.
[2] National Emergency Supply Agency. Cyber Health Project. (2021) Information security and data protection requirements for social welfare and healthcare procurement. Available at: https://www.kyberturvallisuuskeskus.fi/en/ncsc-news/instructions-and-guides/information-security-and-data-protection-requirements-social [accessed 3.9.2021]
[3] FinCCHTA. (2021) Digi-HTA. Available at: www.digi-hta.fi [accessed 3.9.2021].
[4] The Act on the Provision of Digital Services 306/2019

Digihoitopolkujen vaikutukset potilaan hoitoon ja ammattilaisen toimintaan

Pia Liljamo, TtT, kehittämispäällikkö

Pohjois-Pohjanmaan sairaanhoitopiiri, Konsernipalvelut, Kehitys ja viestintä, Terveyskylä, Finland

Biografia Pia Liljamo

Pia Liljamo, TtT, sh, post doc-tutkija, toimii PPSHP:n Terveyskylä-palveluiden kehittämispäällikkönä ja on aloittanut juuri projektipäällikkönä Pohjois-Pohjanmaan hyvinvointialueen ICT-valmistelussa kansalaisen digipalveluissa. Liljamon työtehtävät ovat viime vuosina liittyneet kansalaisille ja potilaille tarjottavien sähköisten asiointipalveluiden suunnitteluun ja kehittämiseen. Tutkimukselliset intressit liittyvät rakenteisen kirjaamisen ja hoitokertomustiedon toisiokäytön, potilaan itsetuottaman tiedon ja digiasioinnin mahdollisuuksien ja vaikutusten tutkimiseen.

Sähköiset asiointipalvelut ovat vakiintuneet osaksi sosiaali- ja terveydenhuollon palvelukokonaisuutta; tästä hyvänä esimerkkinä ovat kansalliset Kanta-palvelut. Sähköiset palvelut voivat olla tiedottavia, vuorovaikutteisia tai asioinnin mahdollistavia palveluja. Esimerkkinä vuorovaikutteisista omahoitopalveluista ovat Terveyskylän Omapolku-palvelun digihoitopolut, jotka tietyissä tilanteissa voivat korvata potilaan ja sosiaali- ja terveydenhuollon ammattilaisen perinteisen kasvokkaisen kohtaamisen. [1.] Terveydenhuollon palvelut ja toimintatavat ovat olleet perinteisesti hyvin asiantuntijalähtöisiä. Digitalisaatio mahdollistaa toimintatapojen kehittämisen ja muuttamisen entistä asiakaskeskeisemmiksi. Tutkimuksista tiedämme, että kansalaiset suhtautuvat digipalveluiden käyttöön myönteisesti. [2.]

Omapolku-palvelun digihoitopolut täydentävät, korvaavat ja sujuvoittavat perinteisiä erikoissairaanhoidon vastaanottokäyntejä, sairaanhoitoa ja potilasohjausta. Palvelu on laajentumassa myös perusterveydenhuoltoon. Digihoitopolulla asioimiseen vaaditaan hoitosuhde tai lähete palvelun tarjoavaan terveydenhuollon yksikköön. Potilaan digihoitopolulle tallentamat tiedot näkyvät ainoastaan häntä hoitaville ammattilaisille ja potilaalle itselleen tai puolesta-asioivalle alaikäisen huoltajalle. Polulla potilas voi lukea hoito- ja potilasohjeita. Hän voi välittää tietoa ammattilaiselle voinnistaan, oireistaan, toimintakyvystään tai seuraamistaan terveysmittauksista erilaisten kyselyiden ja päiväkirjan välityksellä. Yhteydenpito ammattilaisiin onnistuu viestin, chatin tai etävastaanoton välityksellä. [3.] Digihoitopolun kehittäminen lähtee aina kyseisen potilasryhmän ja potilaita hoitavien ammattilaisten tarpeista [4]. Digihoitopolut mahdollistavat potilaiden itse tuottamien hoitoon liittyvien tietojen tallentamisen ammattilaisten käyttöön ennakolta hoidon suunnittelun ja seurannan tueksi. Digihoitopoluilla tavoitellaan hoitoprosessien sujuvuutta ja sitä, että potilaat ovat paremmin valmistautuneita ja ottavat vastuuta omasta hoidostaan; ja siten henkilöstöltä vapautuu aikaa muihin tehtäviin. [3-4.]

Odotukset digitaalisten palveluiden kustannustehokkuudesta ja vaikutuksista ovat korkeat [1,5]. Digipalvelujen odotetaan parantavan potilaiden hoidon saatavuutta ja helpottavan ammattilaisten työtä. Muutoksen seuraamisen ja vaikutusten arvioinnin kannalta on tärkeää tunnistaa ja nimetä tavoitteet ja mittarit, joiden avulla tapahtuvaa muutosta voidaan arvioida. Digihoitopolkujen kehittäminen käynnistyy aina nykytilan kuvauksella ja tavoitetilan asettamisella; tähän keskusteluun tulee koko yksikön henkilöstön osallistua. Pohjois-Pohjanmaan sairaanhoitopiirissä (PPSHP) on otettu käyttöön jo 25 digihoitopolkua ja useita on työn alla. Jokaiselle polulle määritellään tavoitteet toiminnan muutokselle sekä mittarit, joiden avulla muutosta arvioidaan. Yleisimmät tavoitellut muutokset ovat tasalaatuisen ohjauksen tarjoaminen kaikille potilaille, ohjaukseen käytettävän suullisen neuvonta-ajan ja puhelinliikenteen väheneminen sekä potilaiden itsetuottamien tietojen hyödyntäminen ammattilaisen työssä. Esityksessäni käyn tarkemmin läpi jo saavutettuja muutoksia ja koettuja hyötyjä.

Polkujen käyttöönoton myötä on huomattu, että toiminnan muutoksen toteuttaminen ja sen arviointi ovat usein työyksiköille haastavia. Rohkeutta tehdä muutoksia tarvitaan, mutta myös johdon tukea ja linjauksia. PPSHP:n tuore strategia korostaa selkeästi sähköisten palveluiden olevan osa sairaalan toimintaa. Tulevien sote-hyvinvointialueiden tavoitteisiin ei myöskään tulla pääsemään ilman toimivia ja helppokäyttöisiä digitaalisia asiointipalveluita. Kansalaiset haluavat ajasta ja paikasta riippumatonta palvelua myös terveydenhuollossa.

Lähteet:
Saatavilla kirjoittajalta

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Research, Development, and Innovation Partnership Networks Accelerating Digital Health Renewal
Tutkimus-, kehitys- ja innovaatiotoiminnan kumppanuusverkostot vauhdittamassa digitaalisen terveyden uudistumista

Maritta Perälä-Heape, professor of practice, & director
Centre for health and Technology, Faculty of Medicine, University of Oulu

Biography Maritta Perälä-Heape

She develops multidisciplinary, multi-stakeholder RDI network cooperation between research institutes, companies, and health service providers. She develops cooperation between regional, national, and international knowledge partnerships and digital health innovation networks. In the OuluHealth ecosystem, she leads the Oulu Innovation Alliance's spear head program: Data enabled solutions as a part of predictive and supportive healthcare.
Her main interest is to strengthen the health data management skills and secondary use of data, thus enabling data-driven innovation and creating new value for health data as part of proactive and personalized health care. She leads and develops the national partnership network within HyteAiro program (AI in health data analytics) and the National Innovation Ecosystem Collaboration Network (HYTKI) for well-being and health data between five regions in Finland.

Digital solutions are changing the healthcare by enabling streamlining the services, enhancing personal care, and restraining the continuous growth of healthcare costs. To utilize and adopt digital technologies, significant development work must be done to create new practices for networking and knowledge sharing to facilitate the introduction of innovations and smart solutions and to enable business growth. Urgent need is to strengthen multi-level and multi-stakeholder cooperation in the digital transformation of health and care.

The OuluHealth ecosystem applies a multi-stakeholder model (public-private partnership, PPP), in which different actors; health and social care providers, health technology companies, research institutions and education, are committed to the development of joint innovation activities: multi-disciplinary RDI, business development, and testing and piloting environments.

The OuluHealth stakeholders have systematically developed collaborative R&D and innovation and set up a shared platform for multi-stakeholder communities. By bringing together various actors and enabling the combination of broad range of expertise, two specific shared platforms with deployment support services were established during 2018-2020 within the Digital Health Knowledge Hub project.
The deployment and innovation support services were developed for i) Health data practices and competences in analytics for data-driven health and wellbeing innovations, and for ii) Deployment and assessing digital health services (mHealth, Artificial Intelligence, and Robotics). These two communities are carrying out concrete activities to support and contribute to capacity building in the digital transformation of health and care. These communities are helping to define the building blocks for the scaling of innovation practices, and future dynamic collaboration models. The national framework with new cooperation models has been created by the ministerial-led HyteAiro program, which has significantly affected the national scaling-up and implementation of these network partnerships.

The value of these communities is seen in actions where we do not yet have generally accepted or created co-development models. For example, when aiming to avoid pitfalls in the health and wellbeing data usability in the collaborative R&D, new collaborative structures are needed urgently. The rules for collecting, processing, sharing and reuse of health data when developing data-based innovations are not clear in R&D cooperation and the implementation the legislation of secondary use of data in research and development is challenging.

The multi-stakeholder ecosystem-based partnership accelerates digital health renewal, strengthens, business clustering and pooling the best scientific expertise as a joint effort for benefit of the Finish digital health strategies.
For the next generation cooperation, we need to look at the thematic priorities from the perspective of regions and innovative cities, linking them to the relevant EU priorities and other strategic priorities affecting sustainable digital health co-development.
The lecture addresses recent developments and future visions of the Digital Health Knowledge Hub formation.

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O-1: Digi-HTA, assessment process for digital healthcare services and products: information security and data protection in health technology – initial experiences

Jari Jääskelä[,1], MSc. (Tech.), Teemu Tokola[,1], MSc. (Tech.), Kimmo Halunen[,1], DSc. (Tech), prof., Juha Röning[,1], DSc. (Tech), prof.
[1] *University of Oulu, Biomimetics and Intelligent Systems Group*

Introduction: It is well-known that security issues in deployed medical devices, services and programs can have catastrophic consequences, ranging from measurement errors to entire hospital digital infrastructures being held ransom. To avoid compromised patient data or information systems, it is essential that healthcare services and products meet the relevant information security and data protection requirements. To achieve this, persons in charge of procurement decisions need to have accessible information on product conformance. For these reasons, the Digi-HTA assessment [1] includes information security and data protection assessment areas. The requirements for these areas are based on the information security and data protection best practices for social welfare and healthcare procurements published in the Kyber-Terveys[2] project of the Finnish national emergency supply agency Huoltovarmuuskeskus. The outcome of the Digi-HTA assessment is a recommendation that decision-makers can use during the procurement process. The first security assessments made in the Digi-HTA process have uncovered serious security issues and have contributed to the improved security of the assessed products.

Material and Methods: During the Digi-HTA assessment process, the manufacturer fills a self-assessment form. Using this information, the assessor performs the assessment, and due to the nature of security issues, this generally leads to further questions, interviews, and requests for other material from the manufacturer. The final outcome is a summary that highlights the issues in terms of information security and data protection, and informs the decision-makers of things to consider. The assessment criteria and the recommendation structure will be improved continuously using qualitative methods, such as feedback from manufacturers and other stakeholders. As part of this process, we are currently collecting feedback from manufacturers via a questionnaire, and experiences from the project and the assessments will also be provided to relevant national stakeholders.

Results: We have assessed five products and have multiple assessments in progress. The results indicate that healthcare product manufacturers have found the process useful, and usually, the manufacturers have been able to improve the security of their product already during the Digi-HTA process to get a favourable recommendation for their product. The assessment processes have taken longer than expected due to shortcomings and ambiguities in the provided self-assessment forms, and due to feedback cycles and meetings prompted by assessment findings. Of the five assessed products, three received a green light in information security and data protection, whereas two have received a yellow light due to issues that were not fixed during the process. In addition to shortcomings in adhering to best practices, we have also found exploitable security issues. For example, one issue could have led to large scale data breach if exploited by a malicious actor. All of the exploitable issues have been resolved in collaboration with the manufacturers.

Discussion: To better support decision-makers in procuring healthcare services and products that have sufficient quality in terms of information security, the Digi-HTA assessment criteria includes requirements derived from information security and data protection standards and best practices. The assessment process takes place in collaboration with the manufacturer, allowing manufacturers to benefit from an independent review and improve the security of their products, while at the same time signaling the need to resolve these issues beforehand. Because there is a lot of variety between products in terms of risk profiles, naturally some of the requirements are irrelevant for some healthcare products (such as some on-premise related requirements for cloud-based services). Similarly, the assessment criteria may not contain some requirements that are essential for other products with more uncommon risk profiles. In order to make the self-assessment form easier to answer and more relevant to particular products, we plan to create a list of security and data protection requirements that are tailored to each product.

References:
[1] Haverinen, J., Keränen, N., Falkenbach, P., Maijala, A., Kolehmainen, T., & Reponen, J. (2019). Digi-HTA: Health technology assessment framework for digital healthcare services. Finnish Journal of EHealth and EWelfare, 11(4), 326–341. https://doi.org/10.23996/fjhw.82538
[2] Kyber-Terveys-hanke (2019) https://www.kyberturvallisuuskeskus.fi/fi/ajankohtaista/ohjeet-ja-oppaat/sosiaali-ja-terveydenhuollon-hankintojen-tietoturva-ja [accessed 21.8.2021].

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O-2: Patient initiated symptom assessment with an electronic symptom checker. Study for clinical validation.

Ville D. Liu[1], BM, Minna Kaila[23], MD, PhD, professor, Tuomas Koskela[45], MD, PhD, professor
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[2]*Clinicum, Lääketieteellinen tiedekunta, Helsingin yliopisto;*
[3]*HUS Yhtymähallinto; Helsinki;*
[4]*Lääketieteen ja terveysteknologian tiedekunta, Tampereen Yliopisto, Tampere;*
[5]*TAYS Perusterveydenhuollon yksikkö, Tampere*

Introduction: The purpose of an electronic symptom assessment is to give the patient filling in the assessment an idea of the quality and urgency of the treatment likely to be required for the symptom (triage). As a result of the assessment, the user is instructed to either treat the symptom and the associated health problem himself or herself, or prompted to contact a health care professional who will provide an assessment of the situation and, if necessary, treatment. This study describes the clinical validation results of the 14 different symptom checkers introduced in the Omaolo-project. [1]

Material and Methods: This is a mixed methods study using quantitative and qualitative methods. The study was a multicenter study in 14 different health care organizations participating in the validation process. The study was conducted in primary healthcare units using the so-called "walk-in" model where clients come to a health center mainly without a prior phone call. The user answered the questions posed by the electronic symptom checker, after which a nurse familiar with triage assessed the need for treatment of the same user's symptom. The triage nurse was not allowed to know the result of the electronic symptom assessment until he or she had assessed the patient's condition. The study assistant monitored the completion of the study user's electronic symptom checker.

Results: Findings from 825 individual patient users, nurses, and study assistants were analyzed based on separate completed study forms. The mean "exactly matched" for all symptom estimates was 52.6%. The mean "exactly matched" or "overconservative but suitable" for all symptom assessments was 66.6%. Safe assessments of electronic symptom checkers accounted for 98.6% of all assessments made. A case was defined as safe if the conflict condition was not met and the recommendation for action given by the symptom assessment was at most one degree of urgency less urgent than the triage assessment of the same case. Definition of a conflict: "Cases assessed by the caregiver as urgent / on-call duty but assessed by the electronic symptom checker as non-urgent / self-care".

Discussion: The findings show that electronic symptom assessments are safe compared to the assessment of an experienced nurse. In addition, they are acceptable, reasonably easy to use, and understandable as assessed by patients. The symptom assessment questionnaires have been clarified and made more understandable based on the developmental needs identified during the study. [2]

References:
[1] DigiFinland Oy (owner: Republic of Finland), Kuntatalo, Toinen linja 14, 00530 Helsinki, https://digifinland.fi/en/etusivu-english/ and https://digifinland.fi/en/our-operations/omaolo-service/ and https://www.omaolo.fi/
[2] Liu, V. D., Sellgren, L., Kaila, M., & Koskela, T. (2021). Usability of online symptom checkers. *Finnish Journal of EHealth and EWelfare*, *13*(2), 100–112. https://doi.org/10.23996/fjhw.97020

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O-3: Ethical evaluation in digital health contexts: voting with the Saari triangle

Jaakko Hakula[1,2]

[1]*Student in Health and Human Services Informatics, Faculty of Social Sciences and Business Studies, University of Eastern Finland*
[2]*GP, specialized in general and occupational medicine, entrepreneur*

Introduction: The concept of digital health encompasses the interrelationships between individual, public and global health, and methods and tools based on information technology, used by both patients and experts in various professions and organizations. The digital transformation of health and care is one of the main priorities also in the European Union. Digitalized technologies have wide-ranging socio-economic effects, which need to be discussed incessantly on local, national, and international democratic forums. Digitalization is the very matter of ethics and morals, too. [1, 2].

The aim of the abstract is to present an imaginary case of ethical decision-making with the aid of voting theory. Elections are everyday phenomena all over the world. There is a plethora of voting methods, the rules and outcomes of which can differ from one another remarkably. Lay knowledge in theory and practice is scarce to understand the peculiarities of voting methods. Even social choice theorists disagree in many respects. The Saari triangle is a geometric visualization of a three-candidate (or alternative) election. At first glance the context of the Saari triangle seems trivial, but a closer look reveals an astonishing complexity. Election outcomes may inform more about the choice of an election rule than about the true preferences of the voters (or decision-makers) [3, 4]. Evidently, same kinds of discrepancies are faced in voting on ethical alternatives. Moral assessment from multiple perspectives is needed [5].

Material and Methods: The criteria for an imaginary case to be ethically evaluated are derived from the paper by Vayena et al. [1]. The five conditions of innovations in digital health in order of importance are 1) data access, 2) data protection, 3) accountability, 4) evidence, and 5) trust. There are three alternatives A, B, and C to be voted for – e.g. three different kinds of digital technologies. The Saari triangle is the methodology applied, with the focus on positional and pair-wise voting rules. The five criteria each are represented by the number of votes given by the voters. The number of votes in the preference profile are those of the example case presented by Saari (the sixth criteria having zero votes) [4]. The data in the preference profile stand for the six, strict ranking regions, where 1) A $\succ$ B $\succ$ C, 2) A $\succ$ C $\succ$ B, 3) B $\succ$ A $\succ$ C, 4) B $\succ$ C $\succ$ A, 5) C $\succ$ A $\succ$ B, and 6) C $\succ$ B $\succ$ A. The words "closer is better" are expressed by Saari himself, to stand for the preferential order of an election outcome in empirical cases [4].

Results: The voting results can be read and interpreted from the Saari triangle. The positional rule of "vote for one" is the plurality rule (Pl), which ranks the alternative A as the ethically best solution. The "vote for two" or antiplurality rule (Apl) produces the outcome B $\succ$ C $\succ$ A (i.e. B is netter than C, which is better than A). B is the best alternative. The Borda Count (BCo) sets the alternative C in the first place. In this example case, the pair-wise outcomes end up in a cycle: A $\succ$ B, B$\succ$ C, and C$\succ$ A. The cycle means irrationality [4]. A perplexing result remains. Which one of the three digital systems is the best choice in an ethical sense, taken the aforementioned weights for the criteria into an account? A question that remains unanswered?

Discussion: Voting in social theory is a traditional way of making decisions in multiple areas of social and professional encounters. In digital technologies modern methods of computational social choice are applied in algorithmics. The pedagogy of this abstract is that ethical and moral decisions made by groups of people often are based on voting. Whether real decisions are made by voters or complex rules, is the crux of the abstract. Onto−epistemological aspects and moral assessment of trust are perhaps some of the most contradictory and multi-faceted notions, deserving a thorough examination of its own in the future [5].

References:

[1]Vayena E., Haeusermann T., Adjekum A. & Blasimme A. (2018).Digital health: meeting the ethical and policy challenges. ETH Zűrich, research collection. **https://www.research-collection.ethz.ch/handle/20.500.11850/239873** [Accessed 01.08.2021].

[2] European Commission (2021). Shaping Europe's digital future. eHealth. **https://digital-strategy.ec.europa.eu/en/policies/ehealth** [Accessed 12.8.2021]

[3] Eggers, A. C. (2021) A diagram for analyzing ordinal voting systems. Soc Choice Welf 56, 143–171. **https://doi.org/10.1007/s00355-020-01274-y**

[4] Saari, D. G. (2008) Complexity and the geometry of voting. Mathematical and Computer Modelling, 48 (9-10), 1335-1356. https://doi.org/10.1016/j.mcm.2008.05.033

[5]Ruotsalainen, P. & Blobel, B. Health information systems in the digital health ecosystem—problems and solutions for ethics, trust and privacy. *Int. J. Environ. Res. Public Health* 2020, *17*, 3006. **https://doi.org/10.3390/ijerph17093006**

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Session 2B: Novel Digital Solutions for Healthcare

Chair: Deputy Executive Medical Officer Terhi Nevala
Oulu University Hospital

Thursday 7th of October 2021

11:05 – 12:35

2B-1 **Future possibilities of Medical AI in disease detection and characterization**
Simo Saarakkala, Professor
University of Oulu

2B-2 **How AI will revolutionize usage of clinical information**
Janne Liisanantti, Professor
University of Oulu, Oulu University Hospital

2B-3 **eCoaching in the management of chronic coronary syndromes**
Kari Kaikkonen, Associate Chief Physician
Oulu University Hospital

2B-4 **What are the benefits of future regional electronic health record systems for users**
Eila Erkkilä, Chief Physician
City of Oulu

5 min rapid scientific presentations

O-4: **Adapting ETSI SmartBan to eHealth**
Matti Hämäläinen DSc., Tuomas Paso MSc.
[1]Centre for Wireless Communications, University of Oulu, Finland

O-5: **Cancer Prediction Using Graph-based Gene Selection and Explainable Classifier**
Mehrdad Rostami[1] MSc., Mourad Oussalah[1] PhD
[1]Centre of Machine Vision and Signal Processing, Faculty of Information Technology, University of Oulu, Finland

O-6 **Distributed network and service architecture for future digital healthcare**
Erkki Harjula[1] DSc., MSc., Tanesh Kumar[1] DSc., MSc., Johirul Islam[1] MSc., Muneeb Ejaz[1] MSc., Ivana Kovacevic[1] MSc.
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Novel Digital Solutions for Healthcare
Terhi Nevala, Deputy Chief Medical Officer
Oulu University Hospital

Biography Terhi Nevala

Terhi Nevala is a specialist in readiology who has worked in the Northern Ostrobothnia Hospital District as a Chief Administrative Officer since August 2018. Between August 2021 and February 2022 she is the Deputy Chief Medical Officer of the Northern Ostrobothnia Hospital District.

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Future possibilities of Medical AI in disease detection and characterization

Simo Saarakkala, Professor

University of Oulu

Biography Simo Saarakkala

Simo Saarakkala is a Professor of Biomedical Engineering at the Faculty of Medicine, University of Oulu, Finland. He is also a Leader of Digital Health research profiling actions at the University of Oulu. Prof. Saarakkala has published over 200 peer-reviewed scientific articles on diagnostics of musculoskeletal diseases and prediction of their progression. He serves as an Editorial Board Member in four scientific journals and is regularly giving invited talks in international scientific meetings. He has been the primary supervisor of multiple undergraduate and doctoral students as well as the leader of national and European-level research projects. He has h-index of 43 and his publications have been cited over 6050 times (Google Scholar). Prof. Saarakkala's group is actively using artificial intelligence, machine learning and data mining in his group's research.

AI-based methods are becoming more and more popular in the field of medical diagnostics and prognostics. Application of AI in the field of medical imaging has been particularly popular in the recent years. In medical imaging, the primary target of AI has been to automatically detect and classify abnormalities from the images. Furthermore, AI can be applied to enhance visual medical images and even increase their spatial resolution. Besides just analyzing a single image or image stacks, current AI algorithms are nowadays able to combine imaging data with other patient data such as demographic data, symptoms, clinical data, laboratory examinations, etc. When imaging data is combined with other patient data, it is possible to increase the prognostic capability of AI algorithms. Another promising area of AI in medicine is Natural Language Processing (NLP). When applying NLP to medical records, it will be possible to aid medical practitioners in disease diagnostics and prediction of patient outcomes. In this lecture, some of the most recent and promising applications of AI in medical diagnostics and prognostics will be reviewed.

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How AI will revolutionize usage of clinical information
Janne Liisanantti, Professor, Chief Physician
Oulu University Hospital, University of Oulu

Biography Janne Liisanantti

My research interest is in the hospital processes and in the perioperative process. The big question is, why one survives, and another does not even with the same demographics. My clinical background is in the ICU but I feel comfortable in ORs and Eds as well. At the moment, I am working with the world's greatest research team, Research Group of Anesthesiology in MRC Oulu, aiming to develop novel, innovative, unique, open, and equal research culture and environment.

Health care system produces enormous amounts of data, each day, each minute. This data includes clinical data, patient demographics also outside health or disease related data. Beside the clinical data, the system produces data on resource use and economics. This huge mass of data is mainly used in the sectors of its need; for instance clinical data by health care professionals and resource usage data by hospital management.

In my talk, I will imagine and build a utopia of a world with AI assisted hospital environment, where everything is taken into account.

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eCOACHING in the management of chronic coronary syndromes
Kari Kaikkonen, MD, Ph.D.
Department of cardiology, Oulu University Hospital

Biography Kari Kaikkonen

Kari is an experienced clinical cardiologist with passion to improve secondary prevention for patients suffering chronic coronary syndromes. Together with the multidisciplinary team from Oulu University Hospital and in collaboration with Finnish Heart Association, he has innovated and constructed new digital care pathways and eCoaching program on the Health Village platform. Kari is convinced that novel eHealth solutions can bring real value for the care of the heart patients.

eCoaching is a novel concept to improve long-term results of care for patients suffering chronic coronary syndromes (CCS). Based on an adequate in-hospital segmentation, significant part of the CCS patients, diagnosed at coronary angiography, may be treated on specific CE-marked digital care pathway constructed on the national Terveyskylä-platform. Digital care pathway for CCS patients provides an uninterrupted care pathway from hospital to primary care. On the pathway it is possible to monitor and adjust medical treatment, provide adequate patient information and education and timely react for the possible needs of the patients that would otherwise lead to unnecessary visits at policlinics. First experiences of the eCoaching have been very encouraging. We have been able to improve intermediate outcomes of care compared to previous European surveys as well as patient satisfaction in these CCS patients. We believe that improved outcomes with decreasing costs can bring real value in the treatment of chronic coronary syndromes.

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What are the benefits of future regional electronic health records for users?

Eila Erkkilä, Deputy Chief Physician, MD

Welfare services, City of Oulu

Biography Eila Erkkilä

Eila Erkkilä works as a deputy chief physician in the health services of the City of Oulu. She is specialized in public health and has also special competence in healthcare information technology. She's been working as a general practitioner for over 20 years. Her interests are developing the technology in health services as well as the information systems and is responsible for the city's health information systems and their implementation. She is also part of the Oulu Welfare Lab team. From 2020 she has been working as a medical adviser for Esko Systems Oy. Twitter: @EILAERKKILA

Background

When the City of Oulu together with the Northern Ostrobothnia Hospital District carried out a survey on the care paths and services of the elderly, the main result was that there should be a single common HER throughout the region. Now all 19 organizations in the region have different information systems due to administrative and historical reasons. The experience of healthcare professionals shows that the flow of information between different systems is difficult and makes it difficult to implement good care. Why is that?

Main content of the presentation

Results in a survey conducted for doctors in Finland on the use of the information systems:

- Access to information from elsewhere (from other organizations) takes too much time,
- Medication information from another organization is particularly difficult to find out.

How a single system improves the situation and why? What do users want, have they been consulted? On what grounds do they respond? Even more questions remain to be answered: Whether the benefit of a single system is an independent factor, regardless of the system itself? Whether single (although poor) system is always better than two or more (even good) systems. Whether this has been investigated or should this be investigated?

Let me give you two examles of the benefits of a single system: These are one medication (list of medicines) and on health and treatment plan. In addition, I propose how users and organizations benefit from the fact that there is only one system: these are related to the

- easier mobility of professionals and work cycle
- easier user training and user instructions
- easier orientation of new professionals and trainees
- easier basic training of health professionals

Conclusion

One system is good to have. A good system is even better. Listen to users: the patient information system is a basic tool, it can be a helper, an enabler or a disadvantage and a slowdown.

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O-4: Adapting ETSI SmartBAN to eHealth

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Introduction: The current trend in healthcare provision is going towards personalized and remote services, which are provided outside of hospitals or other care units, thus benefitting an eHealth approach. The place to collect health data is more often person's/patient's home. This procedural change sets new requirements for the personal medical devices as well as their connectivity solutions. Dealing with personal health data means that security, privacy, and trust need to be in the highest level; to protect personal sensitive data but also to provide reliable data for healthcare professionals' use. Not only dependable connectivity but also compatible data presentation and format are needed to open markets to various vendors, which enables way towards cheaper devices and better security of device supply. European Telecommunications Standards Institute (ETSI) is working towards a connectivity standard for smart body area networks (BAN), which could fasten this progress.

SmartBAN in Brief: The ETSI Technical Committee (TC) Smart Body Area Network (SmartBAN) is answering the increasing needs to provide reliable and seamless connectivity solutions for individuals' remote healthcare and wellbeing status monitoring. The standard defines physical layer (PHY) and medium access control layer (MAC) protocols, but also mechanisms for security and semantic interoperability provision in such a way that the remote monitoring solution is easy to use in and adapt to heterogeneous communications environment [1]. The driving forces have been energy efficiency, good co-existence with other existing radio technologies sharing the space, and to provide priority channel access for emergency traffic. As ETSI SmartBAN is flexible and future proof concept, it can be easily adapted to operate with all the existing radio standards, as well as being compatible with future 6G and beyond technologies [2]. Based on the one-hop star topology (amendment to support relay functionality is to be published soon), SmartBAN permits cost effective BAN network installation. The network coordinator, called as a hub, contains the highest intelligence and computing power within a network. This makes it possible to exploit cheaper nodes, which can be focused, e.g., on specific vital sign measurement or some other preliminary defined action. One envisioned SmartBAN network is formed by one hub and up to 16 simpler nodes. However, for practical realization, it is assumed that there are less than 8 nodes in one network, thus carried by an individual. All the measured data can be directed to centralized data records via the hub, or presented locally, e.g., using a smart phone or watch (which can also act as a hub.) In the standard, efficient solutions for heterogeneity as well as interoperability management are included, thus SmartBAN is interoperable in technical, semantic, and informational levels. Due to the unified metadata presentation, the SmartBAN data can be unambiguously described, which enables, e.g., automated data analysis and alarm handling. SmartBAN's modular semantic reference model, ontology and architecture are harmonized, e.g., with the corresponding oneM2M specification for Internet of Things (IoT) applications [1], which also improves its interoperability with other systems.

Discussion: The targeted use-cases where SmartBAN can be adopted are heavily focused on different kinds of eHealth and eWelfare applications, such as fall, sleep, apnea, abnormal cardiac rhythm or activity monitoring, etc.; just to name few [3],[4]. As SmartBAN enables high priority emergency traffic and better spectrum utilization via unused transmission time usage by primary node, it will significantly improve the spectrum usage and faster channel access in crowded environments, such as hospitals accommodating lots of persons using wearables, or when there is an immediate need to transfer high priority data. The nodes and wearables to be included in the SmartBAN network can be selected on-demand, depending on the monitoring purpose. The standard itself does not restrict utilization of any kind of sensor.

References:
[1] M. Hämäläinen, L. Mucchi, M. Girod-Genet, T. Paso, J. Farserotu, H. Tanaka, D. Anzai, L. Pierucci, R. Khan, Md M. Alam, P. Dallemagne, "ETSI SmartBAN Architecture: the Global Vision for Smart Body Area Networks", IEEE Access, Vol. 8, pp. 150611 - 150625, 2020, Print ISSN: 2169-3536, Online ISSN: 2169-3536, DOI: 10.1109/ACCESS.2020.3016705.
[2] M. Hämäläinen, T. Paso, L. Mucchi, "ETSI SmartBAN in Medical IoT", URSI General Assembly, Aug 28 – Sep 4, 2021, Rome, Italy.
[3] Smart Body Area Networks (SmartBAN); System Description, document ETSI TR 103 394 V1.1.1, Jan. 2018.
[4] Smart Body Area Networks (SmartBAN); Applying SmartBAN MAC (ETSI TS 103 325) for various use-cases, ETSI TR 103 711 V1.1.1, Oct 2020.

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O-5: Cancer Prediction Using Graph-based Gene Selection and Explainable Classifier

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Introduction: Improvements in the microarray devices has increased the accumulation of DNA microarray data. With this advancement, physicians will be able to simultaneously examine different aspects of gene expression in an experiment to diagnosis or classify various types of cancer and other diseases [1]. The rapid growth of data accumulation in the fields of medicine has posed a major challenge for data processing and analysis techniques. This enormous amount of microarray data cannot be analyzed by physicians in a short time to speed up diagnosis, prognosis, and treatment plans. Thus, it is important to develop a digital solution that can handle this large number of e-healthcare data efficiently. Therefore, DNA microarray classification has become critical to the DNA microarray analysis. Moreover, high dimensional DNA microarray has presented serious challenges to the existing machine learning and classification methods. In other words, in many of cancer and microarray datasets, it is possible that many genes are irrelevant or redundant for machine learning algorithm. Besides, lack of explainability and interpretability is often seen as a challenge that restricts the wide spread of machine learning technology in health sector.

Material and Methods: In this study a novel explainable cancer prediction model is proposed. The developed model consists of four main steps. In the first step, the primary genes are represented as a graph. In this graph, each gene is demonstrated by a node and the edge weights show the similarities between genes. In the second step, an iterative process is performed to find gene communities. Next, those of high score genes are chosen from each community to generate the final gene set. It is expected that the developed gene selection strategy, while choosing a subset of genes with the least redundancy, will also maximize the relevance of these genes with the label of medical data. Finally, in the fourth step, a decision tree-based prediction technique is developed to improve the explainability of the learning algorithm. Transparency of decision tree makes it widely employed for machine-learning problems that require an understanding of both the model structure and its prediction.

Results: The performance of the developed approach are compared with three new cancer prediction model: FSARM [2], BHAPSO [3] and, AHEDL [4]. Five publicly datasets were employed: Colon, Leukemia, SRBCT, Prostate Tumor, and Lung Cancer. The results of the experiments show that in all cases the proposed method performs better than the other cancer prediction model. For example, the result reveals that the prediction accuracy of the developed model on the Colon dataset was 89.13%, which is 1.85% higher than the average classification accuracy for the second-ranked method (i.e., FSARM). Similarly, the average accuracy of the developed approach in all microarray data was 87.91%, which is 2.93% higher than the average prediction accuracy for the second-ranked method (i.e. FSARM).

Discussion: In this study an efficient multi-objective graph-based gene selection search strategy is developed that can efficiently and effectively delete irrelevant as well as similar genes. Moreover, this study proposes an artificial intelligence decision system to provide physicians with a simple and human-interpretable set of rules for cancer prediction. In contrast to previous deep learning-based cancer prediction models, which are difficult to explain to physicians due to their black-box nature, the proposed prediction model is based on a transparent and explainable decision forest model.

References:
[1]. Rostami, M., et al., *Integration of multi-objective PSO based feature selection and node centrality for medical datasets.* Genomics, 2020. **112**(6): p. 4370-4384.
[2]. Gakii, C. and R. Rimiru, *Identification of cancer related genes using feature selection and association rule mining.* Informatics in Medicine Unlocked, 2021. **24**: p. 100595.
[3]. Pashaei, E., E. Pashaei, and N. Aydin, *Gene selection using hybrid binary black hole algorithm and modified binary particle swarm optimization.* Genomics, 2019. **111**(4): p. 669-686.
[4]. Zheng, X., et al., *Gene selection for microarray data classification via adaptive hypergraph embedded dictionary learning.* Gene, 2019. 706: p. 188-200.

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O-6: Distributed network and service architecture for future digital healthcare

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Introduction: According to WHO, the worldwide prevalence of chronic diseases increases fast and new threats, such as Covid-19 pandemic, continue to emerge, while the aging population continues decaying the benefit-dependency ratios. These challenges will cause a huge pressure on the efficacy and cost-efficiency of healthcare systems. Thanks to the emerging technologies, such as novel medical imaging and monitoring instrumentation, and Internet of Medical Things (IoMT), more accurate and versatile patient data than ever is available for medical use. To transform the technology advancements into better outcome and improved efficiency of healthcare, the seamless interoperation of these key technologies needs to be ensured. Beyond 5G communication technologies, Edge computing, Artificial Intelligence (AI) and Virtualization have a major role in this transformation. In our work, we explore the combined use of these technologies for managing the complex tasks of connecting patients, personnel, hospital systems, electronic health records and medical instrumentation into a unified framework.

Concept: We have taken the concept, we call as "edge-cloud continuum", a base approach for implementing the computational and communication architecture for future digital healthcare scenarios. It enables utilizing the most optimal - with respect to e.g. performance, reliability or efficiency - of the three architectural tiers for deploying different system components, namely *core tier* including traditional cloud data centers, *access tier* accommodating edge servers providing e.g. low latency, and *local tier* accommodating local edge machines capable of running the most lightweight edge services. This architecture and its prototype implementation are introduced in [1].

Results: We have evaluated the feasibility of the concept with a series of real-world and simulation studies. In [2], we implemented a dynamic service deployment model that enables using distributed local edge computing as a part of the edge-cloud continuum. The results demonstrated the feasibility of our approach in a Covid-19 scenario, where a patient is first remote monitored at home, who is then, due to a weakening condition, hospitalized. Along the treatment path, the patient monitoring service is seamlessly extended to a treatment service with an oxygen mask reacting to blood oxygen saturation. In [3], we studied Blockchain-based data anonymization at the edge for improved patient privacy protection. The results revealed that improved privacy protection can be achieved with tolerable cost on performance and resource-efficiency. Most recently, in [4], we studied latency-critical computing in the edge-cloud continuum, with the objective to minimize the usage of system resources, while maximizing the number of accepted latency-limited task requests. The proposed algorithm provided high acceptance rate while it resulted in allocations close to optimal. This helps ensuring the operation of latency-critical medical applications, such as remote surgery, in resource-constrained environments under high load.

