Suomen Telelääketieteen ja eHealth seura
Finnish Society of Telemedicine and eHealth

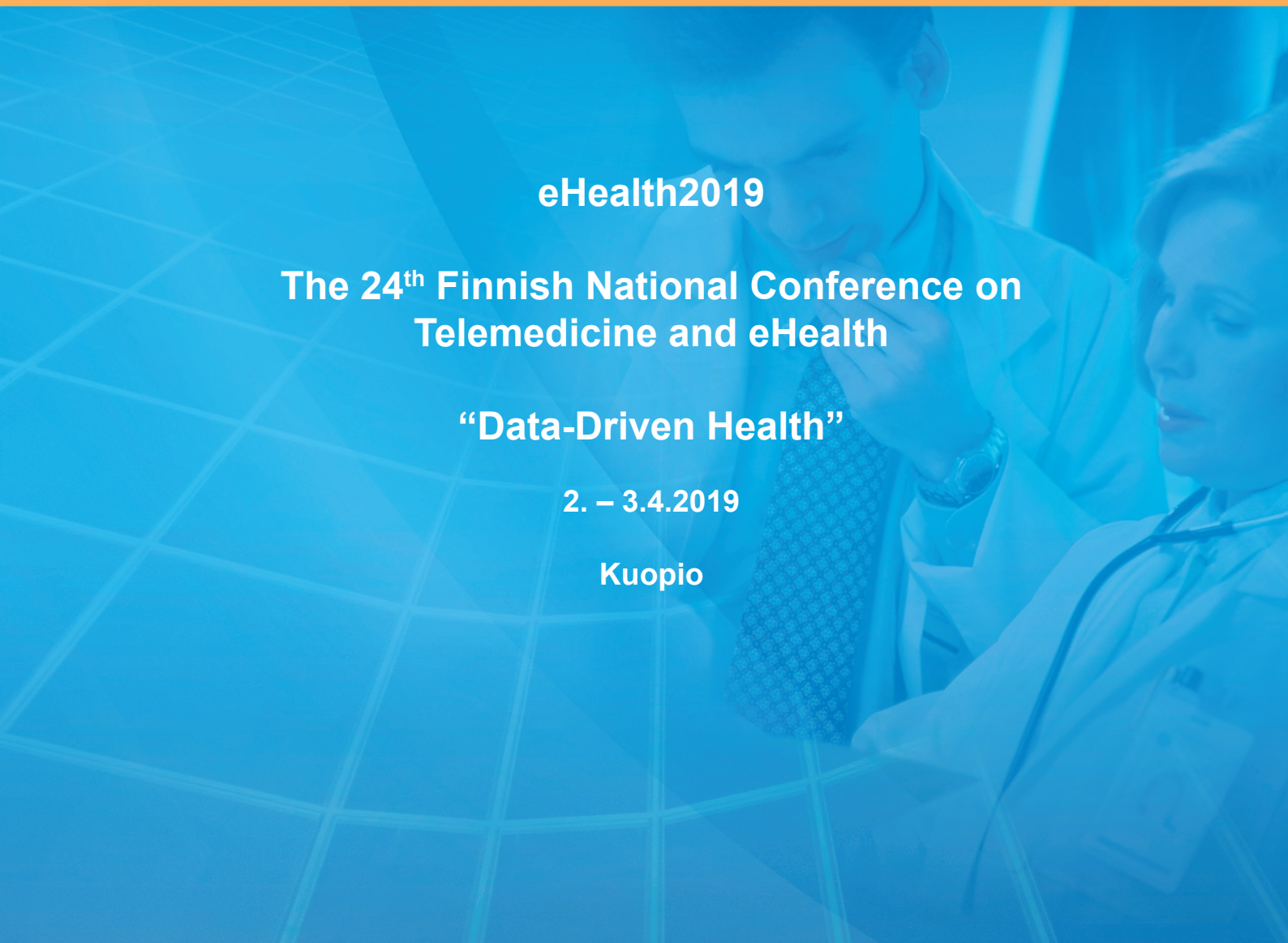
eHealth2019

The 24th Finnish National Conference on Telemedicine and eHealth

“Data-Driven Health”

2. – 3.4.2019

Kuopio



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Esipuhe

XXIV Kansallinen telelääketieteen ja eHealth seminaari

Arto Holopainen, puheenjohtaja
Suomen telelääketieteen ja eHealth seura ry.

Arvoisat kutsuvieraat, hyvät seminaaripäivien osallistujat,

Suomen telelääketieteen ja e-Health seuran puolesta minulla on ilo toivottaa teidät tervetulleeksi eHealth2019 ja 24. vuotuiseen kansalliseen konferenssiimme, jonka teemana on ”Tieto ei ole kaakana”.

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

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

Suomen telelääketieteen ja eHealth seura tukee stipendein suomalaisen eHealth osaamisen näkymistä kansainvälisesti. Osallistumme terveydenhuollon tietotekniikan standardointityöhön kotimaisen IHE (Integrated Healthcare Enterprise) Finland –ryhmän, Euroopan standardointikomitean (CEN) ja muiden kansainvälisten stardardointiorganisaatioiden kautta. Seuramme on perustajajäsen pohjoismaisessa Nordic Telehealth Association (NTA) järjestössä sekä International Society for Telemedicine and eHealth (ISfTeH) järjestössä. Seuramme sihteeri Pirkko Kouri palvelee yhdellä ISfTeH:n hallituspaikoista järjestön varapuheenjohtajana.

Vuoden 2019 konferenssissa käsitellään teemoja ja tuodaan uusinta tietoa kansainvälisestä, pohjoismaisesta sekä kansallisesta digitaalisesta terveydenhuollon kehityksestä ja ratkaisuista. Kohtauspaikkana seminaari tarjoaa tuoretta tietoa niin lääkäreille, hoitohenkilökunnalle kuin hallinnosta, suunnittelusta ja koulutuksesta vastaaville. Konferenssin vierailukohteet tarjoavat näköalapaikan uusien ratkaisujen käytännön soveltamisesta terveydenhuoltoon ja ihmisten arkeen. Konferenssi sisältää englanninkielisen ja suomenkielisen rinnakkaisohjelman. Konferenssimme tarjoaa jälleen tänä vuonna tutkijoille mahdollisuuden tiiviisiin ”5 Minute Rapid Scientific” esityksiin.

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

Erityinen kiitos seminaaristamme kuuluu yhteistyökumppanillemme Kuopion yliopistolliselle sairaalalle, joka on vastannut viestinnästä, käytännön järjestelyistä ja paikallisten tutustumiskäyntien organisoinnista.

Toivotan kaikille osanottajille hyviä seminaaripäiviä!

Arto Holopainen

Foreword

The 24th Finnish National Conference on telemedicine and eHealth

Arto Holopainen, President
Finnish Society of Telemedicine and eHealth

Dear invited guests, dear participants of the conference,

It is my great pleasure to warmly welcome all of you to our eHealth2019 and 24th annual conference, which theme this year is “Data-Driven Health”.

Finnish Society of Telemedicine and eHealth (FSTeH) has 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 Finnish 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 continuous education and training of health professionals in the eHealth sector by coordinating special competence for healthcare information technology to physicians and dentists together with Finnish Medical Association and Finnish Dental Association. Our conference will contribute 10 hours of theoretical training for Finnish physicians’ and dentists’ special competence for healthcare information technology.

Our society supports the international visibility of Finnish eHealth expertise by scholarships and our representatives participate to healthcare information technology standardization with IHE (Integrating Health Care Enterprise) Finland, European Committee for Standardization (CEN) and other international standardization organizations. Our society is a founding member of Nordic Telehealth Association (NTA) and International Society of 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 offers unique meeting place and new information to physicians, young researchers, nursing staff as well as to responsible persons for management, research, development and education. The site-visit present interesting solutions for the better and effective healthcare. Conference includes parallel English and Finnish tracks as well joint plenaries. In order to help scientists strive for brevity and clarity in their communications, we offer this year again a compact style of presentation called "5 Minute Rapid Scientific" presentations.

On behalf of Finnish Society of Telemedicine and eHealth I would like to express my gratitude to all lecturers and scientific abtract 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, Kuopio University Hospital. They have been responsible for communication, practical arrangements and organizing local visits.

I wish everybody a very successful conference!

Arto Holopainen

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.

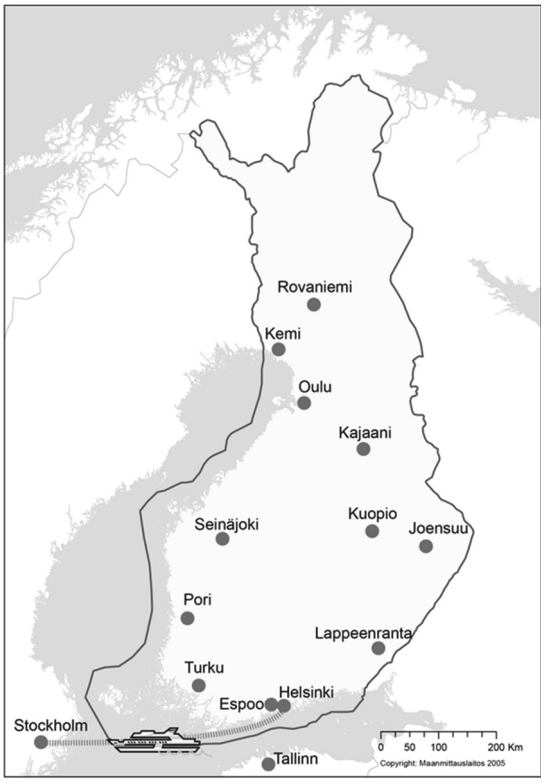
The board accepts the members based on application. Membership will be available for individuals or companies and organisations, as well as supporting membership. Foreign and overseas members do not pay an annual fee, if they submit a regular report of the progress of eHealth in their respective countries

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

- 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



Kuopion yliopistollinen sairaala

Pohjois-Savon sairaanhoitopiiri on Pohjois-Savon 18 kunnan omistama kuntayhtymä, joka koordinoi Kuopion yliopistollisen sairaalan toimintaa. KYS vastaa 247 000 pohjoissavolaisen erikoissairaanhoidosta ja lähes miljoonan itä- ja keskisuomalaisen erityistason erikoissairaanhoidosta.

KYSin erityisvastuualueeseen kuuluvat Pohjois-Savon sairaanhoitopiirin lisäksi Pohjois-Karjalan sairaanhoito- ja sosiaalipalvelujen kuntayhtymä, Keski-Suomen ja Itä-Savon sairaanhoitopiirit sekä Etelä-Savon sosiaali- ja terveyspalvelut. Lisäksi KYSiin on keskitetty valtakunnallisesti vaikean epilepsian diagnostiikka ja kirurgiset toimenpiteet.

KYS on yksi Suomen viidestä yliopistosairaalasta. Se antaa korkeatasoista hoitoa kaikilla lääketieteen erikoisaloilla, tekee kansainvälisesti arvostettua tutkimusta ja kouluttaa tulevaisuuden huippuosaajia. KYS on Suomen suurin lääkärikouluttaja ja maamme suurimpia terveydenhuoltoalan opetussairaaloita.

Erikoissairaanhoidon ohella Pohjois-Savon sairaanhoitopiiri tuottaa perusterveydenhuollon ja vanhusten laitoshuollon palvelut seitsemälle pohjoissavolaiselle kunnalle eli Kysteri-alueelle. Sairaanhoitopiiri vastaa myös koko Pohjois-Savon alueen ensihoitopalveluista.

Laadukas ja tehokas

Toiminta perustuu laatuun ja tehokkuuteen. KYS sai vuonna 1999 ensimmäisenä kokoluokkansa sairaalana Euroopassa SFS ISO 9001:2008 –standardin mukaisen laatusertifikaatin.

Sairaalan tärkein tehtävä on antaa potilaille parasta mahdollista hoitoa. Ennen kaikkea KYS onkin sairaala, jonka potilaat ovat mielipidetiedustelujen mukaan erittäin tyytyväisiä saamaansa hoitoon.

KYS lukuina

- 4 500 työntekijää
- 97 000 hoidettua potilasta
- 509 000 poliklinikkakäyntiä
- 2 100 synnytystä
- 21 000 leikkausta

KYS

Kuopio University Hospital

Operations and tasks

Kuopio University Hospital caters for the specialist medical care of the 247,000 citizens in its area. It also caters for the nearly one million inhabitants in Eastern and Central Finland that require specialist medical care for especially demanding cases.

As one of Finland's five university hospitals, Kuopio University Hospital provides high-quality care in all medical specialities, conducts internationally-renowned research, and trains the top experts of the future. The hospital is the largest trainer of physicians in Finland, and one of the largest health care industry teaching hospitals in the country.

Quality and efficiency

The operation of the hospital is based on quality and efficiency. In 1999, Kuopio University Hospital was the first hospital of its size in Europe to be awarded a quality certificate according to the SFS ISO 9001:2000 standard.

The most important task of a hospital is to provide the best possible care for its patients. According to opinion surveys, Kuopio University Hospital's patients are highly satisfied with the care they have received.

Tasks

Kuopio University Hospital is located in its namesake city of Kuopio, home to more than 100,000 inhabitants. The Puijo main hospital is located in the vibrant Kuopio Science Park area that also hosts the University of Eastern Finland, Savonia University of Applied Sciences, and numerous companies and research centers. The park has evolved into a tight collaborative innovation area where the worlds of business and science can inspire one another.

The activities of Kuopio University Hospital are co-ordinated by the Kuopio University Hospital District Municipal Federation, which is owned by 18 municipalities in North Savo. The hospital district caters for the specialist medical care of the 247,000 citizens in North Savo and that of close to a million inhabitants in Eastern and Central Finland who require specialist medical care for especially demanding cases.

In addition to the Kuopio University Hospital District, the specialist medical care area of Kuopio University Hospital also covers the North Karelia Central Hospital and Honkalampi Centre and the hospital districts of Central Finland, South Savo and East Savo. Furthermore, the diagnostics and surgical operations of severe epilepsy has been centralised nationally at Kuopio University Hospital.

Along with specialist medical care, the Kuopio University Hospital District provides primary health care and institutional care services for the elderly for seven municipalities, or Kysteri areas, in North Savo. The hospital district is also in charge of emergency

Kiitokset / Acknowledgements

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www.careligo.se

Cephalon Finland A/S
www.cephalon.eu

City of Kuopio
www.kuopio.fi

DDD Medical
www.ddd-medical.com

ESiOR Oy
www.esior.fi

Games for Health Finland
www.gamesforhealth.fi

Kuopio Center for Gene and Cell Therapy KCT
www.kct.fi

KuopioHealth
www.kuopiohealth.fi

Mediconsult Oy
www.mediconsult.fi

MediQ
www.mediq.com

MedHelp
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Neurocenter Finland
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RISE Research Institutes of Sweden
www.ri.se

Savonia University of Applied Sciences
www.savonia.fi

Federation of Finnish Learned Societies
www.tsv.fi

Timmi
www.timmi.fi

University of Eastern Finland
www.uef.fi

Visiba care
www.visibacare.se

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www.wolterskluwer.com

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Ohjelma

TIISTAI 2.4.2019 (Finnish track)

Paikka: Kuopion yliopistollinen sairaala, AA rakennus

8.30 Ilmoittautuminen avautuu

Sessio 1 – Data-Driven Health (sessio englanniksi) — Auditorium 1

Chair President, Chief Innovation Officer Arto Holopainen, Finnish Society of Telemedicine and eHealth, City of Kuopio

9.30 Finnish Society of Telemedicine and eHealth opening words
President Arto Holopainen
Finnish Society of Telemedicine and eHealth

9.40 Kuopio University Hospital opening words
Executive Vice President, Research and Innovations Esko Vanninen
Kuopio University Hospital

9.50 Greeting from the Ministry of Social Affairs and Health, Finland
Leader of Change Sinikka Salo
Ministry of Social Affairs and Health, Finnish Government

10.10 Ilkka Winblad Honorary Lecture: Data-Driven Health
Global Strategist Digital Health Lucien Engelen
Deloitte Center For the Edge

10.40 Delivery of Finnish national eHealth awards

10.50 Kahvitauko ja näyttelyyn tutustuminen

Posterit

Näyttely

Sessio 2A: Tietoaltaiden hyötykäyttö (Session in Finnish) — Auditorium 1

Puheenjohtaja tutkimus- ja innovaatiojohtaja Esko Vanninen, Kuopion yliopistollinen sairaala

11.05 Puheenjohtajan johdatus aiheeseen

11.10 Sotetiedon toissijaisen käytön uudet mahdollisuudet
Professori, tutkimusylilääkäri Päivi Rautava
Turun yliopisto, Turun yliopistollinen sairaala

11.25 Mitkä ovat tietoaltaan koostamisen edellytykset?
Dosentti Arho Virkki
Auria tietopalvelu, Varsinais-Suomen sairaanhoitopiiri

11.40 Tietoaltaat: Data-analytiikan, tiedon tuotannon ja terveystaloustulosten hyödyntäjän aarreaitta
Toimitusjohtaja Erkki Soini
ESiOR Oy

11.55 Koko sote-ketjun hallinta tiedon avulla, case: Siun-sote
Hallintoylilääkäri Petri Kivinen
Siun-Sote

5 min rapid scientific presentation

12.10 O-1: Enabling Innovation Activities in Public Hospitals

12.15 O-2: Child placement costs and cost drivers: Isaacus Kuopio data lake project

12.20 O-3: Paramedic student perceptions of the technical and pedagogical usability of a virtual reality simulation

12.25 Presentations from exhibition
- **Neurocenter Finland**
- **ESiOR Oy**

12.35 Lunch

Sessio 2B (English)

Posterit

Näyttely

Program

TUESDAY April 2nd 2019 (English track)

Venue: Kuopio University Hospital, AA Building

8.30 Registration opens

Session 1 – Data-Driven Health (sessio englanniksi) **Auditorium 1**
Chair President, Chief Innovation Officer Arto Holopainen, Finnish Society of Telemedicine and eHealth, City of Kuopio

9.30 Finnish Society of Telemedicine and eHealth opening words
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9.40 Kuopio University Hospital opening words
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9.50 Greeting from the Ministry of Social Affairs and Health, Finland
Leader of Change Sinikka Salo
Ministry of Social Affairs and Health, Finnish Government

10.10 Ilkka Winblad Honorary Lecture: Data-Driven Health
Global Strategist Digital Health Lucien Engelen
Deloitte Center For the Edge

10.40 Delivery of Finnish national eHealth awards

Posters **Exhibition**

10.50 Networking break, coffee, exhibition and posters

Session 2B: Smart Care (Session in English) **Auditorium 2**
Chair CEO Minna Storm, Ecca Nordic

11.05 Chair's introduction to the topic

11.10 Panel Discussion, Smart Care

Omaolo – new generation self-care services (3min opening)
Product Owner Jari Numminen
Sotedigi Oy

Health Village – Digital Leap for the Patient (3min opening)
Director of eHealth Services Sirpa Arvonen
Helsinki University Hospital, Finland

Future Care of Patients with Chronical Diseases (3min opening)
Head – Digital Health Peter Kjäll
RISE Research Institutes of Sweden

Winter is Coming (3min opening)
Global Strategist Digital Health Lucien Engelen
Deloitte Center For the Edge

Digital Nutrition support – APPetitus experiences (3min opening)
Professor Anne Moen
University of Oslo, Norway

5 min rapid scientific presentation

12.10 O-4: Risk Factors of Hospitalization

12.15 O-5: Digital narrative as a tool for interaction and social inclusion

12.20 O-6: The feasibility and effectiveness of remote fitting of cochlear implants

12.25 Presentations from exhibition
- **Visiba Care**
- **Wolters Kluwer**

Session 2A (Finnish) **Posters** **Exhibition**

12.35 Lunch

TIISTAI 2.4.2019 (Finnish track)

Sessio 3A: eKoulutus ja eTutkimus (Session in Finnish) — **Auditorium 1**
Puheenjohtaja professori Jarmo Reponen, Oulun yliopisto

		Session 3B (English)	Posterit	Näyttely	Työpaja: Sosiaaliset robotit (osa 1/2)
13.50	**Puheenjohtajan johdatus aiheeseen**				
13.55	**DigiCampus - Korkeakoulujen yhteinen digitaalinen oppimisympäristö** Hankejohtaja Tuula Heide *Itä-Suomen yliopisto*				
14.05	**Sosiaali- ja terveys alan digitalisaation vaatiman osaamisen vahvistaminen korkea-asteen koulutuksessa** Lehtori Outi Ahonen *Laurea-ammattikorkeakoulu*				
14.15	**Lääketieteen alojen koulutuksen digitalisaatio ja modernisaatio MEDigi-hankkeessa** Työelämäprofessori Jarmo Reponen *Oulun yliopisto*				
14.25	**Tietojärjestelmälääkäri vuonna 2025** Yleislääketieteen erikoislääkäri, vastaava lääkäri Tove Laivuori *Mehiläinen Oy*				
14.40	**Kansallinen SoTe-digitalisaatiotutkimus - manuaalisista raporteista vuorovaikutteiseen seurantaan** Tutkimuspäällikkö Hannele Hyppönen *Terveyden ja hyvinvoinnin laitos (THL)*				
	5 min rapid scientific presentations				
14.55	**O-7: DigiNurse Model develops nursing students´ digital skills**				
15.00	**O-8: Nurses' Satisfaction with Medication Administration System**				
15.05	**O-9: Ubiquitous learning environments promoting deeper and more efficient learning**				
15.10	**Presentations from exhibition** • **Neurocenter Finland** • **Mediq Oy**				
15.20	**Networking break, coffee, exhibition and posters**				

Sessio 4A: Mobiilit terveysratkaisut (Session in Finnish) — **Auditorium 1**
Puheenjohtaja johtajaylilääkäri Päivi Metsäniemi, YTHS

		Session 4B (English)	Posterit	Näyttely	Työpaja: Sosiaaliset robotit (osa 2/2)
16.00	**Puheenjohtajan johdatus aiheeseen**				
16.05	**Liikkuvat terveysasemat - Kokemuksia Eksote:sta** Tietohallintojohtaja Toni Suihko *Eksote*				
16.20	**Mobiilit terveysratkaisut Ruotsissa** Senior Advisor Nima Jokilaakso *Business Finland*				
16.35	**mHealth –palvelut käytännössä** Yksikönjohtaja, Terveystalo Digiterveys Annette Kainu *Terveystalo*				
16.50	**Etädiagnostiset työvälineet** Johtajaylilääkäri Päivi Metsäniemi *Ylioppilaiden terveydenhoitosäätiö YTHS*				
	5 min rapid scientific presentations				
17.05	**O-13: Digital treatment path for children attending HUS Child Psychiatry**				
17.10	**O-14: Cost-benefit evaluation of digital HealthyWeightHub: Virtual Hospital 2.0**				
17.15	**O-15: Differences in lifestyle patterns in association with insulin sensitivity and secretion profiles in a high-risk for diabetes Finnish population**				
17.20	**Presentations from exhibition** • **Ninchat** • **Timmi**				
17.30	**Suomen telelääketieteen ja eHealth Seura ry:n vuosikokous (Auditorio 1)**				
19.30	**Illallinen** Original Sokos Hotel Puijonsarvi (Osoite: Minna Canthin katu 16, Kuopio)				

TUESDAY April 2nd 2019 (English track)

Session 3B: Data-driven Precision Medicine (Session in English) — **Auditorium 2**
Chair: Biobank Director, Professor Veli-Matti Kosma, Biobank of Eastern Finland

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

13.55 **The Future of Genomic medicine**
Professor Juha Kere
King's College London, Karolinska Institutet & University of Helsinki

14.10 **Personalised Medicine and Oncology**
Professor Outi Kuittinen
University of Eastern Finland, Kuopio University Hospital

14.25 **Data-driven future supported by research and innovation competence centers**
Director, Professor of Practice Maritta Perälä-Heape
Centre for Health and Technology, University of Oulu, Finland

14.40 **Precision Care for Health Self-Management in Smart Environments**
Professor Anthony Maeder
Flinders University, Australia

5 min rapid scientific presentations

14.55 **O-10: Implementation of an eHealth application in myeloma treatment: a longitudinal feasibility study for patients and health care professionals**

15.00 **O-11: Digitalized secondary care services for insulin-dependent diabetes patients – Predictive cost-benefit analysis of Virtual Hospital 2.0 digital care path**

15.05 **O-12: How to succeed in implementing welfare technology to elderly care**

15.10 **Presentations from exhibition**
- **DDD Medical**
- **MedHelp**

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

Session 3A (Finnish) | **Posters** | **Exhibition** | **Workshop: Social Robots (part 1/2)**

Session 4B: Patient Safety in Practice (Session in English) — **Auditorium 2**
Chair Patient Safety Manager Kaisa Haatainen, Kuopio University Hospital

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

16.05 **How to improve interdisciplinary information flow?**
Professor Kaija Saranto
University of Eastern Finland

16.25 **Smart sensors will protect the patient safety in telemedicine**
Chief Information Security Officer Jenni Siermala
SoteDigi Oy

16.45 **Integrating Clinical Decision Support into the Workflow to Support Clinical Practice and Patient Activation**
Associate Professor Patricia Dykes
Brigham and Womens' hospital

5 min rapid scientific presentations

17.05 **O-16: Health Technology Assessment Framework for mHealth, Artificial Intelligence and Robotics**

17.10 **O-17: Triage Service user interface testing with end users to meet the requirements of new Medical Devices Regulation**

17.15 **O-18: Cost-benefit predictions of the Virtual Hospital 2.0 digitalized secondary care path for women with endometriosis in Turku area and in Finland**

17.20 **Presentations from exhibition**
- **CARELIGO**
- **Wolters Kluwer**

17.30 **General Assembly of Finnish Society of Telemedicine and eHealth (Auditorium 1)**

19.30 **Dinner**
Original Sokos Hotel Puijonsarvi (Address: Minna Canthin katu 16, Kuopio, Finland)

Session 4A (Finnish) | **Posters** | **Exhibition** | **Workshop: Social Robots (part 1/2)**

KESKIVIIKKO 3.4.2019 (Finnish track)

Vierailut

8.30 **Linja-auto kuljetus vierailuihin (osaan kohteista)**
HUOM! Vierailukohteissa rajallinen määrä osallistumispaikkoja.

1. Kuopion yliopistollinen sairaala (KYS) Itä-Suomen Mikrokirurgiakeskus
2. Kuopion yliopistollinen sairaala; älylääkekaapit ja PET radiofarmasia
3. Itä-Suomen yliopisto, Human Measurement and Exercise Analysis (HUMEA) laboratorio
4. Savonia-ammattikorkeakoulu: Soveltava hyvinvointiteknologia
5. Mäntykampus, ikäystävällinen asumisympäristö, asumisyksiköt (reference site for European Innovation Partnership on Active and Healthy Ageing, EIP AHA)
6. Pelastusopiston harjoitusalue
7. Apteekkien lääkevarastoautomaatio
8. KCT Kuopio Center for Gene and Cell Therapy

10.30 **Kahvitauko ja näyttelyyn tutustuminen**

Sessio 5A: Innovaatiot (Session in Finnish) — Auditorium 1

Puheenjohtaja kouluttajalääkäri Kirsimarja Metsävainio, Kuopion yliopistollinen sairaala

11.00 **Puheenjohtajan johdatus aiheeseen**

11.05 **Innovaatiotoiminnan käynnistäminen yliopistollisessa sairaalassa**
Suunnittelija Pauliina Hyrkäs
Oulun yliopistollinen sairaala

11.20 **Kansalaiset innovaatiotoiminnan keskiössä**
Projektipäällikkö Pauliina Kämäräinen
Kuopion kaupunki

11.35 **Ideasta tuotteeksi - kokemuksia yritystoiminnan käynnistämisestä**
Toimitusjohtaja Mikko Kokkonen
Healthcare Mobile Solutions Oy

11.50 **Innovatiiviset hankinnat työn kehittämisen mahdollistajana**
ICT-arkkitehti Aki Lehto
Tampereen yliopistollinen sairaala

5 min rapid scientific presentations

12.05 **O-19: Large-scale implementation, adoption and use of the Finnish national My Kanta Pages patient portal service in 2010–2018**

12.10 **O-20: The ideas of older people about usability of the Nao robot in their casual activities**

12.15 **O-21: Using Cloud Server to Capture Real-time Blood Pressure to Predict the Adaptation of diagnostic digital pathology in Finland**

12.20 **Presentations from exhibition**

- **Cephalon Finland A/S**
- **Mediconsult Oy**

Session 4B (English) | **Posterit** | **Näyttely**

12.30 **Lounas**

Sessio 6: Visions of Future Health (session englanniksi) — Auditorium 1

Chair Principal Lecturer and Vice-President Pirkko Kouri, Savonia UAS and International Society of Telemedicine and eHealth

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

14.05 **The digital transformation of Health and Care**
Head of the eHealth Unit Marco Marsella
European Commission

14.30 **Telemedicine in Japan now and future**
Professor Hiroshi Kondoh
Tottori University, Japanese Telemedicine and Telecare Association, Japan

14.55 **Enhanced Health Expertise through Artificial Intelligence**
Professor Timo Honkela
University of Helsinki, Finland

15.20 **Summary and closing words**
President Arto Holopainen
Finnish Society of Telemedicine and eHealth

15.30 **Farewell**

WEDNESDAY April 3rd 2019 (English track)

Site visits

8.30 Bus transportation to site visits (when applied)

Note! Site visits have limited seats available.

1. Microsurgery Centre of Eastern Finland
2. Kuopio University Hospital; smart medicine cabinets and PET radiopharmacy
3. University of Eastern Finland (UEF) Human Measurement and Exercise Analysis (HUMEA) laboratory
4. Savonia University of Applied Sciences: Applied Wellbeing Technology
5. Mäntykampus, an elder-friendly living area (reference site for European Innovation Partnership on Active and Healthy Ageing, EIP AHA)
6. Emergecy Services College's Training Ground
7. Medicine storage automation for pharmacies
8. KCT Kuopio Center for Gene and Cell Therapy

10.30 Networking break, coffee and exhibition

Session 5B: Artificial Intelligence & Robotics in Health (Session in English) **Auditorium 2**
Chair: Professor Pasi Karjalainen, University of Eastern Finland

11.00 Chair's introduction to the topic

11.05 AI in Medical Imaging Diagnostics
Professor Simo Saarakkala
University of Oulu, Finland

11.20 AI in multimodality diagnostics of dementia
Chief Scientific Officer Jyrki Lötjönen
Combinostics Ltd.

11.35 Robots in Health and Welfare - recent advanced in Japan
Professor Nobuhiro Sakata
Dokkyo Medical University, Japan

11.50 Ethical questions using robotics in older people's care
Senior Lecturer, PhD Riitta Turjamaa
Savonia University of Applied Sciences, Unit of Health Care, Finland

5 min rapid scientific presentations

12.05 O-22: Development Path and Training of eProfessionals for Becoming Promoters of Digitalisation in Social and Health Care

12.10 O-23: A Biometrics Method to Secure Wireless Body Area Sensor Networks for Telemedicine

12.15 O-24: Strategies for large-scale digital type 2 diabetes risk screening and research participant recruitment

12.20 Presentations from exhibition

- **RISE Research Institutes of Sweden**
- **CARELIGO**

Session 4A (Finnish) | **Posters** | **Exhibition**

12.30 Lunch

Session 6: Visions of Future Health (Session in English) **Auditorium 1**
Chair Principal Lecturer and Vice-President Pirkko Kouri, Savonia UAS and International Society of Telemedicine and eHealth

14.00 Chair's introduction to the topic

14.05 The digital transformation of Health and Care
Head of the eHealth Unit Marco Marsella
European Commission

14.30 Telemedicine in Japan now and future
Professor Hiroshi Kondoh
Tottori University, Japanese Telemedicine and Telecare Association, Japan

14.55 Enhanced Health Expertise through Artificial Intelligence
Professor Timo Honkela
University of Helsinki, Finland

15.20 Summary and closing words
President Arto Holopainen
Finnish Society of Telemedicine and eHealth

15.30 Farewell

Session 1: Data-Driven Health

Chair: President, Chief Innovation Officer Arto Holopainen, Finnish Society of Telemedicine and eHealth, City of Kuopio

Tuesday April 2nd, 2019

9:30 – 10:50

1-1 **Finnish Society of Telemedicine and eHealth opening words**
Arto Holopainen, President
Finnish Society of Telemedicine and eHealth

1-2 **Kuopio University Hospital opening words**
Esko Vanninen, Executive Vice President, Research and Innovations
Kuopio University Hospital

1-3 **Greeting from the Ministry of Social Affairs and Health, Finland**
Sinikka Salo, Leader of Change
Ministry of Social Affairs and Health, Finnish Government

1-4 **Ilkka Winblad Honorary Lecture: Data-Driven Health**
Lucien Engelen, Global Strategist Digital Health
Deloitte Center For the Edge

1-5 **Delivery of Finnish National eHealth Award**

Finnish Society of Telemedicine and eHealth opening words

Arto Holopainen, President
Finnish Society of Telemedicine and eHealth

Biography Arto Holopainen

Mr. Arto Holopainen, MSc (Tech.) is President for the Finnish Society for Telemedicine and eHealth. He is working as Chief Innovation Officer at City of Kuopio, a premier city in Finland with a vision to be the capital, where the good life lives. In this role, he work as innovation leadership by promoting City of Kuopio's strategic themes digitalization, internationality and partnership in all levels of actions. He is promoting the use of international standards as a Secretary at European committee for standardization (CEN) working group "Technology and Applications in Health Informatics" (TC251/WGII). His passion is the disruption and opportunity that digital revolution represents for businesses.

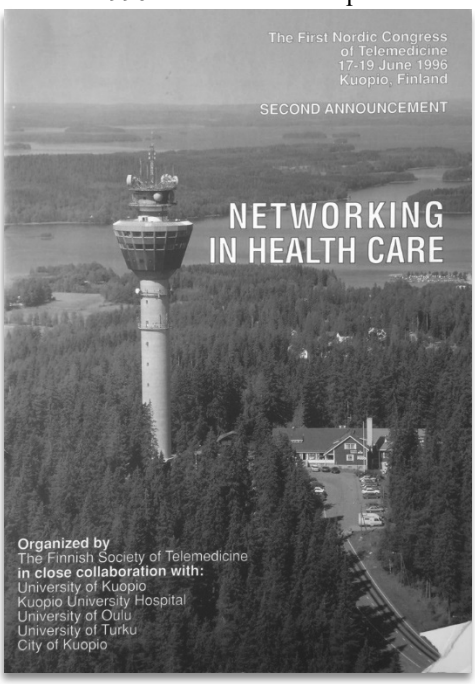
This year we are having our annual Finnish National Conference on Telemedicine and eHealth for the 24th time, now together with eHealth2019 International Conference. This is the third time our annual conference is arranged at Kuopio, in my hometown. The first one at 1996 was society's first international conference, and the second one was national conference at 2007.

Today around 118 000 people live in the city and Kuopio is a modern, developing center of economic life in Eastern Finland. The city is one of the national centers of expertise, with the University of Eastern Finland, one of the largest research universities in Finland, as well as one of Finland's five university hospitals, Kuopio University Hospital. I'm proud to see how Kuopio has grown to be known internationally for pioneering development and expertise in health and wellness, security and biotechnology solutions.

The conference 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 healthcare professionals. In the sessions, practical examples and experiences are shared by more than 40 lecturers from Finland and abroad. Conference includes eight different site-visits offering unique possibility to get hands-on experiences in solutions for the better and effective healthcare

I wish everybody a very fruitful conference and I hope you will also have time to experience City of Kuopio's strategic vision, the Capital of Good Life!

1996 Conference - Kuopio



2007 Conference- Kuopio

Kuopio University Hospital opening words

Esko Vanninen, Research and Innovations Executive Vice President
Kuopio University Hospital, Finland

Biography Esko Vanninen

Mr Esko Vanninen, MD, PhD, eMBA, is Executive Vice President, Research and Innovations at Kuopio University Hospital (KUH). As a Board Certified of Clinical Physiology and Nuclear Medicine he has a strong clinical background in functional imaging. He has worked in various positions including Medical Director and Professor in Clinical Physiology and Nuclear Medicine both at KUH and at University of Eastern Finland (UEF). Dr. Vanninen has published nearly 170 peer reviewed original articles in major medical journals. His current tasks include also issues of sustainable development at KUH

Kuopio University Hospital (KUH) is strongly developing tertiary care medical center in middle of famous Finnish lake district. It serves a total population of 800000 inhabitants. Its activities are based on high quality, effectiveness and skilled specialists promoting the best for the patients. KUH was established in the late 50s as a part of in those days new national hospital network. Medical school started at Kuopio University by 1970s and this strengthened KUH´s position as one of the five University Hospitals in Finland. By gaining the University Hospital status KUH broadened the scope of health science research and began to train health care personnel. At the moment there almost 40 different medical specialities at KUH. KUH is known world wide for example for being a top class epilepsy center and a forerunner of gene therapy.

Digitalisation is taking quantum leaps as a major part of comprehensive care processes at KUH. It is not a slowly progressing evolution but a revolution that will take patient-centered care to a new level. Among the strongest drivers of this development is also the financial burden created by the fast growing elderly population. We just must do things in the future differently, in a new clever way.

KUH will be celebrating its 60th anniversary this year. As a part of this jubilee year, KUH and Finnish Society of Telemedicine and eHealth proud to organise this international conference on the vast possibilities of digitalisation and novel solutions in health care.

I heartily welcome you all to enjoy our inspiring conference.

Greeting from the Ministry of Social Affairs and Health, Finland

Sinikka Salo, Leader of Change
Ministry of Social Affairs and Health, Finnish Government

Biography Sinikka Salo

Dr. Sinikka Salo serves as the Leader of Change in reforming social welfare and healthcare in Finland at the Ministry of Social Affairs and Health, Finnish Government. She directs and coordinates the regional implementation of the reform as well as the related launching and development of health and social services activities at county level. The work is done in collaboration with other national ministries and local authorities. The cornerstones of the health and social services reform include service integration, increasing clients' freedom of choice, digitalisation, developing electronic services and information systems, and curbing the costs of healthcare and social welfare. Previously Dr. Salo has served as the Deputy Mayor of City of Oulu, the Chief Dental Officer at City of Kemi and a researcher at the University of Oulu. Dr Salo has also worked as a leader in international missions in Japan and Kosovo. Dr Salo is a sought-after lecturer both in Finland and abroad, and she has published more than 70 scientific or popular articles.

Preparations for national health and social services reform has been ongoing in Finland for more than ten years. The reform is above all necessary from the perspective of equal access to services, but also from the perspective of the economic sustainability of our country. The reform was included in the Government programme, and it was set to be implemented in connection with the establishment of the county structure.
Prime Minister Juha Sipilä submitted his Government's request for resignation to the President of the Republic on 8 March 2019. Due to the resignation, preparations concerning the regional government, health and social services reform cannot be continued. It will be up to the next government to decide whether the reform work will continue.

Extensive preparatory work has been carried out during this government term. The need for reform of social welfare and health care services remains the same or may even increase in future. The work on renewing the contents of the health and social services reform must continue to ensure improvements in productivity, and also because the current situation does not offer equality in terms of responding to the service needs of the customers.

Digitalisation plays an important role in the health and social services reform. ICT solutions and digitalisation are tools for improving healthcare and social welfare services and creating better opportunities to maintain and improve clients' health and functional capacity. Electronic services can also help people to maintain their health and functional capacity themselves. The aim has been to promote the activities of residents, companies and communities and create the conditions for growth of business. Important cornerstone was approval of the Act on Secondary Use of Health and Social Data at the Parliament in March.

The Ministry of Social Affairs and Health has together with stakeholders drawn up a strategy for information management in healthcare and social welfare, extending until 2020. Enterprise architecture is closely interlinked with the implementation of the strategy, and several perspectives in the strategy have even been used to structure enterprise architecture. Enterprise architecture is a method for planning activities and information management side by side.

Ilkka Winblad Honorary Lecture: Data-Driven Health

Lucien Engelen, Global Strategist Digital Health

Deloitte Center For the Edge

Biography Lucien Engelen

Lucien Engelen is the founding director of the REshape Center for innovation, and advisory to the executive board of Radboud University Medical Center in Nijmegen the Netherlands. Several mindset-shifting projects have been initiated at his center, like most recently the 'REach-platform' for the patient(unions) to ignite their own research by globally crowdsource and crowdfund data for research, flipping the coin for patients from being the subject or contributor to designer and owner of the research(data). Through human-centered design (service design) they get to the core of opportunities for change in healthcare. As the Global Strategist Digital health for Deloitte's Center for the Edge he pushes the needle on a global scale for the needed change of the operational model and the H-UX as he coined it (Healthcare User-Experience). He is also a faculty member at Singularity University's Exponential Medicine in Silicon Valley and in the Netherlands.

We are in the midst of a digital transformation across society that brings opportunities and challenges. What used to work isn't good enough anymore in a world that is increasingly becoming digital.

Through my small company Transform.Health as a vehicle, I operate at the intersection of Innovation & Strategy for executive boards, governments, corporates, and professionals via my role as Edge Fellow for the Deloitte Center for the Edge (Amsterdam, Melbourne and San Francisco) and Singularity University in Silicon Valley in the Netherlands as well as currently in the Nordics.

My modus operandi is always challenging, sometimes provocative but always techno-realistic. My goal is to prepare for a soft landing into the future, meanwhile creating a sustainable global health(care) for all.

It is at the intersection of technology and (digital) patient empowerment where i feel most at home. As the former-founding director of the Radboud University Nijmegen Medical Centre REshape Center and advisor to the Board of Directors (2010-2018) and my prior experience in healthcare brought me on the forefront of health(care) innovation for the past 3 decades.

As one of the 105 initial LinkedIn Influencers over 800.000 people follow my blog, and my latest book (https://lucienengelen.com/book/) describes what dramatic change is ahead for health and healthcare.

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 and Associate Professor Piotr Henryk Skarzyñski from Poland in 2017.

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 2019, Finnish national eHealth award is delivered 16th time.

eHealth award arguments

The Board of Finnish Society of Telemedicine and eHealth decided to deliver two Finnish National eHealth Awards at the 24th Finnish National Telemedicine and eHealth Conference emphasizing novel research:

1. 

   PhD Pia Liljamo's doctoral dissertation entitled "*Agreement between clinical and administrative nursing data. The reliability of nursing intensity data and the possibilities of secondary use of structured nursing care data in determining nursing intensity*" in the field of Health and Human Services Informatics at the Faculty of Social Sciences and Business Studies was held on 16th of November 2018 at University of Eastern Finland. The purpose of this study was to evaluate the reliability of nursing intensity data after two decades of clinical use of the OPCq instrument, combine two data sets, i.e. structured clinical nursing care data (FinCC) and administrative nursing intensity data (OPCq), and compare the agreement between nursing care data and nursing intensity data. The aim was to identify areas in need of development in the FinCC and OPCq and come up with a recommendation on the possibilities of reuse of nursing care data in the assessment of patients' nursing intensity. According to the results, agreement between the parallel evaluations of nursing intensity classifications conducted using the OPCq instrument was good, whereas agreement between the different sections of the instrument varied.

   Reference: http://urn.fi/URN:ISBN:978-952-61-2930-3

2. 

   PhD Anne Kuusisto's doctoral dissertation entitled "*Securing the continuity of patient care by means of an electronic nursing discharge summary*" in the field of Health and Human Services Informatics at the Faculty of Social Sciences and Business Studies was held on 16th of November 2018 at University of Eastern Finland. The purpose of the study is to evaluate how the continuity of care of patients who have been discharged from specialized medical care to primary care is achieved through the use of the electronic nursing discharge summary (ENDS) and to assess its association with the care outcomes from the point of view of nursing professionals. The aim of this study is to identify cross-border, informational and management continuity as well as ENDS's ENDS development needs and to draw up recommendations. According to the results, informational continuity was poorly realized at patient discharge from specialized medical care to primary health care when using ENDS.

   Reference: http://urn.fi/URN:ISBN:978-952-61-2707-1

Sessio 2A: Tietoaltaiden hyötykäyttö / Meaningful use of data lakes

Puheenjohtaja: Tutkimus- ja innovaatiojohtaja Esko Vanninen
Kuopion Yliopistollinen Sairaala

Chair: Executive Vice President, Research and Innovations Esko Vanninen
Kuopio University Hospital, Finland

Tiistai 2.4.2019 - Tuesday 2nd of April 2019

11:05 – 12:35

2A-1 Sotetiedon toissijainen käytön uudet mahdollisuudet

Päivi Rautava, Professori, tutkimusylilääkäri
Turun yliopisto, Turun yliopistollinen sairaala

2A-2 Mitkä ovat tietoaltaan koostamisen edellytykset?

Arho Virkki, Dosentti
Auria tietopalvelu, Varsinais-Suomen sairaanhoitopiiri

2A-3 Tietoaltaat: Data-analytiikan, tiedon tuotannon ja terveystaloustulosten hyödyntäjän aarreaitta?

Erkki Soini, Toimitusjohtaja
ESiOR Oy

2A-4 Koko sote-ketjun hallinta tiedon avulla, case: Siun-sote

Petri Kivinen, Hallintoylilääkäri
Siun-Sote

5 min rapid scientific presentations

O-1 Enabling Innovation Activities in Public Hospitals

Pauliina Hyrkäs[1], MHSc (Health Admin.)
[1]Oulu University Hospital

O-2 Child placement costs and cost drivers: Isaacus Kuopio data lake project

Taru Hallinen[1], MSc, Erkki Soini[1], MSc, Jyrki Tirkkonen[2], MSc, Arja Kekoni[3], MSc
[1]ESiOR Oy, Kuopio, Finland; [2]Istekki Oy, Kuopio, Finland, [3]City of Kuopio, Kuopio, Finland;

O-3 Paramedic student perceptions of the technical and pedagogical usability of a virtual reality simulation

Mikko Myllymäki[1], BHSc, Marja Härkänen[1], PhD, Katri Vehviläinen-Julkunen[1], Prof, Jussi Vainionperä[2], MSc
[1]Department of Nursing Science, University of Eastern Finland
[2]Savonia University of Applied Sciences, Unit of Health Care Kuopio

Sotetiedon toissijaisen käytön uudet mahdollisuudet

Päivi Rautava, Professori, tutkimusylilääkäri
Turun yliopisto, Turun yliopistollinen sairaala

Biografia Päivi Rautava

Päivi Rautava, LKT, EL työskentelee Turun yliopistolla ehkäisevän terveydenhuollon professorina. Hänen vastuualueisiinsa kuuluu toteuttaa ja kehittää terveyden edistämisen ja tietojohtamisen opetusta sekä edistää terveyden edistämisen tutkimusta. Turun yliopistosairaalassa hän työskentelee tietopalvelut –yksikön johtajana edistäen sairaalan kliinistä ja translationaalista tutkimusta sekä sairaalan oman kliinisen tietoaltaan käyttöä tiedolla johtamisessa, uusien hoitojen kehittämisessä ja tutkimuksessa.

Sairauskertomuksen ensisijainen tehtävä on turvata tiedonkulku samaa potilasta hoitavien eri asiantuntijoiden välillä. Sairauskertomus sisältää useita kymmeniä eri ohjelmistoa, jotka eivät ole sellaisenaan yhteensopivia, eikä niistä voi tavallinen käyttäjä saada ulos esimerkiksi historiatietoja. Ilman kattavaa historiaa on mahdotonta arvioida hoitojen vaikuttavuutta tai optimoida palvelun organisointia. Hoitohistoria kaikkine kirjauksineen on lisäksi korvaamaton tieteellisen tutkimuksen, innovaatiotoiminnan ja tietojohtamisen työkalu. Tietoallasta käytetään potilaaseen liittyvän raakadatan, kuten erilaisten kirjausten ja mitattujen signaalien lastauslaiturina. Tämä tieto pitää vielä jäsentää, järjestää, yhdistää, käsitellä ja rikastaa, jotta sitä voidaan käyttää tutkimukseen ja raportointiin.

Tyypillisiä tutkimuskysymyksiä ovat annettujen hoitojen määrä ja laatu, vaikuttavuus eri mittarein, kustannukset ja erilaiset tieteelliset ja toiminnan järjestämiseen liittyvät kysymykset, kuten

Hoitojen ja hoitoprosessien kehittäminen
- tekoälysovellukset ennustamisen tukena
- potilasvirta-analyysit
- uusien lääkehoitokombinaatioiden tilastollinen testaus, kun tiedetään taudin genetiikka/solutason diagnoosi ja potilaan selviytyminen
- hahmontunnistaminen esim. digipatologiassa tai radiologiassa

Tiedolla johtaminen
- johdon työpöytä, taloustoimiston näkymä
- lääkärin ja potilaan näkymä,
- hoidon vaikuttavuus ja (etä)seuranta
- resurssien hallinta ja optimointi

Tiede ja T&K –toiminta
- Yhteistyö lääketeollisuuden ja yliopistojen kanssa tuo tuloja: Biopankkien ja rekisteritutkimuksen yhdistäminen?

Joukkoistaminen
- Datan anonymisointi (EU:n tietosuojakäytönnön mukaisesti) ja vapaat kehitystyökalut: Lääketieteen tutkimus ja kehitys voidaan avata halutuille kohdeyleisöille
- Hackathon-tapahtumat, yrityskehitys, sovelluskehityskilpailut,
- Yliopistojen jatko-opintotyöpajat, …

Periaatteessa vain taivas on rajana.

Possibilities of secondary use of health and social care data

Päivi Rautava, Professor, Chief of Research services
Turku University Hospital and University of Turku, Finland

Biography Päivi Rautava
Päivi Rautava, MD, PhD, works as a professor of preventive health care in the University of Turku. Her responsibility is to carry out and develop the education in health promotion and knowledge management, and to facilitate the research of health promotion. In Turku University Hospital she works as the chief physician of research and promotes clinical and transitional research as well as research, knowledge-based management and development of new treatments through hospital data lake.

The primary purpose of the patient registry is to ensure the flow of information between the different experts who treat the same patient. The patient registry is maintained in separate software applications that are incompatible with each other. Ordinary user cannot, for example, export historical data from the registry. That is why raw data must be collected, structured, organized and enriched into the data lake. The commensurate data can then be used for data-driven management of activities, patient flow analyses, scientific research and R&D, crowdsourcing, visualization of individual patient data, artificial intelligence applications to support decision making, pattern recognition and population level graphs. Only the sky is the limit!

Mitkä ovat tietoaltaan koostamisen edellytykset?

Arho Virkki, Dosentti
Auria tietopalvelu, Varsinais-Suomen sairaanhoitopiiri

BiografiaArho Virkki

Arho Virkki, FT, DI, johtaa Auria tietopalvelua Turun yliopistollisessa keskussairaalassa ja on lääketieteellisen matematiikan dosentti Turun Yliopistossa. Hän on kiinnostunut erityisesti koneoppimisesta, tiedonlouhinnasta ja päätöksenteon matemaattisesta mallintamisesta ja on käyttänyt Linux-järjestelmiä työ- ja harrastusmielessä vuodesta 1999. Nykyisiin mielenkiinnon kohteisiin kuuluvat uusimpien laskentamenetelmien, kuten GPU-laskennan yhdistäminen matemaattiseen mallinnukseen käytännöllisten ongelmien ratkaisemiseksi. Jos hän ei ole jututtamassa ihmisiä, hän työskentelee tilastollisten mallien, projektien, algoritmien, data-analyysin, visualisoinnin tai koneoppimisen parissa, tai on vain ohjelmoimassa jotain R, Python, SQL tai bash -kielillä.

Termejä AI, data mining, pattern mining, machine learning ja deep learning -sanoja käytetään usein löyhästi toistensa synonyymeinä modernista tilastotieteestä puhuttaessa. Koneoppimisesta puhutaan silloin, kun koneet ohjelmoidaan tuottamaan nopeasti tarkkoja ja tarkoituksenmukaisia ennustuksia tai päätöksiä. Tämä on mahdollista, jos käytettävissä oleva data sisältää riittävästi informaatiota.

Koneoppimista on sovellettu jo pitkään esimerkiksi teollisuuden automaatio- ja säätöjärjestelmien toteutuksessa. Menetelmät mahdollistavat perinteisistä lääketieteen hypoteeseista vapaan tutkimuksen, jossa selittävistä ilmiöistä ei tehdä juurikaan etukäteisolettamuksia. Vielä joitakin vuosikymmeniä sitten tutkija joutui suunnittelemaan ensin laskentasäännöt sellaisten piirteiden muodostamiseksi, joilla oletettiin olevan merkitystä ilmiön ennustamisessa. Nykyään on mahdollista laskea laajasta aineistosta esimerkiksi yksilöllinen indeksi lukuisten riskien ja suojaavien tekijöiden funktiona (yksittäisen biomarkkerin tapaan), jolla on vahva sidos johonkin päätetapahtumaan, vaikka tarkkaa vaikuttavaa mekanismia ei tunneta. Esimerkkinä tästä ovat esimerkiksi polygeeniset riskiarviot ja populaatiotason riskimittarit. Sekä potilas että yhteiskunta hyötyvät uusien tutkimusmenetelmien tuottamista entistä vaikuttavammista hoidoista.