Conclusions and future work: In our recent work, we have successfully demonstrated the feasibility of the edge-cloud continuum as the base approach for efficient and secure distributed healthcare service deployment. In the next phase, we are planning to dig deeper into the special requirements of various 6G-enabled healthcare use cases, related to e.g. remote care, medical imaging, and emergency response. Therefore, based on the 6G vision, the future work will have emphasis on AI and Machine Learning (ML) based solutions for enabling context-specific optimization of treatment efficacy and resource-efficiency in the edge-cloud continuum. Moreover, the integration of Distributed Ledger Technologies (DLT) with the distributed healthcare architecture is another crucial aspect to study in the future for seeking optimal solutions for trusted data management in various healthcare scenarios.

References:
[1] E. Harjula et al., "Decentralized Iot Edge Nanoservice Architecture for Future Gadget-Free Computing," in IEEE Access 7, 2019.
[2] J. Islam, T. Kumar, I. Kovacevic and E. Harjula, "Resource-aware Dynamic Service Deployment for Local IoT Edge Computing: Healthcare Use Case," in IEEE Access (Early Access), 2021.
[3] M. Ejaz, T. Kumar, I. Kovacevic, M. Ylianttila, and E. Harjula, "Health-BlockEdge: Blockchain-Edge Framework for Reliable Low-Latency Digital Healthcare Applications," in MDPI Sensors 21 (7), 2021.
[4] I. Kovacevic, E. Harjula, S. Glisic, B. Lorenzo and M. Ylianttila, "Cloud and Edge Computation Offloading for Latency Limited Services," in IEEE Access 9, 2021.

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Sessio 3A: Innovaatiotoiminta, testialustat ja terveysdata / Innovation, test platforms and health data

Puheenjohtaja: Kehitysjohtaja Pasi Parkkila, PPSHP

Chair: Director of Development Pasi Parkkila,
Norhern Ostrobothnia Hospital District, Finland

Torstai 7.10.2021 - Thrusday 7th of October 2021

13:50 – 15:20

3A-1 **Innovointia alueiden yhteistyönä – Pohjois-Pohjanmaan soten yhteiskehittämismalli**
Pauliina Hyrkäs, Innovaatiokoordinaattori
PPSHP

3A-2 **Testaustoiminta yritystoiminnan katalyyttinä**
Timo Alalääkkölä, Testaustoiminnan päällikkö
PPSHP

3A-3 **Case Buddy Healthcare: Hoitopolku Oys TestLabista Eurooppaan**
Jussi Määttä, Toimitusjohtaja
Buddy Healthcare Ltd

3A-4 **European Health Data Space, TEHDAS-hanke**
Tapani Piha, Vanhempi neuvonantaja
Sitra

5 min rapid scientific presentations

O-7 **Review on Data Processing and Analysis of Wearable-based eHealth Data**
Aditi Site[1], Jari Nurmi[1], Elena-Simona Lohan[1]
[1]Electrical Engineering Unit, Tampere University, Finland

O-8 **A proof of concept for in-body implants for longevity and selfcare**
Mahrooz Kayani[1,2] BSc., Iqrar Ahmed[1] MSc., Amila Perera[1] MSc., Alexander Bykov[3] PhD, Marcos Katz[1] PhD
[1]Centre for Wireless Communications, University of Oulu, Finland
[2]Department of Sciences and Technology, University of Camerino, Italy
[3]Opto-electronics and Measurements Technique, University of Oulu, Finland

O-9 **Usability of virtual reality (VR) in the care home context**
Kaisa Lällä[1] MSc., MHSc., Katariina Korniloff[1] PhD
[1]Institute of Rehabilitation, JAMK University of Applied Sciences, Jyväskylä, Finland

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Innovaatiotoiminta, testialustat ja terveysdata
Pasi Parkkila, Kehitysjohtaja
PPSHP

Innovation, test platforms and health data
Pasi Parkkila, Director of Development
Northern Ostrobothnia Hospital District, Oulu University Hospital

Biography Pasi Parkkila

Pasi Parkkila, male, is director of development in NOHD/OYS. He was graduated M.Sc. in 1988 in the University of Oulu, Finland. He holds Professional Development degree (PD) in social and healthcare management from 2001. Parkkila has extensive experience of various research and development positions in the Oulu University Hospital since 1991. In his current position (since 2007), Parkkila is leading non-medical or nursing science related research and development programs and projects between OYS and different stakeholders, including productivity research.

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Innovointia alueiden yhteistyönä – Pohjois-Pohjanmaan soten yhteiskehittämismalli

Pauliina Hyrkäs, Innovaatiokoordinaattori

PPSHP

Innovation through regional cooperation - social and health care co-creation model of Northern Ostrobothnia

Biography Pauliina Hyrkäs

Pauliina Hyrkäs (MSc in Health Management) is the innovation coordinator of the Northern Ostrobothnia Hospital District and the Oulu University Hospital as well as the operative responsible person in developing social and health care innovation activities and testing services of Northern Ostrobothnia. The focus of her research is on the leadership and management of public social and health care innovation activities.

The social and health care system faces major challenges due to an aging population, the retirement of the workforce, as well as demands for high-quality care and cost-effectiveness. Technological, economic, and political conditions are changing constantly, requiring social and health care organizations to anticipate and adopt new, innovative solutions. Organizations are expected to make agile use of, for example, the most advanced technology while respecting cost and regulatory constraints. In Finland, challenges are also caused by uneven economic, social and regional development as well as the economic resources that do not grow at the same pace as the need for services. Challenges in the development of social and health care are also brought about by the complexity of the context and traditional structures, including hierarchies and bureaucracies, which can hamper the flow of information and agile development cooperation between different groups of actors.

It is important to channel the necessary expertise into development processes. Social and health care customers and personnel, as well as other stakeholders such as universities and private companies, all have significant knowhow in the development of social and health care. It is important to create effective ways for different stakeholder groups to participate in development so that services can be genuinely renewed according to the needs of end-users and the target environment. Indeed, in the field of development, there is increasing debate of co-creation, i.e. a way of working or a process based on the creation of value through creative interaction. In co-creation, the customer needs are at the center and representatives of all suitable stakeholder groups are involved as comprehensively as possible during different stages of development.

As part of the Social and Healthcare reform of Finland, new practices are being developed to ensure that people of Finland have equal and smooth access to health and social services and receive help for their individual needs. At the Northern Ostrobothnia the reform also consists of efforts to create and implement regional co-creation model, which enables stronger cooperation as well as involvement of all stakeholders in the development of social and health care services. The model includes a description of regional, continuous, systematic co-creation activities, its processes, management and coordination. In addition, the model describes the support provided to all stakeholders participating in activities - supportive tools, services and roles.

The main supporting tool in regional co-creation is the digital co-creation platform, which enables gathering of development proposals from all stakeholders. The tool also supports the documentation of co-creation processes, the involvement of the necessary experts, the dissemination of good practices and the assessment of the impact of co-creation activities. Health Labs is an example of co-creation and testing service, which offers facilities and expertise in the planning and implementation of development and testing activities, as well as in co-creation with companies. Partner organizations and service departments are authorizing coordinators to support stakeholders in participating and promoting co-creation processes. In order to enable social and health care personnel to have stronger opportunities to influence in the development of their work, personnel are also inspired to act as innovation ambassadors - the forerunners of regional co-creation, generating more cooperative, responsive and innovative social and health care of Northern Ostrobothnia.

In addition to creating a regional co-creation model, the Northern Ostrobothnia and Innokylä (provided by the Finnish institute for health and welfare, the Ministry of social affairs and health, Finnish Federation for Social Affairs and Health and Association of Finnish Municipalities) have designed and launched a national Innovation and strategy network. The aim of the network is to share good practices and solve common development challenges through interregional cooperation, improve social and health care capacity for innovation and prevent duplication of development. Since its launch in the summer of 2021, the network has generated widespread interest: hundreds of experts from different sectors have signed up to its activities. In the future, the main goal of the network is to create a common co-creation model for regions through national cooperation.

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Testaustoiminta yritystoiminnan katalyyttina
Timo Alalääkkölä, Manager of Testing and Innovations
Oulu University hospital

Biography Timo Alalääkkölä

Mr. Timo Alalääkkölä, M.Sc. in Economics, works as a Manager of Testing and Innovations at the Oulu University Hospital. He is developing public-private collaboration models for healthcare sector and managing the OuluHealth Labs innovation, testing and development platform. Alalääkkölä has long experience in IT related research, development and innovation projects since 2004. He started his professional career at Nokia where he was responsible of R&D related innovation procurement management. Since 2013 Alalääkkölä has been working in the health and life science sector. His current responsibilities include operating the OYS TestLab and participation to various development projects at OYS, including Future Hospital 2030 program. His most recent project AICCELERATE aims to develop an adaptable AI-based toolset for a variety of clinical use cases. The project started in the beginning of year 2021 and its pilot cases will focus on patient-centric digital care pathways and on optimizing patient flow management. Alalääkkölä is currently working towards Ph.D. in University of Oulu Business School where he is researching health innovation networks from international business perspective.

Public-private co-creation of eHealth solutions

Introduction/background

Public-private co-creation has gained momentum throughout EU in the past years. Oulu University Hospital recently participated to EU Commission funded inDemand project where we created new model for demand-driven public-private co-creation. The focus in the model creation was especially in solving recognized challenges in public health organization with eHealth solution proposals by private tech companies. Oulu University Hospital utilized its testing laboratory OYS TestLab in the prototype testing and development processes.

Main content of the presentation

OuluHealth Labs is an innovation, testing and development environment, where we coordinate and execute different development activities. For companies, OuluHealth Labs is a testing and development environment to test and develop their Health and welfare products and services in an authentic health care environment and with genuine users.

Our testing platform covers the whole chain of health care and social welfare from the specialized level in university hospitals to basic level health care and students as future professionals.

One of our latest co-creation cases has been Vitacam solution, which is a contactless respiratory rate monitor. This case started from a need of our emergency room nurse and we co-created the solution together with NE Device SW company.

I am sharing our experiences of the co-creation model, its opportunities and its use in eHealth solutions development. I will explain how OuluHealth labs process works and how were able to accelerate development of Vitacam eHealth solution from an idea to medical device.

Future

At the moment we are focusing on expanding the OuluHealth Labs operation model among health and social care operators throughout the Northern Ostrobothnia. One of the first solutions that will be tested in this wider scope is Vitacam solution. OuluHealth Labs operation model for health technology and solution testing is not tied to certain lab environment but it can be executed in various health and social care premises.

Demand-driven co-creation of health solutions has many advantages. In the near future, we are aiming to utilize this model more frequently also in public procurement cases.

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Case Buddy Healthcare: Care Pathway from OYS TestLab to Europe
Jussi Määttä, M.Sc. (Eng)
Buddy Healthcare Ltd Oy

Biography Jussi Määttä

Mr. Määttä is an experienced business leader and start-up CEO. He has experience from different roles in digital health, software, internet and mobile businesses with both start-ups and international corporations. Jussi founded Buddy Healthcare, the company automating care pathways and transforming care coordination for hospitals, in 2015. Today, Buddy Healthcare's award winning care coordination platform is used by a majority of the Finnish hospitals and several hospitals in six other European countries.

Healthcare professionals are forced to spend too much time on things other than providing the care itself. This is why Buddy Healthcare had developed BuddyCare service to free up time for nurses and doctors. The service forms a link between the hospital and the patient through empathic communication and commits the patient to their own treatment. BuddyCare enables the hospital to implement the best possible care pathway, and what's even better, BuddyCare is loved by both patients and healthcare professionals alike.

The history of the company goes back to the year 2015. The founders of Buddy Healthcare learned about challenges that patients, their families, and healthcare professionals are facing around outpatient surgeries. Tight schedules and low resources make it challenging to provide care for each individual patient, even though that is exactly what patients need – time and attention. The feeling that they are being cared for.

In the very early stages of our company, OYS TestLab facilitated the project, in which the founders were able to gather a deep understanding of the challenges from the viewpoint of the patients and healthcare professionals. During the project, it was carefully researched what the patients want and what worries them. What kinds of emotions stir within. It was also studied, how hospitals often communicate in ways that are too complex, sterile, and old-fashioned for the patient together with the professionals from OYS. Finally, the minimum viable product was developed by the company, and the solution was piloted in the pediatric outpatient surgery unit in OYS. That was how BuddyCare care coordination platform was born.

At the moment, BuddyCare is used by 2/3 of all the Finnish hospital districts. In addition, Buddy Healthcare serves all together 28 hospitals in 7 different countries.

In this presentation, Jussi Määttä walks through the learnings with OYS TestLab but also discusses the overall go-to-market process, challenges, and take-aways, of an innovative digital health solution.

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European Health Data Space ja TEHDAS-hanke

Tapani Piha, Vanhempi neuvonantaja

Sitra

Biografia Tapani Piha

Tapani Piha työskenteli Euroopan komissiossa vuodesta 2001 ja toimi yksikön päällikkönä 14 vuotta. Vuodesta 2019 lähtien hän on neuvonut sosiaali- ja terveysministeriötä ja Sitraa digitaalisessa terveydessä, terveystietojen käytössä ja EU:ssa. Hän työskentelee myös digitaalisen terveydenhuollon erityisneuvonantajana Fipran kansainvälisessä verkostossa. Komissiossa hän vastasi mm. terveydenhuollon digitaalisen murroksen edistämisestä, harvinaisten sairauksien eurooppalaisten osaamiskeskusten verkostosta, potilaiden oikeuksista rajat ylittävässä terveydenhuollossa annetusta direktiivistä sekä terveysteknologian arviointipolitiikkojen kehittämisestä. Koulutukseltaan hän on terveydenhuollon erikoislääkäri. Hän palveli sosiaali- ja terveysministeriössä ja koordinoi Suomen EU-terveyspolitiikkaa vuosina 1995-2001. Hän oli vastuussa WHO:n Euroopan aluetoimistossa tupakoimattoman Euroopan toimintasuunnitelmasta vuosina 1989-94.

Data ja digitalisaatio on nostettu Euroopan unionin poliittiseksi painopisteeksi ja se on keskeisesti esillä myös terveyspolitiikassa. Terveyspolitiikan merkityksen nopeaa kasvua kuvaa ehdotus Euroopan terveysunionista ja uusi terveysohjelma EU4Health, joka on rahoitukseltaan viisinkertainen aiempiin ohjelmiin verrattuna. Maaliskuussa 2021 Euroopan komissio esitteli vision Euroopan digitaalisen murroksen vuosikymmeneksi. Vuoteen 2030 mennessä on tarkoitus toteuttaa merkittäviä toimia osaamisen, yritystoiminnan, infrastruktuurien ja julkisten palvelujen alueilla. Vision toteuttamiseen Digitalinen kompassi -ohjelmalla kuuluisivat mm. etälääketieteen palvelut ja terveystietojen älykäs käsittely. Vuonna 2020 esitellyssä komission datastrategiassa konkreettisia digitaalisen ja datapolitiikan toimia ovat hankkeet Euroopan tietoavaruuksista (European data spaces) ja sen terveysosuudesta (European Health Data Space, EHDS) sekä pilvihanke GAIA-X. Dataa koskevan lainsäädännön kulmakivi on tietosuoja-asetus (GDPR) ja monet siihen liittyvät lait, mutta komissio on myös tehnyt useita uusia lainsäädäntöaloitteita, kuten ehdotukset datahallinnosta, digitaalisista markkinoista, avoimen data direktiivin täytäntöönpanosta ja data-asetuksesta.

European Health Data Space (EHDS) – Eurooppalainen terveystietoalue

Eurooppalaisen terveystietoalueen (eli data-avaruuden) luominen on yksi Euroopan komission ja jäsenvaltioiden painopisteistä vuosina 2019–2025. Tavoitteena on, että tulevaisuudessa Euroopan kansalaiset, yhteisöt ja yritykset hyötyvät turvallisesta ja saumattomasta pääsystä terveystietoihin riippumatta siitä, missä niitä säilytetään. EHDS pyrkii parantamaan erilaisten terveystietojen rajat ylittävää vaihtamista ja saatavuutta (sähköiset terveyskertomukset, genomidata, potilasrekisteritiedot jne.). Sillä ei tueta ainoastaan terveydenhuollon työtä (tietojen ensiökäyttö), vaan myös tutkimusta ja terveyspolitiikkaa (toisiokäyttö).

Joint Action Towards the European Health Data Space - TEHDAS-yhteistoimintahanke

Suomella on merkittävä asema Euroopan terveysdata-avaruuden toisiokäyttöä koskevan osuuden valmistelussa, koska Sitra johtaa sitä koskevaa jäsenvaltioiden yhteistä hanketta. Helmikuussa 2021 käynnistynyt TEHDAS-yhteishanke tukee terveystietoaluetta koskevaa komission ja jäsenvaltioiden valmistelutyötä tuomalla yhteen terveystietojen toisiokäytön kannalta merkityksellisiä toimijoita, keräämällä datan toisiokäyttöä koskevia parhaita käytäntöjä EU:ssa ja kehittämällä terveysdatan tehokkaan toisiokäytön edellyttämiä käsitteitä ja vaihtoehtoja. Hankkeen työpaketit keskittyvät rajat ylittävän toisiokäytön hallintoon, datan laatuun, infrastruktuuriin ja kansalaisten vaikutusmahdollisuuksien ja roolin lisäämiseen EU:ssa. Hankkeessa valmisteltava terveysdatan hyötykäytön hallintomali voi sisältää uuden organisaation tai tehtävien sisällyttämisen olemassa oleviin EU:n instituutioihin ja organisaatioihin. TEHDAS-hanke tukee erityisesti terveystiedon toisiokäyttöä koskevan lainsäädäntöehdotuksen valmistelua ja osallistaa jäsenmaat siihen. TEHDAS-hankkeessa on mukana toimivaltaisia organisaatioita 21 EU:n jäsenvaltiosta ja 4 muusta Euroopan maasta, jotka valitsivat Sitran koordinoimaan hanketta yhteisen projektisuunnitelman mukaan. Sitra toimii läheisessä yhteistyössä Euroopan komission ja muiden EU:n instituutioiden ja virastojen kanssa. Suomesta on Sitran lisäksi mukana liitännäisorganisaatioina Terveyden ja hyvinvoinnin laitos (THL), VTT, CSC ja Findata. Hankkeen sidosryhmäfoorumeiden kautta lukuisat eurooppalaiset kansalais- ja etujärjestöt osallistuvat työhön. Helmikuussa 2021 alkanut hanke päättyy heinäkuussa 2023. Hanke on jo julkaissut nettisivuillaan useita raportteja, joka koskevat mm. terveystiedon erityisyyttä ja terveystiedon hallintomalleja. Sen 4,16 milj. euron kokonaisbudjetin rahoittavat Euroopan unioni ja jäsenmaat. Ks. tarkemmin https://tehdas.eu/.

Sitran Terveysdata 2030 -projekti

TEHDAS-yhteistoimintahanke toteutetaan osana Sitran Terveysdata 2030 -projektia. Yhteistoimintahankkeen lisäksi projektissa kiinnitetään huomiota Suomen terveysdatan käyttöön sekä primääri- että toisiokäytössä. Projekti hahmottaa Suomen kilpailukyvyn kannalta keskeisiä teemoja ja tekee selvityksiä kilpailukyvyn kehittämiseksi ja kokeiluja muutoksen tueksi. Tällä hetkellä käynnissä ovat digitaalisiin terapioihin (DTx), hajautettuihin ja virtuaalisiin lääketutkimuksiin ja terveysdataekosysteemeihin keskittyvät selvitykset.

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O-7: Review on Data Processing and Analysis of Wearable-based eHealth Data

Aditi Site[1], Jari Nurmi[1], Elena-Simona Lohan[1]
[1]Electrical Engineering Unit, Tampere University, Tampere, Finland

Introduction: Medical discoveries and new technologies such as mobile apps, novel sensors, wearable technology have contributed as important data source for healthcare data and there has been significant increase in the eHealth data. Different wearable devices and sensors can be used to continuously monitor the conditions of patients and providing health related information, patient's behavior, and multiple physiological parameters. Continuous remote-monitoring healthcare system frequently monitor and analyze patient's status. Important components of such systems are remote monitoring, chronic disease, wearable and sensors and machine learning algorithms. This review examines in depth how health data from sensors can be processed and analyzed using Machine Learning (ML) techniques. This study has focused on the following diseases for obtaining the eHealth data: diabetes mellitus type 1 and type 2, hypertension, and hypotension, atrial fibrillation, bradykinesia, dyskinesia, and fever related diseases.

Material and Methods: The objective of this review is to study the literature and identify the previous work and previous studies which have been carried out in healthcare technology, for analyzing the healthcare data obtained from varied sources using various machine learning algorithms. It aims to compile the information obtained from the previous research and present a generalized view of all the information being gathered from the studies. This systematic literature review was done using 67 studies selected from a systematic process which is like PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) starting from defining the protocol, followed by database selection, concept terms/search terms identification, search query formation and then scrutinizing the studies based on title, abstract and full text.

Results: We found that most of the signals are obtained from the sensors such as accelerometers, gyroscopes, EEG/ECG monitors and smartwatches/wearables. The signals which are important for obtaining health parameters for the chronic diseases are acceleration signals, gyroscopic signals, EEG/ECG signals. This study revealed that the various types of features obtained include time domain and frequency domain features, images, raw signals, spectrogram, time-series data, and multiple type parameters. We explored that studies have used supervised machine learning algorithms for analyzing the data such as support vector machine, tree-based algorithms, boosting algorithms, neural network algorithms. Below figure shows the cumulative diagram of the systematic literature study.
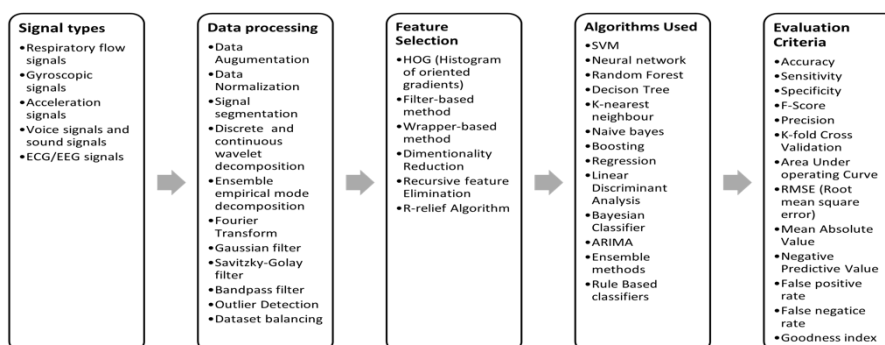
Discussions: This review has generated an overview of the state-of-art for current research field related to the analysis and processing of digital health data using machine learning algorithms. The results obtained from this review along with the knowledge obtained from the previous studies will be used for developing an automated system of healthcare for better detection of chronic diseases. Moreover, the continuous nature of data will help in early detection and prevention of disease. Hence, the focus of this review is on important aspects like wearables/sensors or body area network and data analysis module, which are required for creating a connected/remote monitoring healthcare system.

References:
[1] A. Site, J. Nurmi and E. S. Lohan, "Systematic Review on Machine-Learning Algorithms Used in Wearable-Based eHealth Data Analysis," in IEEE Access, vol. 9, pp. 112221-112235, 2021, doi: 10.1109/ACCESS.2021.3103268.

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O-8: A proof of concept for in-body implants for longevity and selfcare.

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[2]*Department of Sciences and Technology, University of Camerino, Camerino Italy*
[3]*Opto-electronics and Measurements Technique, University of Oulu, Oulu Finland*

Introduction: This article presents the very first proof-of-concept demonstrating simultaneous wireless information transmission and energy harvesting through biological tissues exploiting a single light beam. Such a system could be used to provide highly secure and safe wireless connectivity to body implants while also charging these devices wirelessly. Potential applications of this concept include its use in pacemakers, defibrillators, medicine pumps, brain implants, etc. A data modulated collimated light beam in the near infrared spectrum is used to illuminate an optical phantom that mimics human skin. At the other end, the received optical signal is used to demodulate the transmitted data as well as to harvest energy. Performance evaluation of the system is carried out under different conditions. Results show the efficacy of the system for through body communications.

Material and Methods: We developed an experimental system for demonstrating through body communication and energy harvesting using an optical signal. We have demonstrated the successful data transmission through bio tissues using light [1]. The system comprises of a near infrared (NIR) light source controlled with a current controller and bias T. The transmitted light is captured by a photodiode receiver. The modulated biased signal is applied to LED (Light Emitting Diode) controller to generate the corresponding current for LED. The transmitted light captured through receiver is demodulated for final presentation.
For experiment purposes, we used an optical phantom designed and manufactured for this purpose [2]. The optical properties of used optical phantom match those of the human skin. The phantom is approximately two mm thick. For energy harvesting purposed, a monocrystalline solar cell was used. We designed a charging circuit, and a coin shaped Li-ion battery is attached for storing energy. A single beam is used to jointly data transmission and energy harvesting purposes. The receiver and energy harvesting circuit are placed side-by-side, thus the optical link for data transmission is fully aligned to maximize SNR, while the link for energy harvesting is off-center. An in-body implants can be vital live saving devices whereas wireless link requires to gather information from implants, a wireless pacemaker is one such example and is presented in [3].

Experimental results: We tested the developed system by sending information i.e., images in our case, through the optical phantom and the transmission took 28 minutes. In-body implants consume extremely low power, an example of which is pacemaker that require approximately 50 µW [4] to operate. In our case, the coin battery charged during the data transmission is enough to operate a pacemaker for up to four hours.

Discussions: Maximized data security and maximal capacity battery bank are two baseline requirements when developing a wireless in-body implant. Though our proof-of-concept demonstrates that developing an in-body implants capable of optical wireless data transmission is possible but achieving the baseline requirements is challenging. The optical wireless communication would enhance the data security because the optical wireless communications is less non-vulnerable to remote hacking, but the energy harvesting using single beam is not a straight away approach. We are using NIR-light as it propagates the best in bio tissues and good for data transmission but the commercially available solar cells are not optimized for NIR-light which means not an optimum setting for energy harvesting. Since these are preliminary results on energy harvesting, further research is undergoing to enhance the amount of harvested energy e.g., by increasing transmission power, centering the energy harvesting optical link and off centering the data link, etc. Among other benefits, an optical wireless in-body implants will allow the user to play an active role in selfcare and to monitor the performance of in-body implant.

References:
[1]. Ahmed, I., Bykov, A., Popov, A., Meglinski, I. and Katz, M., 2019, October. Optical wireless data transfer through biotissues: practical evidence and initial results. In EAI International Conference on Body Area Networks (pp. 191-205). Springer, Cham.
[2]. Wróbel, M.S., Popov, A.P., Bykov, A.V., Kinnunen, M., Jędrzejewska-Szczerska, M. and Tuchin, V.V., 2015. Measurements of fundamental properties of homogeneous tissue phantoms. *Journal of biomedical optics*, *20*(4), p.045004.
[3]. Abiri, P., Abiri, A., Packard, R.R.S., Ding, Y., Yousefi, A., Ma, J., Bersohn, M., Nguyen, K.L., Markovic, D., Moloudi, S. and Hsiai, T.K., 2017. Inductively powered wireless pacing via a miniature pacemaker and remote stimulation control system. Scientific reports, 7(1), pp.1-10.
[4]. Haeberlin, A., Zurbuchen, A., Schaerer, J., Wagner, J., Walpen, S., Huber, C., Haeberlin, H., Fuhrer, J. and Vogel, R., 2014. Successful pacing using a batteryless sunlight-powered pacemaker. Europace, 16(10), pp.1534-1539.

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O-9: Usability of virtual reality (VR) in the care home context

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Introduction: Rapid development of technology offers new kind of solutions also for promoting active aging and wellbeing among the older people [1]. Virtual reality (VR) is an immersive technology which offers several applications to the health care domain including elderly care [2,3]. The aim of this study was to investigate whether the VR technology is usable and acceptable technology in the elderly care context. In addition, the aim was to investigate is it possible to bring meaningful experiences into older people's life with VR.

Material and Methods: One man and three women without diagnosis of dementia or cognitive decline with a mean age of 88 years (SD=6,4) living in the care home and four care worker women with a mean age of 33,5 years (SD=12,4) participated this non-randomized interventional study in Finland. Older adults used Oculus Quest VR-glasses approximately twice a week during the 3 to 4 weeks. Content of VR-glasses was selected based on the older adults' own preferences. Data was collected before and after the intervention with semi-structured interview addressing expectations and experiences of VR.

Results: Most of the older people favored nature-related VR content but also opera, downhill skiing and travelling abroad were asked. In generally the VR was a positive experience for older people and they described the experience as a pleasant, surprisingly nice and refreshing. Seeing familiar places and landscaped was felt especially positive. Both older people and care workers brought out that VR was a pleasant variation to the daily life in care home. Older people mentioned that after the VR session the feeling was lighter and the mind more refreshed. According to care workers, some of the older people participants seemed slightly more socially active after using VR glasses. Some of the older adults reported some temporary unpleasant feelings such as dizziness and nausea when using VR glasses. Both older people and their care workers considered VR to be suitable technology in the care home context. Older people considered the VR glasses comfortable and easy to use. However, they suspected that independent use of VR glasses would not succeed because of mobility declines in fingers and lack of technological experience. Rush in care work and negative attitudes toward technology were identified as obstacles for using VR in care home.

Discussion: VR seems to be suitable technology for bringing meaningful and pleasant experiences into older people's life in care home. VR have been identified as a feasible and safe technology for older people also in previous studies [1-4]. It's found to be feasible also among the older people with various levels of cognitive impairments [5] even though the care worker participant of this research suspected that dementia or other cognitive impairment could be contraindication for using VR. In this research some unpleasant feelings were reported when using VR glasses. These feelings were associated with high conditions and rapid movements. It is important to select the VR content based on the older people preferences and be prepared for possible symptoms of cybersickness.

References:

[1] Riva, G., Villani, D., Cipresso, P., Repetto, C., Treberti, S., De Lernia, D., Chirico, A., Serino, S. and Gaggioli, A., 2016. Positive and transformative technologies for active ageing. Medicine Meets Virtual Reality 22: NextMed/MMVR22, 220, p.308. DOI: 10.3233/978-1-61499-625-5-308. Accessed 12.8.2021.
[2] García-Betances, R.I., Arredondo Waldmeyer, M.T., Fico, G. and Cabrera-Umpiérrez, M.F., 2015. A succinct overview of virtual reality technology use in Alzheimer's disease. Frontiers in aging neuroscience, 7, p.80. DOI: https://doi.org/10.3389/fnagi.2015.00080. Accessed 12.8.2021.
[3] Saredakis, D., Keage, H.A., Corlis, M. and Loetscher, T., 2020. Using virtual reality to improve apathy in residential aged care: mixed methods study. Journal of Medical Internet Research, 22(6), p.e17632. DOI: doi:10.2196/17632. Accessed 12.8.2021.
[4] Lee, L.N., Kim, M.J. and Hwang, W.J., 2019. Potential of augmented reality and virtual reality technologies to promote wellbeing in older adults. Applied sciences, 9(17), p.3556. DOI: doi:10.3390/app9173556. Accessed 12.8.2021.
[5] Appel, L., Appel, E., Bogler, O., Wiseman, M., Cohen, L., Ein, N., Abrams, H.B. and Campos, J.L., 2020. Older adults with cognitive and/or physical impairments can benefit from immersive virtual reality experiences: a feasibility study. Frontiers in medicine, 6, p.329. DOI: 10.3389/fmed.2019.00329. Accessed 12.8.2021.

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Session 3B: eHealth skills – from professionals' and citizens' perspectives

Chair: Liisa Klemola, Lecturer, Savonia University of Applied Sciences

Thursday 7th of October 2021

13:50 – 15:20

3B-1 **Competencies to developed eHealth services in multidisciplinary groups**
Merja Männistö, Principal lecturer
Oulu University of Applied Sciences

3B-2 **eHealth skills for Finnish physicians**
Timo Tuovinen, University lecturer
Faculty of Medicine, University of Oulu

3B-3 **Reality of Digital Care in students' health care**
Aleksi Schrey, Chief Medical Officer in Digital affairs
Finnish Student Health Service

3B-4 **Ethical aspects in Digital Health**
Päivi Sanerma, Lecturer
HAMK University of Applied Sciences

5 min rapid scientific presentations

O-10 **UUDO – Multidisciplinary competencies in developing digital Health competence and social care services, spelization education**
Päivi Sanerma[1] PhD (education), Outi Ahonen[2] PhD, MHSc., Jaana Vainionpää[3] MHSc., Mika Paldanius[4] PhD, Leena Hinkkanen[5] MHSc., Katariina Husman MSc., Hanna Naakka[1] MNSc., Merja Männistö[6] PhD
[1]Hamk University of applied sciences, Hamk Smart research unit, Hämeenlinna, Finland
[2]Laurea University of applied sciences, Digital Unit, Espoo, Finland
[3]Seinäjoki University of applied sciences, School of social and healthcare, Seinäjoki, Finland
[4]Oulu University of applied sciences, Special Fields in Health Care, Oulu, Finland
[5]Metropolia University of Applied Sciences, Helsinki, Finland
[6]Oulu University of Applied Sciences, Healthcare and Nursing, Oulu Finland

O-11 **Health care professionsals' perspectives of digital health competence and competence development; qualitative descriptive study**
Erika Jarva[1] MSc., Doctoral Candidate, Anne Oikarinen[1] Post doctoral researcher, Janicke Andersson[2] Associate Professor, Kristina Mikkonen[1] Professor
[1]Research unit of Nursing Science and Health Management, University of Oulu, Oulu Finland
[2]Center for Research on Welfare, Health and Sports, Academy of Health and Welfare, Halmstad University, Halmstad Sweden

O-12 **The Global Public Health – online master's joint programme**
Maria Luojus[1] PhD, Lecturer, Anna Schmaus-Klughammer[2] (LLB hons), Pirkko Kouri[3] PhD
[1]Savonia University of Applied Sciences, Kuopio, Finland
[2]Deggendorf Institute of Technology (DIT), Germany
[3]Finnish Society for Telemedicine and eHealth, Finland

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eHealth skills – from professionals' and citizens' perspectives

Liisa Klemola, Lecturer, PhD

Savonia University of Applied Sciences, Kuopio

Biography Liisa Klemola

Worked for 15 years as a nurse at the KYS eye clinic, then for a few years as a researcher and teacher at the University of Kuopio. 2007-2020 In FCG Finnish Consulting Group Oy, owned by the Association of Finnish Local and Regional Authorities, in various expert positions, the tasks focused on research and development in the social and health sector. From January 2021 as a lecturer at Savonia University of Applied Sciences in the field of welfare, mainly an expert in digitalisation in the social and health field and in the Master's Degree Program in Digital Health degree program.

eHealth skills – from professionals' and citizens' perspectives

Liisa Klemola, Lecturer, PhD

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Competencies to developed eHealth services in multidisciplinary groups
Merja Männistö, PhD, Principal Lecturer
Oulu University of Applied Sciences

Biography Merja Männistö

PhD Merja Männistö works as Principal lecturer (health-promotion and well-being) and Head of Degree Programme in Public Health at Oulu University of Applied Sciences. Her areas of expertise include preventive health care, well-being and health promotion, as well as health coaching and guidance for various client groups, digitalization in social and health care as well as digital pedagogy. She also works as a postdoctoral researcher in the Research Unit of Nursing Sciences and Health Management at the University of Oulu. Her research interests include competence of digital health coach and digitalization in social and health care services, students' collaborative learning and pedagogical solutions in various innovative digital learning environments and teaching technology. In addition, her interest is in the competence of educators in collaborative learning in digital learning environments. She is currently also an expert in health promotion and digital pedagogy development projects.

Introduction: The goal of this abstract is to describe context of SotePeda 24/7 Improve your Digital Health Care and Social Welfare Competencies -project (2018–2020), which funded by the Finnish Ministry of Education and Culture. 23 Finnish universities have taken part in the project. The project aimed to reform education in health and social welfare sector to responds better to needs of the future. In order to have a real impact on studies in health and social welfare sector in the future, the project aimed to find a way to affect study plans, and via them individual courses. The project also aimed to create new digital courses and pedagogical approaches that would ensure fluent, open all year-round digital learning environments. The vision for the project was: "Higher education teachers are multidisciplinary digital and pedagogical experts who work in national open learning environments. Competency descriptions and studies improve university students and professionals' skills and ethical approaches related to the digitalization of health care and social welfare and its development as well as their skills to develop digital human-oriented health care and social services within interprofessional networks."

Part I: Research and development: 1. What is expertise related to digital health care and social welfare services? *Results*: Students' and teacher's multidisciplinary expertise in the digitalization and its development. Use of service design skills in health care and social welfare. Ethical expertise required for digitalization. 2A) What is digi-pedagogical competence? *Results:* Knowledge co-creation in multidisciplinary operating environments of health care and social welfare can be supported with pedagogical models. Collaborative, digital and flexible learning environments promote the development of multidisciplinary expertise. 2B) What kind of new pedagogical models help one learn digital health care and social welfare skills? *Results*: Micros and MOOCs as teaching and learning methods to improve competence of digitalization. Independent online studies can develop one's capacity to use digital health care and social welfare services, practice knowledge-oriented leadership skills and management competencies. Service design training, a mentoring camp, supports the development of students and teachers' service design skills. Created learning contents and pedagogical methods for learning how interprofessional development networks work. Ethical operations model and pedagogy support learning ethics. 3. What kind of new health care and social welfare approaches will be common practices in the future? *Results*: Model of human and client-oriented and ethical digital health care and social welfare work. Tools for future interprofessional development networks and processes of co-developing.

Part II: Pedagogical products: Multidisciplinary expertise in the digitalization of health care and social welfare and its development has been divided into 12 competence areas, which were defined according to the European qualification (EQF) level 6 for students. Teachers' competencies in health and social care informatics and in digital pedagogy were also developed. The definitions of competences will be integrated into curricula of universities of applied sciences and further education programmes and it is a tool for evaluation and development. A vast amount of open learning materials was produced: 422 individual microlearning materials(micros) were developed based on objectives and content of 12 fields of expertise, 30 MOOCs (Massive Open Online Courses, 1-3 credits), dozens of webinar recordings, articles and other learning and teaching materials were produced. All of these have been licensed under the CC BY-SA 4.0 license and are openly available at the Library of Open Educational Resources (aoe.fi) and on the SotePeda 24/7 home page. Service design learning material and the Instructor's Manual were prepared for the service design training/mentoring camp. Open Badges for various future fields of expertise were created. Online simulation model was designed. A virtual puzzle room as a VR learning environment was built. Digital Living Lab, a

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learning and development platform where students can cooperate with companies, was created. Teacher's pedagogical flash cards and related Teacher's Manual was built to provide pedagogical tools, instructions and models for planning courses and help teacher build study modules. Digital learning environments was developed to offer new pedagogical opportunities. Ethical operations model instructions were created. Trialogical metaphor of learning has guided development of pedagogical products in this project. Tips for using these products are available in Teacher's Manual and pedagogical flash cards.