Datan laajamittainen käyttö on kuitenkin mahdollista vain, jos tietoa voidaan yhdistää ja analysoida suurina määrinä pitkiltä aikaväleiltä. Analyysiä varten tarvitaan käytännössä tietoalusta, joka koostuu niin sanotusta tietoaltaasta sekä sitä hyödyntävistä oheisjärjestelmistä. Luento pureutuu tietoalustan koostamisen edellytyksiin, sekä niihin ammattimaisesti hoidettuihin työtehtäviin, joita sairaalan tietopalvelutiimi tai dataa analysoiva biopankki käytännössä tarvitsee.

Luento käsittelee myös altaan ylläpitäjän vastuuta ja tietoturvavaatimuksia, jotka ovat henkilötiedon osalta korkeat. Kokemukset Suomen ensimmäisistä sairaalatietoaltaista ovat osoittaneet, että vapaaseen koodiin perustuvat järjestelmät auttavat tiedon turvallisen käytön varmistamisessa, koska tiedon laatu, käsittelysäännöt ja itse järjestelmien toiminta ovat kaikki avoimesti validoitavissa. Samalla varmistetaan lääketieteellisen tutkimuksen avoimuus ja riippumattomuus. Tiedon hyödyntäminen on vasta alussa, mutta tekniikkaa tärkeämpää on ymmärtää korkealaatuisen tiedon arvo ja pyrkiä hyödyntämään sitä nykyistä laajemmin potilaan hoidossa.

What are the conditions for data lake operation?

Arho Virkki, Docent
Auria Clinical Informatics, The Hospital District of Southwest Finland

Biography Arho Virkki
Arho Virkki, PhD, MSc(Tech) is the head of Auria Clinical Informatics at Turku University Hospital and Adjunct Professor in Medical Mathematics at Turku University. He is especially interested in machine learning, data mining and mathematical modeling for decision support, and has been using Linux for both hobby and work projects since 1999. His current interests include combining the latest technological achievements, like GPU computing and the traditional modeller's toolbox into software products that solve significant real-world problems. When not discussing with people, he works with statistical methods, project management, algorithms, data analysis, visual analytics or machine learning, or is just programming something with R, Python, SQL or bash.

Artificial intelligence is often used as a synonym to machine learning where computers are programmed to produce precise and predictive suggestions for decision making. This is possible, if the source data contains enough information to support the probabilistic inference.

Machine learning has already been successfully applied outside medicine to e.g. automate and control industrial processes. Nonetheless, computing multi-index risk factors for medical decision making, such as polygenic risk factors for selecting the best individualized treatment, would benefit both the individual patients and the society.

Data can be used for decision making only if we can combine and commensurate observations in large scale and for long time span. In practice, this requires a dedicate data platform consisting of a data lake and a bunch of supporting software systems. The lecture gives an introduction to the operation of a data lake and to the roles that are needed to support a profession data analysis team.

The lecture discusses also the high data privacy and access control requirements for register data. Experiences from the first Finnish clinical data lakes have shown that open and ’libre’ software systems provide best means for assessing the validity and correct operation of the whole data platform. The large-scale utilization of data in health care is still in the beginning, and should concentrate on ensuring the value of data for better clinical care.

Tietoaltaat: Data-analytiikan, tiedon tuotannon ja terveystaloustulosten hyödyntäjän aarreaitta?

Erkki Soini, Toimitusjohtaja
ESiOR Oy

Biografia Erkki Soini

Erkki Soini, TtM (terveystaloustiede), toimitusjohtaja (ESiOR Oy), Kustannus-vaikuttavuusryhmän (KVR) puheenjohtaja, www.linkedin.com/in/erkkisoini. Soini on toiminut mm. analytiikka-, real-world-, biopankki- ja terveydenhuollon menetelmien arviointien projekteissa eri tehtävissä sekä tehnyt terveystalousarviointeja, kuten elämänlaadun, resurssien käytön, kustannusten, kustannusvaikuttavuuden, budjettivaikutusten ja informaation arvon analyysejä ja mallinnuksia. Soini on toiminut kutsuttuna useissa alan kansainvälisissä (mm. ISPOR Euroopan kongressin tieteellisen arviointilautakunnan puheenjohtajuudet, SMDM-suunnitteluryhmä, RWD-kongressien ohjausryhmä, ISPOR-arviointilautakunta ja -tuomaristo) ja kansallisissa luottamus- ja ohjaustehtävissä, voittanut palkintoja kansainvälisistä kongresseista sekä julkaissut useita kymmeniä tieteellisiä julkaisuja.

Data lake data (DLD): Treasure chest for data analytics, health technology assessment and health economic results?

Erkki Soini, CEO
ESiOR Oy

Biography Erkki Soini

Erkki Soini, MSc (health econ), CEO (ESiOR Oy), Chairman of Social and Health Economics and Outcomes Group (SHEOG), www.linkedin.com/in/erkkisoini. Soini has extensive experience in real-world evidence, biobank research and health technology assessment projects and health economic evaluations such as quality of life, resource use, costs, cost-effectiveness, budget impact and value of information analyses and modelling. Soini has been invited to serve as e.g. ISPOR scientific review committee co-chair for Europe twice and has taken part in e.g. various guidance groups. Soini has won prizes from international congresses and has authored dozens of scientific articles.

Background: Generally, in a society working with efficiency and budget requirements (i.e., limited resources), the aim should be to provide maximal effectiveness efficiently with the given inputs (technical efficiency) based on optimal decision criteria (allocative efficiency). Health economics and outcomes research (HEOR) can also pursue effectiveness (maximize health gain) and equity (minimize health inequalities) – some aims of the Health and wellbeing, a Finnish governmental key project [1]. In larger scope, health technology assessment (HTA) pursuit e.g. efficiency and equity with clinic, HEOR, ethic, organizational, social and juridical evaluations.

Efficiency and equity should be pursued based on solid and up-to-date HTA evidence. As data and evidence accumulate over time, the HTA content should be updatable, real time and predictive. In eHealth HEOR (e.g. Virtual Hospital 2.0), a use of 1) existing data, 2) predictive analysis, 3) managed knowledge, 4) targeted communication, 5) multi-stakeholder implementation, 6) outcomes assessment, 7) efficiency and equity evaluation, and 8) active corrections was considered relevant [e.g. 2, 3]. Namely, eHealth should be available for all in need, real time and customer responsive [1]. Such eHealth may free considerable monetary potential [2, 3].

Unfortunately, trade-offs between efficiency and equity [4] as well as between efficiency and affordability are common [5]. All of these increase the need for accurate and timely individual-level data. Data lake and service operator projects (Isaacus [e.g. 6-8]) aimed at providing such data fast and securely for various purposes.

Aim: To describe some potential uses of individual-level data lake data (DLD) from HEOR perspective.

Results: HTA should consider multiple viewpoints and be logically established and reported. An approach suited for the HEOR part of HTA requirements is PICOSTEPS principle, which was built as a supplemental part of Finnish Current Care Criteria [9] and is used in e.g. real-world data based [10] and modelled [11] HEOR.

DLD-associated systems such as remote use platforms or encrypted delivery of DLD have the potential to provide fast and secure access to data readily compiled in a single place. In order to be of use, data and metadata need to be clear. Time-series can be available in DLD, which is very important in establishing e.g. characteristics and natural progression of individuals, service pathways and outcomes over time. With such data, the common challenges of HEOR – who is cared for, how, when and what are the consequences over time – can be addressed.

Examples of HEOR effects that can be potentially estimated from DLD include clinical effectiveness, safety, surrogates, resource use, costs, quality of life and survival. Examples of effect modifiers potentially established from DLD by using statistical or machine learning methods include age, sex, conditions, comorbidity, genetics, sequences of treatments, family, care provider at different organizational levels and care pathways.

By using predictive analysis, DLD can be used to establish expected effects and condition/disease progression patterns for HEOR assessment tools such as cost-effectiveness [9], cost benefit [3, 4] or budget impact [12] models commonly applied in e.g. funding decisions or recommendations. Other examples of DLD use include profiling and care targeting. These can be used for the knowledge-based decision making. Additionally, DLD could be applied for outcomes-based implementation such as risk-sharing – a kind of a warranty for health technology. Risk-sharing has the potential to simultaneously gain health and economic benefits [13, 14].

In HTA, targeted, appealing communication based on established methods is important for result applicability and implementation. In the best case, all stakeholders (e.g. patients, sectors, government) are involved [e.g. 15].

Conclusions: DLD can be used efficiently and securely to meet many HEOR needs. Considering technology-related opportunity costs [e.g. 16], eHealth potential [e.g. 2, 3] and practicalities [e.g. 14], DLD together with suitable analytics and eHealth is a potential treasure chest for HTA. However, care should be taken to develop legislation and infrastructure to facilitate the optimal use of DLD and other data sets for various purposes.

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Koko sote-ketjun hallinta tiedon avulla, case: Siun-sote

Petri Kivinen, Hallintoylilääkäri
Siun Sote

Biografia Petri Kivinen

LT Petri Kivisellä on monimuotoinen ura sosiaali- ja terveyspalveluissa ja terveydenhuollon informaatioteknologian parissa. Hänellä on terveydenhuollon tietotekniikan erityispätevyys ja hän on suorittanut HTK tutkinnon hallinto-oikeudesta. Lisäksi hän on suorittanut big data-sovelluksien käyttöön sertifikaatteja. Kivinen toimii tällä hetkellä hallintoylilääkärinä Siun sotessa. Hän käyttää työssään palvelutuotannon ohjaamisessa mm. monia moderneja kustannus per potilas-kustannuslaskenta- ja datan analysointisovelluksia. Kivinen on myös osallistunut sote -uudistuksen valmisteluun antamalla useita asiantuntija-arvioita uudistuksen tarvitsemista IT-sovelluksista sekä ratkaisuista maakuntien ja valtion tarpeeseen. Hän on julkaissut useita julkaisuja, viime aikoina koskien terveydenhuollon tiedolla johtamista, ja hän on ollut kutsuttu puhuja useilla tiedolla johtamisen ja vaikuttavuusperusteisen johtamisen foorumeilla myös Ruotsissa ja Britanniassa.

Siun sote toimii Pohjois-Karjalan maakunnan ja Heinäveden kunnan alueella tuottaen näiden 14 kunnan alueella noin 7000 työntekijän voimin integroituja sote-palveluja. Noin 700 miljoonan euron budjetilla tuotetuista palveluista on ollut tarve saada kokonaiskuva alueen 165 000 asukkaan käyttöön pohjautuvasta vakioidusta palvelutarpeesta ja väestön yhteisestä palvelujen käytöstä kokonaisuutena yli toimialuerajojen.

Palvelutuotannosta on kyetty koko sote-tuotannon kattavalla kustannuslaskennalla sekä sote – tietopakettilaskennan periaattein havaitsemaan alueen suurimmat kustannuksia aiheuttavat palvelut ja asiakasryhmät eri tuotantoyksiköissä ja palvelualueilla, sekä näkemään miten saman sote-palvelun tuottamisen käytännöt ja kustannukset ovat varioineet toisistaan ja mitkä seikat ovat tämän variaation selityksiä. Samoin on kyetty laskemaan säästöpotentiaalia eri palvelukokonaisuuksille alueen sisäisiä palvelun tuottamisen eroja muuttaen alueen kustannustehokkaimpien yksiköiden toimintaan verraten. Käytössä olevat edistykselliset Logex Groupin Prodacapon analytiikkajärjestelmät ovat mahdollistaneet jatkuvan analyysin tekemistä integroiduista palvelukokonaisuuksista sekä kustannusten että intgroitujen palveluketjujen tuottavuudesta ja perusterveydenhuollon, erikoissairaanhoidon ja sosiaalihuollon yksiköiden yhteistoiminnasta, esimerkiksi stroken, lonkkamurtumien ja diabeteksen osalta.

Koko sote-ketjun hallinta käytössä olevan tiedon perusteella on ollut mahdollista evaluoida myös soten selvitymisen kannalta kriittistä kysymysketjua kustannusten ja tuottavuuden näkökulmasta: tekeekö oikea ammattilainen, oikealle potilaalle/asiakkaalle, oikeaan aikaan, oikeita asioita, oikealla tavalla, kustannustehokkaalla tavalla, välttäen tekemästä enemmän vahinkoa kuin hyötyä? Jos ei, mitä pitäisi muuttaa? Käytössämme olevalla analytiikalla tähän ketjuun on mahdollista saada vastauksia.

Managing the entire Social and Health care chain with knowledge, case: Siun-sote

Petri Kivinen, Chief Administrative Medical Officer
Siun Sote - Joint municipal authority for North Karelia social and health services, Finland

Biography Petri Kivinen
Dr Petri Kivinen, M.D. PhD, has a diverse career in social- and healthcare services and healthcare information technology. He has the Special competence of Healthcare information technology. Furthermore, Dr Kivinen has also graduated as B.Sc in Administrative law and civil law. Recently he has finished some certified courses of big data applications. Dr Kivinen works as a Chief Administrative Medical Officer for Siun sote. He manages the service production by information technology solutions in patient level costing and data analysis. He has also taken part in ongoing social and health care sector reform giving several expert evaluations supporting and innovating software solutions for future needs of Finnish counties and the Government. He has published several publications, recently mainly in Finnish concerning health care management by information and has been an invited speaker in different forums of knowledge and outcome based management.

North Karelian social and Healthcare joint municipal authority (Siun sote) is responsible for the organisation, financing and most of the delivery of health (primary and secondary) and social services for the Finnish region of North Karelia in eastern Finland. Siun sote ensures that services form integrated packages offered on an equal basis, close to the clients and based on the population's needs. In effect, Siun sote functions as an accountable care organization (ACO). The budget of the organization is 700 million € and covers the health and social services required by the population of 165 000. Other key figures: Approximately 7000 employees, 14 municipalities, 22 health stations, 450 physicians, 110-120 GPs in primary care.

Siun sote uses advanced analytics solutions produced by Prodacapo in Logex Group to present a comprehensive picture of the region's service production and their costs while providing tools for the continuous management of the efficiency and quality of the integrated services provided by the organization. combine the health and social care service information of the whole region enabling the continuous analysis of the costs and productivity of integrated service chains across primary, secondary health and social care. The solution's patient pathway building tools provide an effective way of analysing the full costs related to specific health problems e.g. such as stroke or hip fractures or diabetes.

The critical questions identified by Siun sote for the management of its integrated service system, and for which Prodacapo's solutions help provide the answers, include: Does the right professional, do for right patient/client, at right time, the right things, in an appropriate way, in cost effective ways within the budget, while avoiding causing more harm than good? And if not, what should be changed? Our analytics solutions can help us to get answers to those questions.

O-1: Enabling Innovation Activities in Public Hospitals

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Introduction
In scientific and societal discussions, the development of innovation is recognized as important and at the same time challenging in healthcare, including in public hospital organizations. Implementation and maintenance of innovation activities require public hospitals to learn and accept new kinds of procedures (Wu & Shieh 2015) since innovation activities differ from traditional R&D activities (OECD 2015). In addition, challenges can be faced in the activities due to the traditional practices and culture of public hospitals: the development of innovations requires risk-taking from the managers, the strong commitment of the staff and the active consideration of the customer's or patient's point of view. Such activity is contrary to the public sector's tradition of being a remote and neutral actor (Veenswijk 2005). Research related to innovation has increased (Fagerberg & Verspagen 2009), especially the importance of innovations in hospitals (Salge & Vera 2009), but new information is still needed to support hospitals' innovation activities in their success (Luo et al. 2014; Plsek 2003).

Material and Methods
As part of the development of the innovation activities of the Oulu University Hospital, a comprehensive interview material was collected as research data besides the University Hospital as Innovation Platforms (YSI) project. Thirteen the most active in the development of the innovation activity participated experts of the Oulu University Hospital were involved in semi-structured interviews. The material was analyzed based on qualitative research and content analysis, which generated information on the factors enabling innovations in the context of a public hospital.

Results
The most important factors for enabling innovation activities in public hospitals are the introduction of organizationally unified practices for innovation activities flexible with regard to the hospital core functions and including a comprehensive mandate for action and promotion of a culture that supports activities. In addition, sufficient expertise must be available for the management and coordination of innovation activities.

Discussion
In order to be able to innovate, hospital management must provide support, such as sufficient resources, for innovation activities. In addition, innovation management experts are needed to organize, coordinate and maintain innovation processes, and to support communication and collaboration between the internal and external hospital stakeholders. It is useful to build the innovation activities of public hospitals on the principles of good governance such as responsiveness, transparency, inclusiveness, co-operation, and equality. In addition, organizationally unified innovation activities should be based on the real development needs identified in the hospital operations. Also, the primacy of the core activities of the hospital should always be respected, which is achieved through the flexible design of innovation processes.

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O-2: Child placement costs and cost drivers: Isaacus Kuopio data lake project

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[3]*City of Kuopio, Kuopio, Finland;*

Background: Finnish government has aimed at responsive and efficient use of healthcare data [1]. An essential part of efficient real-world data use is the process consisting of data – analysis – knowledge management – communication. For that purpose, the Finnish Innovation Fund Sitra funded Isaacus pre-production projects [2] that were aimed at preparing the national Isaacus service operator providing wellbeing data and open data on a one stop-shop basis.

City of Kuopio initiated the pre-production project "Well-being information on children and young people" in 2017 and extended it in year 2018. During the initial pre-production project, a data lake covering health and social care (1/2013–8/2017) data was developed. The data included the 'information packs' data of the social welfare and healthcare reporting system as well as client and guardian data. Remote-use platform for the data lake was developed to support efficient and safe secondary data use. [3] During the extension phase of the pre-production project, the data set covered also year 2017 in full and unit cost data was implemented more accurately.

Aim: To assess the costs and cost drivers of child placement decision based on the extended Isaacus data.

Methods: The data consists of the family social services arranged by the city of Kuopio (2013–2017) for individuals aged 0–17 years. The social care was complemented by primary care data and included key client and caretaker characteristics. To maintain the track of RAD process (request for inquiry, assessment of need for support, decision), the analysis was restricted to clients with at least one request for inquiry to the social or child protective services based on child welfare notification in the data. The first inquiry in the data was the index event.

Multivariate log-OLS regression modelling for the placement costs was done with Stata statistical software.

Results: 48.1% of the clients included in the analysis (total N 387) were male, 80.1% of 366 clients with residence information were Kuopio residents, and 8.5% of the clients had been taken into custody before the index event. At the time of index event, the clients were on average 9.0 (SD 5.7) years old.

The average payer undiscounted cost per placed child in year 2017 real value for the analysed client group was 64 052 € (n 387; SD 85 780 €; range: 61 – 453 149 €; median 26 563 €) during the time spent in placement after the index event (326.73; SD 445.69; median 124; range: 1 – 1775 days). Drivers increasing or decreasing the placement costs were recognized.

Statistically significant predictors for child placement costs were prior placement (+141%), new client status (-61%), later placement (-24%), child welfare notification by the police (-66,3 %), and certain inquiry reasons (self-destructive behaviour +373%, conflicts between child and parent +453%, psychological wellbeing of the child +177%, substance abuse by the child +327%, insecurity +157%, violent behaviour by the child +327%, family conflicts +577% and domestic abuse +109%).

Conclusions: Child placement costs were estimated based on the data and cost drivers were found.

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O-3: Paramedic student perceptions of the technical and pedagogical usability of a virtual reality simulation

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[3]*Department of Nursing Science, University of Eastern Finland*
[4]*Savonia University of Applied Sciences, Unit of Health Care Kuopio*

Introduction

Recent technological advances create vast opportunities for healthcare education. These advances are challenging education providers to apply these novel technologies in education. Virtual reality (VR) is a technology that possess great potential for healthcare education, but has been utilized and researched scarcely in this context.

Material and Methods

The purpose of this master's thesis was to describe paramedic student perceptions of the technical and pedagogical usability of a VR simulation prototype. The prototype was designed and coded for this study to enable competence testing and training of the ABCDE approach. The research data was collected in February 2018 by thematic group interviews after playing the VR simulation. The target group was a convenience sample of first year Savonia University of Applied Sciences paramedic students (n=24). The data was analyzed using abductive content analysis.

Results

Even though technical issues were identified in the VR simulation, the technical usability was assessed to be mainly good. Playing was considered technically easy and students learned it quickly. The graphical layout was considered adequate for the purpose of the prototype, but most of the students had problems seeing some of the details in the environment clearly. Students identified flaws in the simulation, but they were considered only as slightly distracting, not serious. As a whole, the students felt that the simulation was a positive experience. Playing was considered to be fun, interesting, believable, inspiring and educational. Students reported of being focused and immersed in the VR simulation. Students described the VR simulation to be an efficient educational method considering the time they put in to the simulation with the gains of the simulation.

The pedagogical usability of the VR simulation was considered to be mainly good. Students felt that they controlled how the simulation progressed and that the simulation activated them as learners. Students were defined a clear and a justified aim for the VR simulation. Students had mixed opinions on the applicability of the VR-simulation. Students felt that VR simulation added value to the paramedic education in multiple ways. It enabled low-stress, repeatable and independent simulation training. The virtual patient was considered to be more versatile and realistic compared to the traditional simulation manikins. VR-simulation added value to the traditional education also through the attributes of diversity, time efficiency, experience, visuality and objectivity. The scoring algorithm and feedback was considered to be inadequate, which reduced its reliability to measure student competence.

Discussion

It is recommended to incorporate VR simulations in to the paramedic education, because they seem to add value and diversity to learning. It is also recommended to continue the development and integration of VR simulations to healthcare education. Further research is needed to clarify the learning outcomes of using VR simulations. The findings from this study can be utilized in developing next VR simulations to healthcare education.

Session 2B: Smart Care

Chair: CEO Minna Storm
Ecca Nordic

Tuesday 2nd of April 2019

11: 05 – 12:35

2B-1 Omaolo – new generation self-care services
Jari Numminen, Product Owner
Sotedigi Oy

2B-2 Health Village – Digital Leap for the Patient
Sirpa Arvonen, Director of eHealth Services
Helsinki University Hospital, Finland

2B-3 Future Care of Patients with Chronical Diseases
Peter Kjäll, Head – Digital Health
RISE Research Institutes of Sweden

2B-4 Winter is Coming
Lucien Engelen, Global Strategist Digital Health
Deloitte Center For the Edge

2B-5 Digital Nutrition support – APPetitus experiences
Anne Moen, Professor
University of Oslo, Norway

5 min rapid scientific presentations

O-4: Risk Factors of Hospitalization
Kelvin K. Tsoi PhD[1,2,3], Ruby Yu PhD[1], Nicholas B. Chan BSc[3], Karen K. Yiu MSc[3], Helen M. Meng PhD[3, 4], Samuel S. Wong MD[2], Jean Woo MD[1]
[1]JC Institute of Ageing; [2]JC School of Public Health and Primary Care;
[3]SH Big Data Decision Analytics Research Centre;
[4]Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, Hong Kong SAR

O-5: Digital narrative as a tool for interaction and social inclusion
Anna-Liisa Arjama MHS[1], Jukka Koivisto Pedagogical expert[2]
[1]Helsinki Deaconess Institute; [2]Diakonia college of Finland

O-6 The feasibility and effectiveness of remote fitting of cochlear implants
Aarno Dietz[1], MD, PhD, Rauno Jäntti[2], BHealthSc, Matti Iso-Mustajärvi[1], MD
[1]Kuopio University Hospital, Department of Otorhinolaryngology, Kuopio, Finland
[2]Central Finland Central Hospital, Rehabilitation Center, Jyväskylä, Finland

Omaolo – new generation self-care services

Jari Numminen, Product Owner
Sotedigi Oy

Biography Jari Numminen

Jari Numminen works as a Product Owner of Omaolo at SoteDigi Oy. Main responsibility is development of Omaolo and capacity services for Omaolo. Jari has been working in era of eHealth over ten years, including digital services for citizens and electronic health records. He is a Registerder Nurse and has Bachelor's Degree in Information Technology. Most of his spare time is spent as Volunteer Firefighter.

Omaolo is a national e-service that supports self-care and self-service as well as improves results, quality, availability and productivity. Omaolo consist of smart symptom checks and service need evalutions, wellbeing check and coaching and integrated wellbeing and service plan.

At this moment symptom checks and service need evaluations are in production and can be used at www.omaolo.fi. In later updates there is coming more content ja support for Swedish and English languages. Health checks for 5th grade pupils and their parents are in beta-phase.

When the customer has a health problem or symptom, Omaolo assesses the need for treatment and the urgency of it, and automatically directs the client to seek appropriate assistance. The service can also be used to evaluate the client's own or relative's right to certain (social) services.

By using wellbeing check the customer gets a general analysis connecting social, health and oral health care aspects as well as health and well-being risks. The service provides the customer suggestions on measures to improve health and / or directs the customer to seek necessary assistance. Beta-phase is starting on May.

Omaolo is developed with open source code and repositories will be opened later this year. All the source code is owned by SoteDigi and thus there won't be a vendor lock situation. Development is agile and product owner is part of development team.

Omaolo was developed in a joint project (ODA) of fourteen organisations. From the 6th of September 2018, the responsibility was trasferred to a goverment owned development company SoteDigi Oy. Co-operation between SoteDigi and the municipalities and hospital/social and health care districts is key also in the future. New health and social care districts have started to implement Omaolo and thus amount of Omaolo users is growing all the time.

Health Village – Digital Leap for the Patient

Sirpa Arvonen, Director of eHealth Services
Helsinki University Hospital, Finland

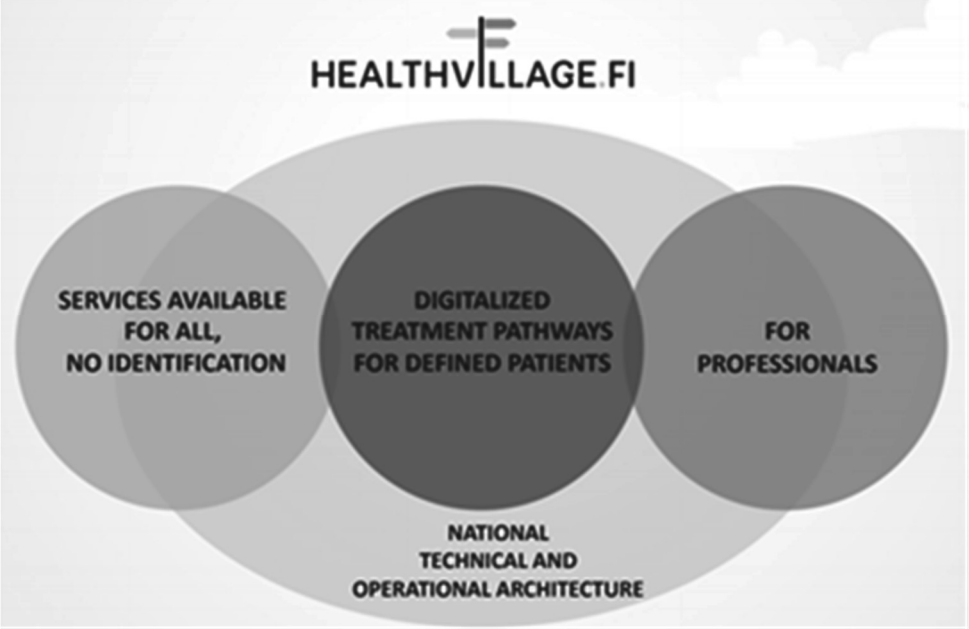
Biography Sirpa Arvonen

Sirpa is experienced in organization developing and systemic leadership, strategic planning, service design, communication management, project management and networks. Sirpa has a lot of experience in planning and implementing eHealth- services, lead of digital transformation and health related information programs. Sirpa is inclusive leader, coach and inspiring lecturer. She has written and produced as a hobby several books and videos among health and wellfare themas.

Health Village (Terveyskylä.fi) is a digital health care service developed together with patients and specialist healthcare experts. Health Village- concept is being built together with University Hospitals in Finland as part of Virtual Hospital 2.0 national keyproject 2016–2018.

Health Village provides information and support for all, care for patients, and tools for professionals. The information content is available for all to use without charge. The digital treatment paths designed for patients require a doctor's referral in current use in Finland. At the beginning of 2019 there are 113 digital paths for different patientgroups or diagnosis.

The Health Village's services are especially well suited for monitoring quality of life, symptoms and lifestyle, and also for supporting those living with a long-term illness. The services complement the traditional treatment paths.



Health Village in short:

- Services for all citizens, patients and professionals.
- Cost control and time savings.
- Easier access to quality care.
- Possible to use ready-made content.
- Ready-made technology platform and development kit.
- Easy way to provide and build digital services.
- Possible to gather data and connect with management and research systems.

More Information:

- www.terveyskylä.fi
- www.virtualhospital2.fi/eng

Future Care of Patients with Chronical Diseases

Peter Kjäll, Head – Digital Health
RISE Research Institutes of Sweden

Biography Peter Kjäll

Peter Kjäll is Head of Digital Health at RISE, Research Institutes of Sweden. He holds a Ph.D in Medical Sciences from Karolinska Institutet and has worked extensively within multi-disciplinary research and development in the interface between novel ICT technology and medicine as well as being an entrepreneur within the field. His role as Head of RISE Digital Health brings together the expertise, applied research and innovative methodology linked to digital health within RISE and couple that to the Swedish industry and healthcare sector. The area Digital Health is interdisciplinary, multidisciplinary and disruptive with the power and potential of digitization as a common denominator. Digital Health includes expertise in areas such as eHealth, digital medical technology, sensors, diagnostics, treatment, service design, system design, big data, artificial intelligence, clinical decision support, digital genetics and proteomics.

The challenge

The project aimed at developing a solution for the care of chronic sickness in the home with the support of IT. In the light of an aging population and thus an increasing burden on health care, new solutions are required. Already today, 85% of Sweden's health care budget is spent on chronic disease management, and as older people develop more chronic diseases, it is estimated to increase. At the same time, in reality, the number of care places in the closed care is reduced.

One way to more efficient care is to develop home care. In order for a broad implementation to be possible through a home care solution supported by IT, a number of challenges must be solved. The project defined 14 challenges, all of which were handled in the project.

The solution must imply a burden on healthcare both economically and laborally, while the business community must see a positive deal in providing care with these solutions. For patients, the solution is experienced easy to handle, it will increase safety and lead to improved disease development with higher quality of life.

The Solution

The COPD project tested a newly developed solution for the care of chronically ill patients in the home. A new care role called Care Operator (CO) was developed in the project. That role can be taken by different organizations. The project tested both an externally procured company (MedHelp) and partly that a hospital itself took the role (Angered Närsjukhus).

The healthcare provider supports the patient at home using sensors that measure certain health parameters, questionnaires and video communications. To handle the technology, CO takes care of a Technical Operator (TO) who installs, monitors, provides support on the equipment, and educates the patient at home. TO the role was taken by Telia Company in the project while nWise was responsible for the video solution.

The patient selection took place at the clinic and the doctor wrote a referral to follow the patient at home. The referral went to CO, which in turn contacted TO.

In the project, CO daily contacted the patients via video and reviewed measurement results and form responses with them. In case of impairment, the doctor at the clinic could be connected via video and relatives could also participate by telephone. The ordinance could then be changed directly in agreement with the patient.

Every Monday afternoon, a virtual round was held where prescribing physicians along with CO went through the patient's health condition before contacting the patient.

The equipment the patient had at home was centered around a touchpad with switched sensors. Examples of sensor values were weight, saturation, pulse, blood pressure and movement (using accelerometer). Great emphasis was placed on physical activity, so sample films were placed on the touchpad. A somewhat more advanced solution based on game theory was also taken by Alkit. The solution implemented by a Kinect sensor was tested in a patient group in Gothenburg.

Winter is Coming

Lucien Engelen, Global Strategist Digital Health
Deloitte Center For the Edge

Biography Lucien Engelen

Lucien Engelen is the founding director of the REshape Center for innovation, and advisory to the executive board of Radboud University Medical Center in Nijmegen the Netherlands. Several mindset-shifting projects have been initiated at his center, like most recently the 'REach-platform' for the patient(unions) to ignite their own research by globally crowdsource and crowdfund data for research, flipping the coin for patients from being the subject or contributor to designer and owner of the research(data). Through human-centered design (service design) they get to the core of opportunities for change in healthcare. As the Global Strategist Digital health for Deloitte's Center for the Edge he pushes the needle on a global scale for the needed change of the operational model and the H-UX as he coined it (Healthcare User-Experience). He is also a faculty member at Singularity University's Exponential Medicine in Silicon Valley and in the Netherlands.

Digital Nutrition support – APPetitus experiences

Anne Moen, Professor
University of Oslo, Norway

Biography Anne Moen

***A**nne Moen is full professor at the Faculty of Medicine at the University of Oslo, Oslo Norway, and adjunct Professor, University college of South east Norway, Drammen, Norway. She is also the founder and CEO of Appetitus AS, a start-up company to develop, market and sustain the APPetitus nutrition app. Her focus in health informatics research is design and deployment of information systems, emphasizing citizen empowerment and engagement with patient facing apps and accompanying services. She is director of UiO:eColab, Institute for health and society, a research lab supporting technology mediated complex patient focused interventions and multidisciplinary teamwork of health professionals, patients and their families in and with primary care or homes. Anne is founding member of the Norwegian Nurses Organisation's special interest group on Nursing informatics and eHealth, and past chair of the Norwegian Society for Medical Informatics. She is the immediate Past President of EFMI (European Federation for Medical Informatics) and current IMIA-EFMI Vice President (2016-2018). She is EFMI representative in the EU eHealth stakeholder group, and lead for their area "Citizens – health data". She was elected fellow of ACMI (American College of Medical Informatics) 2015, and founding member of the IAHSI (International Academy for Health Sciences Informatics). She is member of the EFMI AC2 working committee, set up to by the EFMI Council in 2017 to revise and refocus EFMI's efforts in certification, accreditation and professional recognition of health informatics expertise in Europe. Anne Moen is an RN (1985), with a master degree in nursing science (1996), and PhD in social sciences – specialization in health informatics (2002).*

Undernutrition is an increasing self-care problem among home dwelling older adults. The problem can relate to a variety of factors that in sum lead to declines with health and wellness challenges. Little attention to risks for undernutrition, few tools for assessment of nutritional problems, and little insights to low-threshold nutrition interventions add to the problem.

Future oriented smart care solutions should include tools that affords novel opportunities to document dietary intake, suggest variation in food-intake, and visualize to personalize dietary advice. We developed APPetitus, an easy-to-use application, to strengthen personal nutritional care. In this contribution I will point out key functionalities in the app and share experiences from our field trials that can highlight how digital nutrition support is a key aspect of Smart care.

O-4: Risk Factors of Hospitalization

Kelvin K. Tsoi PhD[1,2,3], Ruby Yu PhD [1], Nicholas B. Chan BSc[3], Karen K. Yiu MSc[3], Helen M. Meng PhD[3, 4], Samuel S. Wong MD [2], Jean Woo MD[1]

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[3]*SH Big Data Decision Analytics Research Centre;*
[4]*Department of Systems Engineering and Engineering Management, The Chinese University of Hong Kong, Hong Kong SAR*

Background: Blood pressure (BP) monitoring is one of the most important surveillance for better healthcare management. Systolic and diastolic blood pressures were used to consider as the main indicators for hypertension. However, the blood pressure variability (BPV) was found to be a potential risk factor for cardiovascular events. The objective of this study was to identify the risk factors of hospitalization based on over a year visit-to-visit BPV.

Methods: e-Health project commenced in Nov 2016, it is a local multi-centered study to monitor BP in the elderly community. All health data and BP records were captured and stored on the cloud server for real-time BP analysis. Participants had regular BP measurement in every week, those with at least 30 BP records in the first year of follow-up were included in this study. Visit-to-visit BPV was defined as the mean absolute deviation between the BP records and the personalized BP trends fitted using cubic regression. Machine learning approach has been used to stratify the levels of BPV for K-means clustering algorithm on both systolic and diastolic BP. All subjects were classified into 3 levels of BPV groups; low, medium and high. The hospitalization was used as the study end-point, and age, gender, mean BP, BPV, number of medication used, frailty, sarcopenia, and memory function were used as the independent variables. Multivariate logistic regression was used to investigate the associations with the hospitalization in terms of odds ratio (OR) with 95% confidence interval (CI).

Results: A total of 1,095 subjects were follow-up for 12 months with average of 163 BP readings per each participant (SD=74). Age, BPV, use of medications, frailty, sarcopenia, and memory function were shown to be associated with the risk of hospitalization (Table 1). In the multivariate analyses, there were significantly increased risk of hospitalization in the medium and high BPV groups (OR=1.67; 95% CI=1.23-2.28 and OR=2.07; 95% CI=1.36-3.13, respectively), in the patients prescribed 1-4 medications and 5 or above medications (OR=2.39; 95% CI=1.29-4.86 and OR=4.05; 95% CI= 2.09-8.51, respectively); in the pre-frail and frail groups (OR=1.47; 95% CI=1.04-2.09 and OR=3.15; 95% CI=2.11-4.74, respectively).

Conclusion: Visit-to-visit blood pressure variability, other than comorbid conditions with complex medication used and personal frailty, is shown to be a risk factor for hospitalization. Regular measurement of blood pressure is recommended to better understand BPV levels.

Keywords: blood pressure variability, hospitalization, hypertension, elderly, machine learning, digital marker

O-5: Digital narrative as a tool for interaction and social inclusion

Anna-Liisa Arjama MHS [1], Jukka Koivisto Pedagogical expert[2]
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[2]*Diakonia college of Finland*

Background: Loneliness and lack of social contacts are common problems with people living in long-term care homes or assisted living. Technological devices provide a promising tool to reduce isolation, promote well-being and support social inclusion. These aims, recognized in national policies, are often difficult to achieve in practice due to expenses or lack of technical knowledge. Our poster describes the results of implementing a "digital narrative" approach in promoting social inclusion.

Aim and setting: Four clients living in long-term care or assisted living units in Helsinki Deaconess Institute participated in a learning circle once a month together with their own workers. The aim was to create a "digital narrative", a short video based on person´s life-story, personality or point of interest. Video, pictures, music and narratives were used creatively by the clients to express their own voice. A pedagogical expert was present to teach and assist with the use devices.

Outcomes: The most important outcome was enabling a new, creative way to be in contact with clients suffering from addictions, handicaps, memory loss or other severe problems. Using digital devices encouraged to explore the interests and experiences of the client in ways that differed from the more traditional professional-client interaction thus enhancing new insights, levels of trust and information of the client's lifeworld. Secondly, building narratives together was a genuine possibility to strengthen client´s own voice as a service user. By using digital devices clients not only expressed emotions and ideas but also made decisions about how to transmit these in a meaningful way. Learning to use the internet, email etc., was also a major outcome that enforced social inclusion as digital citizens in contemporary society.

Further developments: In the next learning circle the pedagogical expert will be accompanied by a client and an employer as technical supervisors. In co-operation with secondary school we will find "digital sponsors", students who will regularly keep in contact with clients. Narratives will be used in teaching students, inducting employers and influencing to the well-being of the people in the weakest position in society.

Keywords: digital narrative, digital storytelling, health promotion, technology in social care, learning circle, social inclusion

O-6: The feasibility and effectiveness of remote fitting of cochlear implants

Aarno Dietz[1], MD, PhD, Rauno Jäntti[2], BHealthSc, Matti Iso-Mustajärvi[1], MD
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Background: Age-related hearing loss (HL) is the third most common chronic health condition affecting older adults. Approximately 30 % of individuals aged 65 or older have some degree of hearing loss. The estimates rise to 70 -90 % of those aged 85 and older. As life expectancy in industrialized countries is increasing, so is the number of the elderly people who develop severe HL. If untreated, it has a well-established association with anxiety, depression, cognitive decline, and loss of social activity and autonomy. Recently, a meta-analysis has identified HL as the most significant but modifiable risk factor for dementia.

Cochlear implantation has become a standard treatment for restoring hearing in severe and profound sensori-neural HL. The rapid evolution of technology has led to constantly improving outcomes and to an expansion of the indication criteria, nowadays including patients with less severe hearing impairment and single-sided deaf-ness. Rehabilitation with cochlear implants requires life-long postoperative care and uses substantial health care resources.

The Kuopio University Hospital's so-called ERVA area provides cochlear implant rehabilitation to a large but sparsely populated region. Cochlear implant rehabilitation requires life-long follow-up at the tertiary institution and the number of patients is constantly increasing.

Objectives: To evaluate the feasibility and cost effectiveness of remote cochlear implant fitting, with respect to the technical realization, quality of of care and the cost-effectiveness.

Material & Methods: 8 adult cochlear implant recipients from the Central Finland Central Hopsital district will be recruited for remote fitting. The patient visit happens at the Rehabilitation Center in Jyväskylä and the sound processor measurements and programming will be performed by an audiologist at the Kuopio University Hospital. Patients experience will measurement with a validated questionnaire. The audiologic results will measured with speech-in-noise tests. Cost-effectiveness will be calculated.

Results: We describe the network requirements and the equipment setup for the remote fitting of cochlear implants. The application of remote fitting for sound processor measurements and programming is time saving for the patients and is associated with lower costs to the health care system.

Discussion: Finland has a sopisticated and powerful telecommunication network, which makes the provision of remote tele-audiology feasible. There is a paucity of research examining reimbursement and cost-effectiveness of remote services in audiology. The preliminary results of the present pilot study will presented. The feasibility and the cost-effectiveness will be discussed.

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Sessio 3A: eKoulutus ja eTutkimus / eEducation and eResearch

Puheenjohtaja: työelämäprofessori Jarmo Reponen, Oulun yliopisto

Chair: Professor Jarmo Reponen, University of Oulu, Finland

Tiistai 2.4.2019 - Tuesday 2nd of April 2019

13:50 – 15:20

3A-1 DigiCampus - Korkeakoulujen yhteinen digitaalinen oppimisympäristö

Tuula Heide, Hankejohtaja
Itä-Suomen yliopisto

3A-2 Sosiaali- ja terveys alan digitalisaation vaatiman osaamisen vahvistaminen korkea-asteen koulutuksessa

Outi Ahonen, Lehtori
Laurea-ammattikorkeakoulu

3A-3 Lääketieteen alojen koulutuksen digitalisaatio ja modernisaatio MEDigi-hankkeessa

Jarmo Reponen, Työelämäprofessori
Oulun yliopisto

3A-4 Tietojärjestelmälääkäri vuonna 2025

Tove Laivuori, Yleislääketieteen erikoislääkäri, vastaava lääkäri
Mehiläinen Oy

3A-5 Kansallinen SoTe-digitalisaatiotutkimus - manuaalisista raporteista vuorovaikutteiseen seurantaan

Hannele Hyppönen, Tutkimuspäällikkö
Terveyden ja hyvinvoinnin laitos (THL)

5 min rapid scientific presentations

O-7 DigiNurse Model develops nursing students´ digital skills

Pirjo Vesa[1], PhD, Principal Lecturer, Helena Ikonen[1], M.Sc., Lecturer, Hanish Bhurtun[1], PhD-student, Lecturer, Arja Halkoaho[2], PhD, Adjunct Professor, Principal Lecturer, Sari Räisänen[2], PhD, Adjunct Professor, Principal Lecturer, Raija Kokko[1,2], PhD, Project Coordinator
[1]Karelia University of Applied Sciences, Finland, [2]Tampere University of Applied Sciences Ltd, Finland

O-8 Nurses' Satisfaction with Medication Administration System

Kuusisto, Anne[1], PhD, Postdoctoral researcher; Santavirta, Jenni[2], MNSc, RN; Saranto, Kaija[3], Professor; Suominen, Tarja[4], Professor; Asikainen, Paula[5], PhD, Adjunct Professor
[1]Satakunta Hospital District, Administration Centre, University of Turku, Department of Nursing Science,
[2]Satakunta Hospital District, Medical Care Area
[3]University of Eastern Finland, Department of Health and Social Management
[4]Tampere University, Faculty of Social Sciences
[5]Satakunta Hospital District, Administration Centre, Tampere University, Faculty of Social Sciences

O-9 Ubiquitous learning environments promoting deeper and more efficient learning

Antti Kotimaa[1], PhD, Anssi Mähönen[1], PhD, Jesse Honkanen[1], MCS, Mikko Myllymäki[1], BHSc, Sirkka-Liisa Halimaa[1], PhD
[1]Savonia University of Applied Sciences, Applied Wellbeing Technology

DigiCampus - Korkeakoulujen yhteinen digitaalinen oppimisympäristö

Tuula Heide, Hankejohtaja
Itä-Suomen yliopisto

Biografia Tuula Heide

Tuula Heide toimii hankejohtajana Itä-Suomen yliopistossa DigiCampus hankkeessa.

DigiCampus - A common digital learning environment for universities

Tuula Heide, Project Manager
University of Eastern Finland

Biography Tuula Heide
Tuula Heide works as a Project Manager at University of Eastern Finland for DigiCampus project.

Sosiaali- ja terveys alan digitalisaation vaatiman osaamisen vahvistaminen korkea-asteen koulutuksessa

Outi Ahonen, Lehtori
Laurea-ammattikorkeakoulu

Biografia Outi Ahonen

Outi Ahonen työskentelee Laurea-Ammattikorkeakoulussa hoitotyön lehtorina, digitaalisessa yksikössä. Hän on hoitotieteen maisteri. Hän tekee väitöskirjaa sosiaali- ja terveydenhuollon tiedonhallinnan osaamisesta Itä-Suomen yliopistossa sosiaali- ja terveysjohtamisen laitoksella. Hän toimii projektipäällikkönä SotePeda 24/7projekteissa, joissa vahvistetaan osaamista sosiaali- ja terveydenhuollon digitaalisten palvelujen kehittämiseen moniammatillisesta näkökulmasta. Hän on Suomen Sairaanhoitajaliiton valtuuston jäsen ja Suomen tele- ja eHealth seuran hallituksen jäsen.

Digital Services in Health and Social Care Needs Multidisciplinary Competences

Outi Ahonen, Senior Lecturer
Laurea University of Applied Sciences, Finland

Ahonen Outi[1], MNSc, Sihvo Päivi[2], MNSc,
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[2]Karelia University of Applied Sciences

Biography Outi Ahonen

Outi Ahonen has been working as senior lecturer in nursing at Laurea UAS. She has master degree in nursing science. She is doing her PhD studies in University of Eastern Finland. She works at Laurea UAS in Digital unit. She is project manager in project considering developing ehealth and Welfare Serivces in multiprofessional perspective called SotePeda 24/7.She is a member of the Finnish Nursing Associations council and a member of the Finnish tele and eHealth board.

Digital health and social care services play important roles in improving care and increasing citizens' participating in their own care. To develop digital services, there needs to be worldwide changes to coordinate quality health services with universal access1 as well as strong guidelines from national policy makers 2. Multidisciplinary cooperation is required to develop digital health and welfare services.

The Finnish health and social care sector is changing fast and citizens are most active to use digital services in European region. In Finland, new digital services are placing an emphasis on each individual's own health and wellbeing expertise and decision-making. Future customers will increasingly produce information about their holistic wellbeing while using digital health and social care services, but customers' abilities to utilize digital tools vary significantly. Professionals need to update their skills and competences so they can support customers in choosing the most suitable services and technologies. Services need to be developed, accounting for the needs of health and social care sector users, and customers are therefore at the center of this digital, customer-oriented reform and are considered to be active experts in their own health and wellbeing2. Future health and social care requires multidisciplinary, boundary-crossing competence to utilize digitalization as part of health and social care services.

The SotePeda 24/7 project (2018–2020) aims to improve the future digital and co-creation skills and competences of multidisciplinary developers of health and social care services. The project defines and develops digital competences for health and social care, information communication and technology (ICT), and business professionals. It offers digital studies, pedagogical solutions, competence frameworks, ethical principles, and a open-study environment in national level. The purpose of this presentation is to describe the aims of SotePeda 24/7 and explain what kinds of digital solutions and pedagogical tools it will offer to meet health and social care sector reforms for educators, students, and working life representatives.

The mission of the project is "Starting from 2020, SotePeda 24/7 project enables an open learning environment for collaborative cross-curricula learning which is produced by co-creation and is implemented through trilogue learning perspective. The knowledge of health and social care digitalization and the development of human-centered services will increase among university teachers, students and professionals. " The results of the project is expected after one year.

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[2] Ministry of Social Affairs and Health. Information Strategy for Social and Health Care 2020 [Internet]. 2015. Available from: http://urn.fi/URN:ISBN:978-952-00-3575-4

Lääketieteen alojen koulutuksen digitalisaatio ja modernisaatio MEDigi-hankkeessa

Jarmo Reponen, Työelämäprofessori
Oulun yliopisto

Biografia Jarmo Reponen

LT, radiologian erikoislääkäri sekä terveydenhuollon tietotekniikan ja mammografia-seulonnan erityispätevyydet, terveyden tietojärjestelmien työelämäprofessori lääketieteellisen kuvantamisen, fysiikan ja tekniikan (MIPT) –tutkimusyksikössä Oulun lääketieteellisessä tiedekunnassa. Teleläätietieteen ja eHealth-seuran aiempi pj, kansainvälistä kokemusta mm. EuroPACS ja Nordic Telemedicine Association pj:na sekä useista järjestöistä ja kongresseista. Ylilääkärin tehtävien ohella 30 vuoden kokemus tietojärjestelmien kehittämisestä, käyttöönotosta ja arvioinnista, erityisesti sähköisestä potilaskertomuksesta ja radiologian järjestelmistä. Hänen tutkimusryhmänsä toteutti maailman ensimmäisen lääketieteellisen mobiiliappsin älypuhelimiin 20 vuotta sitten. Nykytutkimus keskittyy digitalisaatioon terveydenhuollossa, tekoälyn mahdollisuuksiin ja tietojärjestelmien arviointiin. Vastaa lääkäreiden ja hammaslääkäreiden terveydenhuollon tietotekniikan erityispätevyydestä ja toimii hankejohtajana kansallisessa lääketieteen ja hammaslääketieteen perusopetuksen digitalisaatiohankkeessa, MEDigi:ssä.

MEDigi – Lääketieteen alojen opetuksen digitoiminen ja harmonisoiminen – on opetus- kulttuuriministeriön rahoittama koulutuksen kärkihanke (1). Se toteutetaan 1.4.2018 – 31.12.2020 lääketieteellisten tiedekuntien yhteistyönä Helsingin, Itä-Suomen, Oulun, Tampereen ja Turun yliopistoissa. Hanketta koordinoi Oulun yliopisto. Hankkeen kokonaiskustannusarvio on yli 4 miljoonaa euroa, josta OKM rahoittaa 70 % toteutuneitten kustannusten mukaan.

MEDigi hankkeen tavoitteena on valtakunnallinen lääketieteen ja hammaslääketieteen koulutuksen harmonisointi ja modernisointi hyödyntämällä digitalisaatiota opetuksessa. Hankkeessa luodaan yhteinen valtakunnallinen oppimisalusta ja tuotetaan alustalle sähköistä oppi- tentti- ja arviointimateriaalia lääkärin ja hammaslääkärin peruskoulutukseen. Hankkeessa kehitetään myös tulevien lääkäreiden ja hammaslääkäreiden työelämäosaamista tuomalla opetukseen terveydenhuollon sähköisiin työvälineisiin (e-Health, m-Health) liittyvää tietotaitoa. MEDigi-hankkeessa lääketieteen alojen opetushenkilökunnalle tarjotaan digipedagogista koulutusta ja luodaan koulutusmalli digitaidoille myös hankeajan jälkeen.

Työskentely hankkeessa tapahtuu valtakunnallisessa yhteistyössä oppiaineittain, joita esim. lääketieteessä on yliopistosta riippuen yli 50. Kansallisten osaamistavoitteiden kehittäminen oppiaineittain tukee tuoreessa Kansallisen koulutuksen arviointikeskuksen (KARVI) arvioinnissa esitettyjä opetuksen kehittämiskohteita ja luo pohjan sähköisille materiaaleille (2). Yhteinen oppimisalusta mahdollistaa jatkossa joustavan opiskelun ja digitaalisen tiedonsiirron koulutusyksiköiden ja –järjestelmien välillä. Toimintatapa tukee verkostoitumista ja mahdollistaa jatkuvan oppimisen opiskelijoille ja opettajille. Tulevien ja nykyistenkin ammattilaisten osalta tarvitaan uusia taitoja, koska sähköisesti liikkuvat potilastiedot, etädiagnostiikka, etähoito sekä potilaan osallistuminen ovat mukana arjessa ja tekoälyn avustava rooli muuttaa toimintatapoja.

Hanke on käynnistynyt nykyisen digiosaamisen sekä tulevien tarpeiden kartoituksella ja valtakunnalliset oppiainekohtaiset työryhmät ovat aloittaneet työnsä alkuvuoden 2019 aikana. Monessa oppiaineessa käydään nyt ensimmäistä kertaa laajaa keskustelua yhteisistä osaamistavoitteista. Hanke on nostanut esille yliopistoille yhteisiä haasteita kerätyn materiaalin pitkäaikaisesta saatavuudesta ja ylläpidosta, tekijänoikeusasioista ja lääketieteellisten materiaalien tietosuojakysymyksistä.