Discussion: Simultaneously with developing new services and activating citizens towards a more active role, we also need to strengthen the professionals' competencies. These multidisciplinary competencies strengthened skills of teachers, students and professionals in different fields in use, management and development of digital services and structures. When preparing and planning for a future where digitalization and technology play an ever more important role, it makes sense to start with defining what kind of competencies will be needed. This competence should be viewed in a multidisciplinary way and not only from the point of view of health and social services professionals. Digitalization and technology enable multichannel services that affect the daily lives of citizens. In addition to the competencies of the health and social services sector, it also requires IT competence, an understanding of the design aspect and ethical aspect of services, and, of course, the perspectives of the citizens themselves. Combining all these competencies in transdisciplinary way, we will create new functional services. More information at https://sotepeda247.fi/julkaisut/

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eHealth skills for Finnish physicians

Timo Tuovinen[1,2]

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[2]*Medical Research Center Oulu (MRC Oulu), Oulu University Hospital and University of Oulu*

Biography Timo Tuovinen

Timo Tuovinen, M.D., is a university lecturer in the University of Oulu a chair of eHealth education division in the National MEDigi project. He is also a member of the executive committee in the Finnish Medical Society Duodecim - Oulu and in the Association for Medical Education in Finland (AMEF). He's also a former District Chief Physician of The Finnish Medical Association.

Introduction: Digitalization is changing the healthcare processes rapidly and eHealth and telemedicine services are nowadays common (1). This has caused an educational need to improve the digital skills of healthcare professionals. In Finland MEDigi, a key project of Ministry of Education and Culture, responded to this challenge. Aim was to develop and implement digital teaching, learning and assessment solutions and to promote national harmonization of undergraduate medical and dental education. In the core of the project was also to increase the competence related to medical informatics and to the digital tools (eHealth) used in clinical practice. (2)

Main content of the presentation: The MEDigi project supported national, discipline-specific collaboration in reaching consensus regarding the contents of undergraduate education, divided into three levels: core content (level 1), complementary content (level 2) and specialty content (level 3). In every faculty, level 1 core content should form the core of teaching and provide the student the base for further development of competence. eHealth division of MEDigi project consisting of experts from all participating universities started working in April 2019 with the University of Oulu in charge of the progress. Two surveys were made, one for medical and dental teachers and one for those interested in the subject. Based on survey results, collection of background information and seminar work, eHealth division did the core content analysis. (3)

Main content of this presentation is to present the results of eHealth division during the project. Results of the core content analysis were divided into 12 main categories: 1) electronic patient record systems including picture archiving and communication systems, 2) knowledge databases and clinical decision support systems including artificial intelligence, 3) national electronic health record and imaging repositories, 4) information systems used by patients, 5) information security and data privacy, 6) secondary use of health data, 7) ethics and interaction in digital environment, 8) big data in healthcare, 9) health technology assessment, 10) megatrends in digital health, 11) development, research and innovation, and 12) use of medical technology. (3) As a case study, the results of this content analysis were applied to a thematic eHealth day arranged for fifth year medical students together with nurse students in University of Oulu and Oulu University of Applied Sciences. The content analysis helped in the design of the thematic education. (3) eHealth division also mapped the current eHealth teaching of other medical faculties in Finland.

Conclusion/recommendations/future: The undergraduate medical education should include telemedicine and eHealth integrated into curriculum. The core content analysis and national agreement on core competencies will enable to specify consistent learning outcomes and evaluation criteria in the future. Currently teaching is varied in different medical faculties. In our view, the best way to organize eHealth teaching is to integrate it into the teaching of suitable existing subjects.

References:

[1] Reponen J. Terveydenhuollon sähköiset palvelut murroksessa. Duodecim 2015;131(13):1275–6.
[2] Levy AR, Kulmala P, Merenmies J, Jääskeläinen J, Kortekangas-Savolainen O, Jääskeläinen J, ym. National MEDigi project: systematic implementation of digitalization to undergraduate medical and dental education in Finland. Finnish J eHealth eWelfare 2019;11(4):357.
[3] Tuovinen, T., Reponen, J., Isoviita, V-M., et al. Duodecim (2021). Sähköisten terveyspalveluiden opetus lääketieteessä.

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Reality of Digital Care in Students' Health Care

Aleksi Schrey, MD, PhD

Finnish Student Health Service

Biography Aleksi Schrey

My background is a clinician (ENT) in a university hospital for almost two decades. Due to my interest towards digitalization in healthcare, I got an opportunity to enhance my expertise in that field as the CCIO of the hospital district of Southwest Finland from 2019. My goal was to try to bring forth the clinical perspective to the ICT development as well as to act as the interpreter between clinicians and the ICT-department. Finnish Student Health Service (FSHS) has actively developed digital services since 2000. Since my nomination as the chief medical officer of digital affairs at FSHS, my goal is to contribute to optimal and fluent usability and accessibility of digital services for those studying for a Bachelor's or Master's degree at a university or other institution of higher education. All healthcare-services cannot be efficiently provided digitally, thus the local services and physical appointments for students are still necessary in various situations. However, digital solutions for students are welcomed and increasingly desired. Seamless co-operation between professionals is also essential in providing services of high quality.

Introduction/background

Finnish Student Health Service (FSHS) has actively developed digital services since 2000.

According to the Ministry of Social Affairs and Health, Student health care should promote students' health and learning ability and to safeguard and improve the health and safety of the learning environment and wellbeing of the learning community. It should provide health and medical services, including early detection of mental health problems and substance abuse problems, care and follow-up guidance, sexual health services and oral health services; as well as identify students' special support and health examination needs and refer the student to further tests and treatment if necessary.

The Act on healthcare for students in higher education, which took effect on 1 January 2021, constitutes that in addition to university students, students at universities of applied sciences will also have access to the primary healthcare services provided by the FSHS. The number of students covered by FSHS more than doubled, which required FSHS organization reform with service model changes to meet the needs of student health care.

Kela is responsible for the nationwide organization of student healthcare and the related cost estimates, and from 2021 onwards, also for the collection of healthcare fees. The FSHS provides the student health care services nationwide in a manner that ensures equality for all students. The main funder of healthcare for students in higher education will be the state, which will provide 77% of the funding. The healthcare fee paid by students will cover the other 23% of the costs.

FSHS has a nationwide patient data system integrated with national systems, established operating structures and multidisciplinary collaboration networks to promote health in student communities. Digital solutions have been developed and introduced in recent years based on students' wishes and needs. These solutions are cost-effective and can be scaled up to serve the growing number of students from diverse backgrounds. Digital services in FSHS carry a major role in providing these needs nationally.

Main content of the presentation

The student health care provided by the FSHS is presented from the digital aspect with a special focus on the organizational reform since the beginning of 2021. The challenges and possibilities of digital Student health care are discussed.

All healthcare-services cannot be efficiently provided digitally, thus the local services and physical appointments for students are still necessary in various situations. However, digital solutions for students are welcomed and increasingly desired. Seamless co-operation between professionals is essential in providing services of high quality.

Conclusion

Student health care in Finland has faced a historical reform. Digital services and solutions, challenges faced, as well as further development plans are introduced.

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Ethical Aspects in Digital Health

Päivi Sanerma, Phd (education)[1], Raija Koskinen, M.Soc.Sc (sociology)[2]
1Hamk University of Applied Sciences, Hamk Smart research unit, Hämeenlinna, Finland
2Hamk University of Applied Sciences, Hamk Hyos, Hämeenlinna, Finland

Biography Päivi Sanerma

Päivi Sanerma's expertise (Phd 2009, Education science, University of Tampere, Finland) can be categorized in the following three fields: in the field of nursing science her doctoral dissertation, research and practical work experience has been concentrating on public health nursing, especially for elderly and socially disadvantageous groups, as well as for adolescence. Her dissertation focused on nursing practice in home healthcare, evidence-based nursing management, and digital services and solutions in homecare. She is an expert in formation of public health services, preventive healthcare and optimization of health resources especially through the use of digitalization. Dr Sanerma has been a member of a multinational research group focusing on elderly care and development of modular educational programmes for online environment. In the field education, pedagogy and nursing, Dr. Sanerma has developed numerous curricula in the field of nursing according to EU directives, developed cooperation between educational institutions and clinics. In the field of research and development, Dr Sanerma's expertise is in the action research and evaluation methodology and implementation of action research findings into practice (applied research).

Introduction: The goal of this presentation is to describe Ethical operational model as a structure for ethical thinking. In addition, the aim is to describe challenges to identify and evaluate ethical questions related to digitalization. The description of the ethical operational model examines ethical activities both as an entity formed by acts (reflective process of ethical activities) and as a wider entity formed by elements related to the operational model (ecosystem and the digitizing operational environment of the social and healthcare sector). (Sihvo et al., 2021.) The ethical operational model has been developed in the SotePeda24/7 project in collaboration with five Universities of applied sciences between 2018-2020 in the work package Future work and ethical competence.

The purpose of the ethical operational model is to help and to support professionals and citizens to process and make decisions on difficult ethical situations related to digitalization. Because digitalization continuously creates new ethical questions, it is important to consider them among professionals as well as together by professionals and customers in different forums and situations. The main purpose of this presentation is to clarify the ethical operational model as a tool for practical ethical thinking.

Material and Methods:
The ethical operational model emphasizes a professional's ethical sensitivity and motivation in solving ethical problems in dialogue. The model is based on the ethical basis of the social and healthcare sector and aims to consider the ethical challenges posed by digitalization and new technology. Three theoretical outlines; The model of trialogical learning, an ethical operational model related to the artificial intelligence in authority use, and James Rest's components of professional ethical activities have been utilized in the development of the model.

Results: The ethical operational model structures and strengthens the ethical thinking and activities of students, professionals and the wider population. The model consists of five sections 1. Reflective process of ethical action 2. Factors guiding and promoting ethical activities 3. Perspectives to be taken into account in digitalization 4. Circles that interact with ethical activities (individual, communal, societal and global) 5. Future scenarios. The reflective process of ethical action is at the model's core. It includes ethical sensitivity and motivation which are needed in identifying ethical questions and challenges.

The model can be used to reflect and process ethical issues or problems identified in activities as a communal learning process. Development of reflective thinking and competence for processing ethical problems are significant parts of professional growth in health and social care.

Discussion: The ethical operational model is a tool giving structure for identifying ethical problems and questions model can be used in teaching of ethical issues in social and health care and other professional education, in work organizations and in different operational environments at work to reflect on ethical issues, as a support for decision making and to reach solutions in reflective collaboration. The ethical operational model is not separate from the activities, but is integrated as part of the work, services and teaching in the social and health care sector. Digitalization as a phenomenon is all-embracing. Therefore, the model is not only usable in this field but has a broad usability in other sectors of society as well.

O-10: UUDO- Multidisciplinary competencies in developing digital health and social care services, specialization education

Päivi Sanerma, Phd (education)[1], Outi Ahonen, Phd, MHSc[2], Jaana Vainionpää, MHSc[3], Mika Paldanius, PhD[4], Leena Hinkkanen, MHSc[5], Katariina Husman, MSc, Hanna Naakka, MNSc[1], Merja Männistö, PhD[6]

[1]*Hamk University of applied sciences, Hamk Smart research unit, Hämeenlinna, Finland*
[2]*Laurea University of applied sciences, Digital Unit, Espoo, Finland*
[3]*Seinäjoki University of applied sciences, School of social and healthcare, Seinäjoki, Finland*
[4]*Oulu University of applied sciences, Special Fields in Health Care, Oulu, Finland*
[5]*Metropolia University of Applied Sciences, Helsinki, Finland*
[6]*Oulu University of Applied Sciences, Healthcare and Nursing, Oulu Finland*

Introduction: The goal of this abstract is to describe context of UUDO- Multidisciplinary competencies in developing digital health and social care services, specialization education considering multiprofessional implementation and students´ relations to work life. Context of UUDO project is based on collaboration of 14 Universities of applied sciences and SotePeda 24/7- project (2018-2020) as well as situational context in health and social care. UUDO project will carry out new pedagogical model for implementing specialization studies in common execution of consortium of universities of applied sciences. UUDO project is funded by Ministry of Education and Culture. Main purpose of the project is strengthening digital competences of social and health care professionals in fast changing society. In this project a specialization education program will be created and produced.

Material and Methods: In this specialization education the aim is work multidisciplinary way together with teachers, students and working live representatives. The project will carry out research with realistic evaluation about education program in collaboration with all stakeholders and partners. In realistic evaluation the basis of research is evaluating selected phenomena in certain context. Considering students´ experience about importance of digital competences and competence level in related their current competences is in the focus. The study collects research data on topics as follows; The assessment of students' competence is collected at the beginning of the education and 3 months after the training. Evaluation data will be self-assessment of competence, learning diaries as part of a personal study plan, numerical performances, number of competence marks and level of complexity. In addition, the assessment will focus on increasing and utilizing students' employment opportunities.

Results: The project has defined 12 competence domains of digital competences of health and social care, in which "Multidisciplinary competencies in developing digital health and social care services, specialization education 30 credits", 810 hours. The main goal of specialization education is to enable competence for health and social care digitalization for working in multiprofessional planning and development services in advanced expert tasks. The structure of Specialization education studies is built on four main themes: 1) Developing digital health and social care services and informatics competencies, 10 credits. 2) Service design competence 5 credits 3) Optional studies 5 credits and 4) Working life oriented development project 10 credits.

The phase of specialization education program is following: The specialization education has been started 8.6.2021 with optional studies. Part of optional studies have been mooc online educations which have been created in Sotepeda 24/7 project. First courses on theme Developing digital health and social care services and informatics competencies (10 credits), have been started 7.9 2021. In the courses Online interactive competencies (2 credits) and Online guiding competencies (2 credits) participating about 140 students. University of applied sciences Metropolia is implementing both courses. In addition, first phase of evaluation research has been started. First assessment of students' competence has been collected. Working life oriented development project planning in cross-border groups of universities has been started with digital tool.

Discussion: In developing digital health and social care services multidisciplinary cooperation is an important element in the development process. It´s also important that teachers and students get capability to work with digital platforms, what can be used in team work from different places and in different time.

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O-11: Health care professionals' perceptions of digital health competence and competence development; qualitative descriptive study

Erika Jarva1, MSc, doctoral candidate, Anne Oikarinen1, post-doctoral researcher, Janicke Andersson2, Associate Professor, Kristina Mikkonen1, Professor

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2Center for Research on Welfare, Health and Sports, Academy of Health and Welfare, Halmstad University, Halmstad Sweden

Introduction: Health care professionals, such as nurses and allied health professionals, have a crucial role in how digital services are developed and deployed as digital health services have become significant tools in health care delivery and guidelines [1]. Health care professionals need various competence to use digital health in their work and patient guidance [2,3] and competence development must be constant and systematic [4]. Health care professionals' perceptions of digital health care solutions have still presented as nuanced and inconclusive [5]. The purpose of this study is to describe health care professionals' perceptions of digital health competence and identify aspects that influence digital health competence development.

Material and Methods: A qualitative descriptive study has been performed by individually interviewing health care professionals from different health care settings in northern Finland and southern Sweden (n=20) in spring 2019 and spring-summer 2020. A semi-structured interview guide was utilized in data collection. Data analysis has been conducted with inductive content analysis by using NVivo 12 software programme.

Results: Health care professionals' perceptions of digital health competence are connected to competence to provide patient-centric care through digital channels, using technology and digital health systems, interacting with the patient through digital means, evaluating what digital health is, combining digital means with traditional methods and the ability to evaluate own digital health competence. Health care professionals perceive that their digital competence development is influenced by support from colleagues, work community and the employer and aspects related to continuous education, orientation, and digital health adoption.

Discussion: Health care professionals' perceptions of digital health competence focus on the abilities to provide patient-centric care by evaluating the need and possibilities to use digital health. The professionals perceive that digital health competence development is influenced by individual and organisational factors which either enable or prevent competence improvement. Health care and nursing leaders should enable the resources to systematically implement digital health tools in different health care settings as health care professionals perceive that the skills to combine different methods of care provision are part of digital health competence. The results of the study can be integrated in health care practices and digital health implementation to provide further knowledge of how health care professionals adopt digital health and enhance their digital health competence. Further research is needed on different interventions used to study health care professionals' digital health competence.

References:
[1] World Health Organisation (2019) WHO Guideline: Recommendations on Digital Interventions for Health System Strengthening. https://apps.who.int/iris/bitstream/handle/10665/311941/9789241550505-eng.pdf?ua=1 (accessed 20.6.2021).
[2] Kujala S., Rajalahti E., Heponiemi, T. & Hilama P. (2018) Health Professionals' Expanding eHealth competences for Supporting Patients' Self-Management. Studies in Health Technology and Informatics. 2018;247: 181-185.
[3] Konttila J., Siira H., Kyngäs H., Lahtinen M., Elo S., Kääriäinen M., Kaakinen O., Oikarinen A., Yamakawa M., Fukui S., Utsumi M., Higami Y., Higuchi A. & Mikkonen K. (2018) Healthcare professionals' competence in digitalisation: A systematic review. Journal of Clinical Nursing, 28(5-6): 745-761. doi: 10.1111/jocn.14710.
[4] Jimenez G., Spinazze P., Matchar D., Huat G.K.C., van der Kleij R.M.J.J., Chavannes N.H. & Car J. (2020) Digital health competencies for primary healthcare professionals: a scoping review. International Journal of Medical Informatics, 143(2020). doi: 10.1016/j.ijmedinf.2020.104260
[5] Odendaal WA., Anstey Watkins J., Leon N., Goudge J., Griffiths F., Tomlinson M. & Daniels K. (2020) Health workers' perceptions and experiences of using mHealth technologies to deliver primary healthcare services: a qualitative evidence synthesis. Cochrane Database of Systematic Reviews 2020, Issue 3. Art. No.: CD011942. doi: 10.1002/14651858.CD011942.pub2.

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O-12: The Global Public Health online Master's joint programme

Maria Luojus, PhD, lecturer[1], Anna Schmaus-Klughammer[2] (LLB hons) , Member of the Scientific Staff - Hochschule Deggendorf, Pirkko Kouri[3], PhD
[1]*Savonia University of Applied Sciences, Finland*
[2]*Deggendorf Institute of Technology (DIT), Germany*
[3] *Finnish Society for Telemedicine and eHealth, Finland*

Introduction: The purpose for the online global public health education is to promote healthy lives and wellbeing for everyone, everywhere, at all ages. In order to aim at universal health coverage there is a need to develop the infrastructure, for information and communication technologies of public health to promote equitable, affordable and universal access to qualified health data. This requires international online health education of health care and administrative staff. [1] The framework of United Nation's Development Goals 2030 (SDGs) has high-level aim to create actions to end poverty, protect the world, and ensure that by 2030 all people enjoy peace and prosperity. Especially the Goal 3 aims to 'ensure healthy lives and promote well-being for people at all ages. [2] The Master's Degree programme in Global Public Health is a joint programme virtually realized by the Deggendorf Institute of Technology (DIT) in Germany and Savonia University of Applied Sciences Ltd (Savonia UAS) in Finland. Furthermore, the content of the programme has emphasis on Human security issues, such as challenges related to health, food safety, water, energy, and the bioeconomy. Another essential focus of this programme is that both local and global public health can be improved, and costs reduced through the effective use of digitalisation in the health promotion and prevention. Chosen virtual working-ways supports internationality.

Development and realization phase: The programme was planned jointly and realized as online studies. Digital features penetrate the different study modules. The chosen students have at least bachelor level background education and two-year practice experience. The students are from various fields such as nursing, medicine, health IT, pharmacy etc. The online education will start in September 2021, and it lasts appr. two years.

Expected results: The graduated student are expected to work in mid-level administration. The new master will understand the principles of global public health; 1) understand the importance of planning and strategic thinking as a resource for building both professional and citizen-centric global public health promotion; 2) utilize principles of health literacy; 3) is able to apply safe evidence-based information and advanced solutions for better health and wellbeing and 4) is able to manage processes of change needed in advanced global public health.

Discussion: The ongoing development of online global public health demands effective eHealth applications and processes alongside highly competent health care professionals to meet the needs of the different population globally. The qualified information needs to be shared and used in versatile locations.

References:
[1] WHO. (2021) Global Strategy on Digital Health 2020-2025. Available at: https://www.who.int/health-topics/digital-health#tab=tab_1
[2] United Nation. Sustainable development goals 2030. Available at: https://www.undp.org/sustainable-development-goals

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Sessio 4A: Kansalaisen osallistaminen / Citizen involvement

Puheenjohtaja: Minna Storm, Suomen telelääketieteen ja eHealth seura

Chair: Minna Storm, Finnish Telemedicine and eHealth Society

Torstai 7.10.2021 - Thursday 7th of October 2021

16:00 – 17:30

4A-1 **Asiakkaat osallisina sote-palveluissa sekä eHealth ratkaisujen käyttäjinä ja kehittäjinä**
Liisa Jurmu, Osallisuusasiantuntija
Oulunkaaren kuntayhtymä

4A-2 **Kaikki mukaan sähköisiin terveyspalveluihin käyttäjäkeskeisen suunnittelun avulla.**
Sari Kujala, Yliopistonlehtori
Aalto Yliopisto/DigiIN

4A-3 **Lapset ja nuoret digitaalisten palveluiden kehittämisen keskiössä**
Anna-Maija Ohlsson, Design Director
Vincit

4A-4 **Eettiset näkökulmat sosiaali- ja terveydenhuollon sähköisten palveluiden kehittämisessä kansalaislähtöisesti**
Sari Sarlio-Siintola, Lehtori, projektipäällikkö
Laurea, Shapes

5 min rapid scientific presentations

O-13 **Health counceling chat service as a part of the online health counceling services**
Jaana Koivisto[1], MSc, MHSc, Pia Liljamo[2], RN, PhD, Ulla-Mari Kinnunen[3], RN, PhD
[1] City of Nokia
[2] Oulu University Hospital
[3] University of Eastern Finland, Department of Health and Social Management

O-14 **Predictive "maintenance" of citizens with digital twins**
Petri Kettunen[,1], D.Sc., Antti Hahto[,2], M.Sc., Aleksi Kopponen[2], M.Sc., Tommi Mikkonen[,1], D.Sc.
[1]Department of Computer Science, University of Helsinki, Helsinki, Finland
[2]Ministry of Finance, Finnish Government, Helsinki, Finland

O-15 **Engaging aging individuals in co-creation for care-related decision making**
Anna Salmi[1], MA, Emma Karttunen[1], BBA, Sari Sarlio-Siintola[1], MSc. (econ.), MSc. (social ethics)
[1] Laurea University of Applied Sciences

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Kansalaisen osallistaminen
Minna Storm, Yritysvastaava
Suomen telelääketieteen ja eHealth seura

Citizen involvement
Minna Storm, Head of Corporate Affiliates
Finnish Society of Telemedicine and eHealth

Biography Minna Storm

Head of Corporate Affiliates of STeHS. Board professional, Partner and Co-Founder in Nordic startups. Lic. Storm works with Nordic Health and Wellbeing companies, organizations and research institutes. She empowers proactive working capacity with personalized health and nutrition innovations bringing these innovations to market. During the past 20 years, Storm has been working in several projects in the Nordics involving industry, SMEs, public agencies and intergovernmental bodies. Her expertise is in the Nordic health and well-being ecosystems. Her entrepreneurial background and engagement with Nordic growth and innovation companies within Health and Wellbeing supports the collaboration, commitment and interaction of the STeHS society and companies.

You matter. Today the answer to how healthcare can be empowered to a more person-centered (and preventive) care is in most cases eHealth. That is, you meet your healthcare provider in distance; more adjusted to your time, place, motivation and readiness. Additionally, this more often means the increased and long-term engagement of you as an individual providing e.g. various secondary data to support the primary data, health records and decisions made by the care professionals.

For the healthcare this means changes, challenges and opportunities for the development of processes within healthcare. That is, workflows, internal and external communication, data security and actual meetings with an individual, you – wherever you are. The goal is to make the access to healthcare easier, equal (no matter the distance to healthcare, your mother tongue or citizenship) faster and more sustainable with the aims for personalized and preventive healthcare in a lifecycle. You matter.

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Involving customers in the health and social services and the users and developers of eHealth-services

Liisa Jurmu, Specialist in Participation

Consortium of municipalities/Oulunkaari

Biography Liisa Jurmu

Liisa Jurmu has just defended her dissertation on the importance of knowledge and expertise for the renewal of municipalities, and her special areas of expertise are resident and customer participation, municipal renewal and administrative development, network cooperation and municipal organization cooperation.

The health and social service reform has been prepared in Finland for over 15 years. The reform took finally a vital step forwards in June 2021, when the Finnish parliament passed the government´s proposal on the reform of the health, social and emergency services and the establishing of the wellbeing service counties. Now the interim preparatory body is leading the preparation for the new wellbeing service county in the North Ostrobothnia. However, the regional preparing for the then possible reform has already started in the North Ostrobothnia in the autumn of 2020.

The involvement of the customers and residents to the reforming process is a vital part of the health and social service reform. The residents´ involvement and influencing opportunities are determined in the legislation concerning the wellbeing service counties, while also being integral part of the strategy for the new counties. The soon-to-be-composed involvement programs also support the strategy, not forgetting the importance of the role of developing electric services in order to further advance the reform.

The significance of the involvement of both the customers and residents can be examined from multiple different angles. The involvement is vital, for example, in order to ensure the fulfillment of democracy, to develop customer-first services as well as to improve the individuals´ wellbeing and social capital of the communities. All of these aspects are important parts in the preparation process of the new wellbeing counties. The involvement of residents and customers has been taken into account in the reforming of the health and social services in the North Ostrobothnia in multiple ways. In the Future Health and Social Services Centres - programme, the different methods of involving the customers into the development process have been developed and tested in different service contexts by organizing surveys, developing the services with the customers in multiple workshops and by utilizing electric tools and the knowledge of the experience actors. The resident and customer involvement has also been one of the cornerstones in the Health and social service strategy -project, where the different actors have been involved in the strategy´s development process during the last spring via different electric services. The residents have, for example, given their opinions on the focus points and the main objects of the service strategy in different surveys and workshops, as well as via multiple different organizations.

The restrictions imposed following the outbreak of the Covid-19 have had a massive impact on the involvement work. Most of our gatherings have been organized online and we have learned how to use different electric tools and interaction platforms in our work. Our experience has shown that the residents´ readiness to use electric services varies quite a bit. For example, we organized a resident survey in the spring of 2021 as a part of the Health and social service strategy -project, where we enquired the experiences and opinions of using electric services among other things. We found interesting, that 70 per cent of those answered the survey thought that amount of different electric health and social services should be increased and most of those who answered found the electric services easy to use. However, when we are developing the electric services and involving the residents and customers to the development via electric tools we must remember that everyone should have and equal opportunity to be part of the developing process.

In order to best develop the health and social services of the future, we must priorities the needs of the customers and residents. Their involvement is not just a one theme in the development process, but rather the basis for the development of truly impactful services. In order to ensure the involvement of the residents and customers, we need different methods and tools, and for that, electric services provide great new opportunities.

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Kaikki mukaan sähköisiin terveyspalveluihin käyttäjäkeskeisen suunnittelun avulla

Sari Kujala, FT

Aalto-yliopisto, Tietotekniikan laitos

Biografia Sari Kujala

FT Sari Kujala on vanhempi yliopistonlehtori Tietotekniikan laitoksella Aalto-yliopistossa. Sari on koulutukseltaan psykologi ja hänen osaamisalueitaan ovat sähköiset terveyspalvelut, käyttäjäkeskeinen suunnittelu, käytettävyys, käyttäjäkokemus ja käyttöönotto. Tällä hetkellä hän on strategisen DigiIN-hankkeen (www.digiin.fi) varajohtaja ja johtaa NORDeHEALTH-hankkeen (www.nordehealth.eu) työpakettia.

Nuoret ja koulutetut käyttävät eniten sähköisiä terveyspalveluita. Syrjäytymistä ja terveyden eriarvoisuus voi lisääntyä, kun sähköisiä palveluita käyttävät vähiten ne, jotka niitä eniten tarvitsisivat. Sähköisten terveyspalveluista ja niiden hyödyistä tiedottaminen on tärkeää niistä tietoisuuden varmistamiseksi. Samoin terveysammattilaisten suosittelu on hyvin oleellista. Sähköisten palveluiden laatu, käytettävyys sisältäen hyödyllisyyden ja helppokäyttöisyyden, on kuitenkin lopulta tärkeintä kaikkien mukaan saamiseksi niitä käyttämään. Palveluiden saavutettavuus ja selkokielisyys mahdollistavat kaikkien ryhmien käytön. Käyttäjäkeskeisen suunnittelun avulla voidaan varmistaa käytettävät palvelut. Käyttäjien varhainen mukaan ottaminen heidän tarpeidensa ymmärtämiseksi, iteratiivinen suunnittelu prototyyppien avulla ja empiirinen testaus ovat sen perusperiaatteet. Suunnittelu kaikille edellyttää erilaisten käyttäjäryhmien kuten ikäihmisten, lievästi kehitysvammaisten ja muuten heikommassa asemassa olevien ryhmien mukaan ottamista.

Ensuring equal access to digital health services to all people by user-centered design

Sari Kujala, PhD

Aalto University, Department of Computer Science, Finland

Biography Sari Kujala

PhD Sari Kujala is a Senior University Lecturer from the Department of Computer Science of Aalto University. Her background is in psychology and she is an expert in eHealth, user-centered design, usability, user experience, and implementation. She is the deputy PI of the DigiIN project (www.digiin.fi/en/) and leads the subproject of NORDeHEALTH (www.nordehealth.eu).

Younger and highly educated people are more likely to use digital health services. Thus, there is a risk of exclusion and health inequity as the use of the services is often most difficult for the people who have the greatest need for them. Informing about the digital health services and their benefits is important for ensuring awareness of the digital health services. Health professionals' recommendation is also very essential. The quality of the digital services, including usability (utility and ease-of-use), is eventually most important in engaging people in using digital health services. Accessibility and understandable language ensure that the services are available to all groups. User-centered design is the key to the development of usable services. Early user involvement, iterative design, and empirical testing are the principles of user-centered design. Involving different user groups including older people, mildly intellectually disabled and other vulnerable groups is important in designing for all.

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Lapset ja nuoret digitaalisten palveluiden kehittämisen keskiössä
Anna-Maija Ohlsson, Desing Director
Vincit

Biografia Anna-Maija Ohlsson

Anna-Maija Ohlsson on sosiaalipsykologi, joka on erikoistunut ihmiskeskeiseen palvelumuotoiluun. Hänellä on yli 20 vuoden työkokemus digitaalisten palveluiden kehittämisestä ja erilaisten asiakasryhmien kanssa työskentelystä. Viimeiset vuodet Anna-Maija on keskittynyt hyvinvointisektorin digitalisaatioon ja kehittänyt työkaluja lasten ja nuorten kanssa yhdessä kehittämiseen.

Esitys pohjautuu Pelastakaa Lapset ry:ssä vuosina 2017-2021 STEA:n rahoituksella toteutettuun kehittämishankkeeseen 'Digitaalinen sosiaalityö lasten ja nuorten tukena'. Hankkeen taustalla oli ajatus siitä, että sosiaalityön tulee tukea lasten ja nuorten hyvinvointia, osallisuutta ja yhdenvertaisuutta kaikin mahdollisin keinoin. Hankkeen tavoitteena oli, että sosiaalityössä olisi käytettävissä monipuolisesti asiakkaan tarpeisiin vastaavia työn keinoja, joita työntekijät osaavat ja pystyvät käyttämään. Näin lapsilla ja nuorilla olisi paremmat mahdollisuudet saada tietoa, hakeutua avun piiriin ja saada tukea itselleen sopivilla keinoilla. Asiakaskeskeisyys oli olennainen osa hanketta ja hankkeen motto oli alusta asti "ei digiä digin takia".

Esityksen sisältö
Kehittämistyön kantava ajatus oli, että digitalisaatiolla tulisi vastata lasten ja nuorten tarpeisiin ja paikata heidän kokemiaan aukkoja palvelujärjestelmässä. Vain tällä tavalla voidaan kehittää vaikuttavia palveluita.
Tutkimustieto koskien lasten ja nuorten palvelukokemuksia tuo esiin merkittäviä kehittämiskohteita. Lapset ja nuoret eivät ensinnäkään tiedä palveluista tai törmää niihin arjessaan. Palveluiden tulisi näkyä niissä fyysisissä ja digitaalisissa ympäristöissä, joissa nuoret pääosin viettävät aikaansa. Varsinkin sosiaalinen media on merkittävä toimintaympäristö nuorten arjessa.
Avun hakeminen ei ole helppoa lapsille ja nuorille. Siihen liittyy nuorten kertoman mukaan häpeää ja pelkoa siitä, että tulee leimatuksi. Toisaalta nuoria mietityttää se, mihin kaikkialle heidän kertomansa tieto menee, seuraako tieto heidän mukanaan ja ennen kaikkea, mitä heille tapahtuu, jos ongelmistaan kertoo. Avun hakeminen itse on haastavaa, jos olo on voimaton ja ei edes tiedä miksi on paha olla. Jos ei tiedä mikä on, miten voi tietää kuka osaisi auttaa? Nuorilla on myös kokemuksia siitä, että heitä ei oteta vakavasti.
Nuoret kokevat, että heillä on vähän mahdollisuuksia määrittää palvelujen kulkua, jossa he ovat mukana. Tapaamisajat määrittää työntekijä, kun taas nuoret toivoisivat pystyvänsä itse vaikuttamaan niihin. Myös palveluiden saavutettavuus ja pitkät välimatkat ovat merkittävä ongelma.
Palveluissa kerättävä tieto ei ole lasten ja nuorten hallinnassa. Avun piiriin hakeutumista estää pelko siitä, mihin kaikkialle tieto omista ongelmista kirjataan ja kuinka kauan tämä tieto seuraa mukana nuoren elämässä. Jos nuori on monien palvelujen asiakkaana, olematon tiedonkulku eri virastojen välillä tarkoittaa sitä, että omista vaikeuksista joutuu kertomaan kerta toisensa jälkeen ja jokainen uusi hoitosuhde alkaa aina nollatilanteesta.
Lapsilta ja nuorilta kerätään tietoa ja palautettakin, mutta heillä on paljon kokemuksia siitä, että se ei vaikuta mihinkään. Erilaiset kyselyt eivät näyttäydy prosessina, jota voi seurata ja nähdä mihin kyselyn tulokset johtavat. Lapset ja nuoret eivät myöskään tiedä aina oikeuksistaan ja prosessit, joilla oikeuksiaan voisi hakea, ovat monimutkaisia.
Hankkeessa lähdettiin hakemaan ratkaisuja näihin lasten ja nuorten kokemiin haasteisiin konkreettisten kokeilujen kautta. Esityksessä esitellään muutama näistä kokeiluista. Lisäksi esityksessä pohditaan palvelumuotoilua kehittämisen menetelmänä ja mitä pitää erityisesti ottaa huomioon, kun sitä tehdään lasten ja nuorten kanssa.

Päätelmät
Hankkeen kokeilujen ja oppien pohjalta koottiin visio siitä, miten voidaan luoda entistä parempia palveluita lapsille ja nuorille hyödyntämällä digitalisaatiota. Visio vastaa lasten ja nuorten esittämiin toiveisiin ja huolenaiheisiin. Visio huomioi myös sen asettaman muutospaineen toimialan organisaatiokulttuuriin ja johtamiskäytäntöihin.

Hankkeen kaikki materiaali löytyy osoitteesta:
https://www.pelastakaalapset.fi/digisosiaalityo/

Suomen telelääketieteen ja eHealth seura ry.
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Children in the center of designing digital services
Anna-Maija Ohlsson, Design Director
Vincit

Background

The presentation is based on a development project 'Digital social work supporting children and young people', which was run by Save the Children Finland during 2017-2021 and funded by the Funding Centre for Social Welfare and Health. The project was based on ideology that social work needs to support the wellbeing, engagement and equality in all possible ways. The aim of the project was that social work would have all the possible means in use to answer the customer needs. This way children would have better possibilities to get information, seek for help and get support in ways that suit themselves the best. Customer-centricity was an integral goal of the project and the motto was "no digitalization for the sake of digitalization".

Content of the presentation

Digitalization of social work should answer children's needs and fix the problems they experience in the current service system. Only this way can services be built with an impact. Research data on children's experiences on the welfare service system reveals significant issues that should be addressed. Firstly, children don't know about the services or face them in their daily life. Welfare services should be visible in the physical and digitals environments that children spend their days in. Social media is especially an important operating environment for children.

Seeking help is not easy for children. There is a lot of shame and fear of being stigmatized. On the other hand, children are worried about where the information they tell is shared and will that information follow them in the future. They also worry about what is going to happen after they reveal their feelings and problems. It is challenging to seek help, if you don't have the strength and you don't know why you are feeling anxious. Young people also have experiences of not being taken seriously.

Children feel that they don't have a say on how the service that they are part of is organized. They for instance don't have a say on when the meetings take place. Also accessibility and long distances are a significant problem.

Children don't have any control of the data that is gathered in the welfare services. The fear of where the personal information is stored and how far it will follow you prevents children from seeking help. If a child is a customer in several services, there is very little information sharing between the organizations. This leads to a situation where the child needs to explain her situation over and over again.

Feedback is gathered from children, but they feel that it has no impact. Different questionnaires appear as processes that can't be followed up. Children are also poorly aware of their rights and the processes where you can claim your rights are complicated.

In the project, these were the problems to which solutions were sought by concrete experiments. In the presentation a few of the experiments are presented. Also service design as a method is analyzed from the point of view of engaging children in the design processes.

Conclusions

Based on the experiments and learnings a vision was developed on how to develop even better welfare services for children by utilizing digitalization. The vision answers to the wishes and worries that children have brought up. The vision also acknowledges the pressure it puts on changes that are required in the welfare sector's organizational culture and leadership styles.