MEDigi-hankkeen yhteistyössä ovat yliopistojen lisäksi lääkäriseura Duodecim ja hammaslääkäriseura Apollonia. Yhteistyötä tehdään muiden opetuksen kärkihankkeiden kanssa (mm. oppimisympäristön kehittämishanke DigiCampus sekä sote-alan digitalisaation osaamisen kehittämishanke SotePeda 24/7). MEDigi-hankkeella on hankevastaavat yliopistoissa ja hankekoordinaattorina toimii FT, TtM Anna Levy Oulun yliopistosta. Hankkeen verkkosivut löytyvät osoitteesta http://www.medigi.fi.

Lähteet:

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MEDigi project will utilize digitalization to improve the education of medical and dental students

Jarmo Reponen, Professor
University of Oulu, Finland

Biography Jarmo Reponen
MD, PhD, radiologist, special competence in healthcare information systems, serves as a Professor of Practice for health information systems at the Medical Imaging, Physics and Technology(MIPT) research group, Faculty of Medicine, University of Oulu, Finland. He is past president of FSTeH, EuroPACS and Nordic Telemedicine Association and he has served in many international congress organizations. He has parallel to his clinical work 30 years of experience in the development, implementation and evaluation of hospital 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 their research focuses on the effects of digitization in healthcare, with target areas of artificial intelligence and assessment of the use of information systems. Reponen is the responsible teacher for the special competence of healthcare information technology for Finnish physicians and dentists and most recently the project manager in the Finnish national MEDigi project for the digitalization of medical and dental undergraduate education.

MEDigi is a Finnish national project that aims for harmonization and digitalization of undergraduate teaching for undergraduate medical and dental students. It is a collaboration project for all five medical schools in Finland: Helsinki, Eastern Finland, Oulu, Tampere and Turku. The coordinator is University of Oulu. Finnish medical society Duodecim and dental society Apollonia are supporting the project, too. The project timespan is until the end of 2020. MEDigi is financed by the Finnish Ministry of Culture and Education and its total budget is over 4 million euros.

The main target of MEDigi is to build a common national digital on-line learning environment and learning material repository targeted especially to medical and dental students. MEDigi will create contents both for learning and evaluation. This is achieved by national collaboration within individual medical and dental learning topics (specialities) which will set the common learning objectives and competence goals before producing the material for the project. MEDigi will help the medical schools to answer to the recommendations given by the Finnish Education Evaluation Centre (KARVI) in their recent evaluation report of medical education (1). In order to fullfill the goals, MEDigi will improve the digital skills of teachers, too. Moreover, MEDigi will support future physicians and dentists in their professional environment by creating special learning contents for eHealth and mHealth teaching already in undergraduate phase. More information will be available on the MEDigi website http://www.medigi.fi.

Reference:

1. https://karvi.fi/en/publication/educating-doctors-for-the-future/ (Accessed 10.03.2019).

Tietojärjestelmälääkäri vuonna 2025

Tove Laivuori, Yleislääketieteen erikoislääkäri, vastaava lääkäri
Mehiläinen Oy

Biografia Tove Laivuori

Tove Laivuori, LL, yleislääketieteen erikoislääkäri, työskentelee Lääkärikeskus Mehiläinen Töölön vastaavana lääkärinä. Hän on Suomen Lääkäriliiton tietojärjestelmälääkärit - alaosaston puheenjohtaja ja Lääkäriliiton eHealth valiokunnan jäsen. Hän työskenteli aiemmin asiantuntijana Apotti Oy:ssa. Laivuori suorittaa parhaillaan terveydenhuollon tietotekniikan erityispätevyyttä sekä Digital Health tutkintoa Savonia-ammattikorkeakoulussa.

Suomessa eletään digitaalisten terveyspalveluiden ja tietojärjestelmien murroskautta. Modernien tietojärjestelmien kehittämisen myötä tarve uudistaa terveydenhuollon tietojärjestelmiä on ilmeinen. Eri puolilla Suomea on käynnissä useita isoja tietojärjestelmähankkeita. Sujuvien ja helppokäyttöisten tietojärjestelmäratkaisujen kehittämiseksi tarvitaan lääkäreitä, jotka osaavat puhua sekä kliinikoiden että tietohallinnon kieltä.

Suomen Lääkäriliiton Tietojärjestelmälääkärit- alaosasto perustettiin vuonna 2013. Edellisvuonna oli perustettu Lääkäriliittoon Terveydenhuollon tietotekniikan erityispätevyys- koulutusohjelma. Alaosaston tarkoituksena on edistää ja valvoa terveydenhuollon tietotekniikan asiantuntijoina toimivien jäsentensä ammatillisia etuja.

Edelleen esiintyy paljon epätietoisuutta tietojärjestelmälääkäreiden olemassaoloon, osaamiseen ja toimenkuvaan liittyen. Tietoisuuden lisääminen on tärkeää, jotta organisaatioissa ymmärretään mihin tietojärjestelmälääkäreitä tarvitaan ja miten heidän osaamistaan voitaisi tehokkaammin hyödyntää mm erilaisissa kehittämishankkeissa.

Vuonna 2014 alaosasto toteutti tietojärjestelmälääkärin työssä toimiville lääkäreille kyselyn, jolla kartoitettiin heidän taustaa, nykyistä toimenkuvaa, työtehtäviä sekä roolia organisaatioissa. Kyselyn perusteella suurin osa tietojärjestelmälääkäreistä toimi tehtävässään osa-aikaisina ja heidän virkanimikkeissään korostuivat ylilääkärit. Kyselyssä nousi esille tarve selkeyttää tietojärjestelmälääkäreiden toimenkuvaa, vastuita ja valtaa sekä kommunikaatiota johdon kanssa. Kysely on tarkoitus uusia alkuvuodesta 2019 jotta nähdään miten asiat ovat viidessä vuodessa kehittyneet.

Healthcare information technology physician in year 2025

Tove Laivuori, General Medicine Specialist, Chief Medical Officer
Mehiläinen Oy

Biography Tove Laivuori

Tove Laivuori, MD, General Medicine Specialist, works as Chief Medical Officer for Lääkärikeskus Mehiläinen Töölö in Helsinki, Finland. She is the chairwoman of the Finnish Medical Association´s subdivision for guarding of healthcare information technology physician´s interests. She is also a member of the eHealth committee. Previously she has worked as an associate for Apotti Oy. Laivuori is currently conducting the Finnish Medical Associaton´s special competence program for Healthcare information technology and Master´s degree programme in Digital Health at Savonia University for Applied Sciences

Digital health and development of healthcare information systems raise the need for physicians who have combined knowledge in clinical medicine and information technology. The Finnish Medical association´s subdivision for guarding of healthcare IT physician´s interest was established in 2013. A year earlier the Finnish Medical Association established a special competence program from healthcare information technology.

The subdivision conducted a survey for healthcare IT physicians in 2014 to find out about their backgrounds, competences, job description and role within the organisation. The survey showed that most healthcare IT physicians were appointed part-time and many were chief physicians. The survey will be conducted again in early 2019 to see if the situation has changed.

Kansallinen SoTe-digitalisaatiotutkimus - manuaalisista raporteista vuorovaikutteiseen seurantaan

Hannele Hyppönen, Tutkimuspäällikkö
Terveyden ja hyvinvoinnin laitos (THL)

National monitoring of e-health and e-welfare: from manual reporting to interactive dynamic reports

Hannele Hyppönen, Leading Expert
National Institute for Health and Welfare

Biography Hannele Hyppönen

Hannele Hyppönen, PT, PhD, acts as a leading expert in National Institute for Health and Welfare in Service System Research Unit. Her expert area is eHealth benchmarking and evaluation. She has a long experience in clinical work, a master's degree and doctorate in University of Helsinki (organizational learning and sociology of technology). She has worked in the Unit of eHealth and eWelfare in National Research and Development Centre for Welfare and Health (STAKES) since 1996 and in National Institute for health and Welfare (THL) since 2009, leading the national eHealth assessment work, and also the Nordic eHealth indicator development work under the Nordic Council of Ministers. Currently she works as a leading expert in eHealth monitoring and research, including the STEPS -programme for national eHealth benchmarking commissioned by the Ministry of health and social affairs, work for the IMIA WG Technology Assessment & Quality Development, and in several eHealth research projects.

Introduction

Evidence-based policy (EBP) refers to (public) policy decisions informed by established objective evidence. EBP reflects the belief that social goals are best served when scientific evidence is used to inform decisions, instead of piecemeal, cherry-picked or even manipulated information [1, 2]. Evidence-base about what is likely to work in what circumstances is generated for more effective implementation of eHealth policies as well [3]. However, rigorous evidence-building is often too slow to serve policy decisions, where timely, reliable and relevant to the issue at hand, independent and impartial, compact and understandable information is needed [2]. The aim is to report, demonstrate and discuss an interface for dynamic database reporting of systematic, nation-wide eHealth monitoring, constructed to show attainment and impacts of the Finnish eHealth strategy implementation [4, 5].

Material and Methods

The databased eHealth evidence consists of measures drawn from five nationwide eHealth surveys from 2010, 2014 and 2017, with published survey tools [5]. The eHealth policy goals as well as international eHealth monitoring surveys were reviewed to match questions to policy goals and make them internationally comparable. The survey for health care organizations measures availability and use of eHealth tools and services. The survey for social care organizations measures availability of eWelfare tools and services. The surveys for physicians and nurses measure usability and benefits of eHealth tools and services from professionals' viewpoints. The citizen survey measures eHealth and eWelfare service use, utility, barriers and needs. For the database, the survey results were grouped according to the key policy areas: Citizens as service users; Professionals; Service system; Refinement of information and knowledge management; Steering and cooperation in information management; Infostructure [4]. Indicators and composite indicators (checking the reliability) were developed from individual questions or groups of questions to measure percentage of attainment of the individual goals.

Results

The database has two interfaces: 1) data cube with all measures and background variables and 2) graphical database reports for key measurements and selected background variables. In the cubes, users can navigate, filter data, switch measures, customise the table, row and column selections, sort data, export data and generate bookmarks. In the graphical reports users can select measures and background variables and view results (selected measures by selected background variables) on a regional map, radar diagram or different bar charts for easy comparison of e.g. regional results or results by vendor system or patient demographics. The usage of the database cube and graphical reports will be demonstrated by use cases:e.g. ICT manager for a middle sized region, who needs data on baseline situation and benchmark regarding eHealth in his region, to develop the system regionally and to participate in the national eHealth policy development. He is interested in system

integration, patients' preferences in his region, how the policy goal implementations are progressing in his region and what the differences between regions are.

Discussion

The databased evidence allows users to select indicators of personal interest and view them by selected background variable (tailoring results), whereas publications present only results selected by researchers. Feedback on the reporting system allows researchers to continuously improve data collection and reporting to best serve the users.

References

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O-7: DigiNurse Model develops nursing students´ digital skills

Pirjo Vesa[1], PhD, Principal Lecturer, Helena Ikonen[1], M.Sc., Lecturer, Hanish Bhurtun[1], PhD-student, Lecturer, Arja Halkoaho[2], PhD, Adjunct Professor, Principal Lecturer, Sari Räisänen[2], PhD, Adjunct Professor, Principal Lecturer, Raija Kokko[1,2], PhD, Project Coordinator

[1]*Karelia University of Applied Sciences, Finland*
[2]*Tampere University of Applied Sciences Ltd, Finland*

Introduction

Digitalization is a solution for costumers to enable easier to access to care by smartphones, computers and other digital tools. However, that requires the development of health care professionals´ in skills to be capable of coaching and supporting their customers efficiently. Furthermore, digitalization improves data collection monitoring in health care practices to for the safety and quality of care.

The DigiNurse Model for nursing education is being building in the DigiNurse project (2017-2020) to facilitate students to improve their digital competence and professional nursing skills. The DigiNurse project is a practice orientated development project in four European countries: Slovenia, Portugal, Belgium and Finland. The DigiNurse Model aims to guide nursing professionals to choose the best teaching and learning methods for digital coaching.

Material and Methods

To create the Model elements of digital competence we have identified them by systematic reviews (n=3). For the preliminary Model, we have identified Technology acceptance model (TAM) and Harasim´ s model for Online Learning as suitable methods to be applied in digital coaching. To test the preliminary Model, we have build the questionnaire to test the elements of the Model with nursing students. The survey is currently underway (n=84) in Finland. Later transnational patient cases and multidisciplinary workshops will be developed and used, as well as multi-professional simulations and virtual meetings. The active learning method will be integrated into this process and therefore students will be engaged in the assessment, implementation and evaluation activities. The professional elements consist of professional values and technological competence among others.

Results

DigiNurse will be a generic model containing organizational, educational and professional elements for the development of students' digital competence. Based on the systematic reviews, digital coaching was selected for future development in the DigiNurse-project (2019-2020). Digital skills will include the digital coaching of patients, providing tailor-made health promotion and education, monitoring health data and attending to decision protocols, setting life goals, supporting treatment compliance, assessing progress, and integrating advance care planning, all based on shared decision making. The preliminary results of the questionnaire will be discussed in the conference.

Discussion

The digital coaching is a new concept that is less studied. The main challenges associated with the digital coaching were reported being users´ attitudes and features and usability of the tools. Cultural knowledge and sensitivity are utmost important in digital coaching.

References

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O-8: Nurses' Satisfaction with Medication Administration System

Kuusisto, Anne[1], PhD, Postdoctoral researcher; Santavirta, Jenni[2], MNSc, RN; Saranto, Kaija[3], Professor; Suominen, Tarja[4], Professor; Asikainen, Paula[5], PhD, Adjunct Professor

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[2]*Satakunta Hospital District,* Medical Care Area
[3]*University of Eastern Finland,* Department of Health and Social Management
[4]*Tampere University,* Faculty of Social Sciences
[5]*Satakunta Hospital District,* Administration Centre*, Tampere University,* Faculty of Social Sciences

Introduction

Technologies must be highly usable to ensure high-quality and safe care delivery without unnecessary increases in workload (Lopec & Fahey 2018). Medication delivery is one of the most important aspects of patient care and central part of nurses' work. Nurses use the Medication Administration System (MAS) for medication management. (Hurley et al. 2006, Staggers et al. 2007.) Nurses' satisfaction with MAS reflects how usable the system is. There is a strong relationship between critical indicators of poor usability and nurse satisfaction, clinical productivity, nurse fatigue and error rates. (Page & Schadler 2014.) Electronic Medical Administration Records should serve to facilitate communication between nurses, physicians and pharmacists (Staggers et al. 2007).

Objectives

This study is part of an evaluation study of the implementation of the Electronic Health Record (EHR). The purpose is to describe nurses' satisfaction with the use of MAS in the areas of efficacy, safety and access. The study compares the assessments of nurses using the electronic medicine leaflet (home medication application of EHR) with assessments that do not use it. The aim is to produce information that can be utilized in MAS and EHR development.

Material and Methods

A cross-sectional study was conducted in one hospital district. The double-translated Medication Administration. System – Nurses Assessment of Satisfaction (MAS-NAS) was the survey used to explore nurses' satisfaction with MAS. Satisfaction was defined as the degree to which organizational structures and operational practices support the process and procedures of delivering pharmaceutical products to patients. The questionnaire included 11 background questions and 25 questions covering the topics efficacy (n = 9), safety (n = 9) and access (n = 7) of the MAS. The Likert scale was 1–6 (1 = completely agree - 6 = completely disagree). In addition, there was the option 'does not apply'. (Hurley et al. 2006.) The pretested paper-based questionnaire was sent to all the nurses in the psychiatric and operative domains (n = 846). The survey period ranged from December 2014 to January 2015. The data were analysed by statistical methods.

Results

The return rate was 37.9 % (n = 324). The majority of respondents were over 40 years old (62 %), women (86 %) and nurses (82 %). Most (57 %) had over 15 years of work experience in the health care sector. Respondents reported operational (58 %), psychiatric (39 %) and other (1 %) as their domain. Less than half named the ward (46 %), one fifth the operation unit (22 %), just under one fifth the outpatient clinic (16 %) and other (15 %). Fifty per cent of the respondents said they used the electronic medicine leaflet. Over half of the respondents agreed that medication management is effective (53.6 %), safe for patients (63.7 %) and that using the MAS provides the necessary medical treatment information (e.g. medical prescriptions) (54.3 %). The Mann-Whitney nonparametric test revealed that nurses who used the medicine leaflet had a higher average score on the efficacy of the drug management system, safety and access than those who did not use it ($p < 0.001$).

Discussion

EHR users were more satisfied with their MAS than non-users. The difference was statistically significant. The MASNAS measure (Hurley et al. 2006) used in this study can be considered internally consistent as the Cronbach alpha coefficient between all the Likert scale variables in the questionnaire was high (0.92). Just over half of the respondents were satisfied with the MAS. The MAS should thus be developed further in the areas efficacy, safety and access.

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O-9: Ubiquitous learning environments promoting deeper and more efficient learning

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Introduction
The project develops and tests ubiquitous learning environments for social and health care workers and students, work guidance, learning and recruitment. This improves the know-how of students and employees providing information to support recruitment processes. Multiple pilots and test will ensure that the developed ubiquitous learning environments can be effectively exploited at the end of a project. The project builds an easily approachable way of developing and providing new services.

Material and Methods
The ubiquitous learning environments produced in this project are designed to enable familiarization of spaces and equipment or work guidance regardless of time and place. The ubiquitous learning environment includes materials to basic work situations as well as instructions to technical equipment. Same environments can be used in various difficulty levels to support different levels of learning. Students can also get acquainted with genuine working environments already during their studies, thus shortening traineeships and they could focus more on the actual work during the trainee period. Students are able to explore genuine learning- and workplace environments virtually. This enables new professionals to have a broader vision of working life and its needs and allow "silent knowledge" transfer for new professionals. The ubiquitous environments can be utilized as part of the recruitment process, allowing the employer to see how the possible employee works in different situations related to the job.

The environments bring a real laboratory with real equipment and processes to the students to study anytime and anywhere. Emergency care nurses can learn and memorize how machines and equipment work. Nurses in the elderly care can check beforehand, what they should remember when confronting an elderly patient in their home. All this can be done anytime, anywhere.

Results
As a result of this project we receive tools for recruitment, orientation and training. Also an operating model to updating and possible commercialization of these solutions is created.

With these environments we increase students and workers knowhow, make learning more accessible, engaging and with fewer resources, students are better equipped to the working life and workers are better guided to their working spaces, processes and equipment.

Discussion
Ubiquitous environments provide such an informative, instructive and interactive environment not only for students but also for employees. Today’s education and working life wants and needs information based education and training using new technologies like virtual environments. Through virtual education and genuine learning environments, it is possible to achieve a better relationship between education and working life.

Session 3B: Data-driven Precision Medicine

Chair: Biobank Director, Professor Veli-Matti Kosma
Biobank of Eastern Finland

Tuesday 2nd of April 2019

13:50 – 15:20

3B-1 The Future of Genomic medicine

Juha Kere, Professor
King's College London, Karolinska Institutet & University of Helsinki

3B-2 Personalised Medicine and Oncology

Outi Kuittinen, Professor
University of Eastern Finland, Kuopio University Hospital

3B-3 Data-driven future supported by research and innovation competence centers

Maritta Perälä-Heape, Director, Professor of Practice
Centre for Health and Technology, University of Oulu, Finland

3B-4 Precision Care for Health Self-Management in Smart Environments

Anthony Maeder, Professor
Flinders University, Australia

5 min rapid scientific presentations

O-10 Implementation of an eHealth application in myeloma treatment: a longitudinal feasibility study for patients and health care professionals

Anna Maijala[1], MHSc, Jari Haverinen[1,2], MSc, MHSc, Satu Malmqvist[3], MHSc, Niina Keränen[1,4], MD, MHSc, Timo Jämsä[1,4,5], PhD, Jarmo Reponen[1,4], MD, PhD
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O-11 Digitalized secondary care services for insulin-dependent diabetes patients – Predictive cost-benefit analysis of Virtual Hospital 2.0 digital care path

Erkki Soini[1], MSc, Saku Väätäinen[1], MSc, Reeta Rintamäki[2], MD, PhD, Erja Huttunen[2], RN, Sirpa Arvonen[3], MSc, Pasi Kuosmanen[4], MSc
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O-12 How to succeed in implementing welfare technology to elderly care

Kämäräinen Pauliina[2], Registered nurse, BSc student, Kaija-Kortelainen, Minna[1], Registered Social Worker, Master of Social Work, Bachelor of Laws, Kinnunen, Anu[1], MSc, Master of Health Science
[1]Savonia University of Applied Sciences;
[2]City of Kuopio

The Future of Genomic medicine

Juha Kere, Professor
King's College London, Karolinska Institutet & University of Helsinki

Biography Juha Kere

Juha Kere is Professor of Molecular Genetics at Karolinska Institutet, Sweden; Professor of Genetics and Molecular Medicine at King's College London, UK; and group leader at University of Helsinki. He earned MD, PhD, and specialist physician in clinical genetics degrees at University of Helsinki. After postdoctoral research at Washington University, St. Louis, he was acting Professor at University of Helsinki and founding Director of Finnish Genome Center. He has published over 500 scientific original and review articles and supervised 48 doctoral theses. His research spans topics from positional cloning of human disease genes and complex disease genetics to mechanisms of diseases, and most recently, unraveling the activation of the human embryo genome during the first days after fertilization.

Genomic medicine is often understood to include individualised risk predictions, options for choice of treatment, or even drugs used differently depending on one's particular genome. One of the foundations for genomic medicine is laid by the tremendous success of genome-wide association studies (GWAS) in finding genomic markers (typically single-nucleotide polymorphisms, SNPs) that are either risk-increasing or protective in common, complex disorders. Other foundations lie in pharmacogenetics where typically single genes with functional alleles may underlie metabolic differences in drug availability, clearance, accumulation, and effects. After more than 10 years of GWAS, accumulating so far over 3,300 studies and nearly 70,000 SNP/trait associations, one can conclude that most SNP effects are small, diseases appear highly polygenic, many genes have pleiotropic effects (influence on many related phenotypes), and their utility for individual risk prediction is low. Virtually no genomic tests have made it to clinical use, and are unlikely to enter either. Therefore, genomic medicine is unlikely to benefit from individually used predictive tools for common, complex disorders looking at one's genomic constitution. Exceptions include, of course, monogenic effects such as well-documented pharmacogenetic targets where specific, targeted tests are clinically useful and important. Instead, we are likely to see the rise of a new kind of thinking in genomic medicine, exemplified by cancer diagnostics by finding mutated DNA in the cell-free DNA compartment in plasma (also called liquid biopsy). Such DNA tests are based on the notion that DNA fragments with typical cancer mutations are released to bloodstream from rapidly growing (and dying) cancer cells, and that healthy individuals do not carry such mutations. Even rare mutated DNA fragments can be sensitively detected by deep sequencing of soluble DNA fragments in blood. I prefer to call this kind of genetic tests as dynamic gene tests, as they monitor the body's current disease processes in a dynamic fashion, different from the static genome predictions.

Personalised Medicine and Oncology

Outi Kuittinen, Professor
University of Eastern Finland, Kuopio University Hospital

Biography Outi Kuittinen

Outi Kuittinen has been working as professor on Oncology in the University of Eastern Finland since 1.8.2018. Before that she worked in Oulu University Hospital, Department of Radiotherapy and Oncology as physician in chief for lymphoma therapies and stem cell transplantation. Her research acticity coveres both clinical research as well as translational research and research dealing with lymphoma biology. She has been collaborating with Finnish Lymphoma Group, Nordic Lymphoma Group, International Primary Central Nervous System Lymphoma Group and several international reserach teams. She has been the chair for Finnish Lymphoma Group, Finnish Stem Cell Transplantation Group and a member of Nordic Lymphoma Group coordinating group. She has supervised five doctoral thesis.

The human body is an extremely complex system. It´s growth and functions are regulated by approx. 30.000 genes, and multiple variants exist for each of them. Adding more complexity to the system, coding of an individual gene can be started from various points on the gene, thus the same gene is able to code various proteins. In addition to protein coding genes, 28.000 long non-coding RNA sequences exist between genes, and through these, epigenetic regulation of the genes is made possible. Human beings are built from 600 hundred different tissues and cancer may arise from any of these tissues.

Cancer arises when a single cell accumulates multiple genetic aberrations in critical points for intracellular pathways. Various cancers have overexpressed genetic aberrations, but the combinations of these vary for each individual cancer case. Moreover, during growth and dissemination cancer undergoes clonal evolution leading to multiple subclones in a single disease. This “individual tumor in an individual host” is in sharp contrast to our present cancer care paradigm “one size fits all”.

Our history of cancer care starts from the first world war, when physicians realized that a chemical weapon, mustard gas, induced bone marrow aplasia. Nitrogen mustard is a derivative of mustard gas, which was the first cancer chemotherapeutic drug. Until the end of the 1900-century potential cancer chemotherapeutics have been screened in cell culture model for their ability to induce unspecific cell death and their mechanisms of action have been studied afterwards, if studied at all. Taking into account this background it is not surprising that chemotherapeutics have been non-selective, killing both cancer cells as well as normal healthy cells thus inducing severe life threatening side effects. Also, because the same regimens have been used for all, only a proportion of the cases respond and get some benefit, while many patients get only the side effects of the treatment.

The evolution of “omics” has made it possible to analyze from samples simultaneously a huge amount of data describing the biology of the cancer. This increasing knowledge, together with advanced drug development processes, is now turning into a reality of targeted cancer type specific therapeutics. However, the prerequisite for using targeted therapies is knowing more specifically the altered genes and signaling pathways of the tumor. This is technically possible with current methods and also the price of these methods has been promptly declining. Together they will enable a change of paradigm into a truly personalized medicine, taking into account both the individual tumor and host variations, which will help us to achieve better cancer control with less side effects. However, before adopting all this into routine clinical practice we need technical assistance to help physicians handle the huge amount of data generated.

Personally, I believe that at this moment we are for the first time in the dawn of truly effective and tolerable cancer care.

Data-driven future supported by research and innovation competence centers

Maritta Perälä-Heape, Director, Professor of Practice
Centre for Health and Technology, University of Oulu, Finland

Biography Maritta Perälä-Heape

Maritta Perälä-Heape, Professor of practice in data-enabled health care and innovation ecosystems; Director, Centre for Health and Technology (CHT; www.cht.oulu.fi), Faculty of Medicine, University of Oulu, Oulu, Finland. She is managing the strategic R&D&I collaboration between academia, business and public healthcare sector (OuluHealth ecosystem; www.ouluhealth.fi). Prof. Maritta Perälä-Heape has over 30 years' experience in life science and health care sector, mainly in R&D and innovation management, industrial R&D, business development, R&D&I funding, innovation politics and international network building. The main interest is in digitally aided person centric care and data intensive innovations and businesses. The current focus is in building national research and innovation knowledge Hub (DigiHealth Hub) in Finland, and creating synergies with European innovation partnerships and smart specialization strategies. Her strengths include in particular the enhancement of open collaboration by bringing together main stakeholders and building larger R&D&I programs for the future needs in the digital data driven health society. This activity is crucial for the successful evolution towards a predictive, personalized, preventive and participatory healthcare system, creating new business opportunities worldwide.

Due to the huge potential for data-driven innovation in healthcare, especially in the paradigm change towards preventive, predictive and personalized health care, the EU commission and its member states are currently investing heavily in digital health programmes. The wealth of data collected and controlled by healthcare organizations is extremely valuable for the improvement of direct patient care and for the productivity of the healthcare system.

Healthcare data is primarily used for the purposes of patient care. However, for research and development, or for product and service development purposes, it also needs to be accessed by organizations that are not directly affiliated with the healthcare providers. Partnerships with academia and industry are necessary to reap the full benefits of data-driven innovation. In addition, there is a need to transform citizen-generated data to knowledge for better healthcare. Human centric management of personal data (Mydata) is making sure that individuals are in a position to know and control their personal data, but also to gain personal knowledge from them and to claim their share of their benefits.

We have identified several challenges that must be overcome to benefit from the full potential of usage of health data for new products and EU-wide services based on data. The identified data challenges vary considerably depending on the stakeholder (health provider, academia and industry, individual). Challenges common to all stakeholders include data accessibility, exploitability (data quality and quantity), interpretation of data protection rules, data ownership, health data exchange, data processing skills, and data sharing practices, to mention only a few.

We are proposing the establishment of new collaborative structures (DigiHealth Knowledge HUB) to overcome the governance of data in digitally transformed healthcare. This joint international knowledge hub will address specific themes and build competences to maximize the data potential for European benefits in a rapidly changing, digitally aided, data-intensive care environment.

Precision Care for Health Self-Management in Smart Environments

Anthony Maeder, Professor
Flinders University, Australia

Biography Anthony Maeder

Professor Anthony Maeder, Professor of Digital Health Systems & Co-Director of Flinders Digital Health Research Centre, College of Nursing & Health Sciences, Flinders University, Adelaide, Australia. Anthony Maeder joined Flinders University in 2016 as Chair in Digital Health Systems from Western Sydney University, where he founded the Telehealth Research and Innovation Laboratory (THRIL). His previous appointment was as Research Director of the CSIRO Australian eHealth Research Centre in Brisbane (2004-2008). His academic training was in Software Engineering with a PhD in Computing from Monash University awarded in 1992. He is a Fellow of the Institution of Engineers Australia, a Fellow of the Australian Computer Society, and a Fellow of the Australasian College of Health Informatics. He is currently a member of the Standards Australia IT-14 Health Informatics Committee and has represented Australia as a delegate to ISO for TC215 Health Informatics. He is a past President of the Australasian Telehealth Society (2010-2012), served on the Governing Board of the International Society for Telemedicine and eHealth (2013-2016) and is currently Co-Chair of the IMIA Telehealth Working Group.

Currently a number of disruptive influences are affecting future directions for health care, such as new technologies, big data, and citizen centricity. These have led to expectations of health care models adapting to provide individualised health support services based on detailed knowledge of the individual's health circumstances, and with the active and informed involvement of the individual (and possibly others from outside of the professional health sector) as part of the care environment.

Remote Patient Monitoring and Health Smart Homes are two examples of settings for such new health care models, and are reliant on innovative technological, informational and procedural components. In these cases, health status factors and daily living activities of individuals are observed and the resulting flows of data are analysed to provide feedback and invoke actions. Examples of care situations where this approach is applicable include maintaining healthy lifestyle, managing chronic conditions, post-acute recovery and rehabilitation, and supporting ageing related decline.

Technologies of varying complexity must be combined with appropriate data analysis and decision support tools and reliant on a knowledge-base specific to the individual, to produce the underlying self-management systems. Presentation and broader communication of information generated by such a system must also be aligned with the needs and preferences of the individual. Meeting these requirements requires methods to be developed with substantial sophistication for automated learning and adaptivity, which are capable to provide the desired level of specialisation

We will consider some examples of "precision care" that are being developed to operate on the basis of self-management. These cases rely on the central concept of a "smart environment" which is able to source and process relevant information concerning the individual, and access links to external systems and services. Some challenges for the architecting smart environments and the embedded care solutions, and for their integration in the overall health system, will be discussed.

O-10: Implementation of an eHealth application in myeloma treatment: a longitudinal feasibility study for patients and health care professionals

Anna Maijala[1], MHSc, Jari Haverinen[1,2], MSc, MHSc, Satu Malmqvist[3], MHSc, Niina Keränen[1,4], MD, MHSc, Timo Jämsä[1,4,5], PhD, Jarmo Reponen[1,4], MD, PhD

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[5]Department of Diagnostic Radiology, Oulu University Hospital, Oulu, Finland

Introduction

When implementing new technology, outcomes and success can be evaluated from the perspective of implementation process, service and client [1]. Acceptability in particular has been noted as an important aspect when implementing health care solutions [2].

Every year numerous digital health care solutions are introduced to hospitals by different technology companies and taken into clinical use. Because of the rapid development of technology, and the high potential reward, there is a need for a lightweight but documentable evaluation process providing evidence-based information.

An eHealth application Kaiku Health (Kaiku Health Oy, Finland) designed for patient reported outcome (PRO) monitoring and communication between patients and health care professionals (HCP) is being implemented into treatment process of multiple myeloma patients in Oulu University Hospital. The personnel of the clinic is constantly overburdened by the current procedure with numerous phone contacts with the patients. It is expected that the application would reduce this work load and benefit the patients through shorter active wait time. The aim of this study is to evaluate the feasibility of the Kaiku Health application among myeloma patients and HCPs.

Material and Methods

Feasibility is measured during the implementation of the application and subsequent 9-12 months of follow-up. Feasibility is assessed as acceptability, usability, technical feasibility, impact on the treatment related processes (efficiency of time use and treatment related processes), and the extent of uptake (only patients). In addition, HCPs' attitude toward implementation process is assessed.

The research data is collected by questionnaires including questions adapted from the Unified Theory of Acceptance and Use of Technology [3, 4] and all positive version of the System Usability Scale [5], and from log data of the application, such as number of log ins, contacts, and filled PRO questionnaires. In addition, log data, such as number of hospital visits and contacts, is collected from the the hospital patient record and information systems (only patients). HCPs are also interviewed before implementation.

Results

Preliminary results on the interviews with professionals and first questionnaire assessing acceptability of the application and attitude toward implementation process from preconceived aspect will be presented in the time of the conference.

Discussion

This study will provide new information on the implementation of an eHealth application for PRO monitoring and communication between patients and HCPs in Oulu University Hospital.

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O-11: Digitalized secondary care services for insulin-dependent diabetes patients – Predictive cost-benefit analysis of Virtual Hospital 2.0 digital care path

Erkki Soini[1], MSc, Saku Väätäinen[1], MSc, Reeta Rintamäki[2], MD, PhD, Erja Huttunen[2], RN, Sirpa Arvonen[3], MSc, Pasi Kuosmanen[4], MSc

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Background: Virtual hospital 2.0 (VH2.0, Virtuaalisairaala 2.0) platform, a joint project between all Finnish university hospitals [1] is an essential part of a key governmental wellbeing project of customer-responsive services in Finland [2–3]. VH2.0 produces and implements client-oriented digital special care services to various stakeholders (e.g. patients, providers) in Virtual village (Terveyskylä [4]). On national level, five-year cumulative potential health care capacity freed with VH2.0 was estimated at €1.3 billion [5]. Here, eHealth service (digital care path) for specific indication was assessed in terms of predictive cost-benefit analysis.

Aim: Predictive cost-benefit modelling of VH2.0 digital care path for insulin-dependent diabetes patients.

Methods: The health economic evaluation (HEE) considered clinical and economic viewpoints and was based on the PICOSTEPS principle, which reports the content of HEE in its order of importance [6]. PICOSTEPS has been used in e.g. the Finnish Current Care Criteria [7], real-world data (RWD) based [8] and modelled [6] HEEs.
Patients: All individuals with insulin-dependent diabetes who are expected to use specialized care services in 1) the Kuopio University Hospital Catchment Area (KUH ERVA) or 2) Finland generally. *Intervention:* Modelled VH2.0 operational change (prediction) with the examined digital care path including e.g. e-messages, e-appointments, a virtual meeting and material available for patients. *Comparator*: Modelled conventional practice (prediction) based on population and morbidity information and Finnish RWD. *Outcome:* Predicted health care capacity freed (PHCCF, year 2017 real value) at KUH ERVA and at Finnish national level available for other uses within the health care system, allowed by the digital care path.
Setting: Dynamic cost-benefit modelling covering the predicted changes in the patient cohorts based on the population structures and morbidity. *Time*: First five years from year 2018 to 2022 in annual cycles; assuming digital care path implementation was initiated in the beginning of year 2018 and completed gradually in three years at the KUH ERVA level and in four years at the national level. No discounting of PHCCF was done. *Effects*: Expected over-time changes in population structure and morbidity, resource use (e.g., clinician and nurse visits, letters and calls, inpatient days, e-appointments, e-messages, travelling, patient fees) and unit costs based on the RWD and expert information. *Perspective:* Third-party payer including only direct health care and travelling costs. *Sensitivity analyses*: The gradual implementation of digital care path in two or five years.

Results: At the KUH ERVA level, the average annual PHCCF with digital care path was estimated at €0.125 million for the first five years, summing up to total estimated five-year PHCCF of €0.626 million (27.5 % of the total included conventional practice costs). At the national Finnish level, average annual PHCCF with digital care path was estimated at €0.577 million for the first five years, summing up to total estimated five-year PHCCF of €2.89 million (23.2 % of the total included conventional practice costs). The five most important key value drivers for the PHCCF were physician visits, nurse visits, patient fees, travelling and nurse calls.

Conclusions: VH2.0 digital care path for insulin-dependent diabetes patients potentially frees substantial capacity for other purposes. From the perspective of opportunity costs such technological revolution is very valuable and the capacity freed can produce significant effectiveness elsewhere [9].

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O-12: How to succeed in implementing welfare technology to elderly care

Kämäräinen Pauliina[2], Registered nurse, BSc student, Kaija-Kortelainen, Minna[1], Registered Social Worker, Master of Social Work, Bachelor of Laws, Kinnunen, Anu[1], MSc, Master of Health Science
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[2]City of Kuopio

Background
Digitalization and Internet of Things (ItoT) has changed the structure of our society. This is also present in the field of medicine and nursing in changing the way care is provided. National Institute for Health and Welfare suggests that there is wide range of technology available for elderly care and home care particularly, but this does not mean that the full advantages of it are used (Hammar, Vainio & Sarivaara 2017, 1). Guidelines for elderly care also stresses on the importance of providing technologically assisted solutions to care. (980/2012 Act on Supporting the Functional Capacity of the Older Population and on Social and Health Services for Older Persons; Quality recommendation to guarantee a good quality of life and improved services for older persons 2017–2019, 2016). The use of technology in nursing (home care) with elderly people is increasing significantly. However, welfare technology solutions for the elderly in the community are not as available as they could be.

Material and purpose
WelTech project was launched in 2018 to develop wellness technology training courses for social and health care. The aim is to utilize and test the latest welfare technology in training programs. The training courses aim to lower the threshold for the introduction of new technologies. The target group of the project is students, employees and teachers in the field. The project is implemented in cooperation with Savonia University of Applied Sciences, Savo Vocational College, The University of Eastern Finland and the City of Kuopio. As part of the project, a literature review, interviews and a survey was carried out to find the premises for the use of technology for the elderly. Respondents were mainly working in the field of elderly care as nurses or as superiors or as developers. Results give us a comprehensive view on how technology should be implemented to the every day life and for the care of the elderly.

Results
Results show that the main challenges in the launch and use of technology is in the lack of usability, inadequate communication between participants and poorly resourced implementation processes. It also shows that the inclusion of the elderly in the developing process is low. It is also pointed out that a successful launch of the use of technology requires that the technology is customer-orientated and based on real needs. It results itself in ongoing and successful use of technology. Literature also suggests that adequate training and education for both staff and elderly people and their relatives is required.

Discussion
The introduction of successful technology process should be based on a real need. The usability, slowness and incompleteness of technology were the most common problems faced in the process. Customer centric solutions and processes should be developed together with the end-users and those close to them. The preconditions for using welfare technology in home care require an adequate training of staff and individual guidance for the elderly. Care providers and educational institutions need to implement technology and the use of it to their curriculum as an integrated part of futures care study modules.

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Sessio 4A: Mobiilit terveysratkaisut / Mobile Health Solutions

Puheenjohtaja: johtajaylilääkäri Päivi Metsäniemi
Ylioppilaiden terveydenhoitosäätiö YTHS

Chair: Chief Medical Officer Päivi Metsäniemi,
Finnish Student Health Services (FSHS)

Tiistai 2.4.2019 - Tuesday 2nd of April 2019

16:00 – 17:30

4A-1 Liikkuvat terveysasemat - Kokemuksia Eksote:sta

Toni Suihko, Tietohallintojohtaja
Eksote

4A-2 Mobiilit terveysratkaisut Ruotsissa

Nima Jokilaakso, Senior Advisor
Business Finland

4A-3 mHealth –palvelut käytännössä

Annette Kainu, yksikönjohtaja
Terveystalo, Terveystalo Digiterveys

4A-4 Etädiagnostiset työvälineet

Päivi Metsäniemi, Johtajaylilääkäri
Ylioppilaiden terveydenhoitosäätiö YTHS

5 min rapid scientific presentations

O-13 Digital treatment path for children attending HUS Child Psychiatry

Valldén Tuuli[1], Debuty Nurse Manager, M.Soc.Sc., Roiha Sanna[1], RN, MNSc, Anttila Katriina[1,2], Nurse Manager, PhD
[1]Division of Child Psychiatry, Helsinki University Hospital, Finland,
[2]Department of Nursing Science, University of Turku, Finland

O-14 Cost-benefit evaluation of digital HealthyWeightHub: Virtual Hospital 2.0

Saku Väätäinen[1], MSc, Erkki Soini[1], MSc, Sirpa Arvonen[2], MSc, Laura Suojanen[2], MSc, Kirsi Pietiläinen[2], MD, PhD
[1]ESiOR Oy, Kuopio, Finland;
[2]Virtuaalisairaala 2.0 -hanke, Helsinki University Hospital, Helsinki, Finland

O-15 Differences in lifestyle patterns in association with insulin sensitivity and secretion profiles in a high-risk for diabetes Finnish population

Kirubashni Mohan[1], MD, Jussi Pihlajamäki[1], MD, PhD, Timo Lakka[2],MD,PhD
[1]Department of Public Health and Clinical Nutrition, University of Eastern Finland;
[2]Institute of Biomedicine, School of Medicine, University of Eastern Finland

Liikkuvat terveysasemat - Kokemuksia Eksote:sta

Toni Suihko, Tietohallintojohtaja
Eksote

Biografia Toni Suihko

Toni Suihko on kansainvälisesti pätevöitynyt tietohallinnon ammattilainen, jonka tehtäväkenttään on kuulunut laaja-alainen tehtävien ja eri sidosryhmien johtaminen. Viimeisin hänen työtehtävänsä Etelä-Karjalan sosiaali- ja terveyspiirin tietohallintojohtajana on liittynyt kokonaan uuden ICT ympäristön perustamiseen täysin integroidun sosiaali- ja terveydenhuollon tarpeisiin tyhjältä pöydältä, käsittäen koko IT ympäristön niin infrastruktuurin kuin sovellukset. Hänen alkuperäinen tausta on telekommunikaatiossa ja konsulttiyrityksissä, jolloin työskentely sosiaali- ja terveydenhuollon toimialalla on opettanut hänelle merkittävästi sosiaali- ja terveydenhuollon liiketoiminnasta ja erityisesti sektorin ongelmista tällä hetkellä ja tulevaisuudessa. Hän on tuonut toisilta teollisuuden aloilta mukanani paljon oppia sovellettavaksi sosiaali- ja terveydenhuollon tietohallinnon ja ICT tukevien toimintaprosessien kehittämiseen. Nykyisessä työssään hän on osallistunut ja osallistuu lukuisiin kansallisiin projekteihin ja ohjelmiin, työskennellen yhdessä kansallisten toimijoiden kuten Sosiaali- ja terveysministeriö, Valtiovarainministeriö, Kansaneläkelaitos, Terveyden- ja hyvinvoinnin laitos, Suomen Itsenäisyyden rahasto jne. Hän uskoo todella, että toiminnan tulee olla asiakaskeskeistä. Tämä on tuottavuuden ja tehokkuuden päämahdollistaja. ICT näkökulmasta tulevaisuus ei pohjaa perinteisiin sähköisiin potilas- ja asiakastietojärjestelmiin. Perinteisten potilas- ja asiakastietojärjestelmien aikana on takanapäin. Tulevaisuus rakentuu integroidun asiakkuudenhallinnan ja toiminnanohjauksen järjestelmiin, jotka ovat varustettuna keinoälykyvykkyyksillä, kohdentuen sosiaali- ja terveydenhuoltoon.

Mobile Health Stations - Experiences from Eksote

Toni Suihko, Chief Information Officer
South Karelia Social and Health Care District (Eksote), Finland

Biography Toni Suihko

Toni Suihko is an internationally qualified IT management expert and experienced in overall management of different activities and interest groups. His latest career as a CIO of South Karelia Social and Health Care District has related to establishing and building up a the ICT environment of totally integrated social and healthcare organization, with totally renewed IT environment (infrastructure, applications etc.). His original background relates to telecom and consulting companies, working in public sector has thought him a lot about the sector in general and specifically business and operational problems in the area of public healthcare now, and especially in the future. He also believes that public sector, especially the area of social care and healthcare has lot to learn from other sectors. In his present job, He has been involved to several national level projects and programs working together will national level organizations like Ministry of Social Affairs and Health, Ministry of Finance, The Social Insurance Institution of Finland, National Institute for Health and Welfare, The Finnish Innovation Fund etc. He truly believe that customer needs to be in the center. This is the key enabler for effectiveness and efficiency. From ICT perspective the truth does not lie on traditional Electronical Medical Records systems or social care Electronical Customer Records systems. The times of old fashioned EMR or ECR are gone. Future is based on integrated Customer Relationship Management and Enterprise Resource Management systems with AI capabilities targeted to the area of integrated social care and healthcare.

Mobiilit terveysratkaisut Ruotsissa

Nima Jokilaakso, Senior Advisor
Business Finland

Biografia Nima Jokilaakso

Nima Jokilaakso on biotekniikan tohtori, ja hän on työskennellyt Ruotsissa ja ulkomailla tutkimus- ja yritystoiminnassa. Vuodesta 2013 lähtien digitalisointi on kuitenkin ollut hänen painopisteensä, ja hän on perustanut ja johtanut digitaalisen terveydenhuollon yrityksiä. Nima on nykyään Business Finlandin neuvonantaja, joka vastaa Healthtechistä ja toimii Suomen suurlähetystössä Tukholmassa.

Aivohalvaukset ja muut sydän- ja verisuonitaudit ovat yleisin kuolinsyy kaikkialla maailmassa ja yksi yleisimmistä syistä sairaalahoitoon. Eteisvärinä on erityinen huolenaihe. Yli 30 miljoonaa ihmistä on diagnosoitu tämän sairauden varalta, ja arviolta 30 miljoonaa enemmän jää diagnosoimattomiksi ja niillä on merkittävästi suurempi aivohalvauksen ja ennenaikaisen kuoleman riski.

Wearable Technology-sovellukset matkapuhelimille tai tableteille ja muille sähköisen terveydenhuollon ratkaisuille voivat olla tärkeitä ehkäisyssä, nopeassa hoidossa ja kuntoutuksessa.

Mobile Health Solutions in Sweden

Nima Jokilaakso, Senior Advisor
Business Finland

Biography Nima Jokilaakso

Nima Jokilaakso has a PhD in biotechnology and has worked in Sweden and abroad with research and companies in life science. However, since 2013, digitization has been his focus and he has founded and lead companies within digital health. Today, Nima is Senior Advisor at Business Finland, responsible for Healthtech and based at the Finnish Embassy in Stockholm.

Strokes and other cardiovascular diseases (CVD) are the single most prevalent cause of death worldwide, and one of the most frequent reasons for hospitalization. Atrial Fibrillation (AF) is a cause for special concern. Over 30 million people are diagnosed with this condition, and an estimated 30 million more remain undiagnosed and have a significantly increased risk of strokes and premature death.

Wearable technology (WT) applications for mobile phones or tablets and other eHealth solutions can play an important role in prevention, rapid treatment, and rehabilitation.

mHealth –palvelut käytännössä

Annette Kainu, yksikönjohtaja
Terveystalo, Terveystalo Digiterveys

Biografia Annette Kainu

Terveystalo Digiterveys –yksikön yksikönjohtaja ja vastaava lääkäri, koulutukseltaan tuotantotalouden diplomi-insinööri (TKK 1995), lääketieteen lisensiaatti (HY 1996), väitellyt lääketieteen tohtoriksi (HY 2008), erikoistunut Helsingin yliopistollisessa keskussairaalassa keuhkosairauksien ja allergologian erikoislääkäriksi ja saanut keuhkosairausopin dosentin pätevyyden 2018. Työskennellyt mm HYKS Sydän- ja keuhkokeskuksessa osastonylilääkärinä Peijaksen sairaalassa 2012-2018 ja ollut mukana rakentamassa Terveyskylään Keuhkotaloa ja Uniapnean digihoitopolkua. Vuodesta 2018 toiminut Terveystalon Keskitettyjen etäpalveluiden vastaavana lääkärinä osallistuen aktiivisesti uusien terveydenhuollon etäpalveluiden kehittämiseen. Vuoden 2019 alusta yksikönjohtajana valtakunnallisessa Terveystalo Digiterveys-yksikössä, joka tuottaa kaikki Terveystalon terveydenhuollon ammattihenkilöiden tuottamat etäpalvelut mm. noin 10.000 Lääkäri-chat 24/7 vastaanottoa kuukaudessa.

Terveydenhuollon etäpalveluihin kohdistuu paljon odotuksia niin potilaiden, heidän omaistensa, terveydenhuollon ammattilaisten, palvelujen järjestämisvastuullisten toimijoiden kuin maksajienkin taholta. Ala on nopeasti kehittyvä ja monet julkisuudessa tulevaisuuden mHealth –palveluina esitettävät tekniset ratkaisut ovat vielä käytännössä kehitysasteella, ovat huonosti skaalautuvia ja mahdollisesti tarjoavat vain yhden osaratkaisun monitahoiseen kokonaisuuteen.

Kuluttajalle suunnatut mHealth –palvelut tänään ovat monilla toimijoilla tietojen keräämiseen ja nopeaan asiointiin suunnattuja. Terveystalolla on Suomessa pisimpään käytetyt chat-vastaanotot, jotka tänä päivänä palvelevat erittäin nopealla vasteajalla 24/7 eli ympäri vuorokauden. Lääkärin vastaanotolle pääsee nyt vuorokauden ympäri alle 15 sekunnissa– mistä ja milloin tahansa, myös ulkomailta. Lääkäri-chat 24/7 palvelussa voidaan käyttää myös videokuvaa, mutta käytännössä potilaat viestivät pääosin tekstimuotoisesti. Sen sijaan potilaat ovat löytäneet erilaiset kuvaliitteet erittäin tehokkaana tapana täydentää chat-vastaanotolla lääkärin käytössä olevia materiaaleja. Terveystalon chat-vastaanotoilla on vuodesta 2016 asioinut jo yli 200.000 maksavaa asiakasta. Kehittyneen lääketieteellisen laadun raportoinnin ansiosta Lääkäri-chat 24/7 palvelusta tiedetään myös lääketieteellisten laatumittareiden seurantatietoja ja voidaan seurata mm kansallisten hoitosuositusten noudattamista käyttäen sairaskertomuksen potilastietoja.

Uusina palveluina Terveystalo on tuonut tarjolle ajanvaraukselliset videovastaanotot, jotka mahdollistavat eri alojen terveydenhuollon ammattihenkilöiden palvelujen matalan kynnyksen saatavuuden paikasta riippumatta eri puolille Suomea. Etävastaanotot mahdollistavat monipuoliset lääketieteelliset palvelut myös haja-asutusalueille. Videovastaanotot toteutettuna terveydenhuollon yksiköstä tai potilaan kotoa hoitajan tai muun ammattilaisen avustamana ovat jo kohdennettuihin käyttötarkoituksiin arkipäivää. Sen sijaan suorat potilaan ja ammattilaisen väliset videovastaanotot etsivät vielä monilla erikoisaloilla yhteisesti ymmärrettyjä käyttökohteita.

Kehittyneet mHealth-palvelut muodostavat jo tänä päivänä loogisia ja potilaan hoitoa palvelevia hoitokokonaisuuksia mahdollistaen potilaan oman aktiivisen roolin oman terveydentilansa seurannassa ja omaan hoitoonsa osallistujana. Erilaiset digitaaliset terveys- ja hoitosuunnitelmat mahdollistavat terveydenhuollon ammattilaisten tuottaa terveyttä edistäviä hoitosuunnitelmia, joihin potilas pystyy itse osallistumaan ja joiden kautta parhaimmillaan hoito muodostaa potilaalle loogisen kokonaisuuden jossa saavutettavissa olevien välitavoitteiden kautta edetään kohti pidemmän aikavälin tavoitteita. Tekoälyavusteinen riskien tunnistaminen ja palveluiden oikea kohdentaminen ovat nyt jo käytössä, mutta tekoälysovellusten käyttö terveyspalvelujen tuotannossa on vielä suhteellisen pienimuotoista ja niiden todelliset hyödyt jäävät tulevina vuosina nähtäviksi.

mHealth –services in practice

Annette Kainu, Director
Terveystalo, Digital Healthcare

Biography Annette Kainu
Chief of Digital Health at Terveystalo, educational background with M.Sc.in Technology in Industrial Management (1995) MD (1996), PhD (2008) and Medical Specialist in Respiratory Medicine and Allergology. Adjunct professor (University of Helsinki) in Respiratory Medicine (2018).Worked previously in Helsinki University Hospital as a Head of Department between 2012-2018 in which role participated in the development of the Health Village and a digital care pathway for sleep apnea.Since 2018 worked at Terveystalo Healthcare developing new eHealth services. Currently working as the Chief of Digital Health services that provide professional eHealth servces nationally including e.g. Doctor Chat 24/7 Service delivering about 10.000 monthly visits with general practitioners.

eHealth services are besieged with high hopes from all stakeholders – patients, their caretakers, healthcare professionals, healthcare providers and funders. The field is very rapidly developing and many services presented as future healthcare solutions are still in development phase and far from being mature enogh for scaling up for implementation of services. Typically, many current mHealth services in the market provide only one part of the treatment and care pathways.