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Ethical aspects in the development of e-wellbeing services with and for the older citizens

Sari Sarlio-Siintola, SHAPES Ethics Manager
Laurea University of Applied Sciences, Helsinki, Finland

Biography Sari Sarlio-Siintola

Mrs. Sari Sarlio-Siintola, *MSc (econ); MSc (social ethics), works as a senior lecturer and as a project researcher at Laurea UAS. She has been responsible for the ethics work in several EU-projects, including FP7 funded INACHUS and H2020 funded WeLive, RANGER and MARISA. Her key contribution in R&D projects is to examine the ethical and social dimensions of the proposed solutions and, on that basis, guide the development work so that the results – services, products and/or operating models - are ethically and socially legitimate and sustainable. She is currently working as the Ethics Manager of the SHAPES project (The Smart & Healthy Ageing through People Engaging in Supportive Systems). SHAPES Innovation Action intends to build, pilot and deploy a large-scale, EU-standardised open platform. The integration of a broad range of technological, organisational, clinical, educational and societal solutions seeks to facilitate long-term healthy and active ageing and the maintenance of a high-quality standard of life.*

Well-being innovations with and for the older persons have a central role in tackling the challenge of the ageing population. New digital solutions renew the institutional structures and the division of labor between service providers and citizens. People begin to evolve from customers of healthcare services into empowered co-creators of value both in service development and production.

In my presentation, I will introduce the ethical approach of the SHAPES project (The Smart & Healthy Aging through People Engaging in Supportive Systems). SHAPES Innovation Action intends to build, pilot and deploy a large-scale, EU-standardised open platform. The integration of a broad range of technological, organisational, clinical, educational and societal solutions seeks to facilitate long-term healthy and active ageing and the maintenance of a high-quality standard of life.

From an ethics viewpoint, SHAPES is a diverse initiative. Ethical issues include both development work (process), as well as defining and implementation of ethical requirements as features of the proposed SHAPES solution during that development and implementation work (outcome, solution to be created). Ethical requirements stem from both EU fundamental rights and different ethical norms and approaches, as well as from various ethical guidelines for business and technology. In addition, the General Data Protection Regulation (GDPR) is used as a foundation when addressing data protection and -security requirements. The purpose of the ethical requirements is to ensure that the SHAPES initiative becomes an ethically responsible endeavour and a positive innovation for its various end-users and service providers, as well as for society as a whole. The implementation of ethical requirements affects technical solutions and services, as well as the organisational arrangements of SHAPES. The SHAPES Code of Conduct summarises the key aspects of this framework.

Ethical requirements – alongside end-user requirements - are particularly important when developing and employing solutions linked to social values and fundamental rights, and when the target group is vulnerable older persons. New operating models and ecosystems enabled by technology and digitalisation are deeply anchored in the value base of society, not just the economy and business opportunities.

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O-13: Health counseling chat service as a part of the online health counseling services

Jaana Koivisto¹, MSc, MHSc, Pia Liljamo², RN, PhD, Ulla-Mari Kinnunen³, RN, PhD
¹ City of Nokia
² Oulu University Hospital
³ University of Eastern Finland, Department of Health and Social Management

Introduction: As digitalisation increases the use of health services, the need for information and development of e-health services increases. Customers' attitudes towards the use of e-health services have become more positive, while motivation to use e-health services has increased. The use of e-services motivates customers to monitor their health and customers are willing to use e-services if services are easily available. [1]. The purpose of this study was to find out what kind of information and help the customers asked through the anonymous health counseling chat service from the professionals and how the professionals responded to the customers needs for information. The purpose was also to find out what kind of individual guidance the professionals provided to customers in an anonymous health counseling chat service and how customers used the information they received. The aim of this study was to produce information that can be utilized in the development of various customer-oriented online counseling services and e-health services.

Material and Methods: The research data was collected during the spring and early summer 2019 from the Oulu Region Joint Emergency Service (OSYP) which is an anonymous chat service for health counseling and service guidance. The service was prompt by the health information needs of customers. Their questions and concerns related to health issues were possible to write anonymously. Discussions were not recorded in their health records. The research data included (n = 266) discussions, which were analyzed using content analysis and content quantification. Based on the customers' questions, the total number of customers' information needs (n = 679) was greater than the number of chat conversations included in the study (n = 266). That is because all words or phrases describing the needs for information in the discussions were included in the study, from which the upper classes were formed.

Results: According to the results, the anonymous health counseling chat service was contacted related to questions of health, illness and well-being. Of the conversations, 62.3 % (n = 162) concerned the contactor him/herself, 18.1 % (n = 47) the contactor's child, and 15.0 % (n = 39) of the questions did not indicate who was involved. Of the chat conversations, 54.1 % (n = 367) were related to symptoms and pain, 14.1 % (n = 96) to instructions, and 10 % (n = 67) to immunity, medication, and certification. The professionals responded to the customers' needs professionally and, if necessary, asked the customers for more information to be able to provide a personalized health counseling. Customers were given guidance and counseling and, if necessary, they were referred to health care or other services. Most customers were referred to OSYP health counseling, joint emergency services or to their own health center. Customers took advantage of the information, guidance and help they receive to deal with their problems or seek treatment. Generally, the customers were satisfied with the chat service and the information they received.

Discussion: According to the study, there is a need for an anonymous chat service for health services. However, a more precise delineation in the guidance and marketing of chat services is needed so that customers get the help, advice and guidance they need from the chat service they use [1]. Professionals should be encouraged to respond to customers' questions and concerns more verbatim and more broadly. The results of this study on determining the need for information confirming Jylhä's (2007) study of how health care defining information needs in an online service are challenging with unclear issues and due to insufficient background information [2]. It is possible to handle several issues related to health and well-being in a chat and in that case referral to another service might not be needed. In the future, the chat services should be studied from the professional's point of view. In addition, to develop customer-oriented services, it is important to gather customer experiences and development ideas.

References:
[1] Kivekäs E., Kuosmanen P., Kinnunen U-M., Kansanen M. & Saranto K. 2019. Sähköiset terveyspalvelut osaksi potilaan arkea. Finnish Journal of EHealth and EWelfare, 11(1-2), 25–37. https://journal.fi/finjehew/article/view/69813 [accessed 2.3.2021].
[2] Jylhä V. 2007. Terveydenhuollon verkkopalvelun tarjoama tieto ja sen vaikutukset. Asiakkaiden ja henkilökunnan näkökulmat. University of Kuopio, Faculty of Social Sciences
Department of Health Policy and Management, Health and Human Services Informatics.
https://erepo.uef.fi/handle/123456789/9438 [Accessed 2.1.2021]

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O-14: Predictive "maintenance" of citizens with digital twins

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1Department of Computer Science, University of Helsinki, Helsinki, Finland
2Ministry of Finance, Finnish Government, Helsinki, Finland

Introduction: In modern-time healthcare, preventive and health-enhancing measures such as lifestyle recommendations (e.g., physical activity, nutrition) are increasingly advocated. Digitalization makes it possible to realize them effectively with technological means embedded in everyday life of most every citizen (e.g., smart phones, sport watches). We propose to use digital twins for such purposes [1].

According to extant research currently up to 70% of Finnish adults are physically active only lightly or not at all on their own time and about 40% does not achieve the total activity recommendations. There is a need for systematic lifestyle guidance [2]. Formulation, updating and follow-up of effective recommendations requires scientific research and empirical data. In particular for physical activity recommendations, compatible measurements and time series are needed [3]. Digitalization offers many possibilities for such [4].

Material and Methods: In this design-scientific research work, we compose a design blueprint for connecting general recommendations, related supporting services and the actual behavioral information of individual citizens. The context is in the Finnish national AuroraAI program, which aims to combine different cross-sectoral services as seamless service chains aiding citizens' situational well-being by utilizing personal data and AI technology in human-centric ways [5]. The overarching aim of the AuroraAI program is people-centric and anticipating society by strengthening the ability of people to take care of their own holistic (360°) well-being. According to the AuroraAI program principles, instructions and preventive measures based on self-managed personal data and self-set goals may be more motivating and effective. In there, digital twins help people to appreciate their own well-being. We have already previously investigated provisionally the so-called Citizen Digital Twin concept elsewhere.

Results: The idea of this research is to investigate, how Finnish public sector service providers could offer predictive "maintenance services" for citizens in a similar manner as for instance equipment manufacturer companies for their customers. In this design research, we have applied similar thinking to people (citizens') predictive "maintenance" concentrating demonstratively on physical health. The main resulting design artefact is a conceptual process model comprising recommendations-based information processing for configuring the citizen-specific digital twin instance and its operational model. It is preliminary demonstrated with a use case based on a Finnish institutional physical activity recommendation for 13–18-year-olds.

Discussion: The premise here is that it would be possible to enhance the behavior of citizens without laws and obligations by providing enlightening human-centric recommendations as thinking tools. With the help of digital twins, an individual's data-based current state value with respect to the target state of the recommendations makes it possible to form a continuous picture of the situation and to aim guiding and directing services in order to reach the target state. On the other hand, it is possible to prevent from ending up to undesired futures considering the recommendations.

In conclusion, this research suggests that recommendation-driven personal digital twins open up many opportunities for new service innovations and utilizing current ones. Such digitally enhanced healthcare could have the potential to empower individuals to be more directly informed about their personal situation and to self-control to advance towards their own desired pictures of the futures.

References:
[1] Barricelli, B.R., Casiraghi, E., FoglI, D., 2019. A Survey on Digital Twin: Definitions, Characteristics, Applications, and Design Implications. IEEE Access 7, 167653–167671.
[2] Ministry of Social Affairs and Health, 2013. On the move – national strategy for physical activity promoting health and wellbeing 2020. Publications of the Ministry of Social Affairs and Health 2013:10.
[3] Kokko, S., Martin, L. (Eds.), 2019. Lasten ja nuorten liikuntakäyttäytyminen Suomessa – LIITU-tutkimuksen tuloksia 2018. Publication 2019:1, National Sports Council, Helsinki, Finland.
[4] Hamideh, D., Arellano, B., Topol, E.J., Steinhubl, S.R., 2019. Your digital nutritionist. Lancet 393, 19.
[5] Kopponen, A. Villman, T., 2020. Kohti ihmiskeskeistä yhteiskuntaa. Futura 39(4), 33–41.

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O-15: Engaging Aging Individuals in Virtual Co-Creation for Care Decision Making

Anna Salmi[1], MA, Emma Karttunen[1], BBA, Sari Sarlio-Siintola[1], MSc. (econ.), MSc. (social ethics)
[1] Laurea University of Applied Sciences

Introduction: Having a chance to see our grandchildren grow and reach maturity will be the joy and privilege many of us will face. Apart from to the well-appreciated extended possibilities, living a longer life too often means shrinking life circles, decreasing personal choice, and lessening autonomy. To tackle these negative effects, we present an ongoing research that aims to empower aging individuals and their formal and informal caregivers to participate in care-related decision making. This paper deals with the challenge of creating innovative tools and methods for engaging relevant stakeholders in processes of designing digital health solutions to sustain longer and healthier lives of aging people and their independent living. The context of the work is SHAPES, Smart and Healthy Aging through People Engaging in Supportive Systems that is an EC-funded H2020 project. The project aims to create an online platform that provides a wide variety of digital solutions to improve the health, wellbeing, and independence of older individuals. To support these practical goals the SHAPES project seeks to bring forth an open ecosystem for sharing of interdisciplinary knowledge and expertise, discovering existing and future solutions, and providing training on relevant themes.

Theoretical background: In the healthcare sector, design games have been used, for example, to understand the needs of cancer patients when constructing a new hospital wing [3], teaching clinical reasoning and decision-making to nurses caring for COPD patients in a home setting [1], redesigning nursing practices for a newly build hospital and planning a mobile hospital for disaster situations [2]. Design games can work as patient-centric tools for capturing patients' service experiences, that are otherwise hard to pin down, and as platforms for establishing positive communication channels between the patients and caregivers or even within the healthcare profession. Games have an ability to track and measure progress, which is valuable to the data collection process, and visualize and structure information in a manner that offers a commonly understood way of communication between different roles participating in a play session (Institute for the Future 2012). Patients and caregivers might have limited knowledge of how the treatment process is experienced in the role of the other party. Hospitals and other healthcare organizations often have a very organization-centric work culture, which makes it difficult for the professionals to see the treatment from the patient's point of view [3]. Design games help creating a full narrative of this journey and how it can be improved.

Material and Methods: The study involves the redesign of the ATLAS Co-Creation Game and repurposing an existing tool to include aging individuals in the design of care services and the care decision making. The game to be used as a basis for the work reported in this paper was originally developed in the ATLAS Map for Future Service Co-Development research project (2012–2014) at Aalto University. The game combined different theoretical and methodological perspectives from co-design, co-creation and service innovation to co-create new, trans-disciplinary knowledge about service co-development. The earlier ATLAS version was a general design game to be played e.g., when planning client engagement in service design projects or when seeking to learn about co-creation. In the current redesign project, in addition to the context specific objectives of care, the purpose is to address the urgent need of creating digital collaboration methods for geographically distributed co-creation processes. These processes grow in complexity as they take place virtually and involve multiple stakeholders from several sectors, including academia, government, industry and civil society. The study to be reported will involve a virtual workshop that Laurea UAS researchers will conduct in October 2021 in collaboration with AGE Platform Europe located in Brussels, that is one of the SHAPES partners. The ten participants of the virtual workshop belong to Dignified Aging Task Force and they are people with experience of aging and particular expertise on aging advocacy.

Results: The preliminary results of the study will involve knowledge about practices and methodologies of engaging aging individuals in care-related decision-making in digitally supported care. The results will advance research on design games and how they can be further developed to support digitally mediated collaboration and employed in geographically distributed contexts.

References:

[1] Fruhling, Fossum, Johnsen, Slettebo & Vivekananda-Schmidt. 2016. Teaching clinical reasoning and decision-making skills to nursing students: Design, development, and usability evaluation of a serious game. International Journal of Medical Informatics. Vol. 94, p. 39-48. Elsevier: Ireland.

[2] Garde, J. 2013. Everyone has a part to play: Games and participatory design in healthcare. University of Twente, Netherlands. Thesis.

[3] Kronqvist J., Järvinen M. & Leinonen T. 2012. Games as Design Medium. Utilizing Game Boards for Design Enquiry with Cancer. Third Nordic Conference on Service Design and Service Innovation.

Institute for the Future. Referenced on 21st of August 2021. https://www.healthit.gov/sites/default/files/IFTF_SR-1494_Innovations_in_Games.pdf

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Session 4B: Recent evaluation results of the Finnish health and social care information systems

Chair: Professor Jarmo Reponen, University of Oulu, Vice President of FSTeH

Thursday 7th of October 2021

16:00 – 17:30

4B-1 **STEPS 3.0 National health and social care information system monitoring**
Tuulikki Vehko, Research manager
Finnish Institute of Health and Welfare

4B-2 **Are physicians satisfied with their information systems**
Peppiina Saastamoinen, Researcher
Research services, Finnish Medical Association

4B-3 **How current ICT systems serve workflows in nursing?**
Kaija Saranto, Professor & Maiju Kyytsönen, Researcher
University of Eastern Finland, Finnish Institute of Health and Welfare

4B-4 **User experiences of social welfare client information systems (CIS)**
Susi Salovaara, Researcher
University of Lapland

5 min rapid scientific presentations

O-16 **Non-Kanta regional information Exchange for public health care in Finland: a national survey**
Niina Keränen[1,2], Timo Tuovinen[1,2], Jari Haverinen[1,3], Ronja Ruotanen[1], Jarmo Reponen[1,2]
[1]*FinnTelemedicum, Research unit of Medical Imaging, Physics and Technology (MIPT), University of Oulu*
[2]*Medical Research Center Oulu (MRC Oulu), Oulu University Hospital and University of Oulu*
[3]*Finnish Coordinating Center for Health Technology Assessment (FinCCHTA), Oulu, Finland*

O-17 **Digital support for socially marginalized people: what works?**
Soile Juujärvi[1]
[1]*Laurea University of Applied Sciences*

O-18 **Lower back pain detection using deep learning-based method**
Mustafa Al-Rubaye[1], BSc, Juuso Ketola[1], MSc, Jaro Karppinen[3], PhD, Satu I Inkinen[1], PhD, Miika T Nieminen[1,2], PhD
[1]*Research Unit of Medical Imaging, Physics and Technology, University of Oulu, Finland*
[2]*Department of Diagnostic Radiology, Oulu University Hospital, Oulu, Finland*
[3]*Finnish Institute of Occupational Health, Helsinki, Finland*

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Recent evaluation results of the Finnish health and social care information systems

Jarmo Reponen, MD, PhD, Professor of Practice
University of Oulu

Biography Jarmo Reponen

MD, PhD, radiologist, with a special competence in healthcare information systems, serves as a Professor of Practice for health information systems at the research group of Medical Imaging, Physics and Technology (MIPT), University of Oulu, Finland. He is past president of FSTeH, EuroPACS and Nordic Telemedicine Association. Parallel to his clinical work he has gained more than 30 years of experience in the development, implementation and evaluation of healthcare information systems, especially in the field of electronic patient record and radiology systems. His group co-developed the world's first mobile app for smartphones 20 years ago. Currently his research focuses on the effects of digitization in healthcare, with target areas of artificial intelligence and assessment of information systems. Reponen is the responsible teacher for the special competence of healthcare information technology for Finnish physicians, dentists and veterinarians. Currently he is the project leader in the Finnish national MEDigi project for the digitalization of medical and dental undergraduate education and vice-chair in the fifth research profiling programme section "DigiHealth" at the University of Oulu.

FinnTelemedicum research group at University of Oulu started with STAKES (nowadays National Institute for Health and Welfare, THL) systematic surveys on the availability and use of healthcare information systems in Finland in 2003. Already at the beginning, the target was to collect information from all the public healthcare service organisations and from most prominent private service providers. This approach has enabled us to produce research data for the monitoring and assessment of social welfare and health care information systems in national level and provide decision makers valuable data about the impact of health care reforms. The availability and use surveys have since then been repeated regularly in 2005, 2007, 2010, 2014, 2017 and 2020 providing an internationally unique progression track of the development of healthcare digitalization.

A second track to the national research on the effects of digitalization was added in 2010, when Finnish Medical Association, together with FinnTelemedicum at University of Oulu, THL and Aalto University established the first national survey on the user experience of medical doctors with their electronic medical record systems. Approximately 4000 physicians answered the survey, making it the biggest answering population in this kind of studies. The indicators developed originally then have been evolving through further editions and are now used in many other countries, among them Denmark, Iceland, Germany and Australia.

Since 2014 this national monitoring and assessment of digital information systems and services has been formalized under the coordination of THL and the joint data collections have been made every three years with an assignment of Ministry of Social Affairs and Health. New research tracks have been added like user experience studies among nursing staff, availability and use surveys among social care service organisations and private providers and user experience studies among social care staff and citizen´s experiences of the provided digital health and social care services plus additionally usage log information obtained from the national health information exchange systems. Combining these together, Finland is now probably the best documented living lab of health and social care digitalization in one country.

In this session we shall discuss the overall picture of present research data collection in years 2020-2021 and then concentrate to the user experience perspective, how information systems serve physicians, nursing professionals and social care professionals.

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STEPS 3.0 National health and social care information system monitoring

Tuulikki Vehko, Ph.D. Research Manager

Finnish institute for health and welfare (THL)

Biography Tuulikki Vehko

Tuulikki Vehko is Ph.D. and Research Manager at Finnish institute for health and welfare (THL). Currently she is leading The National health and social care information system monitoring project (STePS 3.0). The aim of the project is to produce monitoring information that supports national planning and steering of information system services as well as service providers of social and health care sector. Her research field is health service research and the research methods used cover both qualitative (focus group interviews and vignette studies) and quantitative (survey studies and registered based studies). Electronic list of publication: http://orcid.org/0000-0002-0034-8379

Background

Monitoring and assessment of social welfare and health care information system services -project (STePS 3.0) is ongoing 2019–3/2023. One of the aims of the project is to provide information about the realisation of the objectives defined in the Finnish eHealth and eSocial 2020 Strategy.

eHealth and eSocial 2020 Strategy presents six topics with mottoes:

- Citizen – Doing it yourself;
- Professional – Smart information systems for capable users;
- Service system – Effective utilization of limited resources;
- Refinement of information and knowledge management – knowledge-based management;
- Steering and cooperation in information management – From soloists to harmony;
- Infostructure – Ensuring a solid foundation.

Main content of the presentation

To collect data for the monitoring and assessment of social welfare and health care information system services, we used 6 surveys that were completed in the spring 2020 to spring 2021.

Data collection was executed by several actors: Finnish institute for health and welfare, University of Oulu, University of Eastern Finland, University of Lapland and The Finnish Medical Association.

The covid-19 pandemic delayed the implementation of data collection somewhat, but registered nurses', social care workers', physicians' and citizens' views on digitalization was measured. Moreover, the leaders of social welfare organizations and health care organizations responded to questionnaires.

Thanks to all who responded to the questionnaires!

At the time of the data collection, the national Kanta services were available in healthcare. National portal 'MyKanta Pages' for citizens was widely used. Organizations that provide social services were starting to use Kanta services. The first organizations that provide social services joint on Kanta services a voluntary basis.

The results of the surveys will be published in national reports and dynamic database reports. For example, indicators related to Nurses' views on digitalization are available already in a dynamic database on our website: www.thl.fi/digikyselyt -> In English -> Nurses' views on digitalization.

For English-speaking readers report "E-health and e-welfare of Finland — Check Point Finland 2022" will be published at the end of the project period.

Future

Service renewal as a socio-technological change continues and affects the solutions the social and health care organizations use to provide services. The surveys provide a solid way to measure eg user experiences.

In the future, various data sources, eg usage of data for digital services, may provide information about the extent of use of the service in different areas of the country and in different service types.

References

Ministry of Social Affairs and Health. (2015). Information to support well-being and service renewal. eHealth and eSocial Strategy 2020. Edita Prima. http://urn.fi/URN:ISBN:978-952-00-3575-4

Suomen telelääketieteen ja eHealth seura ry.
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Are physicians satisfied with their information systems?
Peppiina Saastamoinen, PhD, researcher
Finnish Medical Association

Biography Peppiina Saastamoinen

My research background is in public health, and more specifically in employee health and well-being. I am also interested in epidemiology of amyotrophic lateral sclerosis (ALS). At present, I work as a researcher at Finnish Medical Association. My work focuses eg. to labour market issues, well-being of the employees, and on medical education and specialist training.

Introduction

Finnish Medical Association, Aalto University, University of Oulu and Finnish Institute for Health and Welfare have studied physician's opinions on electronic health record (EHR) systems in 2010, 2014, 2017 and 2021. Overall satisfaction to the electronic health record systems has been measured by asking physicians to give a school grade to the system they mainly use. What kind of school grades physicians give to EHR systems and how these grades have developed recently? What are the most important areas for development and what are the best functionalities of the information systems?

Main content of the presentation

In 2021, the overall satisfaction score (range from 4 (fail) to 10 (excellent)) showed slight decline compared to the 2017 score and remained below 'satisfactory' (6.7). Even though the overall score declined, most of the brand specific scores increased. The decrease was mainly due to the poor evaluations received by a recently implemented electronic health record system. In addition, there were wide variation between the lowest and highest scoring brands (range 5.2 - 8.7). Thus, the overall picture suggest that physicians are still not satisfied with their information systems, but closer study shows that there is variation between the brands.

The physicians named 'slowness of the systems and unexpected interruptions in use' as the most important area of development. Electronic prescription was considered as the best functionality.

Recommendations

Regular end-user experience monitoring is recommended to stay up to date on the current trends, development needs, and physician's experiences on newly introduced systems. In addition, intensive collaboration between end-users, heads of organizations, and software developers is needed to improve the usability of the information systems and to ensure the best possible value for physicians, patients, and society.

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How current ICT systems serve workflows in nursing?

Kaija Saranto[1], PhD, RN and Maiju Kyytsönen[2], MHs, RN

[1]*University of Eastern Finland*
[2]*Finnish Institute for Health and Welfare*

Biography Maiju Kyytsönen

Works at the Finnish Institute for Health and Welfare in STePS-project (Monitoring and assessment of social welfare and health care information system services). Focuses on the themes of digitalization, information systems and e-services. Graduated with a Master's degree in health sciences from the University of Oulu in 2019, after having previously worked as a registered nurse

Introduction The Ministry of Social Affairs and Health has collected data about the status of the objectives of the Finnish eHealth and eSocial 2020 Strategy: 'Smart Systems for Capable Users'. This study was part of the project in 2020 that monitors health and social care sectors' digitalization and information system use [1-2]. The survey aimed to research nurses' competences in information management and their experiences of information systems on a general level as well as grouped by information system brand. Nurses' experiences of electronic information systems usage in health and social care had been studied in the project once before, in 2017.

Materials and methods The cross-sectional online survey was directed to working-aged registered nurses, public health nurses and midwifes. The study group was contacted via unions, which sent the invitation to participate for 58 276 professionals. The amount accounted for approximately 72 per cent of the target population. The link to the updated questionnaire was available in Finnish and Swedish from March to April 2020. The data was analysed in SPSS for Windows 25.0 and in Stata/IC 15.1 for Windows. The results were presented in percentages and the results from the two datasets (2017 and 2020) were compared when applicable.

Results The survey was answered by 3 610 nurses, who represented the target population well in terms of age, title, and hospital district. Participants were not satisfied with the support information systems provided due to the long in-service training required. The information flow inside their own hospital was satisfactory, but the information exchange between nurses in other hospitals as well as between nurses and patients caused dissatisfaction. Most of the respondents felt their basic knowledge and skills in information technology was nearly excellent and their use of data protection and security principles were good or excellent in each work sector. Their competencies in using the systems especially in the documentation of patient care in accordance with the nursing process were also good or excellent. The results grouped by information system brand demonstrated differences between brands and between same brand in different working environments (public hospital, community health center, social services and private sector). Some brands showed systematically better results when compared to other brands. The school grades of the information system brands in different working environments ranged from 5,6–8,2 (on a scale from 4 to 10, where 4 is a failing grade and 10 stands for excellent). The results had in general either improved or remained the same since 2017. The development priorities of information systems selected by nurses had mainly remained the same.

Discussion Nurses recognized benefits in the use of information systems and were confident in their information management competences. In general, it seems that the results are slowly improving. However, there was still dissatisfaction with some technical, usability and information flow aspects. Also, the fact that the main information system development priorities had mostly remained the same since 2017, shows that it is not an easy job to meet the standards of Finnish nurses. In order to support the development of usable information systems and information system related workflows, it is important to keep monitoring the development of nurses' experiences.

References:
[1] Saranto, K., Kinnunen, U.-M., Koponen, S., Kyytsönen, M., Hyppönen, H., & Vehko, T. (2020). Nurses' competences in information management as well as experiences in health and social care information system support for daily practice. Finnish Journal of eHealth and eWelfare, 12(3), 212–228. https://doi.org/10.23996/fjhw.95711,

[2] Kyytsönen, M., Hyppönen, H., Koponen, S., Kinnunen, U.-M., Saranto, K., Kivekäs, E., Kaipio, J., Lääveri, T., Heponiemi, T., & Vehko, T. (2020). Information systems as supporters of nurses' work: experiences by system brand. Finnish Journal of eHealth and eWelfare, 12(3), 250–269. https://doi.org/10.23996/fjhw.95704

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User experiences of social welfare client information systems (CIS)

Susi Salovaara[1], MSocSc, Marianne Silén[1], PhD, Sanna Hautala[1], PhD
[1]*University of Lapland, Finland*

Biography Susi Salovaara

Susi Salovaara is M.Soc.Sc. and a doctoral candidate at the University of Lapland and is also working as a junior researcher in The National health and social care information system monitoring project (STePS 3.0). Salovaara studies client information systems as part of social work knowledge formation using both qualitative and quantitative methods. Salovaara has worked as a social worker in the fields of child welfare and 24 hours social and crisis services and as a senior application analyst in the information system development project.

Introduction: In recent years, diverse development work has been carried out in Finland concerning social and healthcare information management to support the broad utilisation of information recorded in numerous information systems [1]. For the first time, the experiences of social welfare professionals are examined as part of the nationwide Monitoring and Evaluation of Social and Health IS Services (STePS 3.0) project [2]. The aim is to provide information about the realisation of the objective defined in the Finnish eHealth and eSocial 2020 Strategy: to ensure that social welfare professionals have access to CISs that support their work [3].

Data and Methods: The research data (n=990) consist of the responses of social welfare professionals who responded to the electronic questionnaire issued from September to October 2020 and who worked in the public, private or third sector in a variety of social welfare positions. The questionnaire was based on and adjusted from the previous pilot study [4] and the validated National Usability-focused HIS Scale (NuHISS) instrument [5]. Research data was analysed using descriptive statistics, chi-square tests and principal component analysis (PCA) with direct oblimin rotation. The group of respondents was standardised with a rough breakdown into two categories: public sector employees and others. The other category includes both private and third sector employees.

Results: The preliminary findings show that although social welfare professionals are capable users of CISs, the support provided by CISs for practice is inadequate in some areas. On the scale of poor to excellent, the majority of professionals evaluate their primary CIS as satisfactory. CISs provide fairly good support for documentation, and they function in a reasonably safe way to secure the well-being of the client. However, there were identifiable challenges in CISs related to the flow of information. The most frequently reported deficiency in CISs was the lack of information transmission between different information systems. When assessing the functionalities of the CISs, significant differences are identified in the assessments of those working in public and other sectors; the CISs are considered to be less technically stable and less functional by public sector employees than those working in private and third sectors.

Discussion: The preliminary findings are in line with the previous results and indicate that CISs have not developed significantly since the pilot study [4]. Although CISs are competent at documenting client information, they serve mostly poorly in providing social welfare professionals adequate tools for information retrieval and utilisation in their daily work. Problems in secure information transfer between different systems remain a key challenge, creating barriers to practical work, data security, and data utilization. Guided by the national strategy, recent advancements in social and healthcare information management have shaped CIS development; however, social services still have work to do to achieve the strategic objectives of information management and utilisation [1,3]. This research provides information that supports the future development work of CISs and fills a long-standing gap in research about social welfare user experiences of CISs as part of national monitoring and the evaluation of social and health information system services [1].

References:
[1] Vehko, T., Ruotsalainen, S., & Hyppönen, H. (Eds.) (2019). E-health and e-welfare of Finland. Check Point 2018. Report 7/2019. National Institute for Health and Welfare (THL). http://urn.fi/URN:ISBN:978-952-343-326-7
[2] Ministry of Social Affairs and Health, STM / 1717/2019, contract 002 / OHO / EMR / 2019, Project number 414919001.
[3] Ministry of Social Affairs and Health. (2015). Information to support well-being and service renewal. eHealth and eSocial Strategy 2020. Edita Prima. http://urn.fi/URN:ISBN:978-952-00-3575-4
[4] Ylönen, K., Salovaara, S., Kaipio, J., Tyllinen, M., Tynkkynen, E., Hautala, S., & Lääveri, T. (2020). Sosiaalialan asiakastietojärjestelmissä paljon parannettavaa: käyttäjäkokemukset 2019. [Much to be improved in social welfare client information systems: User experiences 2019]. Finnish Journal of eHealth and Welfare, 12(1), 30–43. https://doi.org/10.23996/fjhw.88583
[5] Hyppönen, H., Kaipio, J., Heponiemi, T., Lääveri, T., Aalto, A. M., Vänskä, J., & Elovainio, M. (2019). Developing the national usability-focused health information system scale for physicians: Validation study. Journal of Medical Internet Research, 21(5), e12875. https://doi.org/10.2196/12875

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O-16: Non-Kanta regional information exchange for public health care in Finland: A national survey

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Introduction: Health information exchange (HIE) in Finland begun with regional health information exchange (RHIE) pilots in 1998, and continued with the uptake of the national Kanta HIE services 2012 onwards. Even though all public healthcare organizations have now joined Kanta, much of the information exchange is still taking place in the regional level. Partial reasons for this are legacy systems; organizational changes bringing primary and secondary care together; and Kanta not meeting the usability needs of some users [1]. The current role of non-Kanta RHIE in relation to Kanta services is somewhat unclear.

Material and Methods: The Finnish national eHealth availability survey was conducted according to the situation on 1.3.2020 as part of the STEPS 3.0 project for monitoring and assessment of social welfare and health care information systems. Responses were obtained from all 21 hospital districts and 96% (130/136) of primary healthcare units. For this study the following questions for regional healthcare exchange were analyzed:

1) Ability to view information from Kanta or a non-Kanta RHIE seamlessly in the same view as information from the local systems.

2) The visibility of various types of patient data from hospital district to primary healthcare unit or vice versa. Types of data were: Patient record text; laboratory results; imaging reports; and imaging results (images). Hospital districts could respond with "All/In part/No"; primary healthcare units could respond with "Yes/No".

Results: 67% of all hospital districts and 38% of primary healthcare units could see non-Kanta regional information in the same view as their local health record system. 71% of all hospital districts and 65% of primary healthcare units could see Kanta information in the same view in their health record system.

Hospital districts functioned as combination organizations directly responsible for the primary healthcare in their regions in nine cases. For these combination organizations, same view visibility of regional data was assumed to be available.

For the 12 hospital districts that did not also manage primary healthcare in their region, the most common types of non-Kanta information exchange were in imaging: Images were available at least in part from hospital district to primary healthcare according to 100% of the hospital districts and 83% of primary healthcare units, and reports according to 100% and 81% respectively. The least common type of non-Kanta information exchange was that of patient record text from primary healthcare to hospital districts, available at least in part according to 67% of hospital districts and 49% of primary healthcare units. There were three distinguishable RHIE -types for these hospital districts: 1) *Full symmetrical*, where all types of information exchange between hospital districts and primary care were bidirectional and typically high level (4 hospital districts); 2) *One-way*, where visibility from hospital districts to primary healthcare was more prevalent than visibility from primary healthcare to hospital district (4 hospital districts) and; 3) *Symmetrical*, where information visibility was bidirectional, but some of the four information types were less used (2 hospital districts). Two districts did not clearly fit these categories. The responses of hospital districts and primary healthcare were mostly in agreement regarding information visibility in the region.

Discussion: The role, use and types of RHIE in hospital districts in Finland varies greatly. It is most used for imaging and least used for medical texts from primary health care to hospital districts. This may reflect the level of adoption of Kanta in these use cases, though the situation has remained stable since 2017 [2]. The arrangement of RHIE differs a lot in the Nordic countries in general [3]. There are needs for immediate access to regional patient information that are not fulfilled through a national repository [1]. The forthcoming reform for health and social care will bring primary and secondary care together and requires combined information systems also in regional level.

References:
[1] Potilastietojärjestelmät lääkärin työvälineenä 2021 -tutkimuksen ennakkotuloksia. https://www.laakariliitto.fi/laakariliitto/tutkimus/tyo-olot-ja-hyvinvointi/ (retrieved 20.7.2021)
[2] Reponen, J., Kangas, M., Hämäläinen, P., Keränen, N., & Haverinen, J. (2018). Tieto-ja viestintäteknologian käyttö terveydenhuollossa vuonna 2017: tilanne ja kehityksen suunta. THL Report 5/2018.
[3] Hyppönen H., Kangas M., Reponen J., Nöhr C., Villumsen S. et al. (2014) Nordic eHealth benchmarking. TemaNord 2015: 539.

O-17: Digital support for socially marginalised people: what works?

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Introduction: Sufficient digital skills are a key for life management and social inclusion in modern societies. In Finland, a small but significant proportion of citizens are out of services, including e-Health and e-Welfare, due to a lack of digital devices and basic skills, and the covid-19 pandemic has accelerated this trend. [1]. People at the risk of digital exclusion involve socially marginalised people with a background of crime, mental health disorders, and substance abuse. Public service providers have a legal duty to give advice on their digital services to all customers, but this duty does not cover assisting in the basic use of smart devices and software. Instead, the national operational model of digital support [2] addresses responsibility for basic support and training to NGOs and adult education centres. While support for vulnerable people is splitted, they face difficulties to access digital services and are at the risk of further exclusion.

The present study addresses the question what kind of digital support ("digituki") should be provided for socially and digitally excluded people in order to prevent drop out of services and to increase social participation: what works and on what conditions? The study is a part of the project Towards socially inclusive society (DigiIN), funded by the Strategic Research Council at the Academy of Finland (2019-2022).

Materials and methods: Twenty participants representing expertise on digital support of socially marginalised people were recruited through snowball sampling and interviewed from October to December in 2020. Participants included workers, experts, and managers in frontline projects, experts-by-experience and peer support-givers in NGOs, and health and social care professionals. Participants had in-depth experience especially concerning ex-prisoners and mental health service users. Interviews were transcribed and analyzed according to thematic analysis. [3]

Results: Socially marginalised people seek mostly assistance for running necessary businesses via the internet, especially managing social welfare benefits. The main obstacles are inappropriate or missing devices, difficulties with strong electronic identification, inadequate understanding of services, and insufficient skills in the use of smart devices and applications. These concrete difficulties are coupled with mental difficulties, such as learning difficulties, fear of using internet and smart devices, low self-esteem, and distrust of authorities. The most effective way to reach vulnerable people is to provide support in places they visit on regular basis, such as NGOs, meeting places, activity centres, and in some cases, premises of public services. Assistance can take many forms: it can be a part of regular activities or based on individual appointments. Successful support is usually hands-on, side-by-side guidance, taking place in a safe atmosphere and based on mutual trust. The skilful support-giver refrain from doing things on the behalf of the supported-for, set stepwise goals, encourages persistence in practicing, and give positive feedback. The key factor for successful support is advanced empathy and responding to particular needs of the supported-for. Peer support is especially helpful in sharing feelings of shame and social alienation. The best results can be gained when both the support-giver and the supported-for see digital skills as a key for improved and satisfying life, and broader participation in society.

Discussion: Semi-professional forms of support are of crucial importance for assisting vulnerable people in the use of digital health and social welfare services, alongside support from professionals. In order to prevent digital exclusion, established forms of collaboration is needed among service providers and other local actors. Best practices from the NGOs can be applied in the context of healthcare and social services. Detailed conclusions are still underway.

References
[1]. Eronen, A. et al. (2021). Sosiaalibarometri 2021. Koronakriisi ja palvelujärjestelmän joustavuus. Helsinki: SOSTE Suomen sosiaali ja terveys ry.
[2].Valtionvarainministeriö. (2017). Digituen toimintamalliehdotus. Auta-hankkeen projektiryhmän loppuraportti. https://vm.fi/auta-hanke
[3].Braun, V., & Clarke, V. (2021). Conceptual and design thinking for thematic analysis. Qualitative Psychology. Advance online publication. https://doi.org/10.1037/qup0000196

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O-18: Lower back pain detection using deep learning based method

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Introduction: Lower back pain (LBP) is a significant public health problem [1], and up to 84% of people will experience LBP during their lives [2]. LBP is a symptom caused by a variety of syndromes taking place in the spine and surrounding musculature and other tissues [3]. Clinicians use imaging methods to identify pathoanatomic changes in LBP patients. Magnetic resonance imaging (MRI) is often used to image the spine in the case of most spinal diseases, and it is also commonly requested for patients with LBP [4]. In this study we aim to investigate how convolutional neural networks can be applied in the automatic detection of LBP.

Materials and Methods: In this study we used the dataset Northern Finland Birth Cohort 1966 (NFBC1966, http://www.oulu.fi/nfbc/). Individuals living within 100km from the city of Oulu (N=1 540) underwent lumbar MRI examinations. In our experiments, N= 1 416 MRI studies were used. T2 weighted images were chosen as the studied MRI contrast as it allows for a clear visualization of both the vertebrae and intervertebral discs (IVDs) [5]. A script was developed to extract the middle slices from the MRI studies. A subset of dataset of 312 middle slices were annotated manually in such way that masks cover the lumbar area (L1-S1), using CVAT-annotation tool [6]. The masks are used to remove the area surrounding the lumbar spine. The masks were used in as input in image classification method, that was developed to segment the lumbar area for the rest of the dataset automatically. Masks from previous work [7], were also used to segment the IVDs individually. Two different models were tested to classify images with or without LBP. The first model was pretrained ResNet50, where the Conv1 kernels was modified to accept 3D (5 and 9-slice) image besides 2D. The second model was a VGG-M type architecture from SpineNet [8]. Both models used the same hyperparameters and data in the evaluation and testing phases. Changes were made to both models, for the possibility of using multiple branches. Finally, Class Activation Mappings (CAM) method used to implement heatmap by extracting and visualizing the wights from the last convolutional layer [9], showing where the model was focusing when it gave the prediction.

Results: Different experiments were conducted, and many combinations of branches were tested. The best classification results were observed when applying ResNet50 to binary pain classification and Pfirrmann scaling tasks using the whole lumbar spine region as input, with accuracy of 66%, specificity of 67%, sensitivity of 64%, negative predictive value of 95%. When individual IVDs were analyzed, the L2-L3 level exhibited the best results with accuracy of 69%, specificity of 59%, sensitivity of 79%, negative predictive value of 96%.

Discussion: Using AI-enhanced analysis might substantially help with ever-increasing flow of radiological images in terms of time and resource savings. Automatic detection and localization of abnormalities is an important task in medical images, as it has the potential to support clinical decision making across many medical specialties including LBP [8]. To conclude, our study demonstrate that deep learning has the potential to extract meaningful features from T2 MRIs that are robust in low back pain classification.

References:
[1] D. Hoy, P. Brooks, F. Blyth, and R. Buchbinder. The epidemiology of low back pain. Best Practice and Research Clinical Rheumatology, 24(6):769–781, 2010. The Burden of Musculoskeletal Conditions.
[2] Cassidy JD, Carroll LJ, and Cˆot´e P. The saskatchewan health and back pain survey. the prevalence of low back pain and related disability in saskatchewan adults. Spine, 23, 1998.
[3] J. Braun, X. Baraliakos, A. Regel, and U. Kiltz. Assessment of spinal pain. Best Practice & Research Clinical Rheumatology, 28(6):875–887, 2014. How to Investigate.
[4] N Sheehan. Magnetic resonance imaging for low back pain: Indications and limitations. Postgraduate medical journal, 86:374–8, 06 2010.
[5] Joseph P Cousins and Victor M Haughton. Magnetic resonance imaging of the spine. JAAOS - Journal of the American Academy of Orthopaedic Surgeons, 17, 2009.
[6] Boris Sekachev, Nikita Manovich, and Andrey Zhavoronkov. Computer vision annotation tool, 10 2019.
[7] Juuso H. J. Ketola, Satu I. Inkinen, Jaro Karppinen, Jaakko Niinim¨aki, Osmo Tervonen, and Miika T. Nieminen. T2 weighted magnetic resonance imaging texture as predictor of low back pain: A texture analysis-based classification pipeline to symptomatic and asymptomatic cases. Journal of Orthopaedic Research, n/a(n/a), 2021.
[8] Amir Jamaludin, Timor Kadir, and Andrew Zisserman. Spinenet: Automated classification and evidence visualization in spinal mris. Medical Image Analysis, 41:63–73, 2017. Special Issue on the 2016 Conference on Medical Image Computing and Computer Assisted Intervention (Analog to MICCAI 2015).
[9] Bolei Zhou, Aditya Khosla, Agata Lapedriza, Aude Oliva, and Antonio Torralba. Learning deep features for discriminative localization, 2015.

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Vierailut / Site visits

Perjantai 8.10.2021 - Friday 8th of October 2021

8:30 – 10:30

Virailut / Site Visits

1. **OYS TestLab ja Tulevaisuuden sairaalan (OYS2030) projektitoimisto**
   OYS TestLabissa ja Tulevaisuuden sairaala OYS2030 -uudistamisohjelman projektitoimistossa vierailijat tutustuvat OYS:n kehittämisen "hermokeskukseen", jossa rakennetaan uusia toimintamalleja ja ratkaisuja mahdollistamaan "Maailman älykkäin sairaala" sekä alueellista, jatkuvaa oppimista ja kehittymistä tukevaa sosiaali- ja terveydenhuollon innovaatio- ja testaustoimintaa. Vieraille esitellään mm., kuinka Pohjois-Pohjanmaan hyvinvointialueen innovaatioyhteistyön malli kehittyy yhteiskehittäen, millaisia eHealth-ratkaisuja rakennettiin kansainvälisessä inDemand-hankkeessa ja kuinka uusi OYS rakentuu - ei vain fyysisiä puitteita parantamalla, vaan yliopistollisen sairaalan toimintaa rohkeasti uudistamalla.

   OYS TestLab and the Future Hospital (OYS2030) project office
   During the site visit to OYS TestLab and Future Hospital OYS2030 project office, the visitors will become acquainted with the developmental "nerve center" of the Oulu University Hospital. At the project office new operating models and solutions are being created to enable "The World's Smartest Hospital" and to support the development of new innovation and testing practices, promoting continuous learning and development of healthcare and social welfare in Northern Ostrobothnia. The visitors will be shown for example, how the Northern Ostrobothnia wellbeing services region innovation cooperation model develops with co-creation, what types of eHealth-solutions were created in the international inDemand-project, and how the new Oulu University Hospital is being built – not only by improving physical facilities, but by boldly reforming the operations of a University Hospital.

2. **OAMK Simlab**
   Oamk SimLab on Oulun ammattikorkeakoulun monipuolinen sosiaali- ja terveysalan testaus-, kehittämis- ja innovaatioympäristö. Oamk SimLab tarjoaa ympäristöjä terveysteknologian ja hyvinvointipalvelujen tuotekehitykseen terveyden- ja sairaanhoidon, akuutti- ja ensihoidon, kätilötyön, kuntoutuksen, bioanalyytikan, radiografian- ja sädehoidon, suun terveydenhoidon ja optometrian aluilla. Simulaatiostudiot ovat teknologiatuettuja ympäristöjä, joissa on useita potilassimulaattoreita ja muita teknologisia laitteita.

   OAMK Simlab
   Oamk SimLab is versatile simulation and studio environment at Oulu University of Applied Sciences. Oamk SimLab serves test environment for product development of health technology and welfare services in areas health and wellbeing coaching, acute and emergency care, midwifery, rehabilitation, bioanalytics, radiography and ultrasound, dental care and optometry. Oamk SimLab environment includes customizable technology-supported studios with multiple patient simulators and other technical equipment.

3. **PrintoCent**
   PrintoCent tarjoaa ainutlaatuisen ympäristön painetun älyn ja joustavan elektroniikan valmistustekniikoiden kehittämiseen sekä uusien tuotteiden konseptien ja prototyyppien valmistukseen. Yhtenä sovellusalueena on pikadiagnostiikka. VTT Printed Intelligencen avulla on mahdollista luoda ennennäkemättömiä tuotteita: joustavia, kevyitä orgaanisia valokennoja, valaisevia pintoja, suoraan ihoon integroituja antureita sekä viestiviä pakkausmerkintöjä.

   PrintoCent
   In PrintoCent, companies get easy access to new business development and pilot manufacturing resources for the introduction of printed intelligence components, systems and products, from pilot production to early market trials. Application focus areas range from rapid disposable diagnostics, smart flexible lighting, wearable products to Internet-of-Things with sensors and energy harvesting.

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4. **Nokia Garage**

Nokia Garage on ainutlaatuinen demo- ja innovaatiolaboratorio, joka ottaa vastaan ja tarjoaa aktiviteetteja niin erilaisille vierailuryhmille kuin koululaisille ja opiskelijoillekin, sekä tarjoaa erilaisia koulutuksia. Vierailun kohteena toimii Nokia lippulaivalaboratorio langattoman yhteyden testaukseen. Vierailulla pääset tutustumaan langattomien mobiiliyhteyksien merkitykseen eHealthin saralla, kuten 5G:n käyttö kriittisissä infrastruktuureissa sekä muihin tapausesimerkkeihin.

Nokia Garage

Nokia Garage is a unique demo and innovation laboratory that receives and offers activities for different groups of visitors as well as schoolchildren and students, and offers various trainings. The destination will be Nokia's flagship laboratory for wireless connectivity testing. The visit will introduce you to the importance of wireless mobile connectivity in the field of eHealth, such as the use of 5G in critical infrastructures and other case studies.

5. **Polar**

Polar Electro on perustettu 70-luvun lopulla tuoden ensimmäisenä markkinoille puettavan sykemittauksella varustetun urheilutietokoneen. Tällä hetkellä Polar on kansainvälinen yritys, jonka palvelu- ja tuotetarjonta sisältää urheiluun, hyvinvointiin, palautumiseen ja ravitsemukseen liittyviä sisältöjä.

Polar

Polar Electro was founded in the late 70's pioneering the first wearable sports computer with heart rate measurement. Currently, Polar is global company offering products and services with sports, wellness, recovery and nutrition-related contents.

6. **Haltian**

Haltian Empathic Building for smart hospital pyrkii vähentämään kaikki pienet ja suuret tehtävät, jotka vievät huomion pois potilaasta ja siten mahdollistaa kliinisen henkilöstön keskittymisen potilaaseen. Järjestelmä luo digitaalisen kaksosen pohjapiirroksen pohjalta, ja visualisoi ympäristön, tilankäytön ja hyödyntää sisätilojen paikannustietoja.

Haltian

Haltian Empathic Building for smart hospital solution aims to reduce all small and big tasks which takes focus away from the patient to an absolute minimum and enable clinical personnel to concentrate on the patient. It creates a digital twin based on floorplan visualising various environmental data, space utilization and indoor positioning data.

7. **Topcon**

Topcon Healthcare näkee silmäterveyden uusin silmin. Tavoitteemme on tarjota terveydenhuollon ammattilaisille älykkäitä, arvoa tuottavia ja tehokkaita teknologiaratkaisuja hoidon ja palvelun kehittämiseksi. Topcon Healthcare pysyy jatkuvasti kehittyvän terveydenhuoltoalan aallonharjalla ja tarjoaa uusimmat kokonaisvaltaiset ratkaisut, joihin kuuluvat multimodaaliset kuvantamislaitteet, eri valmistajien laitteisiin sopivat datankäsittelyratkaisut sekä uraauurtava etälääketiedeteknologia.

Topcon

Topcon Healthcare sees eye health differently. Our vision is to empower providers with smart, value-driven and efficient technologies for enhanced care. Keeping pace with the ever-changing landscape of the healthcare industry, Topcon Healthcare offers the latest integrated solutions including advanced multimodal imaging, vendor-neutral data management and groundbreaking remote diagnostic technology.

8. **ESKO Systems Oy**

Esko Systems kehittää erikoissairaanhoidon Esko-potilastietojärjestelmää, joka on tutkitusti todettu parhaaksi suomalaiseen terveydenhuoltoon. Olemme voittoa tavoittelematon inhouse-yhtiö, ja kauttamme kunnat ja julkisen sektorin sosiaali- ja terveydenhuollon toimijat pääsevät mukaan luomaan ketteriä ja edullisia arjen potilastyötä tukevia tietojärjestelmäratkaisuja. Parhaillaan kehitämme Eskoon perusterveydenhuollon ratkaisua. Omistajiamme ovat Pohjois-Pohjanmaan sairaanhoitopiiri, Oulun kaupunki, Lapin sairaanhoitopiiri, Länsi-Pohjan sairaanhoitopiiri, 2M-IT, Keski-Pohjanmaan sosiaali- ja terveyspalvelukuntayhtymä Soite ja Kainuun sote.

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ESKO Systems Ltd

Esko Systems' main product, Esko patient information system, is being developed in close cooperation with health care professionals. Studies have proved that the Esko patient information system developed for special health care is the best suited one for Finnish health care. Via our in-house company, municipalities as well as actors in the social and health care fields are able to join in creating agile and affordable information system solutions to support and enhance everyday patient work. Currently we are developing a basic health care solution for Esko. Our owners are the Northern Ostrobothnia Hospital District, the City of Oulu, the Lapland Hospital District, the Länsi-Pohja Healthcare District, 2M-IT, the Central Ostrobothnia Association of Social and Health Services Soite, and the Kainuu Social and Health Care Joint Authority (Kainuun sote).

9. **KOTAS-keskus**

KOTAS-keskus eli kotona asumisen tuen keskus on ikäihmisten palvelualueella toimiva yksikkö, jonka tavoitteena on tukea monipuolisesti ikäihmisten kotona selviämistä. Kotas-keskuksessa koordinoidaan ja kehitetään ikäihmisten tuen palveluita sekä tehdään laaja-alaista yhteistyötä eri toimijoiden kanssa. Kotas-keskuksessa toimivat kotiutustiimi, hälytys- ja turvapalvelut, yökotihoito sekä kotihoidon varahenkilöstö-, etäkotihoito- ja optimointiyksikkö. Lisäksi KOTAS-keskuksesta koordinoidaan konsultoiva- sekä liikkuvasairaanhoitajatoimintaa, kotikuntoutusta sekä kotihoidon ICT-tukea.

KOTAS Center

The KOTAS Center, i.e. the Home Living Support Center, is a unit operating in the service area for the elderly, the aim of which is to provide comprehensive support for the elderly to survive at home. The Kotas Center coordinates and develops support services for the elderly, as well as extensive co-operation with various actors. The Kotas Center has a repatriation team, alarm and security services, night home care and a home care deputy staff, remote home care and optimization unit. In addition, the KOTAS Center coordinates consulting and mobile nursing activities, home rehabilitation and ICT support for home care

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Sessio 5A: Mitä uutta digitaalisuudesta ennaltaehkäisyyn ja kuntoutukseen / What new does digitalization offer to prevention and rehabilitation

Puheenjohtaja: Yliopettaja Marja Äijö, Savonia
Chair: Principal lecturer Marja Äijö, Savonia University of Applied Sciences, Finland

Perjantai 8.10.2021- Friday 8th of October 2021

11:00 – 12:30

5A-1 **Teknologiaan pohjautuva kuntoutus**
Kauko Pitkänen, Kuntoutusylilääkäri
Vetrea-Neuron

5A-2 **Puettava teknologia pienten lasten synnynnäisten kehityshäiriöiden tunnistamisessa ja kuntouttamisessa**
Elina Ilen, Post-doc tutkija
Aalto Yliopisto

5A-3 **Tieto ja prosessirakenteet aktiivisessa ja terveellisessä ikääntymisessä – kuvaus kaatumisen ehkäisystä**
Patrik Eklund, Professori
Uumajan yliopisto, Ruotsi

5A-4 **Teknologia tukemassa ikääntyneen toimintakykyä ja kotona asumista; oululaisten ikääntyneiden kokemuksia**
Marjaana Teerikangas, Palveluesimies
Kotona asumisen keskus, Oulun kaupunki

5 min rapid scientific presentations

O-19 **eHealth needs among rehabilitation in Northern Savonia**
Jori Reijula[1], PhD, docent, Laura Äimälä-Heiskanen[1], MSc, Marja Äijö[2], PhD, Tiina Arpola[2], MSc, Paula Rissanen[3], MSc, Pirjo Komulainen[4] PhD
[1]Vetrea Terveys Oy, Finland
[2]Savonia University of Applied Sciences, Finland
[3]Savon ammattiopisto, Finland
[4]Kuopion Liikuntalääketieteen tutkimuslaitos, Finland

O-20 **Designing and developing virtual escape game for vocational rehabilitation**
Jaana-Maija Koivisto[1], PhD, RN, Kati Nykänen[2], MHSc, PT, Taina Romppanen[3], MNSc, RN
[1]HAMK Smart research unit, Häme University of Applied Sciences
[2]Laurea University of Applied Sciences
[3]Kajaani University of Applied Sciences

O-21 **The experience and effectiveness of councelling mobile/internet interventions for adults with chronic pain in health care: a mixed method systematic review**
Eevi Karsikas[1], RN, MHS-student, Jenni Liuska[1], PT, MHS- student[1], Maria Kääriäinen[1], Professor, PhD, Anna-Maria Tuomikoski[2], Principal Lecturer, PhD, Anne Oikarinen[1], University Lecturer, post-doctoral researcher, Pirjo Kaakinen[1], University Lecturer, post-doctoral researcher
[1] Research Unit of Nursing Science and Health Management, University of Oulu, Finland
[2] Oulu University of Applied Sciences, Oulu, Finland; The Finnish Centre for Evidence-Based Health Care: A Joanna Briggs Institute Centre of Excellence

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Mitä uutta digitaalisuudesta ennaltaehkäisyyn ja kuntoutukseen?
Marja Äijö TtT, Gerontologian ja kuntoutuksen yliopettaja
Savonia-ammattikorkeakoulu

Biography Marja Äijö

Marja Äijö is a principal lecture in Savonia University of Sciences department of Health and Social care since 2008. She is Doctor of Health Sciences (man field of the study for the Gerontology and Public Health). Her specific research interests include gerontology, physical activity, rehabilitation, technology, and education. Äijö has been working as researcher in many development project such as Ellan - European Later Life Active Network, Suupirssi and HIMA. Recently she has worked with the topic of falls prevention relate to the collaboration with European Innovation Partnership on Active and Healthy Aging, action group 2 Falls Prevention. In addition, she works in different research such as IPPGA-RCT and development projects sus as KUNTOS and FUGA projects. Before working in Savonia she was a researcher, university lecturer and assistant in University of Jyväskylä, Department of Health Sciences and Open University.

Johdanto

Suuria odotuksia kohdistuu digitaalisen teknologian, tekoälyn ja koneoppimisen kehittymiseen. Erityisesti kiinnostuksen kohteena on niiden tarjoamat mahdollisuudet edistää ihmisten terveyttä ja hyvinvointia ja myös niiden käyttömahdollisuudet kuntoutuksen toteutuksessa. Suomessa kuntoutuksen uudistamisen toimintasuunnitelmatyöryhmä on korostanut digitaalisten ratkaisujen kehittämisen tärkeyttä. Digitaalisilla ratkaisuilla tarkoitetaan laajasti erilaista teknologiaa kuten sähköisiä terveyspalveluja, mobiilisovelluksia, internetin terveysaiheisia sivustoja ja palvelualustoja sekä puettavaa terveys- ja hyvinvointiteknologiaa.

Digitaalisuus ennaltaehkäisyssä ja kuntoutuksessa

Tutkimuksen ja kehittämisen kenttä digitaalisuuden alueella on laaja. Osaksi myös tästä syystä kuntoutuksessa digitaalisten ratkaisujen hyödyistä ei ole yksiselitteistä selkeää tutkimusnäyttöä. Tutkimustulokset vaihtelevat tutkimusasetelmien, tutkittavien ja käytettyjen digitaalisten interventioiden mukaan. Tutkimuskiinnostusta digitaalisten ratkaisujen kehittämiseen on runsaasti sekä eri sairausryhmien näkökulmasta esimerkiksi neurologisetsairaudet, keuhkosairaudet ja sydänsairaudet että toimintakyvyn häiriöiden näkökulmasta.

Parhaan kuntoutustuloksen saavuttamiseksi keskeistä on kuntoutujalle yksilöllisesti soveltuvien digitaalisten ratkaisujen valinta ja käyttö. Näiden tukiessa kuntoutujan motivaatiota kuntoutumisprosessin aikana voidaan saavuttaa paras mahdollinen tulos. Digitaalisten kuntoutusratkaisujen hyötyjä on tunnistettu esimerkiksi suhteessa kuntoutumisen tuloksiin ja vaikuttavuuteen, kuntoutujan kuntoutuskokemukseen ja myös kustannuksiin ja resurssien käyttöön mm. etäkuntoutuksessa ja robottiavusteissa kuntoutuksessa.

Teknologia-avusteinen kuntoutus, erityisesti neurologisessa kuntoutuksessa, on osoittanut kiinnostavia tutkimustuloksia esimerkiksi painokevennetystä ja robottiavusteisesta kävelyharjoittelusta ja yläraajojen tietokone- ja robottiavusteiset kuntoutuksesta. Puettava teknologia (nk. wearable technology) edustaa vahvasti tulevaisuuden kehittämisen suuntaa, jossa teknologia kulkee huomaamattomasti mukana. Fysiologisen tilan mittaamista signaalein, esimerkiksi sykevälivaihtelun, kehon liikkeiden tai hengitystaajuuden avulla, kehitetään jatkuvasti. Kehitystyö avaa uusia mahdollisuuksia entistä varhaisempaan hoitoa ja kuntoutusta vaativien kehitys- ja tai toimintahäiriöiden tunnistamiseen.

Älykäs tieto- ja prosessijärjestelmä tarvitaan tukemaan teknologia-avusteisen ja puettava teknologia saavuttamia tuloksia terveyden edistämisessä ja kuntoutuksessa. Digitalisaatio edellyttää IT-järjestelmien osalta olennaisen tiedon digitalisointia järkevästi. Tällöin tieto luokitellaan rakenteellisesti samojen periaatteiden mukaisesti yhteneväisesti kokonaisuudeksi, jossa eri tietolähteet ja tiedot "keskustelevat" toistensa kanssa. Tämä edellyttää esimerkiksi ICF-mallin (International Classification of Functioning, Disability and Health) mukaista tiedon luokittelua, tallentamista ja käyttöä.

Tulevaisuuden haaste

Väestön ikääntymisen haaste vaatii muutosta tavassa tarjota sosiaalisia ja terveydenhuoltopalveluja. Tulevaisuudessa olennainen osa näitä palveluja on erilaiset digitaaliset ratkaisut. Tässä työssä etusijalle tulee asettaa asiakkaiden itsenäinen toiminta ja toimintakykyisyys. Erilaisilla digitaalisilla ratkaisuilla on mahdollista tukea esimerkiksi ikääntyneen toimintakykyä ja kotona asumista, mutta se tulee toteuttaa yksilöllisesti ja iäkkään ihmisen omaa ääntä kuunnelle ja kunnioittaen. Tulevaisuuden digitalisaatio avaa paljon mahdollisuuksia tukea ihmisten terveyttä ja toimintakykyä ja toteuttaa kuntoutusta. Käyttäkäämme tätä mahdollisuutta järkevästi.

Lähteet

Saatavissa kirjoittajalta

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Teknologiaan pohjautuva kuntoutus
Kauko Pitkänen, MD, Ph.D
VetreaNeuron

Technology aided rehabilitation
Kauko Pitkänen, MD, Ph.D
VetreaNeuron

Biography Kauko Pitkänen

M.D., Ph.D. Kauko Pitkänen *is the chief of neurological rehabilitation in VetreaNeuron. During his long professional career he has exerted special effort in developing effective ways to provide neurological rehabilitation. His interest has focused on deploying novel technologies as integrated elements of subacute as well as chronic phases of rehabilitation process. With his extensive clinical experience he has contributed to the research and development of new innovations to promote training effects. The scope of interest comprises electromechanical training devices, weight-supported gait training, functional electrical stimulation, digital applications to improve adherence to self-exercise and an interactive platform for telerehabilitation purposes. Mr. Pitkänen has received his Ph.D. in University of Kuopio (a.k.a. Univ. of Eastern Finland) in 2002 and special competence in rehabilitation in 2003.*

Introduction

Numerous forms of modern technology are available to improve rehabilitation outcomes of patients recovering from functional impairment. Mobile technology industry, in particular, has delivered a broad assortment of products ready to be utilized for the purpose of goal-directed training. The discrepancy between growing demand of rehabilitation services and the restricted funding is forcing societies to find innovative solutions to provide effective therapies in hospitals and rehabilitation units. Robotics, virtual rehabilitation and brain-computer interface technologies can offer new tools to the hands of health professionals.

Main content

Mobile applications have the potential to improve self-efficacy in personalised interventions. An interactive platform enables the patient to benefit from the therapist's supervision to shape training programs in the pursuit of individual goals. Wearable sensors provide access to real-time data of body functions which may strengthen the engagement in rehabilitation programs. Studies have shown that wearable sensors may have an important role in home-based rehabilitation increasing adherence to long-term therapy regimes and can improve the odds for favourable outcome. Not being bound to a location or time mobile applications and wearable sensors give more freedom to execute rehabilitation tasks as preferred. Insoles embedded with force sensors are affordable and feasible tools to provide biofeedback to improve gait mechanics and balance. Such instrumental insoles have proven useful for the patients who go through a training program to reduce the risk of falls. Therapy protocols using virtual reality (VR) platform may have the advantage of improving engagement in goal-oriented therapies targeted to facilitate motor learning for balance, gait or limb movements. In many cases virtual reality can be a beneficial supplement that enhances the effects of conventional therapies.

A growing body of evidence shows the benefits of robot-assisted gait training for the patients recovering from spinal cord injury or stroke. Engagement in robot-assisted training accelerates the recovery process and enables to restore walking skills earlier than using conventional methods alone. Convinced by the accumulated evidence, public health and private service providers alike have made investments to deploy gait robot technology. Health professionals responsible for delivering the therapies to the patients are the first to witness the making of positive results.

Brain-computer interface (BCI) technology is an emerging method to enhance recovery after brain injury. Cortical biosignals related to motor intention recorded with electroencephalography can be transformed to virtual movements on a computer screen and simultaneously induced motor responses using peripheral electrical stimulation can potentiate the treatment effect. Advances in limb movement recognition algorithms for human-robot interaction (HRI) offer new approaches to the rehabilitation of the upper limb and hand.

Conclusion

Modern rehabilitation technology offers the advantage of versatility to be used in goal-directed therapies for the patients going through training protocols to improve performance. In addition to facilitate motor learning the novel technology can be harnessed to task-oriented training to improve functionality and participation in real-world activities. Recent advances in BCI and HRI technologies may open new perspectives to more effective rehabilitation techniques in the future.

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Puettava teknologia pienten lasten synnynnäisten kehityshäiriöiden tunnistamisessa ja kuntouttamisessa

Elina Ilén, Research project Specialis in Smart and Funcitonal Textiles

Aalto University, Helsinki

Biografia Elina Ilén

TkT Elina Ilén on yksi puettavan elektroniikan pioneereja maailmassa. Hän työskentelee tutkimus- ja kehitysprojektien johtajana Aalto Yliopistossa, Taiteiden ja Suunnittelun korkeakoulussa sekä yrittäjänä. Hänellä on DI tutkinto kuitumateriaali- ja vaatetustekniikasta vuodelta 1999 Tampereen Teknillisestä Korkeakoulusta, josta lähtien hän on tutkinut, kehittänyt ja suunnitellut tekstiilielektroniikan tuotteita urheiluun, hyvinvointiin, ja lääketieteelliseen tutkimukseen ja diagnostiikkaan. Lisäksi hänellä on vankka kokemus kansainvälisistä T&K&I -hankkein johtamisesta sekä yritysten että yliopiston edustajana; aina projektin ideoinnista ja rahoituksen hakemisesta projektin läpivientiin saakka. Hän on keksijänä 5 puettavan teknologian patentissa. Hänen väitöskirjansa (2015 TTY) materiaalitekniikan alalta käsittelee tekstiilisten kehonmittausantureiden soveltuvuutta lääketieteen ja terveydenhuollon tuotteisiin. Tällä hetkellä tutkimus yliopistossa keskittyy lasten neurologisten häiriöiden todentamiseen puettavan elektroniikan avulla ja aurinkokennojen luotettavaan, tehokkaaseen ja näkymättömään vaateintegraatioon, mahdollistaen energia-autonomiset tekstiilielektroniikan sovellukset. Lisäksi hän aktiivisesti suunnittelee ja kehittää puettavan elektroniikan tuotteita kansainvälisille alan yrityksille oman yrityksen Planno Oyn kautta.

Biography Elina Ilén

D.Sc (Tech.) Elina Ilén, Research Project Lead in Aalto University, Helsinki, School of Arts and Design and the entrepreneur, is one of the pioneers in the area of smart textiles and wearable textile electronics. Her work in the University includes in addition to research, leading external funded projects from research ideas to constructing a consortium and applying the funding to implementing and managing the projects. She got her M.Sc in Fiber, Textile and Clothing Science at Tampere University of Technology 1999. Since then, she has been researching and developing mass production-ready textile-based body sensing solutions for sport and well-being as well as medical and health care sectors for global companies like Polar Electro (FI), Suunto Movesense (FI), Adidas (GE), Myontec (FI), Emfit (FI) SoomaMedical (FI), Reima (FI), Nokia Technologies (FI), Lode (NL). She is a co-inventor in five patents concerning textile based wearable electronics. Her dissertation (2015) from Tampere University of Technology, Department of Material Science discusses decontamination of textile body sensors for the medical environment. Currently, her academic research focuses on applying the wearable textile sensor solutions for medical diagnostics and treatments and textile integrated autonomous energy harvesting systems as well as design process management in multidisciplinary collaborations. She has up-to-date knowledge of commercial textile electronics applications as she provides R&D services in the area of wearable technology via own company, Planno Oy. She has a worldwide supplier and manufacturer networks of textile and clothing industry. She is also the founder, CEO and head of design in Wouwou Gear Oy, a start-up, which designs, develops and markets gears for babies, and the founder partner of Silver Clothing Oy, which has its own branded slow-fashion clothing collection Fitzgrey® for women.

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Tieto ja prosessirakenteet aktiivisessa ja terveellisessä ikääntymisessä – kuvaus kaatumisen ehkäisystä

Patrik Eklund, Professor

University of Umeå

Biografia Patrik Eklund

Patrik Eklund is professor in computer science with a background in mathematics (algebra, logic, topology). His basic research is mostly within many-valued logic and as based on category theory. He has developed a wide range of applications in the private and public sectors.

Teknologia tukemassa ikääntyneen toimintakykyä ja kotona asumista; oululaisten ikääntyneiden kokemuksia

Marjaana Teerikangas, Palveluesimies

Kotona asumisen keskus, Oulun kaupunki

Biografia Marjaana Teerikangas

Marjaana Teerikangas on fysioterapeutti, yhteiskuntatieteiden maisteri ja tohtorikoulutettava (GNC/Oulun yliopisto) sekä palveluesimies Oulun kaupungin Kotas-keskuksessa. Hän toimii myös Kuntoutuksen kehittämisohjelman projektikoordinaattorina Pohjois-Pohjanmaan tulevaisuuden sosiaali- ja terveyskeskus -hankkeessa (POPsote). Marjaana on kuntoutuksen kehittämisestä, vaikuttavista toimintamalleista, monialaisesta yhteistyöstä ja ennaltaehkäisyn näkökulmista kiinnostunut yhteistyön tekijä. Marjaana on ilolla seurannut teknologisten ratkaisujen ennakkoluulotonta edistämistä ja käyttöönottoa ikäihmisten palveluissa Oulussa.

Tässä esityksessä tuodaan esille oululaisten ikäihmisten näkemyksiä etäkotihoidon ja lääkerobotin käytöstä osana kotihoitoa ja toimintakykyistä arkea. Lyhyet videot havainnollistavat toimintakyvyn ylläpitämisen ja kuntoutumisen näkökulmia teknologian hyödyntämisessä.

Technology supporting the elderlies' ability to function and live at home; experiences of the elderly in Oulu

Marjaana Teerikangas, Service Manager

Support center for living at home, City of Oulu, Finland

Biography Marjaana Teerikangas

Marjaana Teerikangas is a physiotherapist, she has a Master's degree in social sciences and is a doctoral candidate (GNC / University of Oulu) and the service manager at the Kotas Center of the City of Oulu. She is also the project coordinator of the Rehabilitation Development Program in the Northern Ostrobothnia Future Social and Health Center project (POPsote). Marjaana is interested in the development of rehabilitation, effective operating models, multidisciplinary cooperation and prevention aspects. Marjaana has happily followed the open-minded promotion and implementation of technological solutions in services for the elderly in Oulu.

This presentation presents the views of elderly Oulu residents on the use of telecare and medical robot as part of home care and functional everyday life. The short videos illustrate the perspectives of functional maintenance and rehabilitation in the utilization of technology.

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O-19: eHealth needs among rehabilitation in Northern Savonia

Jori Reijula[1], PhD, docent, Laura Äimälä-Heiskanen[1], MSc, Marja Äijö[2], PhD, Tiina Arpola[2], MSc, Paula Rissanen[3], MSc, Pirjo Komulainen[4,] PhD
[1]*Vetrea Terveys Oy, Finland*
[2]*Savonia University of Applied Sciences, Finland*
[3]*Savon ammattiopisto, Finland*
[4]*Kuopion Liikuntalääketieteen tutkimuslaitos, Finland*

Introduction: Aging people are forced to carry out steadily extending working-lives as the old-age dependency ratio will rise considerably in the near future. Meanwhile social and healthcare resources will become increasingly scarce, although the need for healthcare and rehabilitation services is bound to increase. The aim of this research was to evaluate the critical expertize of rehabilitation specialists operating in Northern Savonia and the strengths and weaknesses, and especially eHealth needs among the rehabilitation process. The research was carried out as a part of European Social Fund (ESF) funded project " Expertise and business network for North Savo rehabilitation services". [1,2]

Material and Methods: We interviewed 30 rehabilitation specialists (67% of whom were women) for this study in 2020. The interviewees were aged 24-60 years working in the field of rehabilitation. Their job titles included e.g. rehabilitation specialists, leaders, doctors, physioterapists, practical nurses and community sector representatives. A few interviewees were rehabilitating customers. The interviews were carried out using semi-structured theme interview forms. The interview material (approximately 150 pages) was recorded, transcribed and analyzed using content analysis method.

Results: According to the study results, factors causing challenges among rehabilitation included insufficient ICT and e-Health know-how, perceived lack of time, inadequate information and patient data management, and poor or lacking data-applications, ICT-tools and systems. Also, fatigue and strain due to increased usage of ICT systems and applications was identified, as well as difficulties in creating efficient interaction between rehabilitators and rehabilitation professionals via remote applications. Also, need for increased utilization of group rehabilitation using remote applications was suggested in order to create stronger peer-support for the rehabilitators. Furthermore, utilizing ICT applications currently in widespread use in eHealth, could enhance effectiveness of remote rehabilitation. Lastly, need for training to rehabilitation professionals was identified; mainly concerning eHealth and ICT-communication applications and systems.
The strengths related to the rehabilitation process in Northern Savonia included collective pride and strong basic expertize among rehabilitation professionals. Moreover, there was a strong foundation and urgency regarding education and training among the field of eHealth and remote rehabilitation.

Discussion: The ever evolving field of rehabilitation demands effective eHealth applications and processes alongside highly competent rehabilitation professionals to meet the needs of the aging population base in Northern Savonia. There is a need for more customer centric eHealth and rehabilitation processes, wherein the rehabilitator's needs are met – physically and psychosocially. By bridging together the rehabilitation and ICT expertize in Northern Savonia, it is possible to provide training and education to raise the level of both the rehabilitation processes and professionals in the area.

References:
[1] Lassila, J. and Valkonen, T. (2014), "Health and long-term care expenditure in Finland when living alone increases", Nordic Journal of Political Economy, Vol. 39, p. 14.
[2] Reijula, J., Reijula E., and Reijula K. (2016), "Insight into healthcare design: lessons learned in two university hospitals", Journal of Facilities Management, Vol.14, No. 3, p. 266-.282.

O-20: Designing and developing virtual escape game for vocational rehabilitation

Jaana-Maija Koivisto[1], PhD, RN, Kati Nykänen[2], MHSc, PT, Taina Romppanen[3], MNSc, RN
[1]HAMK Smart research unit, Häme University of Applied Sciences
[2]Laurea University of Applied Sciences
[3]Kajaani University of Applied Sciences

Introduction

This study is related to the Kela -funded Mystery 24/7 project, which aims to design and develop a virtual escape game for young people and young adults to support vocational rehabilitation. The study aims to promote young people's learning abilities and daily lives management abilities through a virtual escape game. The purpose is to describe the development process and generate principles for the design of a virtual escape room for vocational rehabilitation.

The development of vocational rehabilitation is important because, despite significant social investments and development work, there are still many young in who are not in employment, education or training. The corona pandemic has increased youth unemployment and the use of employment services, and in Finland, the youth unemployment rate has risen faster during the corona than for the population as a whole [1]. Young people outside working life and education have a high risk of being left out of the mainstream and receiving a low level of education. Many young people need support in terms of their ability to study and for their well-being and management of everyday life. Vocational rehabilitation organized by Kela is one way to support these young people.

Virtual reality can be defined as a three-dimensional computer simulation that mimics reality, creating a realistic experience for the user [2]. In an escape game, the player seeks to solve tasks related to a specific theme or story that require problem-solving skills and the ability to work under pressure. Virtual escape game enables young people to engage in developing their learning abilities and daily lives management abilities. In addition, the game offers a new kind of tool for professionals working with young people.

Material and Methods

This study follows the principles of design-based research. In addition, co-creation was used as an approach in designing the research and development process. The development of the virtual escape game for vocational rehabilitation was conducted by using iterative cycles of analysis, design, development, testing and refinement of the game in close collaboration among end-users, game developers, students, educators, and researchers in a real-world setting [3]. In this project, the end-users, young people, and youth work professionals were brought to co-create together in the dialogue between user insights and expert considerations. The co-creation workshops both allowed for the user-centred design of the game, as well as strengthening collaboration with stakeholder networks [4]. Mixed research methods were used in the study.

Results

The result of the study includes a virtual escape game to be utilized in vocational rehabilitation, as well as a handbook for professionals to use the game as a tool in vocational rehabilitation. In addition, the design-based research process facilitated the generation of design principles based on theoretical and empirical knowledge gained through iterative cycles.

Discussion

The study enables end-users to actively participate in the design and development process of a virtual escape game. Young people and professionals will receive a new and innovative method to support vocational rehabilitation. In addition, the research provides information on how similar serious games could be developed using co-creation methods. In the future, the effectiveness of the game in vocational rehabilitation should be studied.