Most consumer-targeted mHealth-services are focused on collecting data for predictive modelling and possibly for quick and easy exchange of information. Terveystalo Healthcare has the longest history of mHealth services in Finland that today provide general practice chat visits with very rapid access to general practitioner 24/7. Doctors' apppontment is accessible in under 15 seconds around the clock – from where and when the patient needs, also from abroad. Doctor-chat 24/7 service supports also videochat, but very few patients want to use the video and instead prefer the text based exchange of information with the possibility of additional photographs. Doctor-chat 24/7 has delivered already over 200.000 paid consultations from 2016 when the service originally started. Today, almost 10.000 chat visits are conducted every month. The medical quality is also continually followed with the unique possibility of analyzing electronic medical records to gain insight into the adherence to national and international medical guidelines.

As new services in 2019, Terveystalo has brought pre-booked videovisits to the wide range of healthcare professionals to all customers. Videovisits enable the provision of high quality services also to those areas where there might be difficulties in securing different specialties and therapies. Videovisits delivered from the healthcare units or possibly from the patients home perhaps assisted by a nurse or other healthcare professional, are increasingly used to focused and previously identified specified services. However, direct videovisits between the customer and the healthcare professionals are still relatively small scale and seek acceptance from the patients and providers.

Well developed mHealth services are today logical and patient oriented service pathways that enable the patient to actively particiate in his or her treatment. Different digital care pathways enable the professionals to plan and deliver health promoting activities already before the development of actual disease and give the patient the possibility of actively participating in his or her treatment. AI based algorithms already help to predict risk and to target the heathcare resources, but clearly the promise of AI services is yet to harness effectively.

Etädiagnostiset työvälineet

Päivi Metsäniemi, Johtajaylilääkäri
Ylioppilaiden terveydenhoitosäätiö YTHS

Biography Päivi Metsäniemi

Päivi Metsäniemi, MD, is a specialist of public health medicine and has a special competence degree in healthcare technology. She works now as Chief Medical Officer in Finnish Student Health Services (FSHS). She is enthusiastic about measuring and improving healthcare outcomes, developing the work processes, digital tools and working environment for physicians and other healthcare professionals. The digitalization of healthcare with all its benefits and challenges are the core of Päivi's own working life, as she has implemented virtual doctor's appointment processes, created models for using everyday healthcare data in clinical leadership and innovated and implemented a customer-centric digital health plan..

Tausta
Ylioppilaiden terveydenhuoltosäätiö (YTHS) tuottaa opiskelijaterveydenhuollon palvelut kaikille suomalaisille korkeakouluopiskelijoille (n=125 000). Palvelut laajenevat vuonna 2021 kattamaan myös kaikki ammattikorkeakouluopiskelijat (n= 130 000). YTHS on edelläkävijä etäterveydenhuollon palveluiden tuottamisessa kahdesta syystä; opiskelijat kohderyhmänä sekä toivovat että adoptoivat uusia palvelumuotoja mielellään ja toisaalta terveydenhuollon ammattilaisista, erityisesti lääkäreistä, on pulaa tietyillä harvaan asutuilla seuduilla. Tässä pilotissa tutkittiin, miten etädiagnostiset välineet palvelevat virtuaalivastaanottoa opiskeluterveydenhuollon ympäristössä. Tutkimme sekä ammattilaisen että opiskelijan kokemusta että etädiagnostiikkaa hyödyntävän vastaanottokäynnin toteutumisen kustannusvaikuttavuutta verrattuna tavanomaiseen vastaanottokäyntiin.

Menetelmät
Viidessä opiskeluterveydenhuollon yksikössä (Joensuu, Rovaniemi, Pori, Rauma ja Vaasa) annettiin mahdollisuus ottaa etäyhteys hoitajan vastaanotolta tietoturvallisen Skype-sovelluksen kautta kahteen yleislääkäriin (Oulussa ja Turussa), joiden käytössä oli etädiagnostisia välineitä (etästetoskooppi, etäotoskooppi ja etädermatoskooppi). Käynnit kirjattiin potilastietojärjestelmään ja hoitoon osallistuneet ammattilaiset täyttivät lyhyen arviointikyselyn jokaisen käynnin jälkeen. Kustannukset arvoitiin huomioimalla sekä palkat sivukuluineen että etädiagnostisten välineiden käyttö.

Tulokset
Pilottijakson aikana toteutui 317 potilaskäyntiä, joista 220:sta saatiin kerättyä arviointikysely. 40% käynneistä hyödynnettiin etädiagnostisia välineitä. Mielenterveyssyyt, hengitystieinfektiot ja iho-ongelmat olivat yleisimpiä yhteydenoton syitä. Noin 14% käynneistä tarvittiin jatkokäynti tavallisella vastaanotolla. Kolmanneksessa käynneistä sovittiin jatkoseuranta puhelimitse. Noin kolmasosassa ei tarvittu mitään jatkoseurantaa. Ammattilaisten suhtautuivat etävastaanottotilanteeseen myönteisesti (arvosanakeskiarvo 4.78 / 5) Kustannusanalyysi osoitti, että vaikka etädiagnostiikkaa hyödyntävä käynti voi olla kalliimpi kuin tavanomainen, on se hyvä keino parantaa hoidon saatavuutta alueilla joilla on lääkäripulaa.

Johtopäätökset
Etädiagnostikkaa hyödyntävä etävastaanotto on hyvä lisä opiskelijaterveydenhuollon palveluvalikoimaan sekä palvelun käyttäjien että ammattilaisten mielessä. Kustannusvaikuttavuutta laskettaessa tulee ottaa huomioon mm. työvoimapula.

eDiagnostic tools

Päivi Metsäniemi, Chief Medical Officer
Finnish Student Health Services (FSHS)

Biography Päivi Metsäniemi
Päivi Metsäniemi, MD, is a specialist of public health medicine and has a special competence degree in healthcare technology. She works now as Chief Medical Officer in Finnish Student Health Services (FSHS). She is enthusiastic about measuring and improving healthcare outcomes, developing the work processes, digital tools and working environment for physicians and other healthcare professionals. The digitalization of healthcare with all its benefits and challenges are the core of Päivi's own working life, as she has implemented virtual doctor's appointment processes, created models for using everyday healthcare data in clinical leadership and innovated and implemented a customer-centric digital health plan.

Background
We at FSHS (Finnish Student Healthcare Service) are recognized pioneers of e-Health in Finland. Our future plans to expand FSHS services for rural areas and shortage of GPs make e-Health necessary. In a three months pilot our aim was to study online consultation between a nurse and a GP, and how different digital diagnostic tools (otoscope, dermatoscope and stethoscope) work in these consultations. We also wanted to study cost efficience of these consultations compared to GP´s face to face visits.

Methods
Using data-safe Skype, we offered nurses in five health care units (in Joensuu, Rovaniemi, Pori, Rauma, and Vaasa) digital tools to consult GPs in two other units (Oulu, Turku). All consultations were registered in our electronic health record and evaluation forms were filled by professionals after the consultations. The costs of salaries and digital tools were calculated.

Results
The number of GP-and-nurse consultations was 317. GPs filled the evaluation form in 220 cases and nurses in 222 cases. Digital diagnostic tools were used in 40% of cases. Mental health issues, respiratory infections and skin problems were the most common diagnoses. About 14% of the patients needed a new GP's appointment, about a third involved a follow-up telephone appointment, and one third did not require follow-up at all. Telemedicine consultations, according to both the nurses and the GPs were, on the whole, a success (mean 4,78 /5). In this pilot, the costs of one consultation were 248,31 €.

Conclusions with key message
Telemedicine consultation and digital diagnostic tools worked mainly very well and the health professionals were mainly satisfied with them. In this pilot study, the costs of telemedicine consultation were higher than face to face visit. However, the need of GPs in rural areas makes e-Health necessary.

O-13: Digital treatment path for children attending HUS Child Psychiatry

Valldén Tuuli[1], Debuty Nurse Manager, M.Soc.Sc., Roiha Sanna[1], RN, MNSc, Anttila Katriina[1,2], Nurse Manager, PhD

[1] Division of Child Psychiatry, Helsinki University Hospital, Finland, [2]Department of Nursing Science, University of Turku, Finland

Introduction

Over 10% of children have psychiatric disorders (1), but health services are not able to provide care for all (2). The current health services have challenges, such as increasing clients' needs for high quality treatment, inequal access to care and increasing costs. Regarding child psychiatric treatment, the number of patients is increasing. In the age group of 0– 12-year-olds, the number of visits doubled from 2007 (160 visits per 1000 children) to 2017 (336 visits per 1000 children) (3). Although digitality may cause some demands to users and professionals (4), it is found to be a solution to enhance health services (5). In addition, development of digital solutions in health services is proposed in national and international guidelines (4). Therefore, the development process of digital treatment path is also ongoing at HUS Child Psychiatry.

Material and Methods

This presentation aims to describe a digital treatment path in its development phase at HUS Child Psychiatry. A child psychiatric digital treatment path is one of the many treatment paths in Health Village that is a national digital health service. Health Village and digital treatment paths are one of the main outcomes of the Virtual Hospital 2.0 project that is a joint project between the university hospitals in Finland (6). At HUS Child Psychiatry the development process of digital treatment path started in 2017. Multi-professional development group consisted of nurses, psychologists, child psychiatrist, music therapist, secretary, occupational therapist, social worker and the development manager. The group gathered development ideas and information from digital treatment paths in Health Village (6) and from web site of Lastenmielenterveystalo.fi (7). The professionals` competence and experiences were used and discussed. A pilot phase of digital path is going to start in the beginning of 2019.

Results

The digital treatment path is planned to use with school aged children attending child psychiatric specialized health care. Security and privacy are guaranteed by using bank or mobile identification codes. Child psychiatric digital treatment path is in development phase. It already consists of five functionalities. 1) The path provides general information including assessment period, treatment at outpatient and inpatient clinics, emergency instructions and treatment interventions; 2) parents can keep a journal of their child`s symptoms; 3) they can check from the calendar the upcoming appointments and get reminders; 4) parents have a possibility to exchange secure messages or chat with their worker; and 5) video appointments between the professionals and the family can be arranged.

Discussion

Digital path may have a potential to complete children's mental health services. I.e. the path may provide new ways to meet patients having difficulties to access to clinics or replace cancelled meetings. More knowledge about children's, parents' and professionals' experiences on use is needed. In the pilot phase, the child psychiatric digital path will be evaluated by monitoring the number of users and collecting feedback on experiences. Information will be used for further development of digital treatment path for children having psychiatric disorders.

References

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O-14: Cost-benefit evaluation of digital HealthyWeightHub: Virtual Hospital 2.0

Saku Väätäinen[1], MSc, Erkki Soini[1], MSc, Sirpa Arvonen[2], MSc, Laura Suojanen[2], MSc, Kirsi Pietiläinen[2], MD, PhD
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Background: Virtual hospital 2.0 (VH2.0, Virtuaalisairaala 2.0) platform, a joint project between all Finnish university hospitals [1] is an essential part of the Finnish governmental wellbeing project of customer-responsive services [2–3]. Virtual village (Terveyskylä [4]) of VH2.0 produces and implements client-oriented digital special care services to various stakeholders (e.g. patients, providers). Five-year cumulative potential health care capacity freed in Finland with VH2.0 was estimated at €1.3 billion [5].

Here, a specific VH2.0 digital care path (HealthyWeightHub, HWH) was evaluated in terms of observed local and predicted national cost-benefit. The examined HWH path is a 12-month long coaching and education service, designed to help obese patients to make permanent life changes, first launched in October of 2016.

Aim: Cost-benefit evaluation and prediction of VH2.0 HWH care path locally and in Finland, respectively.

Methods: This cost-benefit research was based on the PICOSTEPS principle, which reports the content of health economic evaluation (HEE) in its order of importance [6]. PICOSTEPS was developed during Finnish Current Care Criteria work [7] and has been used in real-world data (RWD) based [8] and predictive [6] HEEs.

Patients: Adult obese individuals in 1) the Helsinki University Hospital Catchment Area (HUS ERVA) or 2) Finland generally. *Intervention:* VH2.0 HWH path. *Comparator*: Conventional group coaching. *Outcome:* Estimated and predicted potential health care capacity freed (PHCCF, year 2017 real value) at HUS ERVA and Finnish national level, allowed by the digital care path, respectively. *Setting:* 1) Retrospective examination of treated patients at HUS ERVA level and 2) predictive modelling at Finnish national level. Prediction assuming HWH was implemented at national level in 2018 and the national goal was to treat 1 % of the obese patients annually by 2022. *Time*: 1) Two years between October 2016 and October 2018 at HUS ERVA level retrospective examination; 2) Five-years from year 2018 to 2022 in annual cycles for the predicted PHCCF at national level, assuming digital care path implementation was initiated in the beginning of year 2018 and completed gradually in five years. *Effects*: Expected resource use (e.g., treatment, travelling, patient fees) and unit costs based on the RWD and expert information. *Perspective:* Third-party payer covering only direct health care costs and travelling. *Sensitivity analyses*: Half or twice as many obese patients are treated in 2022.

Results: HWH saved €2.69 million over the two years between October 2016 and October 2018 at the HUS ERVA level, compared to a hypothetical scenario where patients treated with HWH had received conventional group coaching instead of HWH. If the patients who received group coaching had also been treated with HWH, additional €1.02 million could have been saved in the same time period at the HUS ERVA level.

At Finnish national level, treating 1 % of the obese patients with conventional group coaching would cost approximately €24.3 million in 2022. Treating same number of patients with HWH was estimated to cost €6.35 million, resulting in annual PHCCF of €18.0 million in 2022. The cumulative five-year PHCCF would be €50.7 million at Finnish national level, compared to conventional group coaching. Conversely, approximately 3.8 times more obese patients could be provided care with HWH than possible with conventional group coaching.

Conclusions: HWH is potentially very cost-saving and allows provision of weight control treatment for larger populations than previously possible. While providing nation-wide conventional group coaching for large proportion of obese patients was not feasible, HWH allows more efficient use of resources targeted at combating increasing obesity epidemic. The findings are further highlighted by the fact that analyses did not include productivity costs or indirect costs associated weight loss and treatment of long-term sickness (e.g. diabetes).

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O-15: Differences in lifestyle patterns in association with insulin sensitivity and secretion profiles in a high-risk for diabetes Finnish population

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Introduction
It is important to study the association between the lifestyle habits and plasma insulin levels because insulin resistance and β-cell dysfunction can exist simultaneously in the prediabetes state. Identifying the modifiable risk factors aids in the early and more effective implementation of strategies to prevent type 2 diabetes among high-risk individuals. This study aims to explore the combined impact of lifestyle factors on insulin sensitivity and secretion indices in a high risk for diabetes Finnish population.

Material and Methods
Data for the present study originates from the baseline data of the Stop Diabetes (StopDia) study collected between March 2017 and February 2018. StopDia studies how healthy lifestyle can be supported by individual level solutions utilizing digitalization and by altering living environment to make healthy choices preferred and easier.

Demographic, socio-economic, anthropometric, clinical, biochemical data were collected from 2866 male and female participants aged between 18 to 70 years in the hospital districts in the regions of Northern Savo, Päijät-Häme and South Karelia. Insulin sensitivity and secretion was calculated using the Matsuda Insulin Sensitivity and Disposition Indices, and factor analysis was used to identify lifestyle patterns. Regression analyses was used to study the association between the lifestyle patterns and the insulin indices.

Results
Five lifestyle patterns were identified. The pattern characterized by snacking, consuming vegetables and root vegetables and fruits and berries was positively associated with both the insulin indices. The pattern characterized by sitting at work, consumption of vegetables and root vegetables, sleep during workdays and having lunch was positively associated with the Matsuda ISI but not significantly associated with the Disposition Index. Consumption of alcoholic beverages like beer, cider and long drinks, drinking coffee and smoking was positively associated with the Matsuda Index but only after adjustment for sex and BMI ($\beta=0.095$, $p<0.001$). There was however a significant negative association between the Disposition Index and the same pattern ($\beta=0.048$, $p=0.011$), but this significance was lost after adjustment. The pattern characterized by sweetmeats, fastfood, sausage and cold cuts consumption was inversely associated with both insulin indices, but lost its significance with the Disposition Index after adjustment for sex and BMI.

Discussion
Insulin sensitivity and secretion profiles are associated with different sets of lifestyle factors. These differences should be considered when implementing lifestyle modification strategies**.**

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Session 4B: Patient Safety in Practice

Chair: Patient Safety Manager Kaisa Haatainen
Kuopio University Hospital, Finland

Tuesday 2nd of April 2019

16:00 – 17:30

4B-1 How to improve interdisciplinary information flow?

Kaija Saranto, Professor
University of Eastern Finland

4B-2 Smart sensors will protect the patient safety in telemedicine

Jenni Siermala, Chief Information Security Officer
Sotedigi Oy

4B-3 Integrating Clinical Decision Support into the Workflow to Support Clinical Practice and Patient Activation

Patricia Dykes, Associate Professor
Brigham and Womens' hospital, USA

5 min rapid scientific presentations

O-16 Health Technology Assessment Framework for mHealth, Artificial Intelligence and Robotics

Jari Haverinen[1,2], MSc, MHSc, Niina Keränen[2,3], MD, MSc, Petra Falkenbach[4], MSc, Anna Maijala[2], MHSc, Jarmo Reponen, MD, PhD[2,3]
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O-17 Triage Service user interface testing with end users to meet the requirements of new Medical Devices Regulation

Marja Ylilehto[1], Paramedic (Master), BSc, RN, Pia Liljamo[1], PhD, RN
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O-18 Cost-benefit predictions of the Virtual Hospital 2.0 digitalized secondary care path for women with endometriosis in Turku area and in Finland

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How to improve interdisciplinary information flow?

Kaija Saranto, Professor
University of Eastern Finland

Saranto Kaija[1], Professor, Kivekäs Eija[1], MHSc, PhDc, Sjöblom Olli[2], PhD, Kinnunen Ulla-Mari[1], PhD, Palojoki Sari[3], PhD
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Biography Kaija Saranto

Kaija Saranto, PhD, RN, FACMI, FAAN, FIAHSI works as a full Professor and programme leader at the master and doctoral degree levels in Health and Human Services Informatics (HHSI) at the University of Eastern Finland, Department of Health and Social Management. In 2012 the HHSI master's degree programme received the status "IMIA accredited" by the International Medical Informatics Association as the very first internationally. She is the International Taskforce Liaison for The HIMSS TIGER Committee and actively engaged with the international curriculum development of health informatics for the digital society. Currently she is the Chair of the Education Working Group of European Federation of Medical Informatics. She is leading research groups focusing on health data analytics, digital care, and patient safety.

Introduction

Digitalization has not only changed information management via the use of various electronic tools, but also the way professionals communicate in health care [1]. Today, a lot of health services communication occurs both synchronously and asynchronously using recorded data through orders, results, progress notes, and portals [2]. Phases in the delivery of care that are prone to hazards include patient intake, intra- or inter-hospital patient transition, and hospital discharge. Patient transition creates an opportunity for incidents, the consequences of which can cause suffering, extra work, and lack of trust for future encounters [3]. The purpose of this presentation is to discuss and provide examples of hazards and incidents in the Finnish patient safety incident reporting system (HaiPro) [4] aiming to reveal possibilities for improving interdisciplinary information flow.

Material and Methods

The data regarding the effects of incidents on hospital image from 2007 through 2016 was gathered from the HaiPro system, from the category Information Flow and Information Management (n = 12,294) and the subcategory Verbal Communication (n = 2,538). Data focusing on patient transfer was extracted from the electronic register and analyzed using SAS Enterprise Miner for Clustering and Content Categorization Studio for data mining. The text mining of the data revealed 492 reports in 40 clusters, where a cluster is a collection of data that are similar to one another. Content Categorization Studio specified codes that needed to be matched, such as coding for the word transfer.

Results

Most of the incident reports (75%) were submitted by nursing professionals, while physicians provided 7% of the reports. Most of the incidents (60%) dealt with missing information, followed by delayed, wrong, inaccurate, or inadequate information (17%), e.g., "Neither the patient's hospital admission nor his transmission to the ICU was mentioned to his relatives," or "The relatives learned of the hospital admission through their friends." There were also deficiencies in the interpretation and understanding of the content of information (14%), e.g., "The information regarding a patient carrying Extended Spectrum Beta-Lactamases was not forwarded between the units, causing a risk for other patients in the ward who may be more vulnerable to the risk of infection. The information was obtained later from the relatives." The minority of incidents dealt with patient identification omissions or misidentification (3%), e.g., "A patient suffering from aphasia had no identification bracelet, which caused a significant risk of serious adverse events. The plan was to carry out a blood transfusion."

Discussion

The data from the incident reports gives an impressive overview of the gaps in the interdisciplinary information flow. Because health care is a complex and fragmented system that provides the possibility for a systemic failure, this data is a valuable resource for improving communication by identifying risk factors in this error-prone area. Even if the organizational structures and processes between organizations in the research data differed in their general features, some similarities in the discrepancies can be found. The possibility for

the electronic health record system to generate consistent and timely interdisciplinary communication was not fully utilized, and standardized communication checklists such as ISBAR could have prevented many of the incidents described in the Results chapter. The case examples suggest that incident reports are an important tool for correcting errors and improving patient safety. Health care professionals are genuinely concerned for the safety of their work, and the reporting of problems leads to visible improvements in patient safety.

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Smart sensors will protect the patient safety in telemedicine

Jenni Siermala, Chief Information Security Officer
Sotedigi Oy

Biography Jenni Siermala

Jenni Siermala is M.Sc in Information System Science, works as an Chief Information Security Officer (CISO) at the SoteDigi Oy. Responds and leads the organization security and privacy. Coordinating the security of the organization service production. Develops and maintains security guides and processes for the social and healthcare sector. Responds and leads the organization risk management and audits. Before this worked 10 years as an Information Security Architect at the Oulu University Hospital. Chairwoman in the national group of experts from the Digital Security Steering Group..

The operation of the smart hospital is based on an ICT environment with optimized and automated processes. In the smart hospital, IOT devices support the hospital's key tasks, improving existing management practices and taking new ones into use. Improved diagnostics / surgical ability. One of the key goals is to introduce IoT to healthcare, expand hospital boundaries and provide remote care. Various medical devices, such as implantable devices and other mobile devices, enable real-time patient monitoring of key vital functions. This reduces the patient's treatment costs and improves the patient's experience. The patient can now receive treatment from his own home.

Medical Device Regulation (MDR) requires the medical device manufacturer determines the intended use of the device. The software came under the Medical Device Directive 2010. The medical device must be based on medical evidence. The responsibility of the manufacturer covers the entire product lifecycle from design to exit from the market. The manufacturer is therefore responsible for the entire lifecycle of the medical device, the application, interfaces and security as well as unqualified standards. The regulation of medical devices requires the manufacturer to use an appropriate quality system and risk management method. The manufacturer has the responsibility to monitor the performance of the product in the market.

Cloud Services is widely accepted for IoT-compatible healthcare solutions that enable scalability, data analysis, and reliability in solutions. However, the geographic centralization of cloud service centers requires that the data collected from the sensors is transmitted through multiple jumps to data processing that adversely affects the latency sensitivity of the service. In addition, the management of cloud resources in heterogeneous healthcare environments requires complex management to avoid the constant review of resources for uneven and uncertain information flows to healthcare systems.

The rapid development of health technology enables more efficient and better care, enabling people to work longer and live in their own homes with advanced technology. Information and Communication Technology (ICT) enable more advanced smart devices for healthcare and self-care through computers, sensors and network technology. Health care has been utilizing sensor technology for years to monitor patient strength. Sensors are used in hospitals, health centers, ambulances and home care. At the other end of the range of smart healthcare applications are fitness monitoring and, at the other end, monitoring the vital functions of people in hospitals. The application improves the quality of healthcare systems with machine learning algorithms and artificial intelligence.

As noted above, telemedicine is one of the key components of a smart hospital. Thus, according to MDR, the manufacturer is responsible for the entire lifecycle of the medical device. Applications that are medical devices the manufacturer is responsible for developing and manufacturing the software according to the latest technology, considering the principles of lifecycle, risk management, security, authentication and validation. In addition, manufacturers must set minimum requirements for hardware, network features, and security measures, including protection against unauthorized access, as required to use the software.

The Network and Information Security Directive, in turn, aims to ensure a high level of security of network and information systems throughout the Union. According to the Directive, key service providers, for example heath care and certain digital service providers are required to manage comprehensive network and information security risks and report to the responsible authorities any security incidents that hamper or threaten continuity of operations.

When designing safe remote medical care, it is necessary to identify the overlapping responsibilities of the medical device manufacturer and the smart hospital in security. According to the intended use of the device, medical devices are used for health care and well-being devices to support strength.

Integrating Clinical Decision Support into the Workflow to Support Clinical Practice and Patient Activation

Patricia Dykes, Associate Professor
Brigham and Womens' hospital, USA

Biography Patricia Dykes

Dr. Dykes is program director for research in the Center for Patient Safety Research and Practice at Brigham and Women's Hospital and Associate Professor at Harvard Medical School. Her program of research focuses on patient safety and informatics; most notably fall prevention and integration of decision support into clinical workflows for care team member use (including patients and family). Dr. Dykes is the lead investigator on the Fall TIPS studies. She is author of 2 books, over 100 peer reviewed publications, and has presented her work nationally and internationally. She is Chair-elect of the American Medical Informatics Association Board of Directors, an elected fellow of American Academy of Nursing, and an elected fellow of the American College of Medical Informatics.

Clinical decision support (CDS) can provide clinicians, staff, patients and consumers with specific knowledge and information to enhance health and health care. The "five rights" of CDS include providing the "right information" to the "right stakeholder", in the "right format", through the "right channel" and at the "right point in the workflow". When one or more of the "five rights" are violated, CDS is ineffective.

This presentation will review the principles of effective CDS design, discuss common CDS limitations, and then provide some examples of CDS in use at Brigham and Women's Hospital in Boston, MA, USA that aims to support evidenced-based interdisciplinary practice and patient activation.

O-16: Health Technology Assessment Framework for mHealth, Artificial Intelligence and Robotics

Jari Haverinen[1,2], MSc, MHSc, Niina Keränen[2,3], MD, MSc, Petra Falkenbach[4], MSc, Anna Maijala[2], MHSc, Jarmo Reponen, MD, PhD[2,3]

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Introduction: Health technology assessment (HTA) refers to the systematic evaluation of the properties, effects, and/or impacts of health technology. The main purpose of the assessment is to inform decision-makers in order to better support the introduction of new health technologies. A cost of € 30 000 or more per patient, significant impacts on public health or the economy, regional disparities in use and safety considerations are the criteria for starting the assessment in Finland. Digital healthcare solutions have brought with them a great potential to further develop healthcare services, but their introduction should follow the same criteria as other healthcare methods. They must provide evidence-based benefits and be safe to use; and their impacts on patients and organizations need to be clarified. Also, all data security issues must be in order. The Centre for Health and Technology (CHT) from the University of Oulu and the Finnish Coordinating Center for Health Technology Assessment (FinCCHTA) made a preliminary mHealth assessment commissioned by the Ministry of Social Affairs and Health (STM). It was found out that in order to enhance the introduction of digital healthcare services a dedicated assessment framework is needed. STM has launched The Well-being and Health Sector's Artificial Intelligence and Robotics Program (Hyteairo) to support and speed up the utilization of artificial intelligence (AI) and robotics in a healthcare sector[1]. In practice, this means that AI and robotics also should be included in the assessment framework to support the implementation of this strategy.