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O-21: The experiences and effectiveness of counselling mobile/internet interventions for adults with chronic pain in health care: a mixed method systematic review

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Introduction: Chronic pain is multidimensional problem [1]. Chronic pain causes significant suffering, limitation of daily activities and reduced quality of life [2,3]. Chronic pain is a major global health issue [2,4]. According to WHO [5] client-to-provider telemedicine is beneficial and can improve access to health services, reduce the burden of travel and decrease inequities for populations that have difficulties in accessing health services. There is evidence that chronic diseases, like chronic pain can be treated by telehealth and it saves time and is cost-effective [6,7].

Material and Methods: This mixed method review aims was to synthesize best available evidence on the effectiveness and experiences of mobile/internet-based counselling interventions among adults with chronic pain in health care. The review was conducted according to the JBI [8] guidelines. The quantitative component exams the effectiveness of counselling mobile/internet interventions on pain and quality of and qualitative component exams the experiences of counselling mobile/internet interventions among adult's patients with chronic pain. Primary studies were included if they concerned adult chronic pain patients, age between 18-70 years, hospitalized in somatic health care units. Six major databases were searched to identify appropriate primary and secondary studies.

Results: Of the 1779 studies found, 14 were included in this review. When the qualitative and quantitative studies were interpreted as a whole, the counselling mobile/internet interventions can reduce pain and improve some dimensions of quality of life and patients experience the intervention as an interactive learning process with the support of health care professionals and mobile/internet devices.

Discussion: Counselling mobile/internet interventions were effective way to deliver care. Digital interventions should be implemented to health care to better encounter the needs of the patients with chronic pain.

References:
[1] Nicholas, M., Vlaeyen, J., Rief, W., Barke, A., Aziz, Q., Benoliel, R., Cohen, M., Evers, S., Giamberardino, M. A., Goebel, A., Korwisi, B., Perrot, S., Svensson, P., Wang, S. J., Treede, R. D., & IASP Taskforce for the Classification of Chronic Pain (2019). The IASP classification of chronic pain for ICD-11: chronic primary pain. Pain, 160(1), 28–37. https://doi-org.pc124152.oulu.fi:9443/10.1097/j.pain.0000000000001390
[2] Breivik, H., Eisenberg, E., O'Brien, T., & OPENMinds (2013). The individual and societal burden of chronic pain in Europe: the case for strategic prioritisation and action to improve knowledge and availability of appropriate care. BMC public health, 13, 1229. https://doi-org.pc124152.oulu.fi:9443/10.1186/1471-2458-13-1229
[3] Gaskin, D. J., & Richard, P. (2012). The economic costs of pain in the United States. The journal of pain, 13(8), 715–724. https://doi-org.pc124152.oulu.fi:9443/10.1016/j.jpain.2012.03.009
[4] Nahin R. L. (2015). Estimates of pain prevalence and severity in adults: United States, 2012. The journal of pain, 16(8), 769–780. https://doi-org.pc124152.oulu.fi:9443/10.1016/j.jpain.2015.05.002
[5] WHO, (2019). WHO guideline: recommendations on digital interventions for health system strengthening. https://www.who.int/publications/i/item/9789241550505
[6] Eze, N. D., Mateus, C., & Cravo Oliveira Hashiguchi, T. (2020). Telemedicine in the OECD: An umbrella review of clinical and cost-effectiveness, patient experience and implementation. PloS one, 15(8), e0237585. https://doi-org.pc124152.oulu.fi:9443/10.1371/journal.pone.0237585
[7] Mariano, T. Y., Wan, L., Edwards, R. R., & Jamison, R. N. (2021). Online teletherapy for chronic pain: A systematic review. Journal of telemedicine and telecare, 27(4), 195–208. https://doi-org.pc124152.oulu.fi:9443/10.1177/1357633X19871746
[8] Lizarondo, L., Stern, C., Carrier, J., Godfrey, C., Rieger, K., Salmond, S., Apostolo, J., Kirkpatrick, P., Loveday, H., (2020). Chapter 8: Mixed methods systematic reviews. In: Aromataris E, Munn Z (Editors). JBI Manual for Evidence Synthesis. JBI. doi: https://doi.org/10.46658/JBIMES-20-09

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Session 5B: Nordic Health: Patient Accessible Electronic Health Records

Chair: Chief Specialist Vesa Jormanainen, Finnish Institute for Health and Welfare

Friday 8th of October 2021

11:00 – 12:30

5B-1 **1177.se in Sweden**
Andreas Leifsson
Inera

5B-2 **The role of the national health platform Sundhed.dk during the COVID-19 pandemic in Denmark – pushing the agenda towards developing digital solutions based on the users' needs**
Therese Kjellerup Thorstholm, User Consultant
Sundhed.dk Denmark

5B-3 **Helsenorge.no in Norway**
Ole Bryøen
Norwegian Directorate of eHealth

5B-4 **The Role of the National Citizen Health Portal during COVID-19**
Guðrún Auður Harðardóttir, National Project Manager
National Centre for eHealth, Iceland

5B-5 **My Kanta Pages in Finland**
Vesa Jormanainen, Chief Specialist
Finnish Institute for Health and Welfare

5 min rapid scientific presentations

O-22 **Cross-national telemedical services in ENT (Poland, Kyrgystan, Kazakhstan)**
Piotr H. Skarżyński[1, 4, 5, 6], Irina Pierzyńska[1, 2, 3], Kinga Wołujewicz[4], Adam Walkowiak[1, 4]
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[2]The Center of Hearing and Speech Medincus, Bishkek, Osh (Kyrgyzstan)
[3]The Center of Hearing and Speech Medincus, Shymkent (Kazakhstan)
[4]Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany (Poland)
[5]Medical University of Warsaw, Warsaw (Poland)
[6]Institute of Sensory Organs, Warsaw/Kajetany (Poland)

O-23 **CATHCHAT: a telemedicine platform for paediatric interventional cardiac catheterization in Africa**
Rik De Decker MSc[2], FCPaeds(SA), Kate Larmuth PhD[1-2], John Lawrenson FCP(SA)[1-2]
[1]Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital,
[2]University of Cape Town, Cape Town, South Africa.

O-24 **Maturity of health care testbeds – A survey from Nordic countries**
Emilia Kielo-Viljamaa[1], RN, Ph.D., Senior Lecturer; Eva Collanus[2] Ph.D. Candidate; Janne Lahtiranta[2,3] Ph.D., Professor of Practice, Antti Tuomisto[2] Ph.Lic. Lecturer
[1]Novia University of Applied Sciences, Finland
[2]University of Turku, School of Economics, Finland
[3]Turku Science Park, Finland

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1177.se in Sweden
Andreas Leifsson

Inera AB, Sweden

Biography Andreas Leifsson

Andreas has a 20 year long background within digitalisation in different sectors. Since 2016 is Andreas employed by Inera AB and in this role he responsible for research about Ineras services and the market development.

Lecture synopsis

This speech will deal with the development of the Swedish e-health services provided by the 21 health care regions through Inera AB. The main focus will be on 1177 Vårdguiden, that provides e-services and advice through telephone and the website 1177.se.

The presentation will cover the long term development and the effects of Covid-19.

The audience will also learn how Covid-19 has affected both patients and health care personal when it comes to usage of digital services

The role of the national health platform sundhed.dk during the COVID-19 pandemic in Denmark – pushing the agenda towards developing digital solutions based on the users' needs

Therese Kjellerup Thorstholm, MSc, User Consultant, Anthropologist
Sundhed.dk, Denmark

Biography Therese Kjellerup Thorstholm

As an anthropologist and user consultant Therese K. Thorstholm works with combining quantitative data, qualitative data and design thinking methods. The focus is to ensure that the development of digital solutions for the public Danish healthcare sector corresponds with the users' digital behavior and needs. For more than 10 years Therese has worked with innovation and user centric methods within the startup ecosystem, the private and public healthcare sector in Denmark.

Sundhed.dk – the national platform for health data in Denmark

Sundhed.dk is politically founded – it is a co-operation between all five Danish regions, the state and the municipalities – and it is governed by its' own political board with representatives from each of its partner organizations.

From 80.000 monthly visits in 2003 to 8 million monthly visits in 2021, sundhed.dk (in English: health.dk) has come a long way. Already collecting health data from more than 120 data sources across the health care sector in Denmark, sundhed.dk was the obvious digital platform choice during the COVID-19 pandemic. It already provided a digital, secure infrastructure of citizens' health data and there was a wide knowledge of the platform in Denmark for citizens and health care practitioners.

From "nice to have" to "need to have"

During the pandemic sundhed.dk went from being a platform that was valuable, yet not necessary - to being a necessity in all Danish citizens' lives. Following the national strategy of testing as many as possible, sundhed.dk provided the necessary solutions within the website and an existing app:

- COVID-19 test result (incl. access for parents to children's data)
- Notifications for COVID-19 test results
- COVID-19 passport (incl. access for parents to children's passport)
- COVIDmeter – a page for citizens to access a weekly questionnaire about COVID symptoms
- Video consultation with specialists (e.g. psychologists)
- FAQ corona theme page
- Intuitive chatbot to help support citizens in finding their COVID-19 related data
- Sundhed.dk's user support team provided support to users through phone and e-mail.

How did the pandemic push the user-centric development agenda?

Before COVID-19 Sundhed.dk already had an extensive monthly user visit. With the large focus on the platform sundhed.dk and the app MinSundhed (in English: MyHealth) the need to create solutions as user-friendly as possible paved the way for thinking 'users first' during development. For instance, receiving notifications when test results are ready would give an immense value to users and eliminate the need to relog numerous times daily to check if results had arrived. Prior to COVID-19 this was a subject that sundhed.dk was conscious of, but during the pandemic the Danish government and citizens had expressed a public, strong opinion about easy access and user-friendly interfaces. Therefore, sundhed.dk had to act fast, creating the best solutions in unison with the political landscape.

Will the learnings from COVID-19 affect how the public sector creates digital solutions in the future?

I argue that due to COVID-19 there is a new openness - and public expectations - towards creating digital solutions within the public sector, where the focus is to create value based on what the public needs, while developing these solutions much faster than previously. With more than 1 million unique monthly logins onto sundhed.dk and more than 4.3 million downloads of the app, MinSundhed, the goal is to now stay relevant, providing information and convenient access to health data for all citizens in Denmark. Sundhed.dk's ambition is to continue on the current course, seeing potential in further creating user-friendly solutions for all citizens – putting their needs first.

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Helsenorge.no in Norway
Ole Bryøen, MSocSc in Computer Science, MBA in Global E-Management
Directorate for eHealth, Oslo, Norway

Biography Ole Bryøen

Ole Bryøen has a Master of Information Science from the University of Bergen (UIB) and an MBA in eManagement from the Norwegian School of Economics (NHH). Mr. Bryøen regularly serves as an eHealth subject matter expert in grant boards at the Research Council of Norway. Ole Bryøen currently works in the Norwegian Directorate of eHealth in Oslo, where he combines his technical background and work experience to develop and publish indicators to follow use of eHealth in Norway. Ole has worked with ICT for almost 20 years in different areas of public sector, and 10 years as a consultant in IBM and Gartner.

Introduction / Background
Helsenorge is the public health portal for residents in Norway. The portal has information about health, diseases and treatment. The content is provided by various actors in the Norwegian healthcare sector. At helsenorge.no you will also find self-service solutions where you can access various health-related online services.

Helsenorge is designed to make it easier for patients and relatives to meet the health service, give them a greater degree of mastering and to strengthen the patient role.

Helsenorge shall:
- make it easier to find and choose medical services
- offer access to your own health information
- offer self-service and self-help opportunities
- provide information and advice on health and lifestyle, symptoms, illness, treatment and patient rights

Main Content of the Presentation
When Norway closed down in March 2020, a need arose for digital transformation and new ways to work. Close cooperation between the health and care sector and private business has provided new national e-health solutions in record time. During 2020 helsenorge almost doubled its number of visits to 70 million and logins to 43 million. For 2021 it seems like these numbers might double again.
This presentation will describe basic functionality of helsenorge.no and changes during COVID-19.

Conclusion / Recommendations / Future
Activity on helsenorge is high and new features are continuously added. It will be important to have good governance and common direction and road map to secure a sound further development of the largest health portal in Norway.

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The Role of the National Citizen Health Portal during COVID-19

Gudrun Audur Hardardottir, PhD, National Project Manager

National Centre for eHealth, Directorate of Health, Iceland

Biography Gudrun Audur Hardardottir

Gudrun is a project manager at the National Centre for eHealth, Directorate of Health in Iceland, working on the development, standards and implementation of the national patient portal and the national electronic health record. She has worked in the field of health informatics for the past 18 years, but also has several years' experience working as a clinician in acute care, administrator, teacher, and policymaker. She has served on several eHealth committees, both locally and internationally. Gudrun has a BSc in Nursing from the University of Iceland and a PhD in Health Informatics from The University of Iowa, USA.

gudrun

Introduction / Background

The National Citizen Health Portal in Iceland is a centralized web application that offers citizens secure digital access to their own health information and eHealth services. The health portal is fully integrated into the national electronic health record, and accessible to citizens through a single access point. Parents have access to their children´s health data up to 16 years of age. The use of the portal is free of charge to all citizens.

The first wave of the COVID-19 pandemic hit Iceland on February 27th, 2020. It was clear that additional smart solutions were needed ASAP for surveillance and management of the new highly contagious and deadly virus. Moreover, the solutions needed to be fully integrated with the national electronic health record, the citizen health portal, the Chief epidemiologist, and the Department of Civil Protection and Emergency Management.

Main Content of the Presentation

This presentation describes the role of the National Citizen Health Portal during COVID-19. Furthermore, it describes how smart, integrated digital solutions were developed and implement in just ten days to help Iceland deal with the pandemic.

Conclusion / Recommendations / Future

Citizens´ use of the National Citizen Health Portal has increased exponentially during the pandemic.

Strong leadership, collaboration, dedication, and the availability of integrated digital solutions, where critical information is accessible in real time to all stakeholders, has played a significant part in helping Iceland minimize the effects the pandemic has had on Icelandic citizens. It is important to continue to advance the use of eHealth services to promote enhanced quality of healthcare and patient safety.

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My Kanta Pages in Finland
Vesa Jormanainen, Chief Specialist
Finnish Institute for Health and Welfare (THL)

Biography Vesa Jormanainen

MD, MSc, specialist in public health medicine. Current position is chief specialist at Performance Assessment of the Health and Social Service System at the Finnish Institute for Health and Welfare (THL), Finland. Previously he worked as the director of operational management to make real large-scale implementation and adoption of the national Kanta ICT services for social welfare and healthcare services in Finland in 2010–2017. He also has experience in concept building and directing medical technology assessment at the Finnish Medicines Agency in 2009–2010. He has international working experience from major pharmaceutical companies in health economics, outcomes research and pricing as a team manager. Previously he was in Board of Directors at the European Health Telematics Association (EHTEL, Brussels, Belgium). Currently he is Board Member of the Finnish Pharmaceuticals Pricing Board, and the Chairman of the Finnish Association of Public Health Medicine.

Background: Kanta is the name of the comprehensive Finnish national, centralized, integrated and shared data system services for healthcare and social welfare services, community pharmacies and citizens. The Kanta services form a unique statutory nationwide service concept, which has been introduced in phases since May 2010. Implementation and adoption of the national Kanta services were carried out step-by-step from May 2010 to December 2017. The current principal Kanta services include My Kanta Pages (since May 2010), Prescription Centre (May 2010), Pharmaceutical Database (May 2010, Patient Data Repository and Patient Data Management Service (November 2013), Kelain web service (September 2016), Client Data Archive for social welfare services (May 2018) and Kanta Personal Health Record (May 2018).

Main Content of the Presentation: The presentation will cover features of My Kanta, its use presented by using time series, maps and charts. The high proportion (63%) of the adults (at least 18-year-olds) used at least once My Kanta in 2020. My Kanta use was highest (67%) among the 18–65-year-olds, whereas 60% among the 66–75-year-olds and 32% among those at least 75-year-olds. The COVID-19 effects on the My Kanta are described. The presentation will also provide results on use of the Koronavilkku ('COVID-19 blincker'), the Finnish contact tracing app and the web-based Omaolo COVID-19 symptom self-assessment medical device (CE marked).

Conclusion: The population in Finland have accepted well the national Kanta services and can access My Kanta via internet in a 24/7 fashion. The use of My Kanta has increased exponentially and especially after the launches of new services. Mandatory recording of electronic health and prescription data to the national data repositories provide the population full access to their own data regardless if it were born in public or private services provider processes. The Kanta services will step-by-step enlarge to social welfare and become mandatory in a few years. Now the Client Data Archive for social welfare services are in voluntary use. As Finland will start the major social and healthcare reform in January 1, 2023, the national Kanta services will provide the actors a 'spine' for recording and transmitting relevant healthcare and social welfare data from a service provider to another in an interoperable and standardized fashion. Development activities of the comprehensive Finnish national, centralized, integrated and shared data system services for healthcare and social welfare services, community pharmacies and citizens are continuously under way.

References:
1. Jormanainen, V., & Reponen, J. (2020). CAF and CAMM analyses on the first 10 years of national Kanta services in Finland. *Finnish Journal of EHealth and EWelfare*, *12*(4), 302–315. https://doi.org/10.23996/fjhw.98548
2. Jormanainen, V., Parhiala, K., Niemi, A., Erhola, M., Keskimäki, I., & Kaila, M. (2019). Half of the Finnish population accessed their own data: comprehensive access to personal health information online is a corner-stone of digital revolution in Finnish health and social care. *Finnish Journal of EHealth and EWelfare*, *11*(4), 298–310. https://doi.org/10.23996/fjhw.83323
3. Jormanainen, V. (2018). Large-scale implementation and adoption of the Finnish national Kanta services in 2010–2017: a prospective, longitudinal, indicator-based study. *Finnish Journal of EHealth and EWelfare*, *10*(4), 381–395. https://doi.org/10.23996/fjhw.74511
4. Jormanainen, V., & Soininen, L. (2021). Use and users of the web-based Omaolo Covid-19 symptom self-assessment tool in Finland since March 16, 2020. *Studies in Health Technology and Informatics, 281, 739–743*. https://doi.org/10.3233/SHTI210270

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O-22: Cross-national telemedical services in ENT (Poland, Kyrgyzstan, Kazakhstan)

Piotr H. Skarżyński[1, 4, 5, 6], Irina Pierzyńska[1, 2, 3], Kinga Wołujewicz[4], Adam Walkowiak[1, 4]
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[4]Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany (Poland)
[5]Medical University of Warsaw, Warsaw (Poland)
[6]Institute of Sensory Organs, Warsaw/Kajetany (Poland)

Background: According to the World Health Organization, around 466 million people all over the world have hearing problems; therefore, proper diagnosis, treatment and rehabilitation of ENT diseases are extremely important to help patients to hear and live better. However, early and accurate diagnosis and appropriate, effective rehabilitation are not easy; it's a complex and difficult process.

Development work: It is especially complicated in case of countries where medicine has not still reached satisfying level. Medical facilities in less developed countries like Kazakhstan or Kyrgyzstan benefit from telemedicine cooperation with European specialists. The possibility of conducting regular telerehabilitation and telediagnostics with specialists, e.g. from Poland, improves the knowledge and skills of local doctors. Taking in consideration our experience we have noticed that over time they are less and less in need of direct support, as in many cases they are already able to carry out their own diagnostics and implement proper medical procedures.

Material and evaluation: Obtained data has shown that despite the high number of people implanted and hearing aid users, access to post-operative care (in the case of hearing implants), auditory rehabilitation and hearing implant fitting is limited in Kyrgyzstan and Kazakhstan. In order to facilitate patients' access to medical services and raise standards of medical care, in particular access to telemedicine, the Centre of Hearing and Speech Medincus in Kyrgyzstan (Bishkek, Osh) and Kazakhstan (Shymkent) enables diagnostics (teleABR) and rehabilitation (telefitting) via Internet connection and direct teleconsultation with specialists from the Center in Poland (Kajetany). Patients do not have to travel to remote specialist centres or sometimes even to other countries. We made it possible to solve the problem of accessibility of audiology services in underdeveloped regions. Thanks to the use of modern IT technologies, it is possible to provide telehealth applications such as: telediagnostics, telefitting, telerehabilitation or teleeducation. Numerous consultations are carried out within the International Network of Teleaudiology that joined following countries: Poland, Ukraine, Belarus, Kyrgyzstan, Kazakhstan and Senegal.

Discussion: We claim that telemedicine is the future of healthcare services, i.e. a form of service provision when the patient and the doctor are not in the same place. Using the Internet, modern communication tools and biomedical engineering, it is not only possible to carry out remote prevention and control of health condition, but also to make diagnoses and perform medical procedures.

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O-23: CATHCHAT: a telemedicine platform for paediatric interventional cardiac catheterization in Africa

Rik De Decker MSc[2], FCPaeds (SA), Kate Larmuth PhD[1-2], John Lawrenson FCP(SA)[1-2]
[1]*Department of Paediatrics and Child Health, Red Cross War Memorial Children's Hospital,*
[2]*University of Cape Town, Cape Town, South Africa.*

Background: In Africa, paediatric interventional catheterisation is a rare commodity, since there is a small number of trained paediatric cardiologists in African hospitals. Skills for interventional catheterisation can usually only be gained by undergoing fellowship training elsewhere, or by attending costly international congresses, but then hands-on experience is still limited. Consequently, there is a dire shortage of paediatric cardiologists trained in interventional cardiac catheterisation and limited opportunities for such training exist. [1]

Due to limited facilities in Africa for congenital heart *surgery,* most children with congenital heart disease will receive no treatment and die. Interventional cardiac catheterisation holds promise to begin to address this need: surgical or intensive care facilities are usually not required for the interventional management of common, "simpler" congenital heart defects, e.g. ASDs, PDAs, pulmonary valvar stenoses, etc.

Methods: CATHCHAT was developed at RCWMCH to stream interventional cardiac catheterisation procedures live via the Internet. An international expert is invited to view the procedure remotely and can comment and teach during the procedure.   Local and international audiences can log in to witness the procedures in real time and are able to interact directly with the operators in the cath lab. The power of CATHCHAT is that the logged-in audience can witness the procedure live and learn from observing our experience and the interaction with the expert.

Results: CATHCHAT has been growing over the past 5 years and has broadcast more than 120 live cases over 34 days comprising 18 *different* procedures (e.g., PDA, ASD, and VSD occlusions, pulmonary valvuloplasties, etc.). All paediatric cardiac centres in South Africa, as well as many centres in Africa, Australia, India, and Europe have logged in to observe and comment on procedures.

Conclusion: This *triangular* online teaching model of "telemedicine" is powerful and unique to CATHCHAT. We hope that it will help to stimulate the growth of paediatric interventional cardiac catheterisation capacity in Africa. A research module to assess the potential impact of CATHCHAT in Africa is currently under development.

Reference:

[1] De Decker R. (2018). Cathchat. *European Heart Journal* 39 (23): 2129–2132. https://doi.org/10.1093/eurheartj/ehy264

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O-24: Maturity of health care testbeds – A survey from Nordic countries

Emilia Kielo-Viljamaa[1], RN, Ph.D., Senior Lecturer; Eva Collanus[2] Ph.D. Candidate; Janne Lahtiranta[2,3] Ph.D., Professor of Practice, Antti Tuomisto[2] Ph. Lic. Lecturer
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[2]*University of Turku, School of Economics, Finland*
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Introduction: Testbed activities in health care have become a more and more important part of hospitals' and higher education institutions' day to day operations. However, the knowledge related to the maturity of the health care testbeds is limited. This survey aimed to describe testbed activities in Finland and other Nordic countries and assess the maturity of these testbeds as part of the Health Campus Turku (HCT2.0) project.

Material and Methods: The data were collected in spring 2021 from seven university hospitals, four universities of applied sciences and one primary care organization. Five out of the seven university hospitals were from Finland, one in Sweden and one in Norway. All universities of applied sciences were from Finland, as well as the primary care organization. The data were collected using semi-structured remote access interviews. The data were analyzed based on the following maturity factors: resources, facilities, marketing and communications, repeatability, contract models, time at the market area.

Results: *Resources:* The testbed activities in the participating organizations mainly were funded from various projects. However, testbed activities as a business activity were becoming more and more common. The testbed activities were coordinated by testbed managers, coordinators or project leaders. Other professionals, like nurses and physicians from the hospitals and teachers from the universities of applied sciences, participated in the testbed activities on occasion. In universities of applied sciences, students were also often involved in the testbed operations and could do their practical training periods or write theses related to the testbed activities.
Facilities: In most university hospitals, the whole hospital itself was a testbed environment, but there were also laboratories and simulation facilities for the testbed activities. In the primary health care organization, the testbed environments were also real-life facilities, for example, patients' homes and out-patient clinics. In the universities of applied sciences, the testbed environments instead were laboratory and simulation facilities at the campus.
Marketing and communications: Testbeds in the participating organizations were advertised using web pages, social media, networks and events. A regional testbed network coordinated the testbed operations in most of the organizations. The network often consisted of the hospital district and higher education institutions. National and international co-operation was also common.
Repeatability: Assessment of the effectiveness of the tested products or services was not very common in the participating organizations. Instead, the testing was mostly usability testing of the products and services, and the assessment mainly was conducted using qualitative assessment and cost estimates.
Contract models: In most organizations, there were existing process descriptions and contract models, which could be tailored case-by-case. In some of the organizations, the testbed processes and contract models were under development.
Market area: The testbed activities were either user or company oriented. Co-creation of the products and services between the organization and company, especially in the universities of applied sciences, was expected as it was part of their Research, Development and Innovation (RDI) operations. In addition, a continuous discussion with companies and other stakeholders was an essential part of the testbed operations.

Discussion: The testbed activities in the health care and higher education organizations are merging with the daily operations in Nordic countries. Specialization within the organizations was also seen, for example, robotics, rehabilitation or medical devices. The regional, national and international co-operation was seen as essential and the systematic and coordinated processes. The challenges were related to insufficient resources and bureaucracy.

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Session 6: Future and Visions

Chair: Board member Annette Kainu, FSTeHS

Friday 8th of October 2021

14:00 – 15:30

6-1   **Development of Digital Health in Europe**
Konstantin Hyppönen, Policy Officer
European Reference Networks, Belgium

6-2   **Use of Digital Health to mitigate the impacts of COVID-19 in the WHO European Region**
Clayton Hamilton, Coordinator for Digital Health
WHO Europe

6-3   **Digitalization as means of growth of health sector and of better health and wellbeing for individuals**
Sari Palojoki
Ministry of Social Affairs and Health

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Future and Visions
Annette Kainu, MSc., MD, PhD, Adjunct professor, CEO
University of Helsinki, Medzilla Oy

Biography Annette Kainu

Board professional, Medical Specialist and Consultant works currently as the founder and CEO of Medzilla Oy. Formerly Chief Medical Officer of Digital Health at Terveystalo, the largest private healthcare provider in Finland, and Head of Department, HUCH Heart and Lung Center, Hospital District of Helsinki and Uusimaa. Dr Kainu works with startups, SMEs and pharmaceutical companies in Digital Health and bringing healthcare innovations to market.

COVID19 pandemic catalyzed the digital revolution globally especially in healthcare. Unprecedented changes in the way healthcare services are accessed and delivered have been observed during less than two years. This was possible with the long-term development undertaken by both the private and public sectors, NGOs and researchers. The COVID-19 pandemic helped us also to overcome many hurdles – both in the regulatory environment, reimbursement for eHealth, and in the digital literacy of patients and providers alike. Development cycles shortened from years to weeks in response to the global crisis. Now, adjusting to the new normal, we need to harness the positive with lessons learned to continue the drive in digital transformation and adopting new technologies in order to tackle the enormous challenges we face in the post-COVID-19 era.

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Development of Digital Health in Europe
Konstantin Hyppönen, PhD

Policy Officer (SNE), Unit B3 Digital Health, European Reference Networks, DG Health and Food Safety (SANTE), European Commission, Brussels, Belgium

Biography Konstantin Hyppönen

Dr. Konstantin Hyppönen is a policy officer working on digital health in DG SANTE of the European Commission. He is currently participating in design of the European Health Data Space. Previously, he has taken part in a number of international projects, including setting up the EU Digital COVID Certificate system, and cross-border ePrescription and Patient Summary services between EU member states. During 2018-2020, he acted as the chair of the eHealth Member States Expert Group (eHMSEG) supporting the deployment of the European cross-border eHealth Digital Service Infrastructure. Before joining the Commission, in Finland, Dr. Hyppönen has worked as a chief architect in Kela's Information Services, responsible for the technical architecture of the Finnish eHealth hub, Kanta Services. Kanta also provides support for social services.

On 19 February 2020, the European Commission presented a Communication on "A European strategy for data" [1]. This communication envisages the creation of a common European Health Data Space (EHDS) that is essential for advances in preventing, detecting and curing diseases as well as for informed, evidence-based decisions to improve the accessibility, effectiveness and sustainability of the healthcare systems. EHDS should not only be seen as an instrument facilitating the reuse of health data for research and other secondary purposes. The Communication also highlights the right of citizens to access and control their personal health data and to request the portability of the data. The EHDS proposal could thus be seen as a call for improving the availability and access to health data both for primary and for secondary use, naturally with relevant data protection and security safeguards.

The Commission is now working on the preparation of a legal proposal on EHDS. Multiple policy options are being examined, with different levels of intensity. The main goals of the proposal are to:

- Support access to, sharing and use of health data for healthcare delivery purposes (primary use of health data). The initiative aims to support individuals' control of their health data, including data portability.
- Foster a genuine single market for digital health services and products, tele-health, tele-monitoring and mobile health.
- Facilitate trusted and secure access to and re-use of health data for research, innovation, public health policy-making and regulatory activities, including support for products and services incorporating AI. This should be done while ensuring relevant data protection and security mechanisms.

As regards the primary use of health data, MyHealth@EU infrastructure, supporting access to Patient Summaries of patients or enabling them to purchase medications abroad on an electronic prescription written in their home country, is already functional in multiple Member States. The system is used on a daily basis. The infrastructure should be developed to support with further services, such as the access to further types of health information (such as imaging studies, laboratory results and discharge letters). At the same time the coverage of the system should be expanded to the remaining Member States.

Currently, citizens can access their health data online in some but not all Member States, and the right for data portability is not implemented extensively. The EHDS legal proposal will explore options for improving patient access to their data, possibly also enabling the translation of the data into English or the language understood by a health professional abroad when the patient is seeking healthcare there.

On the secondary use of health data, a study has shown a wide level of fragmentation in the implementation of GDPR. Some Member States have already set up national or regional data permit/access authorities. However, the number of such countries is still rather small, and health researchers, policy-makers and regulators are still facing significant limitations when accessing and re-using health data.

A study supporting the Impact Assessment on the EHDS is ongoing in order to analyse different policy options and to aid in the preparation of the legislative proposal. The study will be finalized in autumn 2021, providing significant input to the finalization of the legislative proposal to be adopted in a few months after that

[1] https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52020DC0066

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Use of Digital Health to mitigate the impacts of COVID-19 in the WHO European Region

Clayton Hamilton, Regional Adviser

Digital Health Flagship, Division of Country Health Policies and Systems, WHO Europe, Denmark

Biography Clayton Hamilton

Mr. Clayton Hamilton leads the digital health flagship programme within the WHO Regional Office for Europe's Division for Country Health Policies and Systems, providing support and guidance on all aspects of digital health and innovation to support health systems strengthening and reform in the Region's 53 Member States. With a background in ICT development and business management and over 22 years of UN experience working in the fields of technology, digital health, and public health, Mr. Hamilton provides strategic guidance to assist countries in their development of national digital health programmes within the framework of delivering on WHO's triple billion targets and in working towards the achievement of the UN Agenda for Sustainable Development. In working to accelerate the uptake of safe and inclusive digital health services for all, Mr. Hamilton leads the development of dialogue and regional guidance on digital health and innovation, establishes partnerships with major international stakeholders working to reform health systems and public health, and provides thought leadership on the adoption of frontier digital technologies to improve access to healthcare and empower individuals in their choices for better health and well-being.

The 53 countries in the WHO European have accelerated their adoption of digital technologies to prevent and mitigate the impacts of the COVID-19 pandemic at an unprecedented rate. The presentation examines the ways in which digital technologies have been used in Europe since the start of the pandemic and how the lessons learned are likely to influence the delivery of Primary Health Care in a post-pandemic context.

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Digitalization as means of growth of health sector and of better health and wellbeing for individuals

Sari Palojoki, PhD

Ministry of Social Affairs and Health Finland

Biography Sari Palojoki

Sari Palojoki *is as a Senior Advisor at the Ministry of Social Affairs and Health in Finland. She is Ph.D. in health informatics and M.Sc. in clinical health care. She has among others public administration and leadership qualifications and she is e.g., certified lead auditor for quality systems and information security. Currently, Palojoki´s post-doctoral research with governmental research funding is focusing especially on technology-induced errors in health information systems. Her research was recognized by a national eHealth Award 2018.*

She has total of over 20 years' working experience. In the beginning of her career she gained experienced among cancer care drug research teams, pharma industry and the Finnish Authority for Medicines, Fimea. For over 6 years, she worked deputy head and head of the eWelfare and eHealth and Data Structures unit at the National Institute for Health and Welfare. For almost 7 years she worked as Head of Patient Safety and Security within the Helsinki University Hospital District´s (HUS) Group Administration being responsible for total of 23 hospitals´ patient safety and quality systems. Before starting the ministerial position she was also responsible for the Data Protection and Security Program for the Finnish Health and Social Care reform at the County Council. At the Ministry she promoted digitalization goals during the Finnish presidency of EU council and medication-related data management, EU eHn including Covid-19 coordinated actions and Nordic eHealth collaboration. Since April 2021 she contributes Ministry´s Department of Health Security as e.g., lead of Personalised Medicine Program.

The Finnish Health Sector Growth Strategy for Research and Innovation Activities was published in 2014. Decisive steps will be taken to develop research and innovation activities in the health sector guided by the Roadmap between 2020 and 2023. On the basis of know-how, measures will be taken to improve people's health and wellbeing through the opportunities offered by research and technological development.

Personalised medicine promotes the health and wellbeing of individuals by utilising research, new technologies and a wider range of information resources. The aim is to prevent diseases and to improve diagnostics and the effectiveness of treatments. Privacy protection will also be ensured and people's equal opportunities to receive care and influence their own health will be supported. Finland has invested in health competence centres and in making health data easily and securely available for secondary use. The objective of the project on personalised medicine in Finland is that the National Genome Centre, the National Cancer Centre, the Neurocentre Finland, the National Drug Development Centre and the FINBioBank cooperative will establish their operating models and funding in 2021–2023. At the same time EU data and digital policy is evolving rapidly and funding is growing accordingly. It creates opportunities for co-financed projects to Finland both as a leader and a partner.

Finland's primary assets in genomics are extensive collection of genomic data and high-quality expertise. The 1+MG initiative in Finland is promoted by a Coordination Group led by the Ministry of Social Affairs and Health. The setting up a coordinated data governance mechanism for high-quality genomic data would result in an unprecedented access to genomic data across different populations in Europe. This would have direct benefits for research and personalised medical practice and further positive impacts on prevention, public health and healthcare. A successful governance of "a Genomic Data Space" (GDS) would ensure the close links of the genomic data management to other specific health data management systems under the umbrella of the European Health Data Space.

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P-1: Conflicts and trade-offs between biomedical ethics, care ethics, desiderate of ICT in health and core value clusters in cybersecurity

Jyri Rajamäki,1, D.Sc. (Tech), PhD
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Introduction: Ethics is crucial in healthcare and new eHealth services make ethical questions even more pressing and raises new ones, such as ethics of cybersecurity in healthcare [1]. Loi et al. [2] have investigated the relation between ICT desiderata and the four principles of biomedical ethics and mapped trade-offs between the goals of cybersecurity into conflicts between the four principles of medical ethics. However, also other ethical guidelines and recommendations exist for healthcare and new eHealth services [3]. Some of them have conflicting requirements.

Material and Methods: This study applies research material that is collected during the SHAPES project, which has received funding from the European Union's Horizon 2020 research and innovation programme under the grant agreement no. 857159. The study follows design science research methodology [4]. It (1) presents a conceptual model for a system approach to analyse the ethical matters, which are related to cybersecurity in digital healthcare and well-being, and, as an example, (2) proposes ethical guidelines from the viewpoint of *consent*.

Results: The conceptual model for a systematic relation analysis of ethical matters related to cybersecurity in digital healthcare and well-being includes a systematic mapping of the relations between the four different ethical aspects (biomedical ethics [n=4], care ethics [n=3], core value clusters in cybersecurity [n=4] and technical aims [n=4]). This mapping generates 84 value pairs. The ethical guidelines for SHAPES project regarding consent are: (1) design and develop all functionalities so that consent is requested from the end-user on a regularly basis, (2) inform other stakeholders such as family members or healthcare professionals for which processes consent need to be requested from the end-sure and pro-vide enough material for communication, (3) design processes in a way that consent is requested on a frequently basis and strive to provide information about consent in several formats such as audio and printed text, and (4) quality and level of service must not be negatively affected, even if the end-user refuses to give consent. If an end-user refuses to give consent, a fall-back process for re-requesting consent through another channel must be in place. Healthcare professionals should be considered in requesting consent.

Discussion: The conflicts between biomedical ethics and technical aims have been studied [2]. A similar analysis is needed from the relations between (1) biomedical ethics vs. ethics of care, (2) biomedical ethics vs. core values in cybersecurity, (3) ethics of care vs. technical aims, (4) ethics of care vs. core values in cybersecurity, and (5) technical aims vs. core values in cybersecurity. This study presents the model how this analysis can be carried out in a systematic way, and, as an example, examines ethical guidelines with regard to consent.

References:
[1] Weber, K., & Kleine, N. 2020. Cybersecurity in Health Care. In: *M. Christen et al. (eds.), The Ethics of Cybersecurity*. Cham: Springer, pp. 139-156.
[2] Loi, M., Christen, M., Kleine, N. & Webe, K. 2019. Cybersecurity in health–disentangling value tensions. *Journal of Information, Communication and Ethics in Society, 17*(2), pp. 229-245.
[3] Rajamäki, Jyri (2021) Ethics of Cybersecurity in Digital Healthcare and Well-Being of Elderly at Home, In: Eze, T., Speakman, L., Onwubiko, C. (eds.) Proceeding of the 20th European Conference on Cyber Warfare and Security ECCWS 2021, Academic Conferences International Limited, Reading, UK., pp. 619-622.
[4] Hevner, A & Chatterjee, S 2010, *Design research in information systems: Theory and practice,* Springer Science and Business Media, New York, NY, US.

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P-2: The possibilities and meaning of new technologies in rehabilitation

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Introduction: New technology opens many possibilities in developing future rehabilitation. However, when seeking to develop acceptable and workable solutions for practical work in rehabilitation, it is crucial to get the opinion of the rehabilitation expert alongside the development work of engineers. The aim of this study was to examine rehabilitation practitioners' perspectives about possibilities and meanings of new technology and their thoughts on what is needed that digitalization could take a leap forward in rehabilitation.

Material and Methods: The study is part of the REcoRDI-project (Platform Ecosystem for Strengthening of RDI Activities in Multidisciplinary Rehabilitation) [1]. Data was collected in the online workshop organized for rehabilitation professionals (practical workers, specialists and researchers) in the area of Central Finland in the end of the year 2020. Twenty-two rehabilitation professionals participated in the workshop and worked on the Howspace platform. A qualitative research approach was used to understand rehabilitation professionals' perspectives and opinions and inductive content analysis was used to analyze the data.

Results: Participants thought that new technological solutions have the potential to deliver significant resource benefits while supporting sustainable development. Technology enables new types of communication methods and increases the continuity of the rehabilitation process through patient-driven interventions. The view of the rehabilitation professionals was that technology facilitates communication regardless of time and place, enables better access to rehabilitation in a timely manner and reduces regional inequalities. The challenges were perceived to be the slowness of effectiveness research in relation to the rapid development of technology. In addition, there are large differences in digital competencies between both professionals and also clients and especially between different age groups, which challenges the use and acceptance of rehabilitation technology. To promote use of new technology in rehabilitation, digital and technology competences should be increased, for example by utilizing technology tutors. New forms of cooperation should be developed, and it would also be important to build a common understanding between different sectors. Support should be given to the uptake of new technology, to improve its usability and accessibility, as well as user engagement.

Discussion: We are living in a time of rapid technology advancements which is also strongly involved into the field of rehabilitation as well. This study shows that technology has huge potential to offer diverse alternative ways to provide patient centered services in rehabilitation. However, training and support are needed to enhance digital competences of both rehabilitation professionals and patients which should be considered. In addition, the challenge is the slowness of the research process in relation to the fact that technology is developing, and new innovations are emerging in a fast cycle. Randomized controlled trials may not be the optimal approaches to support the generation of meaningful, timely, and practical evidence related to rehabilitation technology and thus, alternative approaches should be considered [2].

References:
[1] Rantakokko M, Sipari S, Paltamaa J, Malinen K, Korniloff K, Harra T, Vänskä N, Lehtonen K. Monialaisen kuntoutuksen soveltavan tutkimustoiminnan vahvistaminen ekosysteemissä – REcoRDI. Kuntoutus 2019, 42 (3), 44–48.

[2] Wang RH, Kenyon LK, McGilton KS, Miller WC, Hovanec N, Boger J, Viswanathan P, Robillard JM, Czarnuch SM. The Time Is Now: A FASTER Approach to Generate Research Evidence for Technology-Based Interventions in the Field of Disability and Rehabilitation. Arch Phys Med Rehabil. 2021 May 13:S0003-9993(21)00366-X. doi: 10.1016/j.apmr.2021.04.009. Epub ahead of print. PMID: 33992634.

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P-3: Preventive home visits for older people by utilizing gamigification and mobile application as an evaluation tool

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[3]*Lapland University of Applied Sciences*

Introduction: The population forecast indicates that the number of over 65-years-old will increase from around 22% to 30% by 2060 [1]. According to the Quality Recommendation to guarantee a good quality of life and improved services for older persons they should be encouraged to independent actions to strengthen their own health and functioning, likewise municipalities should increase preventive services [2]. In order to promote the functional capacity of the elderly, it is important to identify and address the risk factors that hinder everyday activities in a timely manner. Proactive planning is becoming increasingly important and one way to support this is through preventive home visits. Extensive research has been done on their effectiveness, but the results are partly contradictory and the reason is probably the different implementation methods. More impact research is needed, as well as integrated guidelines [3] and the use of digital and technological solutions to carry out preventive home visits. The purpose of the study is to describe the preclinical or predictive mobility problems and related factors observed during preventive home visits to 75-year-olds, and to investigate the effect of exercise counseling and game solutions on identified mobility problems during the 4-month follow-up period. The aim is to produce information that can be used to make the methods of preventive home visits more effective by utilizing gamification.

Methods: The target group is over the age of 75 people (n = 100), who are not covered by social and health services and who have received a preventive home visit. The study is a quantitative intervention-based follow-up study. The intervention groups consist of people who have been found to have preclinical mobility problems during a preventive home visit. In the first stage, the functional capacity data is collected during preventive home visits with a structured questionnaire. Data collection of functional capacity utilizes the HEKO mobile application, whose functional assessment targets are bridged to the ICF (International Classification of Functioning, Disability and Health) classification. Data is collected on everyday activities as well as mental-wellbeing, social-wellbeing and risk of falls. In the second phase, a home visit is carried out for the elderly who had mobility problems in the first phase. Their physical performance is assessed by a short physical performance test (SPPB) combined with a mobile solution developed to measure balance, Ainone Balance. The Ainone Balance application utilizes Romberg's standardized test [4].

Results: The results of the study will be reported later. The conference will present a research design and the content and development of the HEKO mobile application to be used during preventive home visits.

Discussion: Adding technological and game-based solutions to the implementation of preventive home visits for the elderly will accelerate the collection and utilization of assessment data for detecting preclinical mobility problems in the elderly, supporting survival at home, and developing various regional services.

References:

[1] Statistics Finland (2015).

[2] Ministry of Social Affairs and Health (2020). Quality recommendation to guarantee a good quality of life and improved services for older persons 2020–2023 : The Aim is an Age-friendly Finland. Publications of the Ministry of Social Affairs and Health 2020:37.

[3] Seppänen, M., Heinola, R. & Andersson, S. (2009). Hyvinvointia ja terveyttä edistävää toimintaa käytännössä: ikäihmisten neuvontakeskuspalvelujen ja ehkäisevien kotikäyntien toteutuminen kunnissa. THL, tutkimusraportti..

[4] Gallamini, M., Piastra, G., Lucarini, S., Porzio, D., Ronchi, M., Pirino, A., Scoppa, F., Masiero, S. & Lucrezia Tognolo, L.(2021). Revisiting the Instrumented Romberg Test: Can Today's Technology Offer a Risk-of-Fall Screening Device for Senior Citizens.

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P-4: Maintaining health and well-being skills using a hybrid model - Case people with or without cancer

Pirjo Airaksinen[1], executive manager, Heidi Kolehmainen, RN, Expert in promoting wellbeing, Minna Enqvist, Family coordinator
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Introduction: Pandemic time effects also in services in third sector. Cancer causes significant physical, emotional and social changes; as a result, it generates numerous needs in both, people with or without disease. The needs of people with cancer are e.g., family adjusts, health care system interaction, stigmas, need for information, interpersonal relations, and life style preservation. With the coverage of Covid-19 vaccine, hopefully in the fall regional North Savo Cancer Society will slowly move towards a new era. The Covid-19 period has strengthened the Cancer Society's expertise in virtual functions. The method of remote control of people with or without cancer will be developed even stronger with the help of a hybrid model with a new wellness service. A new form of service is the Welfare Living Room (Living Room), which is intended to be a low-threshold meeting place for people with or without cancer. In hybrid model some participants attend the Living room in-person, while others join it virtually from home or local units.

Material and Methods: The Living Room has a wide range of health and well-being-producing things for people with or without cancer on site at the Cancer Society. There are 20 local cancer units with over 4100 members in the region. In the local units, participants join in the activities of the Living Room remotely. The average age of people with or without cancer is around 55 years and their digital skills vary a lot. To narrow the digital gap some of the actors in the local units have been trained in the use of audiovisual equipment during the autumn.

Results: It is anticipated that the Living Room trains people and their families how to provide effective self-care, to solve health and wellbeing challenges or problems and to satisfy people's needs and demands. Via Living room the participants have qualified information related to nutrition, sleep, physical activities, and share experiences on living with or without cancer. Feedback from participants on the hybrid model is collected through a feedback form. Based on the estimates in the feedback forms, the hybrid model will be further developed. Continuous dialogue with customers plays an important role in the development of living room operations.

Discussion:
The goal of the Living Room is to promote the health and well-being of people with cancer, their loved ones and families, and to reduce loneliness by increasing inclusion. The aim is to create a communal place where people experience empowerment in everyday life, can influence activities and feel part of the community. For the Cancer Society the quality of both communication and many-format information services guarantee its value to people with or without cancer.

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P-5: Teaching and test laboratory for medical imaging

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Introduction: In this project, a joint comprehensive medical imaging teaching and testing laboratory is being created as collaboration between University of Oulu (UO), Oulu University of Applied Sciences (OUAS) and Oulu University Hospital (OUH). Here we present the project plan and report the status of the on-going project.
Materials and Methods: The project is funded for 2021-2022 by a grant of the European Regional Development Fund (EAKR), Council of Oulu region. The laboratory is being established on the premises of OUH. The laboratory will eventually consist of both physical and virtual spaces to host numerous imaging modalities and tools to facilitate tuition, testing, research and development. Stakeholders and activities benefitting from the laboratory include but are not limited to teaching and research at UO and OUAS, continuing education for radiation protection at OUH, Finnish companies willing to test their imaging-related hardware and for joint R&D projects between OU and Finnish companies. Collaboration with companies is piloted during the project. Physical devices in the laboratory will either be purchased with project funding or donated/provided by OUH or companies. The virtual tools, most importantly 360° environments of imaging rooms and MRI, CT and radiography simulators will become openly accessible for anyone interested globally. A steering group composed of representatives of different stakeholders oversees the project.
Results: The equipment of the laboratory will become available at different phases of the project (Table 1).

Table 1: Physical and virtual equipment/devices (entities), source/funding arrangement and year of availability

PHYSICAL			VIRTUAL		
Entity	**Source/funding**	**Status**	**Entity**	**Source/funding**	**Status**
Digital mammography	OUH	2021	360° environments of imaging rooms	EAKR	2021
Digital radiography	OUH	2022	MRI simulator	EAKR	2021
Dental CBCT	EAKR	2021	CT simulator	EAKR	2021
Digital x-ray detector	donation	2022	Radiography simulator	UO	2020
Numerous test phantoms and objects	EAKR	2021	Anatomy learning environment	EAKR	2022
Radiation meter	EAKR	2021			
Wet nuclear medicine lab	OUH	2021			
Computed tomography	OUH*	2022			
Linear accelerator	OUH*	2022			

* spare devices at OUH which can be used for laboratory use when available

Discussion: The teaching and testing laboratory is unique in Finland and serves a wide range of imaging professionals. The laboratory strengthens Oulu's position nationally by providing a single infrastructure that serves the needs of education, business and research on a single campus. During and after the project, the laboratory's physical and virtual equipment will be utilized in a variety of ways for continuing education in biomedical engineering, physics, medical technology and radiographer training. The teaching and testing laboratory offers researchers and companies in the field diverse opportunities to test and develop new methods and devices, which further strengthens Northern Ostrobothnia's expertise in medical technology. By facilitating future R&D projects, the laboratory is expected to attract further external funding. Further information on the laboratory can be found from the project web page [1] and press [2, 3].

References:

[1] https://www.oulu.fi/mipt/node/211347
[2] https://yle.fi/uutiset/3-11708212
[3] https://www.mediuutiset.fi/uutiset/pohjoisen-voimanponnistus-ouluun-syntyy-ainutlaatuinen-laaketieteellisen-kuvantamisen-opetus-ja-testilaboratorio/636aeaad-b270-4732-9948-7de553025209

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P-6: Health Management of Chronic Diseases at Aged Population by Point-of-care Diagnostic Devices and Big-data platform

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Introduction: People who suffer from chronic diseases are required to monitor key health index periodically. In countries with large population such as China, amount of patients usually outnumbers quantity of healthcare workers, which requires Internet-of-Thing (IoT) big-data platforms for digital health management for the chronic disease populations.[1] However, as the population ages, their decreasing mobility hinders their access to hospitals or health centers for body check and diagnostic tests.

Discussion of the situation: As a result, periodic acquisition and monitoring of their health data face a challenge. Here, we come up with a digital health management solution based on a combination of wearable Point-of-care diagnostic devices and the IoT platform. It consists of 3 elements: 1) Point-of-care data acquisition: people make use of wearable devices such as non-invasive glucose watch to achieve real-time monitoring patient's health data at home as well as transmit and store them into the IoT platform; 2) Data mining mechanism: the platform adopt machine learning approaches to train data as well as predict patient's health status by the historical data; and 3) patients are advised based on their medical records to the platform that integrate with trained data to generate health advisory to inform patients of their health status.

Without the need of healthcare manpower, this solution might lead to an innovative business model of digital health management in countries with large, aged populations.

References:

[1] Raji, A., P. Golda Jeyasheeli, and T. Jenitha. "IoT based classification of vital signs data for chronic disease monitoring." *2016 10th International Conference on Intelligent Systems and Control (ISCO)*. IEEE, 2016.

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P-7: Effect of a low-cost sustainable mHealth intervention to dissuade physical inactivity

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Introduction: Thirteen years after the publication of the Nudge Theory [1], a concept which proposes positive reinforcement and indirect recommendations to influence the decision making and behaviour of individuals, there is substantial research into Nudge Theory in many areas. For example, nudging has been applied as a technique to improve hand hygiene among health care employees to decrease the number of health-related infections [2]. Recent work of nudging interventions in an office environment showed that it helps to stimulate stair use of employees [3]. Normative messages as a way of nudging have been used particularly towards positive anticipated emotion to influence physical activity (PA) [4]. Some researchers [5] highlighted the limited understanding of the long-term effects of nudging in a technological context and suggested future studies on field trials of digital nudging interventions to investigate their effects over the long term and once nudges are removed. Digital interventions such as mobile health (mHealth) is a possible solution to persuade individuals towards PA. However, this is effective in increasing PA levels in adults in the short term [6]. The goal of the project is to explore the effect of the use of nudges to dissuade individuals from physical inactivity. This study is aimed to design and develop a low-cost nudging mHealth intervention such as a wearable touch interactive printed electrochromic displays (EC) based wrist band or a digital screensaver in a smartphone that allows users to check their time with normative messages when walking. This intervention will then be utilised for individuals to investigate whether it stimulates physical activity. The design of the nudging intervention will be followed by an iterative User-Centered Design (UCD) process, according to the ISO standard 9241-210:2019 [7]. The intervention will be assessed by experimental studies with quantitative and qualitative surveys.

Material and Methods: A randomized controlled trial (RCT) based experimental design will be carried out on a group of people. Participants will be randomly selected and divided into two conditions (Group A: using an Electrochromic displays-based wrist band; Group B: continuing their usual daily routine). The participants' key factors (consisting of intrinsic motivation, level of influence of the normative messages in the context of their physical activity behaviour) will be measured over eight weeks for each condition (experimental and control). These subjective measures (e.g., their daily usage of the interventions to do daily physical activities) will be gathered from participants' responses. Also, users' activity will be logged automatically by the smartphone they have with them, which will allow us to look at the objective data of the users and analyse accordingly. Face-to-face interviews will be conducted based on questionnaires (which will be formulated and tested based on participants' feedback and recommendation). On the quantitative side, the Intrinsic Motivation Inventory (IMI) (using the 7-point Likert scale) [8] will be used to measure intrinsic motivation and the level of influence of the normative messages in the context of their PA behaviour.

Results: We conducted the first iteration of empathizing step (observe the users and their views about the nudging intervention) of the UCD process. We tried to observe students' behaviour, engaged them through interviewing, and watch and listen to them carefully. Face-to-face interviews were conducted with 13 students in Jan-Feb 2021 using online platform zoom due to the COVID-19 pandemic. Most of those (11) are pursuing their master's degree at the University of Oulu, Finland, and the rest (2) are from different institutes in the European Union. The purpose of this interview was to summarize the views of the students regarding a cost-effective solution with a normative message when walking. We then tested the EC-based wrist band prototype and a digital display screensaver in a smartphone over the participants for a short period of 10 minutes. The test result has informed us that participants highlighted a low-cost and sustainable technology and preferred the normative message as a digital display screensaver in a smartphone than that of the EC-based wrist band to dissuade their physical inactivity.

Discussion: Participants pretended that they used the prototypes, and it was only for 10 minutes. Future studies will focus on more iterations of UCD and a longitudinal study of eight weeks. It can be expected that the study results will demonstrate a positive impact to decrease physical inactivity among the users.

References:
From the writers

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P-8: Finnish Nurses Digital Health and Social Services Strategy Promoting   Nursing Informatics in Advance Practice Nursing

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Introduction: In Finland a large reform is currently ongoing in organizing health and social care services. The reform has a remarkable influence on knowledge management and health and nursing informatics in clinical practice. The goal of this abstract is to describe the implementation process of the Finnish Nurses Association's (FNA) strategy for nurse's digital health and social services [1]. At the same time the goal is to describe and compare the different roles of advance practice nursing (APN) model and the need for understanding of nursing informatics. Advance practice nurses guide and support colleagues and clients in implementing evidence-based nursing e.g., in special areas. [2.] Documentation in clinical nursing practice provides the most data in day-to-day health care, and nurses need to be able to utilize the analyzed information for the benefit of patients, but also more broadly for nursing administration. Nurses also play a key role in engaging the public in health communications. Increasingly all citizens are using digital services and are actively involved in their own care. The FNA strategy strengthens public participation in the use and development of health and social services. All these functions need nurses' skills as providers, end-users and developers of digital services. [1, 2.]

Material and Methods: Development of APN education model has both theoretical and practical approach. include the FNA strategy, international examples, current studies and regulations, design models related to creating of new education for APN area. The FNA strategy for digital health and social services consists of six different areas: 1) Technology to support client involvement, 2) Digital services as part of nurses' work, 3) Safety and ethics in the digital environment, 4) Digital health services and skills, 5) Management of digital health services, 6) Research and development of digitalization of health services. From competence point of view each area of the strategy describes different informatics competencies from different role of nurses. [1] Nursing informatics (NI) definitions follow international guidelines such as widely accepted Stagger´s competence level orientation. At the advanced level, independent clinical nursing and health promotion as well as the related ethical decision-making, teaching and instruction, consultation, evidence-based practices, management, cooperation, research and development form the basis which guide the constructing the APN model. At present we have in Finland two different nursing professions clinical nurse specialist (CNS) and nurse practitioner (NP). CNS`s role has evolved over 20 years and there are 120 professionals working as broad-based, aimed to ensure and develop the quality of nursing, foster the implementation of evidence-based nursing and support the organization's strategic work. NP's role is still in working progress. Although the education is in place, organisations do not have positions for NPs. [2.] Methodologically the development project has a simple proceeding path: Plan-Do-Act-Check method which guides to reveal elements of advance practice nursing education in the field of nursing informatics. Planning phase is ongoing. Concrete educational model will be finalized by the year in 2024.

Results: After graduation APN, NP, CNS nurses have competencies in information management, skills to support and guide nurses in digitalisation, knowhow how patients are more involved in their care. Today nurses at all level have bachelor level of competence in nursing informatics. However, we need to define informatics role in advance practice nursing. Nurses have special role in narrowing the gap both among staff nurses and between clinical nursing and ICT. Documentation, data analyses, and knowledge management are essential parts in APN. Furthermore, to create effective eHealth services, nurses at APN level have a role as innovators and developers working in multidisciplinary teams.

Discussion: At present regulations in health and social care and effective evidence-based care require extensive use of information management in day-to-day care. Nurses need information management skills at all levels of education and work. Advance practice nursing plays an important role in the quality of care. In addition, in advance practice nursing there is a occasion to have a distinct nursing informatics (NI) specialty.

References: [1] FNA 2021. Finnish Nurses Association's Digital Social and Health Services Strategy. https://sairaanhoitajat.fi/wp-content/uploads/2021/06/E-health-2021_.pdf
[2] FNA 2016. New roles for nurses –quality to future social welfare and health care services https://sairaanhoitajat.fi/wp-content/uploads/2020/01/new-roles-for-nurses.pdf

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P-9: Initial study on detection of blood clots in the leg using a portable device for telemedicine applications

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Introduction: Interest in wireless portable medical monitoring and diagnosis systems has increased significantly, motivated partially by their potential to address widely recognized challenges related to the aging population and equality in rural area health care. Detection of blood clots in their early phase is essential to avoid serious thrombosis. Current methods to detect blood clots are usually MRI, CT, or ultrasound which require visit in the hospitals. In rural areas, patients with suspected blood clot may need to travel hours to get verification for blood clot. Thus, diagnosis of blood clots with portable devices would be essential for modern healthcare. There are initial studies on detection of thrombosis with electrical impedance spectroscopy [1]. However, there is a lack of studies which present detection methods of miniature sized blood clots with realistic models. Our study presents an initial study on blood clot detection in the leg area using microwave radio channel analysis.

Material and Methods: The evaluations are conducted with electromagnetic simulations using anatomical voxel model and directive antennas operating at the frequency range 1-6 GHz. A small blood clot is modelled as sphere with radius 2.25 mm and with dielectric properties (DP) determined in [2]. The blood clot is inserted in the vein located in the muscle tissue of the lower leg at the same horizontal cross-section as the antennas. The radio channel parameter S21 is evaluated between two on-body antennas in the presence and absence of the blood clot. The physical phenomenon behind this idea is that DP of the blood clot differ from DP of blood, which causes changes in the radio channel between the antennas. Thus, blood clots can be detected with intelligent radio channel analysis.

Results: The S21 channel parameters in the presence and absence of blood is presented in Fig.1. It is found that even small blood clots may change the radio channel response and hence, blood clots could be detected with radio channel analysis. In this case, the maximum difference is 1.2 dB at 3.6 GHz. Obviously, the impact of the blood clot depends on the clot size and location as well as frequency range. The next step is to evaluate the blood clots having different sizes in different areas. Besides, optimal antenna types with most appropriate frequency range, number and locations of antennas are studied to maximize the detectability of blood clots.
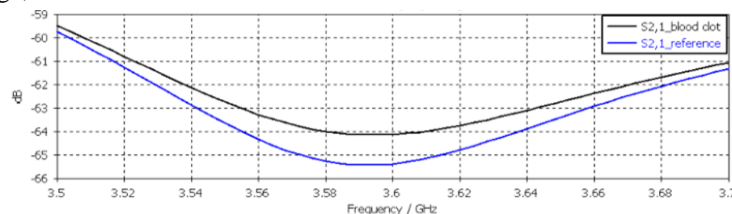

Figure 1. S21 parameters in the presence and absence of blood clot.

Discussion: This initial study presents the idea of detecting blood clots in the legs using a method based on microwave channel analysis. The first simulation results show that even small blood clot may cause detectable changes in the channel response. Further evaluations are needed to verify the detectability in different cases as well as study optimal types, number and location of the antennas. The proposed blood clot detection method could be realized with portable low-cost, low-power and safe devices which could be used as one of the telemedicine's advanced applications. The devices could be used in the ambulances or even at homes of the patients having clear risk for the blood clots, for instance after the surgery. In the case of blood clot suspicion, the patient could contact the hospital for further instructions, or even the device itself could inform the caregivers automatically. The proposed method would increase the equality in rural healthcare as well as enhance diagnosis in hospitals.

References:

[1] Jianping Li, et al, "Quantitative detection and evaluation of thrombus formation based on electrical impedance spectroscopy", Biosensors and Bioelectronics, Volume 141, 2019.
[2] Santorelli A, Fitzgerald S, Douglas A, Doyle K, O'Halloran M. Dielectric profile of blood clots to inform ischemic stroke treatments. Annu Int Conf IEEE Eng Med Biol Soc. 2020.

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P-10: The digital workplace survey in occupational health services

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Introduction: In Finland occupational health services are a part of the primary health care system, but also as a part of the workplace health and safety system. Occupational health services mean the activities of occupational health professionals that the employer has a duty to arrange by law. One of the main activities of occupational health services is regular workplace surveys. The purpose of workplace surveys is to investigate the hazards, exposures and strains of the work environment and evaluate their impact on employees' health and safety and propose actions to improve health and safety at work. [1] However, the changing working life and digitalisation have increased the diversity of work, abolished traditional and created new professions and new ways to work. Work is increasingly being done in virtual work communities, and employees do not always have a physical workplace. [2] It means, that occupational health services have challenges to get enough information of work-related risks and stress factors. [3] Because of that, a digital workplace survey has become more common in occupational health services. However, there are scarcely any earlier studies on the content of digital workplace surveys in occupational health services.

Material and Methods: The purpose of the study was to describe the content and the development needs of digital workplace surveys. The study was conducted as a qualitative study during August to September 2019 and was analysed using the content analysis method. The informants of the study (n=18) were occupational health professionals working in eight occupational health providers. The material was collected with group discussions (n=8), in which the themes were from the stages of the process of workplace survey in occupational health services.

Results: Most commonly the digital workplace survey included a digital health and working conditions questionnaires for supervisors and employees, which produced a traffic light-type risk view with an individual and group levels. Some occupational health professionals used a digital tool, mainly for the workplace survey documents management in collaboration with employers. Some had access to the workplace health and safety system, from which the occupational health professionals were able to see the risk assessments, accidents and "near miss" notifications of workplaces in real time. In addition, in one occupational health provider the digital workplace survey enabled professionals' mobile documentation during the workplace visit. The harmonisation of digital surveys and better utilisation of previous workplace surveys were mentioned as the development needs. Besides, the workplace survey reports should be displayed more visually to the workplaces according to respondents.

Discussion: The information of workplace surveys is important in occupational health professionals. Without this information, it would be difficult to promote and maintain employees' work ability and coping at work. This study showed that, the digital workplace study is most often an electronic questionnaire. Although slight progress of technology use has been made, it is necessary to continue the development of digital workplace study processes. Especially because technology makes it possible to find out about working conditions in a more versatile way. [3]. Also, on workplaces where occupational health professionals cannot be physically visited.

References:
[1] The Occupational Health Act 1383/2001
[2] Eurofound. 2016. Foundation Seminar Series 2016: The impact of digitalisation on work. Eurofound, Dublin. https://www.eurofound.europa.eu/sites/default/files/ef_publication/field_ef_document/ef1650en.pdf [accessed 10.8.2021]
[3] Nissinen, S., Koroma, J., Koskinen, H., et al. (2019). Etänä toteutettava työpaikkaselvitys: Teknologian mahdollisuudet ja haasteet työterveyshuollon perustyöpaikkaselvityksessä. Työterveyslaitos. http://urn.fi/URN:ISBN:9789522618665

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P-11: Data augmentation with noise estimation for COVID 19 detection

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Introduction: Due to the huge impact of the current Coronavirus disease 2019 (COVID-19) pandemic over the globe, many research was devoted to implement relevant and quick screening mechanisms. However, the availability of relevant patient dataset is still limited, especially in case of X-ray images and CT scan images where only small-scale dataset were made publicly available. This issue prevented researchers from developing efficient deep learning models which require large scale data for training.

Material and Methods: In this regard, this study explores the use of alternative data augmentation strategies for compensating a such limitation. More specifically, acknowledging the sensitivity of random data augmentation strategies for COVID-19 detection, we introduced a new noise-based estimation approach that enables us to perform data augmentation that preserves the noise/signal ratio of the original CT images. Then, we use a pre-trained image Denoising Deep Neural Network DnCNN to calculate different sets of augmented images. The first set contains denoised images from original CT scans. In the second set, we apply Gaussian noise with the estimated variance of each class to original images. Then, we calculate again denoised images from the second set of images (noisy images) using the same DnCNN network. Next, we merge the three created subsets with the original images set and create a large dataset which we introduce to a Temporal Convolutional Network TCN in order to classify images into a two-class model. We use for that Matlab R2020a for the augmentation techniques and Python 3 for the classification architecture.

Results: Experimental results demonstrate the reliability of our augmentation technique that allows the classifier to be trained on an enlarged dataset and hence capture highly significant features. In addition, it enables us to achieve high performance of 97.57\% recognition accuracy on the publicly available SARS-CoV-2 CT scan dataset.

Discussion: In general, acquiring medical data is very difficult due to patients' privacy, ethics in medical research and unavailability of annotated data which may require experienced annotators and is time-consuming. For this, data augmentation is the most obvious path to extend and enrich the existing small datasets by creating new samples close to original samples, leading hence to larger datasets. Motivated by the fact that data augmentation can be used to generalize any AI model based on deep learning to unseen data, improve its performance and prevent it from over-fitting, we presented a data augmentation technique based on noise estimation and injection of equal noise to original images to enlarge the training data. Unlike [1] who indicated that geometrical data augmentation in X-ray images decreased the detection accuracy, and similarly to [2], we show that using data augmentation could improve marginally the detection accuracy of the COVID-19.

References

[1] ELGENDI, Mohamed, NASIR, Muhammad Umer, TANG, Qunfeng, *et al.* The effectiveness of image augmentation in deep learning networks for detecting COVID-19: A geometric transformation perspective. *Frontiers in Medicine*, 2021, vol. 8.

[2] NISHIO, Takayuki, SHINKUMA, Ryoichi, et MANDAYAM, Narayan B. Estimation of Individual Device Contributions for Incentivizing Federated Learning. In: 2020 IEEE Globecom Workshops (GC Wkshps. IEEE, 2020. p. 1-6.

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P-12: The use and transfer of patient-generated health data to the hospital patient information system

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Introduction: In Finland, the eHealth national strategy aims to increase citizens' activity by improving information management and developing electronic services. Citizens are encouraged to increase their life management and self-care by using electronic services and by producing information that professionals can use in their work. [1.] The goal is that patient's self-generated electronic health data for health care professionals' use will reduce the handling and copying to patient records of paper forms completed at home. In healthcare, the information produced by the patient is information about the person's health and well-being, which has been agreed with a professional. Depending on the stage of the service process, the information can be preliminary or further information, for example. [2.] An electronic preliminary information form (EPIF) refers to preliminary information provided by the patient, typically via a web browser. This requires strong identification on the part of the patient so that the information is stored for the correct individual. Once approved by a healthcare professional, the information in the EPIF is stored and can be transferred to the patient information system. From the viewpoint of patient safety, the EPIF must be sufficiently easy to use so that all relevant health information about the patient is available to professionals. Integration of patient-generated information into the patient information system that is in use and sharing information between systems is considered important. [2-3.]

In recent years, an EPIF has been developed in the Northern Ostrobothnia Hospital District. Piloted in June 2019, the use of the form has expanded to six units in 2021. The aim of this abstract about the development work is to describe the process of the adopted EPIF as a whole, from when the patient fills in the data to when the data on the form are stored in the patient information system and adjacent systems.

Material and Methods: Before a scheduled appointment or procedure, EPIFs are activated for the patient to complete. The patient is instructed to log in via the Suomi.fi authentication service to complete the form using strong identification. If needed, a reminder to fill in the form can be sent by text message. The EPIF fetches the patient's personal information from Oberon and any information stored previously about the patient from the Esko electronic health record system, which can then be corrected by the patient if necessary. The patient fills in basic information, background information, information about medication, previous illnesses, symptoms, risks and procedures. Once the information reported by the patient has been checked by a nurse, most of it is immediately stored in the patient and anesthesiology information system where it can be viewed by all professionals.

Results: From the onset of implementation to the end of July 2021, a total of 270 healthcare professionals from seven different units have been trained to use the system. The EPIF has been activated for completion for 7,200 patients; of these, about 70% have completed it. By the end of 2021, the EPIF will be taken into use in several new units. The form has also been integrated into the digital care pathways of the Omapolku service. It will also be part of the electronic service portal OmaOys.

Discussion: It is vital that all the information needed prior to patient treatment and pre-procedure planning is collected in an appropriate and standardized manner. With information collected in a standardized manner, communication between professionals becomes more effective and the preliminary information obtained can be used for a variety of purposes, such as assessment of outcomes, research and for generating new information. [1,3.] A research project to assess the benefits and impact of the service is about to be launched. In the project, information will be gathered from professionals about time use, fluidity and quality of service when using traditional preliminary information forms compared to the use of the newly developed EPIF.

References:

[1] Tieto hyvinvoinnin ja uudistuvien palvelujen tukena - Sote-tieto hyötykäyttöön -strategia 2020 (Information to support well-being and service renewal. eHealth and eSocial Strategy 2020). 2014. Ministry of Social Affairs and Health, Finland. Available in Finnish: http://urn.fi/URN:ISBN:978-952-00-3548-8 [accessed 20.8.2021].

[2] Vuokko R, Penttinen J, Siira T, Lundkvist T. (2020) Itse- ja omahoidon kokonaisarkkitehtuuri (The overall architecture for self-care). 10/2020. Ministry of Social Affairs and Health, Finland. https://yhteistyotilat.fi/wiki08/display/THLSOTEKAAOJULK [accessed 9.8.2021].

[3] Tanni P. 2021. Utilization of Patient Generated Health Data: Experiences of the Health Care Professionals – an Integrative Literature Review. Master's thesis. University of Eastern Finland, Department of Health and Social Management, Health and Human Services Informatics. http://urn.fi/urn:nbn:fi:uef-20211086

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P-13: Computer vision to aid in the assessment of the patient's condition in the emergency department triage

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Introduction: Emergency departments (ED) in Finland provide emergency care in situations where care and treatment can´t be delayed until the next day. Emergency care includes an assessment of the need for treatment based on the patient´s condition. [1.] Assessment of the patient´s condition in ED triage is based on observations and physiological measurements made by a health care professional. Respiratory rate (RR) can be used to assess a patient's condition and as one of the components in the Early warning score (EWS), that is widely used in clinical decision making also in EDs. There are not many tools available to measure the RR of an unmonitored patient in triage, excluding manual counting which can be unreliable. In manual counting the result may be affected by the patient consciously slowing down their breathing or by a professional shortening the measuring time. Various studies in hospitals raise concerns with accuracy of this method, with a multisite study showing that measured values skew strongly to a textbook estimate of 18-20 breaths instead of a normal distribution and in a single site, only 36% of such measurements are correct. [2.] In a busy ED environment, where time pressure leads to error-prone manual measurement of RR not being consistently recorded, the importance of simple and reliable measurement methods is emphasized.

Methods: In September 2017 – November 2020, Oulu University Hospital (OUH) participated in the international InDemand project, looking for problems that arose in practice that could be solved with digital health solution in co-creation between hospital and technology companies. In the 2019 application round, the experts of the ED of OUH presented the challenge of developing an unmonitored patient's respiratory rate monitor, especially for the needs of the ED. NE Device SW from Oulu was chosen to solve the challenge with their technology competences. As a result of co-creation, a CE-marked software (Vitacam®) that measures vital signs, was developed. Vitacam uses live video from a digital camera as input, which it then processes on a server using computer vision to obtain the measurements. It analyses digital video to locate a subject's face, from which it automatically derives the chest region. From both these regions, the video is further analysed to obtain respiratory rate and heart rate. During the development phase, two formative evaluations were performed in OUH TestLab. Each evaluation involved testing of the actual software by target users such as ED professionals. The setup at the TestLab was comparable to an actual assessment room in an ED. After evaluations at the OUH TestLab, Vitacam was installed for pilot use in the OUH ED in June 2020. Third formative evaluation was conducted with pilot users. Evaluation received only 6 responses from ED professionals.

Results: Pilot use and evaluations conducted in OUH TestLab made it possible for the company to proceed with the development of Vitacam and start preparing for clinical evaluation and CE-marking. OUH TestLab also assisted the company in the review of the clinical evaluation report by finding a suitable clinical expert for the position. The direct clinical benefits of Vitacam are valid measurements of both RR and HR and contactless measurement. The indirect clinical benefits are improved patient safety through improved clinical data for decision-making. [2.]

Conclusion: The eagerness of ED professionals to test Vitacam in its actual operating environment was clearly lower than expected. ED as an operating environment poses challenges for the deployment of new digital health solutions. Solutions can have significant changes to a professional's workflow, making it difficult to approve the new solution. [3.] In order to successfully deploy an digital health solution such as Vitacam, it would be important to create a positive atmosphere in the ED for receiving new solutions, demonstrate the benefits that can be achieved by using the solution and take into account the requirements of a challenging operating environment. [5] Factors influencing the deployment of digital health solutions in the ED should be clarified, for example, through qualitative research.

References:
[1] Sosiaali- ja terveysministeriö (2017) Valtioneuvoston asetus kiireellisen hoidon perusteista ja päivystyksen erikoisalakohtaisista edellytyksistä. Sosiaali- ja terveysministeriön muistio 22.8.2017 [accessed 27.7.2021].
[2] Clinical evaluation report v1.3 (2021) NE Device SW
[3] Ackerman S, Tebb K, Stein JC, Frazee BW, Hendey GW, Schmidt L ym. (2012) Benefit or burden? A sociotechnical analysis of diagnostic computer kiosks in four California hospital emergency departments. Soc Sci Med.Dec;75(12):2378-85.
[4] Ylilehto M, Liljamo P, Raatiniemi L & Kanste O (2021). Leader's perceptions of the impact of increasing use of e-health services on assessing the need for treatment – qualitative study on secondary care emergency department. Finnish Journal of EHealth and EWelfare, 13(1), 32–48.

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P-14: Systemic requirements for innovation in a Nordic preventive healthcare ecosystem

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Introduction: Reporting on an ecosystem development in Finland and Sweden, which focuses on personalized health, functional food science and preventive healthcare rather than treatment of diseases, such as IBS and obesity, we elaborate on the challenges needed on multiple levels to co-create value on individual, organizational and population levels. Combining ecosystem participants' strategic perspectives requires close, frequent, and intensive interactions to facilitate intersubjective sensemaking that generates ecosystem level strategizing. Preventive healthcare constitutes a systemic endeavor in which multiple stakeholders create the means for consumers to engage and implement sustainable habitual and routine changes, which are driven by convenient access, intrinsic motivations and extrinsic social rewards and a multitude of different analog and digital solutions that need to be well integrated. The more we shift from treatment of diseases to person-centered wellbeing as well as to personalized preventive care, the more we downshift from special healthcare to population preventive care and need to consider the organizational and social sides in the pursue of reconstructing the ecosystems behind the current care models.

Exploring co-innovative ecosystems: It is of interest to acknowledge and evaluate the critical factors affecting the emerge of an ecosystem and its modularity. This study emphasizes the role of core competencies of each actor for a co-innovative ecosystem. That is, who are the actors and what are the determinants, the critical factors, that make all these actors to create and develop their ecosystem. It is of interest here to study why and how this alignment occurs and how does it pursue the development of personalized care for selected target groups. Secondly, within these ecosystems the role of core competencies as well as the access to them by the involved partners are studied. To what extent can the core competencies of the involved or potential partners be seen as critical elements of the ecosystems or as determinants for joining the ecosystem. Thirdly, to adopt modular ecosystems as strategic tools for gaining international opportunities to new personalized care services and solutions, the discussion between internationalization, international business strategy and ecosystems take place. Additionally, we emphasize the market exploration for Nordic and global business development concerning personalized care.

Methods: Firstly, we review the theoretical discussion of co-innovative ecosystems, Secondly, we stress to select and study earlier and recent ecosystems with export emphasis. There, we analyze the core competencies, the content, and the processes within the ecosystem. There, adopted practices, practical functioning, roles, and tools are acknowledged and evaluated and connected into the theoretical framework and contribution. We also elaborate on the issues that need considerations in the commercialization processes. Thirdly, we aim to understand how to overcome silos (between institutions, innovations, and technology processes) for better contribution to health (and selected chronical diseases target groups). That is, practical relevance and functioning, theory connection and -contribution orchestrate the research problem solving constructs. We review some insights of constructing a holistic ecosystem and contemplate on the radical innovation challenges that need overcoming to cater to the aspirations and realize preventive care. We elaborate on the issues that need considerations in the commercialization processes and which often faces resistance from cognitive biases and human nature, outlining some of the prominent issues that determine success for preventive individualized care.

Keywords: Preventive care ecosystem; nutrition; organizational strategies and internationalization strategies; overcoming challenges of radical innovations; preventive healthcare.

Finnish Society of Telemedicine and eHealth
eHealth2021 International Conference
The 26th Finnish National Conference on Telemedicine and eHealth

Finnish special competence for healthcare information technology

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[2]Chairman of the committee of the special competence for healthcare information technology

Healthcare information and communication technology has become an everyday companion for physicians, dentists and veterinarians. In Finland, the current availability of electronic medical record systems is 100% both in public and private care (1). Telemedicine and eHealth solutions are an inheritant part of digital transformation. They extend from professional consultation services to mHealth and self care solutions targeted to citizens (2). Digitalization is playing a major role in the Finnish social and health care strategy, and the expected outcomes depend on the success of digital services (3). However, the education process has not been well prepared to these needs.

Therefore, in 2012 Finland was to our knowledge the first country in Europe to establish a special competence for healthcare information technology to physicians and extend that since 2015 to dentists and since 2018 to veterinarians. The vision is that medical doctors, dentists and veterinarians could use their clinical expertise in the development of novel eHealth and mHealth solutions (4). The experienced network of experts could then collaborate with enterprises, research institutes and other actors in the field. The formalized special competence is providing a motivating professional career path to the individuals, too.

In order to qualify for the special competence program, one has to become first a medical specialist consultant. A five years experience in clinical work without specialization after a licenciate degree is enough for dentists and veterinarians. The special competence requires then two years practical service and theoretical studies. The practical service in the information technology domain can consist of e.g. developmental, educational or research duties. One can also serve in an enterprise or make own research. According to rules, the duties should be versatile, it is not enough to work with only one information system. The theoretical studies are collected from courses in universities and universities of applied sciences, from eHealth conferences and seminars. It is mandatory to participate international eHealth events. (5)

There are no formal exams, but the applicants have to fill a competence portfolio under a supervision of their mentor. Two external reviewers then give their opinions. After reading those opinions, the special competence committee organized by the Finnish Society of Telemedicine and eHealth makes its recommendation and the final degree of special competence is given by the Finnish Medical Association or the Finnish Dental Association or The Finnish Veterinarians Association, respectively. (5)

In June 2021 already 135 applicants have been enrolled to the program. There were 121 physicians, 13 dentists and 1 veterinarian among them. Of those enrolled, 83 physicians, 13 dentists and one veterinarian have achieved the full competence. Those still in process have received guidance for their studies from the special competence committee. Those graduated have found positions as leading healthcare information technology experts or in administrative tasks in regional or national health information technology projects.

This special competence gives already graduated doctors, dentists and veterinarians an ability to utilize their knowledge about healthcare processes for the benefit of the new eHealth and mHealth services. However, it is necessary to bring these skills in the future as a module to the basic medical education. Therefore University of Oulu has since 2016 produced a specific eHealth course for medical students (6).

References:
1. Reponen J, Kangas M, Hämäläinen P, Keränen N, Haverinen J (2018) Tieto- ja viestintäteknologian käyttö terveydenhuollossa vuonna 2017, Tilanne ja kehityksen suunta. Raportti 5/2018 THL (E-health and e-welfare of Finland. Checkpoint 2018. English abstract). http://urn.fi/URN:ISBN:978-952-343-108-9 (read 26.9.2020).
2. Reponen J (2015) Terveydenhuollon sähköiset palvelut murroksessa. Pääkirjoitus. Duodecim 131:1275–6.
3. Ministry of Social Affairs and Health (Sosiaali- ja terveysministeriö) (2015) Information to support well-being and service renewal. eHealth and eSocial Strategy 2020. Edita Prima, Helsinki. http://urn.fi/URN:ISBN:978-952-00-3575-4 (read 26.9.2020)
4. Reponen J, Tuomiranta M, Erkkilä E (2013) Terveydenhuollon tietotekniikasta erityispätevyysohjelma. Suomen Lääkärilehti 68 (13-14): 1031-1033, 2013.
5. Reponen J (2017) Finnish special competence for healthcare information technology to physicians and dentists: aims, contents and initial experiences. Finnish Journal of EHealth and EWelfare, 9(1), 42-45. https://journal.fi/finjehew/article/view/61134 (read 26.9.2020).
6. Honkanen Juha-Pekka (2017) Hands-on eHealth For Medical Students. HiMMS Europe Insights 5(4):42-43

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The International Society for Telemedicine & eHealth (ISfTeH)

ISfTeH | International Society for Telemedicine & eHealth

Your Global Partner in Digital health

Mission Statement
ISfTeH exists to facilitate the international dissemination of knowledge and experience in Telemedicine and eHealth, to provide access to recognised experts in the field worldwide, and to offer unprecedented networking opportunities to the international Telemedicine and eHealth community.

ISfTeH is THE international federation of national associations who represent their country's Telemedicine and eHealth stakeholders. The ISfTeH is also open to additional associations, institutions, companies and individuals with a keen interest in the subject of Telemedicine and eHealth, or with activities that are relevant to this field.

The ISfTeH fosters the sharing of knowledge and experiences across organizations and across borders and aims to promote the widespread use of ICT tools and solutions in health and social care in order to:

- improve access to healthcare services
- improve both prevention and quality of care
- reduce medical errors
- integrate care pathways
- share and exchange information with citizens/patients
- reduce costs

Since 2008, the ISfTeH has also been awarded the status of "NGO in Official Relation with the World Health Organization", making it the international reference in Telemedicine and eHealth for health policy makers from around the world. Through its national member associations and through courses and conferences, the ISfTeH does participate in the establishment of eHealth training and implementation plans, and provides assistance and education where needed. The newest element is Consortium of Educational Institutions in Digital Health (CONEDIG) which assist the CONEDIG-partners to coordinate their programs around Digital Health education issues (e.g., telemedicine, eHealth, m-Health, Medical Informatics, Bio-Medical Engineering such as teaching, research, development, practical applications in view of initial graduation and post-graduation.

Current Working Groups are as follows: Chronic Disease Management, Digital Transformation Leadership, eHealth Economics, Francophonie, Healthcare Disparities and Digital Health, Iberian and Iberian-American, Medical & Bio-Informatics, Practical Digital Health, Standards and Accreditation for Telehealth Services, Tele-Audiology, Tele-Cardiology, Tele-Dentistry, Tele-Dermatology, Tele-Nursing, Tele-Urology, Women (WoW)

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NGO in official
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Switzerland	Finland	Switzerland

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Finnish Journal of eHealth and eWelfare

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Finnish Journal of eHealth and eWelfare

http://www.finjehew.fi

Finnish Journal of eHealth and eWelfare (FinJeHeW) is a scientific journal established by the Finnish Society of Telemedicine and eHealth (FSTeH) and the Finnish Social and Health Informatics Association (FinnSHIA), and it also serves as the official journal for the members of the establishers.

The Journal was established in 2009. The aim of the Journal is to promote scientific research, communication and education in the fields of information and communication technology relating to social and health care, telemedicine, eHealth and eWelbeing.

Financial assistance has been granted to the journal by the Federation of Finnish Learned Societies since 2010. FinJeHeW benefits the members of the associations further by functioning as an information channel, multidisciplinary publication forum, and supporter for the international network.

The Journal welcomes articles on information and communication technology of social and health care, telemedicine, eHealth, and eWelbeing. Instructions for authors can be found on the Journal website. FinJeHeW is mainly a Finnish language journal, but also includes articles, abstracts and other material in English. All submitted manuscripts are evaluated by the editor. Manuscripts that are considered suitable for publication in the Journal are sent to two referees for assessment. The contents of this journal will be available in an open access format starting from autumn 2017. The Journal is published in electronic form and includes four issues per year.

Journal ISSN index is 1798-0798.

Contact information:

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Integrating the Healthcare Enterprise (IHE) Finland

IHE (Integrating the Healthcare Enterprise) on kansainvälinen yhteisö, joka määrittelee standardeihin perustuvia profiileja terveydenhuollon tietojärjestelmien integrointiin ja järjestää niitä tukevaa testausta ja esittelytilaisuuksia. Toimintaan kuuluu kansainvälinen ratkaisujen määrittely ja kansallisten käyttöönottojen ja tarkennusten tukeminen. IHE Finland on IHE Internationalin ja IHE Europen virallinen jäsen.

TAVOITELTUJA HYÖTYJÄ

- Integraation helpottaminen, standardien valinta ja edistäminen (mm. sähköisen potilaskertomuksen edistäminen)
- Toistettavan työn ja räätälöinnin väheneminen
- Tilaaja/toimittaja-kommunikaation tehostuminen
- Tuotteiden helpompi yhdistäminen muiden profiilia noudattavien kanssa
- Työnkulkujen tehokkuus, parhaat käytännöt
- Virhemahdollisuuksien väheneminen
- Tiedonsaannin tehokkuus
- Organisaatioiden sisäisen ja välisen integroinnin mallit
- Ratkaisujen toimivuuden testaaminen ja esittely
- Kansainväliset markkinat
- Testauksen järjestäminen

TOIMINTAMUODOT

- **Integrointiprofiilit** (standardien soveltaminen tiettyyn määriteltyyn työnkulkuun) - **Integration Profiles**
- **Testaustapahtumat** (profiilien mukaisten tuotetoteutusten testaus yhdessä) - **Connectathon**
- Projektikohtaiset testaustapahtumat: projektikohtaisten konfiguraatioiden (sanasto, dokumenttityypit, työnkulut jne.) testaaminen IHE-profiilien kanssa - **Projectathon**
- Vakiintuneiden "valmiiden" standardien suosiminen
- Domain-pohjaiset foorumit integrointivaatimusten keräämiselle, profiilien kehittämiselle, testaukselle, käyttäjäorganisaatioille ja yrityksille
- Koulutustilaisuudet ja webinaarit

MITEN MUKAAN

- Toiminnan suuntaamista tehdään suomalaisten toimijoiden ajankohtaisten tarpeiden pohjalta
- Tulossa työkokouksia painopisteiden tarkentamiseen, tukea konkreettisille kehityshankkeille
- Kotimaisissa hankinnoissa alettu vaatia IHE-profiileja ja viitata niihin kansallisissa määrittelyissä
- IHE Finland-kokoukset avoimia IHE Finland jäsenorganisaatioille
- Profiilit ja tehdyt selvitykset saatavilla ilmaiseksi arviointiin ja käyttöön
- Osallistu IHE Finlandin järjestämiin koulutuksiin!
- Seurantaa ja osallistumista varten yhteystiedot alla: http://www.hl7.fi/hl7-finland-liity-yhdistykseen http://www.hl7.fi/sig-toiminta/ihe-sig/
- Liity IHE Finlandin sähköpostilistalle ja LinkedIn-ryhmään!

LISÄTIETOJA

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Integrating the Healthcare Enterprise (IHE) Finland

IHE (Integrating the Healthcare Enterprise) is an international non-profit organization that works to improve the way healthcare systems share information electronically. IHE encourages the use of established interoperability standards such as HL7 and DICOM and strives to solve specific integration problems faced by its members in the real world through Integration Profiles. IHE Finland is a member of IHE International and IHE Europe.

BENEFITS OF USING IHE

- Optimize clinical workflow and strengthen the information link between different departments
- Streamline the flow of clinical information, reduce errors and improve efficiency
- Simpler integration and implementation
- IHE profiles fill the gap between standards and systems integration
- Clear path toward acquiring integrated systems
- Common framework and better communication for vendors and purchasers
- Flexibility while ensuring that key integration needs are met
- Provides common workflow and reduces the need for tailoring
- International development and publication of IHE Technical Frameworks

WAYS OF WORKING

- **Integration Profile Specification**: technical specifications for implementing standards
- **Connectathon**: opportunity for vendors to test the interoperability of their products with peer vendors
- **Projectathon**: tests your project specific configurations (vocabulary, document types, workflows, etc) in the context of the IHE profiles working together
- Prefences for established, complete standards
- Forum for collecting integration requirements, developing profiles and testing, for both vendor and user organizations

JOIN US

- IHE activities directed to the needs of Finnish organizations
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ADDITIONAL INFORMATION

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OULUHEALTH –
THE ECOSYSTEM THAT DRIVES INNOVATION

Decades of experience supporting a thriving ICT industry has turned Oulu into a magnet for anyone looking to push the envelope. This is the city where science, health and industry meet, which results in numerous health innovations and cooperation opportunities. A constant flow of people, innovative Health and Life Science companies and strong expertise in digital health, 5G/6G technologies, medical imaging and artificial intelligence make Oulu a perfect place to bring healthtech ideas to life.

Oulu is also home to **OuluHealth**, the ecosystem that has a unique culture of collaboration along a broad spectrum: academia and researchers, social and healthcare providers, businesses, local government and citizens. An important beneficiary of all of these connections is the Oulu University Hospital (OYS), slated to be the world's smartest hospital as a part of the Future Hospital 2030 project. In the future, it is also expected that Oulu will boast the New Health & Life Science Campus, which will aim at being a leading European centre for health and social care, research, testing, training, innovation and development.

OuluHealth is driving the change in digital health and care and strongly investing in the digital health research. The ecosystem focuses on developing RDI cooperation models between regional, national, and international knowledge partnerships and digital health innovation networks. Its primary goals include accelerating innovation, boosting the health tech business and bringing more advanced, personalised and connected health services to citizens. Many of the ecosystem's initiatives stimulate the development of healthcare professionals' innovation and testing capabilities as well as strengthen the use of data and solutions as part of predictive and reactive healthcare.

One of the ecosystem's greatest assets is the **OuluHealth Labs** where social and healthcare professionals are on hand to help test services and products in an authentic environment and with genuine users. The OYS TestLab, a part of the Oulu University Hospital, offers you authentic hospital spaces and functions for testing ideas with genuine users. The Oulu WelfareLab offers real-world facilities - for example, service homes and health centres - for testing processes and products. The Oamk SimLab gives you the opportunity to simulate your solutions and test ideas in the early stages of innovation and for training staff.

The OuluHealth ecosystem is designed to benefit all citizens by creating better healthcare services and solutions. Bring your knowledge, networks and passion to our community and make the future healthier.

www.ouluhealth.fi

Onko etävastaanotto uusi normaali?
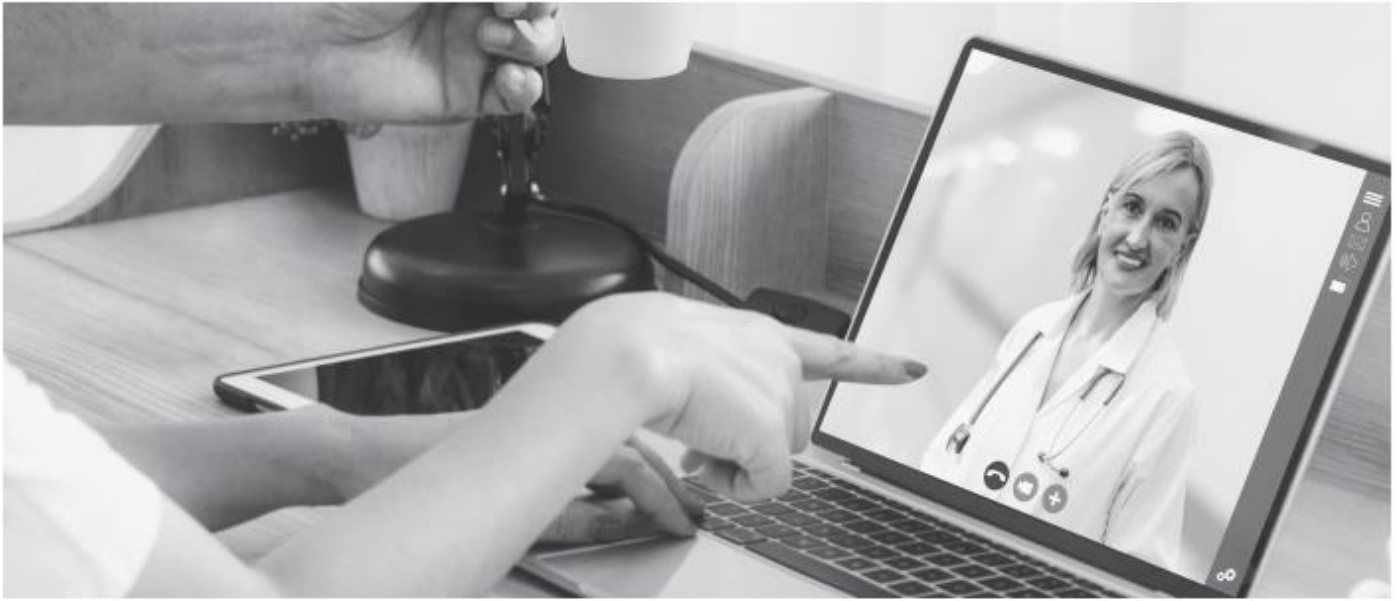
Mitä tapahtuu, kun koronapandemian aiheuttama poikkeuksellinen tilanne on ohi – jäävätkö uudet, pikavauhdilla ja ilman vaikuttavuusarviointia käyttöön otetut toimintatavat pysyviksi?

Terveyspalveluiden tulevaisuutta pohdittiin The Economistin järjestämässä webinaarissa Future Gazing: Healthcare in 2021 and Beyond, joka on katsottavissa InterSystemsin verkkosivuilta. Keskustelijat olivat digitaalisen terveydenhuollon huippuasiantuntijoita Yhdysvalloista ja Isosta-Britanniasta. Noin tunnin mittainen tallenne antaa hyviä vihjeitä suunnasta, johon olemme todennäköisesti menossa meilläkin.

Erikoissairaanhoito lähtee kotikäynnille

Accenturen Yhdysvaltain terveystoimialalle tarkoitettuja ohjelmisto- ja konsultointipalveluja luotsaava toimitusjohtaja **Kirstin Ficery** arvioi, että jatkossa erikoissairaanhoito tulee ihmisten koteihin. Tämän mahdollistaa teknologian kehitys ja uudenlaisten palveluyritysten syntyminen.

Etävastaanotot pystytettiin monin paikoin lähes yhdessä yössä, mutta potilaat ovat ottaneet ne hyvin vastaan. Ficery kertoi Accenturen potilaskyselystä, jonka vastaajista 60 prosenttia toivoi uuden teknologian jäävän käyttöön koronapandemian jälkeenkin. Potilaat kokivat saaneensa etävastaanotoilla yhtä hyvää tai parempaa hoitoa kuin ennen pandemiaa kasvokkain. Mieluisin vaihtoehto on etävastaanoton ja kasvokkain toteutettavien terveyspalveluiden yhdistelmä.

Uusista palveluista hyvä esimerkki on kuluttajaelektroniikka- ja kodinkoneliike Best Buyn asiakastukipalvelu Geek Squad, joka on ottanut valikoimaansa lääketieteellisten laitteiden asennukset ja käytön opastuksen. Näin kotona olevien potilaiden tilaa on mahdollista seurata entistä paremmin.

Tekoäly laskee kustannuksia ja parantaa tiedon laatua

Mobasher Butt toimii lääketieteellisenä johtajana yrityksessä nimeltä Babylon Health. Yrityksen kehittämä, tekoälyä hyödyntävä sovellus tarjoaa pääsyn NHS:n terveyspalveluiden pariin älypuhelimen kautta.

Butt uskoo, että tulevaisuuden maailmassa paras mahdollinen hoito on nykyistä useampien ulottuvilla. Tämä johtuu siitä, että digitalisaatio parantaa lääkäreiden käytössä olevan tiedon laatua, nopeuttaa parhaiden hoitokäytäntöjen leviämistä ja helpottaa konsultointia. Kroonisten sairauksien seuranta ja hoito helpottuu puhelinsovellusten avulla. Hyvää hoitoa voidaan toteuttaa AI-avusteisesti nykyistä halvemmalla.

Potilaiden toivomukset voidaan huomioida entistä paremmin

Johtaja **Don Woodlockin** vastuulla ovat InterSystemsin digitaalisten palveluiden alustat, joita terveyspalveluiden tarjoajat käyttävät kautta maailman. Hän uskoo digitaalisten työkalujen lisääntyvän käytön johtavan potilaskeskeisyyden kasvuun.

Potilaskeskeisyys saa puhtia siitä, että potilaan toivomukset hoitonsa suhteen on mahdollista kirjata digitaaliseen tietokantaan yhdessä hoitavan lääkärin kanssa. Kun tieto potilaan toiveista on omaisten ja kaikkien hoitoon osallistuvien nähtävissä, voidaan esimerkiksi saattohoito toteuttaa nykyistä useammin potilaan tahtoa kunnioittaen. Tätä on jo kokeiltu NHS:n Coordinate My Care -hankkeessa Isossa-Britanniassa.

Seuraavaksi hänen mukaansa yksittäisiä datalähteitä pitäisi onnistua hyödyntämään kokonaiskuvan muodostamiseksi, sillä tästä hyötyisivät sekä tutkijat että yhteiskunnan muut eri toimijat. Woodlock toteaa kuitenkin, että tähän tarkoitukseen data ei ole vielä tarpeeksi puhdasta. Hyvän eli puhdistetun datan avulla meidän olisi mahdollista tehostaa hoitoketjuja ja säästää yhteiskunnan varoja.

Prat Vemana on Kaiser Permanenten digitaalisten palveluiden johtaja, jonka vastuulla ovat Yhdysvalloissa 39 sairaalan ja yli 12 miljoonan potilaan digitaaliset palvelut. Hän on yhtä mieltä Ficeryn ja muiden keskustelijoiden kanssa siitä, että telelääketiede on tullut jäädäkseen. Hoidon saavutettavuus paranee lähivuosina huomattavasti, kun etähoidon välineistä ja niiden käytöstä tulee arkipäivää niin lääkäreille ja hoitajille kuin potilaillekin.

Vemana muistuttaa, että digitaaliset palvelut mahdollistavat terveyspalveluiden painopisteen siirtymisen hoidosta ennaltaehkäisyn suuntaan. Hänen mielestään tätä mahdollisuutta ei kannata jättää käyttämättä.

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The European Connected Health Alliance (ECHAlliance) was established in 2011 as a not for profit member organisation in order to connect the dots in digital health. Now **10 years** later we are the Global Health Connector connecting over **78 countries** and **4.4 billion** people across the globe using our network of international ecosystems.

We have built a global community that has grown considerably and we have some highlights we would like to share about our ecosystems network, membership, involvement in international projects and initiatives such as the Digital Health Society, the Digital Health Observatory and now the Global Health Connector Partnership. **READ MORE+**

Ecosystems

ECHAlliance have built and developed a network of **70+ International Digital Health Ecosystems** that stretch from Argentina to Australia and who meet at **over 220+ ecosystem gatherings** per year.

During 2020 we opened **15 new ecosystems** from **14 countries** expanding our network globally. We welcomed **5 new ecosystems in Latin America** including Argentina, Brazil, Mexico, Chile and most recently Uruguay. **READ MORE+**

70+ International Ecosystems

Members

Over the last **10 years** we have grown as a member organisation with **850 health organisations** #connectingthedots across the globe.

90% Public/ Not for profit/ Government agencies

From EU **75%**

Over **90%** of our members are public/not for profit organisations and **75%** are based in the EU.
Within our network there are **220** Education/Research organisations along with **70** patient groups and over **120** Hospitals and Healthcare Providers. **READ MORE+**

220	**70**	**120**
Education/Research organisations	Patient groups	Hospitals and Healthcare Providers

EU Projects

We have contributed to the transformation of health and care by delivering ambitious Research & Innovation projects. During 2020 we have collaborated with:

134 Partners from **23 Countries** in **10 EU Projects**

We will launch new projects in 2021 and continue our work to support international R&I collaboration in the new 2021-2027 EU programming period. **READ MORE+**

Events

During the last **10 years** we have been actively #connectingthedots across the world. In 2020 we connected **22 countries** by:

12 Hosting 12 of our own Global Events

10 Leading over 10 digital health sessions during 10 International Events

33 Speaking at 33 Global Events

We will organize the **8th Edition of the Digital Health & Wellness Summit** @ 4YFN during the Mobile World Congress in Barcelona on **29th June 2021** and are proud to announce that the **3rd DHS Summit** will take place **November 2021**.

We will continue to work with our strategic partners to provide more global opportunities and lead sessions featuring our members and ecosystems at ATA and HLTH Partner Events. **READ MORE+**

Global Health Connector Partnership

In response to the Global Pandemic during 2020 we took the decision to launch the Global Health Connector Partnership to start #connectingthedots globally across Africa, Australia, Canada, Europe, India, Latin America, the Commonwealth and USA... **READ MORE+**

DHS

Launched by the Ministry of Social Affairs of Estonia and the ECHAlliance, **The Digital Health Society (DHS)** movement was born during the Estonian EU Presidency in 2017 as a call for action.
The 1st objective of the DHS has been to bring together all stakeholders of the digital health ecosystem around the table to drive the agenda of the EU Presidency.

In 2020 we ran our **2nd Digital Health Society Summit** and **2 Round Tables** around health data topics. **READ MORE+**

the digital health **society**
Powered by ECHAlliance

2 Days programme
15 Sessions
9 Sponsors & Partners
40 International speakers

14 Virtual exhibitors
Over **550** registers
From **55** countries
150 New connections

DHO

In 2018 we launched the **Digital Health Observatory** to facilitate and promote the transfer of knowledge, creating a community of knowledge in Digital health open to all professionals of the health ecosystem from local to global.

digital health observatory
empowered by ECHAlliance
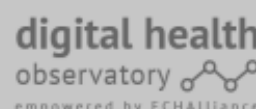
ECHAlliance is proud to build upon the success of the Digital Health Observatory by hosting **52 new articles** during 2020 and creating a **brand new** look and feel to the website. **READ MORE+**

Suomen telelääketieteen ja eHealth seura ry.
eHealth2021 kansainvälinen konferenssi
XXVI Kansallinen telelääketieteen ja eHealth seminaari

List of participants

Finnish Society of Telemedicine and eHealth Board of Directors

Ahonen	Outi	Laurea University of Applied Sciences
Jormanainen	Vesa	Finnish Institute for Health and Welfare
Kainu	Annette	Medzilla Oy
Kouri	Pirkko	FSTeH, ISfTeH
Klemola	Liisa	Savonia University of Applied Sciences
Numminen	Jari	Simakka Oy
Reponen	Jarmo	University of Oulu
Storm	Minna	Ecca Nordic
Virkkunen	Sanna	Solita Oy

Speakers

Ahonen	Outi	Laurea University of Applied Sciences
Alalääkkölä	Timo	Oulu University Hospital
Blobel	Bernd	University of Regensburg, Germany
Bryoen	Ole	Norwegian Directorate of eHealth, Norway
Eklund	Patrik	University of Umeå, Sweden
Erkkilä	Eila	City of Oulu
Hamilton	Clayton	WHO Europe, Denmark
Hardardottir	Gudrun Audur	National Centre for eHealth, Iceland
Haverinen	Jari	University of Oulu
Hyppönen	Konstantin	European Reference Networks, Belgium
Hyrkäs	Pauliina	Oulu University Hospital
Ilén	Elina	Aalto University
Jormanainen	Vesa	Finnish Institute for Health and Welfare
Jurmu	Liisa	Consortium of municipalities/Oulunkaari
Kaikkonen	Kari	Oulu University Hospital
Kainu	Annette	Medzilla
Kiuru	Krista	Ministry of Social Affairs and Health
Kjellerup Thorstholm	Therese	Sundhed.dk, Denmark
Klemola	Liisa	Savonia University of Applied Sciences
Korpelainen	Juha	Northern Ostrobothnia Hospital District
Kujala	Sari	Aalto University
Kyytsönen	Maiju	Finnish Institute for Health and Welfare
Leifsson	Andreas	Inera AB
Liisanantti	Janne	Oulu University Hospital
Liljamo	Pia	Northern Ostrobothnia Hospital District
Männistö	Merja	Oulu University of Applied Sciences
Määttä	Jussi	Buddy Healthcare Ltd
Nevala	Terhi	Northern Ostrobothnia Hospital District
Ohlsson	Anna-Maija	Vincit
Palojoki	Sari	Ministry of Social Affairs and Health
Parkkila	Pasi	Northern Ostrobothnia Hospital District
Perälä-Heape	Maritta	Centre for Health and Technology, University of Oulu
Piha	Tapani	Sitra
Pitkänen	Kauko	VetreaNeuron
Reponen	Jarmo	University of Oulu
Saarakkala	Simo	University of Oulu
Saastamoinen	Peppiina	The Finnish Medical Association
Sarlio-Siintola	Sari	Laurea University of Applied Sciences
Schrey	Aleksi	Finnish Student Health Service
Salovaara	Susi	University of Laplad
Sanerma	Päivi	HAMK University of Applied Sciences
Saranto	Kaija	University of Eastern Finland
Storm	Minna	Ecca Nordic

Finnish Society of Telemedicine and eHealth
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Teerikangas	Marjaana	City of Oulu
Tuovinen	Timo	University of Oulu
Turpeinen	Miia	Northern Ostrobothnia Hospital District
Vehko	Tuulikki	Finnish Institute for Health and Welfare
Voutilainen	Merja	Northern Ostrobothnia Hospital District
Äijö	Marja	Savonia University of Applied Sciences

Conference Delegates

Ahmed	Iqrar	University of Oulu
Airisto	Marko	Nortal Oy
Al-Rubaye	Mustafa	University of Oulu
Arolaakso	Sari	Laplan University of Applied Sciences
Arvonen	Miika	KYS
Autio	Anna	Oulu University Hospital
Autio	Olli	University of Oulu
Beddiar	Djamila Romaissa	University of Oulu
De Decker	Rik	Red Cross Children's Hospital, South Africa
Ehrola	Anne-Mari	Municipality of Liminka
Elo	Satu	Lapland University of Applied Sciences
Enqvist	Minna	Pohjois-Savon syöpäyhdistys Ry
Fernandes	Jefferson	ISfTeH, Brazil
Giunti	Guido	University of Oulu
Griffith	Michele	21stMD.com, United States
Grip	Jukka	Päijät-Häme Welfare Group
Haapanen	Tomi	Innokas Medical
Haikonen	Timo	Duodecim
Hakala	Emma	University of Oulu
Hakula	Jaakko	
Halonen	Jaakko	Terveystalo
Haque	Sanaul	University of Oulu
Harjula	Erkki	University of Oulu
Harkio	Arja	Northern Savonia Hospital District
Heikka	Juhani	Istekki Oy
Heikkinen	Krista	Kajaani University of Applied Sciences
Heikkinen	Mari	Kajaani University of Applied Sciences
Heikkinen	Tuija	Kajaani University of Applied Sciences
Heikkinen	Tuomo	Kajaani University of Applied Sciences
Henner	Anja	
Honkanen	Kati	Päijät-Häne Welfare Group
Huang	Jian-An	University of Oulu
Husman	Katariina	Laurea University of Applied Sciences
Hyvönen	Pekka	Oulu University Hospital
Hämäläinen	Matti	University of Oulu
Iivanainen	Sanna	
Jarva	Erika	University of Oulu
Jutila	Mirjami	University of Oulu
Juujärvi	Soile	Laurea University of Applied Sciences
Juntunen	Timo	Kajaani University of Applied Sciences
Juuso	Esko	Nutri-Flow Oy
Jääskelä	Jari	University of Oulu
Jääskeläinen	Petteri	Savonia University of Applied Sciences
Kaasinen	Outi	Heart2Save
Kaikkonen	Sanna	Kajaani University of Applied Sciences
Kaimio	Anne-Maarit	Pihlajalinna Oulu Oy
Karjalainen	Kirsi	Nortal Oy
Karsikas	Eevi	University of Oulu
Kelahaara	Eveliina	Päijät-Häme Welfare Group

Suomen telelääketieteen ja eHealth seura ry.
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Keltti	Heli	Northern Ostrobothnia Hospital District
Kemppainen	Anne	Kajaani University of Applied Sciences
Kemppainen	Jaana	Kajaani University of Applied Sciences
Keränen	Niina	University of Oulu
Keränen	Ville	Kajaani University of Applied Sciences
Kettunen	Petri	University of Helsinki
Kielo-Viljamaa	Emilia	Yrkeshöskolan Novia
Kiviaho	Mika	Central Finland Hospital District
Knuutila	Sanna	Northern Ostrobothnia Hospital District
Koivukangas	Mikael	Haaga-Helia
Koivisto	Jaana-Maija	HAMK University of Applied Sciences
Kokkonen	Antti	MediConsult Oy
Komulainen	Silja	Terveystalo
Kopperoinen	Tuomas	Pihlajalinna Lääkärikeskukset Oy
Korhonen	Janne	InterSystems B.V. Finland
Korniloff	Katariina	Jyväskylä University of Applied Sciences
Kujari	Mona	Oulu University Hospital
Kukkonen	Sanna-Leea	City of Oulu
Kulmala	Petri	University of Oulu
Kuosmanen	Pasi	Northern Savonia Hospital District
Kuusisto	Anne	Satasairaala
Kyllönen	Erja	Kajaani University of Applied Sciences
Lapinlampi	Anna-Kaisa	Kajaani University of Applied Sciences
Lehtinen	Hannamari	Helsinki University Hospital
Lehto	Tuomas	Duodecim
Lehtola	Anni	Kajaani University of Applied Sciences
Lievens	Frank	ISfTeH, Belgium
Lievens	Frederic	ISfTeH, Belgium
Lindberg	Minna	Kajaani University of Applied Sciences
Liukkonen	Katja	Helsinki University Hospital
Liuska	Jenni	University of Oulu
Liuski	Kimmo	Esko Systems Oy
Loimu	Aino	Lapland Hospital District
Lotvonen	Veera	Nortal Oy
Lukkarila	Pirjo	Oulu University Hospital
Lyytikkä	Johannes	Duodecim
Lähdesmäki	Raija	Oulu University Hospital
Lällä	Kaisa	Jyväskylä University of Applied Sciences
Lämsä	Elina	Novartis Oy
Mahlamäki	Anu	Duodecim
Malmqvist	Satu	Northern Ostrobothnia Hospital District
Marjala	Juha	Kajaani University of Applied Sciences
Mikkonen	Hanna	Northern Ostrobothnia Hospital District
Mikkonen	Juha	The Finnish Medical Association
Moilanen	Helena	Kajaani University of Applied Sciences
Moilanen	Mari	Northern Ostrobothnia Hospital District
Mujunen	Ville	Ninchat
Mustakangas	Jani	University of Oulu
Mäkelä	Anne	University of Oulu
Mäkinen	Joonas	Duodecim
Mäkitie	Laura	Helsinki University Hospital
Naakka	Hanna	HAMK University of Applied Sciences
Nenonen	Eeva	Northern Ostrobothnia Hospital District
Nevala	Elina	Karelia University of Applied Sciences
Niemi	Laura	NE Device SW Oy
Niskanen	Teemu	Duodecim
Nissinen	Sari	Finnish Institute of Occupational Health
Numminen	Sari	
Parviainen	Jonna	Lapland Hospital District
Pihlajaniemi	Vesa	

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Piippo	Esko	Medanets Oy
Pohjolainen	Laura	Johnson & Johnson Medical Devices
Pyykönen	Sanna	Nortal Oy
Pärnänen	Juha	Nortal Oy
Päivärinne	Miila	InterSystems B.V. Finland
Rajamäki	Jyri	Laurea University of Applied Sciences
Ranta	Juha-Matti	Medanets
Rautio	Minna	Kajaani University of Applied Sciences
Rostami	Mehrdad	University of Oulu
Rounaja	Reetta	Northern Ostrobothnia Hospital District
Saarela	Hanna-Leena	Esko Systems Ltd
Saaristo	Fia	MediConsult Oy
Saarivuori	Lauri	Terveystalo
Salo	Harri	
Salo	Sinikka	
Sankelo	Piia	Kela
Sarajärvi	Sanna	City of Oulu
Savola	Mikko	Monidor
Schmaus-Klughammer	Anna	Deggendorf Institute of Technology, Germany
Siilanen	Lempi	Kajaani University of Applied Sciences
Siltala	Juho	Northern Ostrobothnia Hospital District
Simi	Maarit	Astrazeneca
Sipilä	Jaakko	South Ostrobothnia Hospital District
Sipilä	Mari	Northern Ostrobothnia Hospital District
Sipilä	Mika	ProWellness Health Solutions Oy
Site	Aditi	Tampere University
Skarzynski	Piotr	Poland
Sneck	Sami	Northern Ostrobothnia Hospital District
Snicker	Elisa	Savonia University of Applied Sciences
Soininen	Katja	Kuopio University Hospital
Sutinen	Sonja	Kajaani University of Applied Sciences
Särestöniemi	Mariella	University of Oulu
Tauriainen	Eija	Kajaani University of Applied Sciences
Toivanen	Sanna	Kuopio University Hospital
Toppinen	Arto	Savonia University of Applied Sciences
Tuomikoski	Anna-Maria	Oulu University of Applied Sciences
Tuomikoski	Kirsi	Northern Ostrobothnia Hospital District
Vesa	Pirjo	Karelia University of Applied Sciences
Virrankari	Suvi-Tuulia	Kajaani University of Applied Sciences
Virranniemi	Annukka	Northern Ostrobothnia Hospital District
Virtanen	Arto	
Väyrynen	Anu	Kajaani University of Applied Sciences
Ylilehto	Marja	Northern Ostrobothnia Hospital District

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