Material and Methods: In this development work, a questionnaire currently in use, mini-HTA, is used as the baseline for the assessment framework for mHealth, AI, and robotics. The assessment criteria will be complemented by good national and international practices, as well as a literature review and an assessment of the experts[2,3]. The aim is to find critical parameters on how to evaluate mHealth, AI, and robotics solutions for healthcare to support the introduction of those services. The assessment framework will be tested and further developed with real-use cases such as pilot studies and the introduction of new, digital healthcare services.

Results: The preliminary findings show that when introducing digital services in healthcare, the understanding of care process changes and commitment for changes are essential to ensure the successful introduction of services. Data protection and security issues need to be in order to ensure the confidence of citizens and professionals in digital healthcare services. Patients may have limited abilities to use digital services due to age or illness, and then accessibility and usability plays a crucial role. When utilizing AI in healthcare, the key question is the exact definition of which problem AI solves, or if AI is needed at all to solve the problem. The data sources have to be clarified, and access rights to data should be in order. Personnel must know what kind of recommendations AI provides and who makes the final decisions on treatment. When the robots are used in healthcare, they can produce changes to the infrastructure of healthcare service providers. Safety issues are important when robotics is used in healthcare—for example, when the connection is lost, there should be no harm to the patient. The forces used by the robots are such that the patients are not injured, in any case.

Discussion: There is a need for an assessment framework for digital health services. Healthcare professionals want to know which digital tools they can use and what the clear benefits are in their daily work. Companies need information on what is required to get their solutions approved for use. Finally, assessments provide evidence-based information for decision-makers to support their decisions related to new digital healthcare services.

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O-17: eTriage Service user interface testing with end users to meet the requirements of new Medical Devices Regulation

Marja Ylilehto[1], Paramedic (Master), BSc, RN, Pia Liljamo[1], PhD, RN
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Introduction
In Finland the objective of the national eHealth and eSocial Strategy 2020 is to support the active role of citizens in promoting their own well-being by improving information management and implementing self-management and online services [1]. The Virtual Emergency Hub online service was built around the Health Village concept which is part of the Virtual Hospital 2.0 Project. The primary focus in developing the Emergency Hub is to support citizens' own decision-making in acute health problems. One upcoming innovation in the Emergency Hub is an eTriage Service, which is a nationally operated digital tool for assessing the need for emergency treatment. The purpose of this paper is to describe how the user interface testing of the eTriage Service for end users is implemented in order to meet the requirements for the new Medical Devices Regulation (2017/745/EU) (MDR) [2].

Material and Methods
The eTriage Service is an electronic database that contains over 160 symptom or injury based recommendations. The main purpose of the eTriage Service is to ensure that people suffering from an acute health problem are directed to the right place at the right time. In order to make the eTriage Service available to the public, the service user interface must comply with the relevant regulations. The user interface must be compliant and CE marked to demonstrate conformity [2]. To ensure that the eTriage Service user interface is understandable and safe to use in all circumstances, we conducted wide-ranging user interface testing for volunteer end users. End user testing has an important role when developing decision supportive systems for citizens even though testing is often found to consume resources [3].

To recruit end users we published an open invitation in the Emergency Hubs own newsfeed and took advantage of the Health Villages social media channel (Facebook) and survey tool (Hotjar). To participate in the testing, the volunteer end user had to send an email to the eTriage Service developers. The email served as informed consent to participate in the testing. Information and electronic testing material was then sent to the tester by email. Testing was carried out with the user interface open for testing with ready-made test cases. A total of ten different test cases were created based on the user interface product requirements and service risk assessment. The tester performed one given test case independently and sent test results to the service developers using an electronic form. Most of the tests were performed using the e-mail method mentioned. In addition, a few test occasions were carried out in which service developers were on-site to conduct testing on voluntary end users.

To meet the requirements for the new MDR, the eTriage Service user interface is being tested with at least 100 end users. End users who perform the testing may be laymen or healthcare professionals. 50% of testers should use the eTriage Service interface for the first time and the testers should represent all age groups from 16 to over 60 years of age. Each test case is tested by at least 10 different testers. Test results collected on the electronic test form are analysed and fed into the validated testing platform. A Test case can be accepted when the tester ends up with the correct recommendation within the given time window.

Results and discussion
At the time of writing, testing has been ongoing for 4 weeks and we have managed to recruit 75% of the testers with the described methods. The results of eTriage Service user interface testing will be analysed in early 2019 and the final results will be presented at the eHealth2019 Conference in Kuopio April 2019. We have gained valuable information and experience in testing the user interface with end users as well as recruiting testers through electronic contact and feedback channels. By engaging with the eTriage Service end users to test the service during the development phase supports the customer-oriented implementation of the service. User interface testing often consumes a lot of resources and large-scale implementation for end users can be challenging. The model for the recruitment and sending of test material to the testers can improve the implementation of electronic service user interface testing in other service development projects.

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O-18: Cost-benefit predictions of the Virtual Hospital 2.0 digitalized secondary care path for women with endometriosis in Turku area and in Finland

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Background: Virtual Hospital 2.0 (VH2.0, Virtuaalisairaala 2.0) and its platform are essential parts of a key governmental wellbeing project of customer-responsive services in Finland and based on a joint project of all Finnish university hospitals [1–3]. VH2.0 produces and implements client-oriented digital special care services to patients, providers and other stakeholders in Virtual village (Terveyskylä [4]). The five-year cumulative potential health care capacity freed with VH2.0 in Finland was estimated at €1.3 billion [5]. Here, eHealth service (digital care path) for specific indication was assessed using cost-benefit analysis for predictions.

Aim: Predict the cost-benefit of the VH2.0 digital care path for women with endometriosis.

Methods: The study considered clinical and economic viewpoints and was based on the PICOSTEPS principle, which reports the content of health economic evaluation (HEE) in its order of importance [6]. E.g. the Finnish Current Care Criteria [7], real-world data (RWD) based [8] and modelled [6] HEEs have used PICOSTEPS.
Patients: All individuals with endometriosis who are expected to use specialized care services in 1) the Turku University Hospital Catchment Area (TYKS ERVA) or 2) Finland generally. *Intervention:* Modelled VH2.0 operational change predictions with the examined digital care path for women with endometriosis, including e.g. e-appointments with nurses. *Comparator*: Modelled conventional practice predictions based on population and morbidity information and Finnish RWD. *Outcome:* Predicted health care capacity freed (PHCCF, year 2017 real value) at TYKS ERVA and at Finnish national level available for other uses within the health care system, allowed by the digital care path.
Setting: Dynamic cost-benefit modelling estimating the predicted changes in the patient cohorts based on the population structures and morbidity. *Time*: First five-years from year 2018 to 2022 in annual cycles; assuming digital care path implementation was initiated in the beginning of year 2018 and completed gradually in three years at the TYKS ERVA level and in four years in national level. No discounting of PHCCF was done. *Effects*: Expected over-time changes in population structure and morbidity, resource use (e.g. clinician visits, nurse and clinician calls, e-appointments, travelling, patient fees) and unit costs based on the RWD and expert information. *Perspective:* Third-party payer limited to direct health care and travelling costs. *Sensitivity analyses*: The gradual implementation of the digital care path for the endometriosis patients in two or five years.

Results: At the TYKS ERVA level, the average annual PHCCF with endometriosis digital care path was estimated at €0.036 million for the first five years, summing up to total estimated five-year PHCCF of €0.179 million. The change in total costs was 14.4 % of the total conventional practice health care costs included.
At the national Finnish level, average annual PHCCF was estimated at €0.203 million for the first five years, summing up to total estimated five-year PHCCF of €1.02 million (12.7% of the total included conventional practice costs). The most important value drivers for PHCCF were revisits to a clinician and nurse calls.

Conclusions: VH2.0 digital care path for women with endometriosis potentially frees noteworthy capacity for other purposes. From the perspective of opportunity costs such technological change is very valuable and the capacity freed can produce significant effectiveness for other patients elsewhere [9].

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Vierailut / Site visits

Keskiviikko 3.4.2019 - Wednesday 3rd of April 2019

8:30 – 10:30

Virailut / Site Visits

1. **Kuopion yliopistollinen sairaala (KYS) Itä-Suomen Mikrokirurgiakeskus**
   Itä-Suomen Mikrokirurgiakeskus (MKK) on perustettu vuonna 2017. Keskus tarjoaa 24/7 avoinna olevan ja pysyvän paikan, jossa kirurgit ja muu leikkaussalin henkilökunta voivat säännöllisesti harjoitella tarkkuutta vaativia kädentaitojaan ja erilaisia kirurgisia tekniikoita keinotekoisessa ympäristössä. Tarjoamalla parempia koulutusmahdollisuuksia ja lisäämällä alan tutkimusta on mahdollista vähentää komplikaatioiden määrää ja saavuttaa kustannussäästöjä. Infrastruktuuri mahdollistaa myös translaationaalisen tutkimuksen ja EU-standardien mukaisen vaativan terveysteknologian arvioinnin (HTA). Keskus auttaa tutkijoita ja yrittäjiä tavoittamaan uusia markkinoita ja työllisyyttä operatiivisen lääketieteellisen teknologian alalla. Teknologinen kehitys ja koulutus auttavat operatiivisen lääketieteen turvallisuuden, vaikuttavuuden ja potilaiden paremman hoidon kehittymistä ja siten parantaa myös työn tehokkuutta ja vähentää julkisia kustannuksia.

   Microsurgery Centre of Eastern Finland
   Kuopio University Hospital (KUH) Microsurgery Center (MIC) has been established in 2017. The Center offers 24/7 open and permanent place where the surgeons and other operating room staff can regularly practice hands on training and different surgical techniques in an artificial environment. By providing better training possibilities and increasing research in the field, it is possible to reduce the number of complications and achieve cost savings. The infrastructure also allows translative research and enables demanding health technology assesment (HTA) that meets EU-standards. The MIC assists both academics and entrepreneurs to reach new markets and employment. The technological advances and education will help make operative medicine safer and more efficient by providing the patients with better care, and therefore improved work capacity and reduced public costs.

2. **Kuopion yliopistollinen sairaala; älylääkekaapit ja PET radiofarmasia**
   Lääkehuolto-ja hoito sairaalassa on monivaiheinen prosessi ja siihen osallistuu monta tekijää. Lääkehoitoprosessi sisältää myös monia virhemahdollisuuksia. Kuopion yliopistollisessa sairaalassa (KYS) hyödynnetään uutta teknologiaa ja automaatiota lääkkeiden varastointi- ja jakelujärjestelmissä. Tavoitteena on tehostaa ja tarkentaa lääkehuoltoa – ja hoitoa sekä parantaa potilasturvallisuutta.

   Sairaala-apteekissa varastorobotti varastoi lääkkeitä ja keräilee osastojen tilaukset suoraan laatikoihin, jotka ovat valmiita kuljetukseen. Lääkkeenvalmistusyksikkö hyödyntää automatiikkaa mm. robotiikan avulla valmistetaan käyttövalmiit antibioottiruiskut potilaan hoitoa varten. Infuusioliuosten ladontarobotti puolestaan uudelleenpakkaa tukkupakkauksista puretut infuusioliuokset rullakoihin, jotka toimitetaan osastoille. Tablettien annosjakelulaite jakaa pitkäaikaispotilaiden lääkkeet.

   KYSissa on 64 älylääkekaappia leikkaustoiminnassa, heräämössä, tehohoidon osastolla, naisten akuuttiosastolla, päivystyspoliklinikalla ja sydänvalvontaosastolla. Älylääkekaappi on sähköinen, tietojärjestelmän ohjaama lääkkeiden varastointilaitteisto. KYSin älylääkekaapit räätälöitiin yksiköiden tarpeisiin käyttäjälähtöisesti ja suunnitteluissa innovoitiin mm. hoitohuone/-salikohtaiset, läpiantoperiaatteella toimivat älylääkekaapit, jolloin lääkkeen ottaminen ja täydentäminen voidaan toteuttaa samanaikaisesti. Lähiälylääkekaappien lisäksi lääkehuoneisiin sijoitettiin keskusälylääkekaapit. Älylääkekaappien käytön tavoitteena on tehostaa ja tarkentaa lääkehuoltoa - ja hoitoa sekä parantaa potilasturvallisuutta.

Kuopio University Hospital; smart medicine cabinets and PET radiopharmacy
Medication management in the hospital is a multi-stage process and involves many people and numerous steps. It also contains many possibilities of errors. The Kuopio University Hospital (KYS) utilizes new technology and automation in pharmaceutical storage and distribution systems, which has been planned to address these medication challenges. The goal is to improve patient safety.

In hospital pharmacy department drug storages and storage management have been automated by using storage and retrieval robot. Robot for intranevous drug reconstitution in aseptic conditions offer ready-to-administer (RTA) antibiotic syringes for the patients in units. Robotics for infusion fluids handling and repackaging removes fluid bags from the cardboard boxes and place them in trolleys which are delivered to the patient care units. Automatic tablet dispensing machine dispense prescribed medicines for long term patients.

There are 64 automated dispensing cabinets (ADCs) located in Kuopio university hospital in Operation theatres, Recovery rooms, Intensive care unit, Women's acute care unit, Emergency department and Cardiac care unit. Most of the ADCs are equipped by using an innovative pass-through method of ADC. This system allows the filling of the ADCs outside the room, and medicines can be given to patient inside the room at the same time. These ADCs are supported by bigger automated central cabinets in medication room. ADCs provide computer-controlled storage, dispensing, and tracking of drugs. These also reduce medication errors, improve stock control and bring about cost savings.

Positron-emission tomography (PET) is one of the most important methods in today´s molecular imaging. Molecules are labeled with positron-emitting radioactive atoms and used to visualize biochemical and physiological processes in living organisms. PET diagnostics are increasingly important tools on the path to personalized medicine. Due to the short half-lives (typically from 2 to 110 min) of PET isotopes, radiopharmaceuticals are produced either on daily basis or even for individual patient investigations. PET radiopharmacy is located at Kuopio University Hospital, Kuopio, Finland. The laboratory is part of the Diagnostic Imaging Center and the clinical production of radiopharmaceuticals is controlled by Hospital Pharmacy. Productions process strictly follows the law of medicinal agency and GMP-protocols to ensure the finest quality and safety for the patients. GE Healthcare PETtrace 860 cyclotron can accelerate high energy protons or deuterons and it is currently used to produce 18F (half-life of 110min), 11C (20min), 15O (2min) isotopes. The production facility consists of a cleanroom laboratory (class C). Two automated dispensing systems are installed (Clio and Theodorico, Comecer). The laboratory area is monitored for radiation and automated systems are installed to ensure that the working environment is safe constantly

3. **Itä-Suomen yliopisto, HUMEA laboratorio**
Ihmiskehon toimintaa voidaan mitata ajan funktiona käyttämällä erilaisia mittausjärjestelmiä. Näissä mittauksissa hankittuja aikasarjoja kutsutaan yleensä biosignaaleiksi. Yleisimmin tutkittuja biosignaaleja ovat elektrokardiografia (EKG) ja elektroenkefalografia (EEG), jotka ovat sydämen ja aivojen sähköisten toimintojen mittauksia. Biosignaalien analyysi on haasteellinen, sillä hyödyllisen tiedon hankkiminen näistä signaaleista vaatii usein monimutkaisia matemaattisia malleja sekä taustalla olevan ihmisen fysiologian tai neurofysiologian tuntemusta.

Ryhmän tärkeimmät tutkimusaiheet ovat tällä hetkellä ihmisen liikeanalyysi, Parkinsonin taudin liikkeenohjauksen mallintaminen, kardiovaskulaarisen signaalin analyysimenetelmät sekä psykofysiologiset mittaukset ihmisen käyttäytymisen ja terveyden arvioinnissa. Tutkimusryhmällä on käytössään korkealuokkaiset laboratoriotilat yliopiston kampusalueella (Kuopion kampus). Tiloihin kuuluvat ihmisen liike-, ihmisen suorituskyvyn laboratoriot sekä ajosimulaattori ja robottiavusteiset kuntoutusmenetelmät.

Tutkimusryhmä osallistuu jatkuvasti useisiin kansallisesti ja kansainvälisesti rahoitettuihin projekteihin, ja yhteistyö kliinikoiden ja teollisuuden kumppaneiden kanssa on erittäin intensiivistä. Ryhmällä on avoin laboratorioympäristö, jossa neljä päätoimintoa sijaitsevat yhdessä avoimessa tilassa.

Katso 360 asteen näkymä laboratorioista (https://glovr.fi/lms/uef-360-labra/). 360-näkymässä vaadittu salasana: UEF.

University of Eastern Finland (UEF) Human Measurement and Exercise Analysis (HUMEA) laboratory
The functioning of human body can be measured as a function of time by using different kinds of measurement systems. The time series acquired in these measurements are in general called biosignals. The most commonly studied biosignals include the electrocardiogram (ECG) and electroencephalogram (EEG) which are measurements of electrical activities of the heart and the brain, respectively. The analysis of biosignals is challenging, because extraction of useful information from these signals often necessitates complex mathematical models as well as knowledge of the underlying human physiology or neurophysiology. The functioning of human body can be measured as a function of time by using different kinds of measurement systems. The time series acquired in these measurements are in general called biosignals. The most commonly studied biosignals include the electrocardiogram (ECG) and electroencephalogram (EEG) which are measurements of electrical activities of the heart and the brain, respectively. The analysis of biosignals is challenging, because extraction of useful information from these signals often necessitates complex mathematical models as well as knowledge of the underlying human physiology or neurophysiology.

The main research topics of the group are currently human motion analysis, modelling of motor control in Parkinson's disease, cardiovascular signal analysis methods, and psychophysiological measurements in assessing human behaviour and health. The research group has state-of-the art laboratory facilities at the Campus area of the University (Kuopio campus). The facilities include human motion, human performance laboratories, as well as a driving simulator and robot-assisted rehabilitation facilities. The research group is constantly involved in several nationally and internationally funded projects, and the collaboration with clinical and industrial partners is very intensive. The group has an open laboratory environment, where four main functions are located in one open space. Please see 360 degree view of the laboratories (https://glovr.fi/lms/uef-360-labra/). The password required for the 360-view: UEF

4. **Savonia-ammattikorkeakoulu: Soveltava hyvinvointiteknologia**
Savonia-ammattikorkeakoulun soveltavan hyvinvointiteknologian painoalalla edistämme teknologisten sovellusten kehittämistä ja kaupallistamista, asiakkaan osallisuutta tukevaa teknologiaa ja sähköisten palvelujen turvallista käyttöä. Lisäksi tarjoamme koulutusmenetelmiä ja -kokonaisuuksia työelämälle, alan opiskelijoille ja opettajille hyödyntäen uusinta teknologiaa. Koe virtuaaliset opetusympäristöt, leikittele teknologioilla ja mieti miten voisit soveltaa niitä omassa työssäsi. Lisätietoja: sht.savonia.fi

Savonia University of Applied Sciences: Applied Wellbeing Technology
One focus area of Savonia University of Applied Sciences is applied wellbeing technology which promotes the development and commercialization of applications, the support of inclusive technology and the safe use of electronic services. In addition, we offer education and concepts for working life, students and teachers in the field, utilizing the latest technology. Come and experience virtual teaching environments, play with technologies, and consider how you could apply them in your own work. More information: http://sht.savonia.fi/in-english

5. **Mäntykampus, ikäystävällinen asumisympäristö, asumisyksiköt**

Mäntykampus, an elder-friendly living area
Mäntykampus has been chosen as a reference site for European Innovation Partnership on Active Healthy Ageing (EIP on AHA) network. Mäntykampus is elder-friendly living area in the city of Kuopio. Mäntykampus is large complex consisting of two nursing homes, 100 assisted living homes and 250 senior homes for independent living. Community center in the middle of Mäntykampus works place for group and volunteer activities etc. Mäntykampus is also a Living Lab environment. Current ICT solutions for supporting living at home and assisted living lack the interaction between demand and supply. Living Lab platform brings together different stakeholders (business, research, public and private health providers and customers) to solve key bottlenecks in collaboration.

6. **Pelastusopiston harjoitusalue**
Merkittävä osa Pelastusopistossa toteutettavasta käytännön koulutuksesta tapahtuu harjoitusalueella, joka sijaitsee noin 10 kilometrin etäisyydellä opistolta. Alue on käytössä niin ammatillisessa peruskoulutuksessa kuin erilaisilla täydennyskursseilla. Harjoitusaluetta käytetään myös viranomaisten yhteisten suuronnettomuusharjoitusten toteutukseen. Tarjoamme aluetta mielellämme

myös turvallisuuskoulutusta järjestävien organisaatioiden käyttöön. Alueen suunnittelussa on erityisesti pyritty luomaan mahdollisuudet toteuttaa turvallisesti käytännön harjoituksia mahdollisimman todenmukaisissa oloissa. Alueelta löytyy monipuolisia koulutusharjoituskenttiä ja erikoisrakennuksia, vastaanotto- ja huoltorakennuksia sekä luokkatilat. Harjoitusalueella voidaan harjoitella erilaisten palojen sammutusta, kemikaalivahinkojen torjuntaa, monipuolisia pelastustehtäviä, hälytysajoa ja onnettomuuksissa loukkaantuneiden ensihoitoa. Ensihoidon harjoituksissa hyödynnetään kaikkia harjoitusalueen kohteita. Kansainvälisestikin arvioiden korkeatasoista ja monipuolista aluetta kehitetään jatkuvasti. Viimeisimpänä vuonna 2015 käyttöönotettu monipalosimulaattori, jossa voidaan harjoitella teollisuushalli-, parkkihalli- ja kauppakeskuspalojen sekä tunnelimaisten tilojen palojen sammuttamista, pelastustoiminnan johtamista, rakenteellista paloturvallisuutta sekä palontutkintaa. Lisäksi simulaattoria voidaan hyödyntää tutkimus- ja kehittämistoiminnassa sekä onnettomuustutkinnassa.

Emergency Services College's Training Ground
The Emergency Services College provides vocational education for firefighters, sub-officers, fire officers and emergency response centre operators in Finland. The College also offers a wide variety of specially tailored further training and in-service training for national and international professionals in the rescue and emergency field. It is also responsible for the training and recruitment of Finnish experts to international civil protection missions.

The College is supervised by the Finnish Ministry of the Interior. A significant portion of practical training at the Emergency Services College takes place at the training ground. The training ground is used for both vocational education and training as well as further training courses. It is also used in the realisation of disaster training exercises jointly carried out by different authorities. When the training ground was designed, an effort was made to create an environment for safe performance of training exercises in conditions that are as realistic as possible. The area includes versatile training exercise fields and special buildings, a reception and maintenance buildings as well as classrooms. The training ground can be used for practising various scenarios: extinguishing different types of fires, prevention of chemical spills, diverse rescue assignments, driving on emergency runs and provide emergency medical care to those injured in accidents. Emergency medical care exercises utilise all the training exercise fields on the training ground.

7. **Apteekkien lääkevarastoautomaatio**
NEWICON OY on vuonna 2007 perustettu terveysteknologiayritys, joka on Suomen markkinajohtaja apteekkien lääkevarastoautomaatiossa sekä sairaaloiden älylääkekaappi- ja I.V. antibioottirobottien toimittajana. Fixu-automaateille on myönnetty Avainlippu-tunnus merkiksi suomalaisesta työstä. Yritys on toimittanut lääkehuollon automaatioratkaisuja lähes sataan apteekkiin ja sairaala-apteekkiin Suomessa, Tanskassa, Venäjällä, Israelissa ja Iranissa. Henkilökuntaa on noin 60. Yrityksellä on käytössään sertifioitu ISO 9001 -laatujärjestelmä.

Medicine storage automation for pharmacies
NEWICON OY is a health technology company founded in 2007. It is the market leader in medicine storage automation for pharmacies in Finland. The company has delivered medical service automation solutions to over 100 pharmacies and hospitals in Finland, Denmark, Russia, Israel, and China. Product portfolio consists from medicine storage and retrieval systems, smart medicine cabinets and IV medicine compounding systems. The company employs approximately 60 people and uses an ISO 9001 certified quality management system.

8. **KCT Kuopio Center for Gene and Cell Therapy**
Kuopio Center for Gene and Cell Therapy (KCT) is an international, newly established research organization in Kuopio, Finland, focused on developing novel gene and cell therapy products in the class known as Advanced Therapy Medicinal Products (ATMPs). The center's niche is in the interface between academic, basic research and the commercial biotechnology industry. Its exclusive access to FinVector's GMP manufacturing and regulatory capability can rapidly move novel science through these difficult stages and into human trials. KCT provides an exciting environment for applied research of ATMPs discovering, establishing and developing them through Phase I clinical trials and utilizing some of the most advanced analytical and mechanistic proof of principle approaches in the sector. During the visit we will introduce KCT for the visitors and there will be a possibility to see research labs and Finvector´s GMP facility. Further information www.kct.fi. You find KCT also from LinkedIn, Instagram and Facebook.

Sessio 5A: Innovaatiot / Innovations

Puheenjohtaja: kouluttajalääkäri Kirsimarja Metsävainio
Kuopion yliopistollinen sairaala

Chair: MD, Clinical Educator Kirsimarja Metsävainio
Kuopio University Hospital, Finland

Keskiviikko 3.4.2019- Wednesday 3rd of April 2019

11:00 – 12:30

5A-1 Innovaatiotoiminnan käynnistäminen yliopistollisessa sairaalassa

Pauliina Hyrkäs, Suunnittelija
Oulun yliopistollinen sairaala

5A-2 Kansalaiset innovaatiotoiminnan keskiössä

Pauliina Kämäräinen, Projektipäällikkö
Kuopion kaupunki

5A-3 Ideasta tuotteeksi - kokemuksia yritystoiminnan käynnistämisestä

Mikko Kokkonen, Toimitusjohtaja
Healthcare Mobile Solutions Oy

5A-4 Innovatiiviset hankinnat työn kehittämisen mahdollistajana

Aki Lehto, ICT-arkkitehti
Tampereen yliopistollinen sairaala

5 min rapid scientific presentations

O-19 Large-scale implementation, adoption and use of the Finnish national My Kanta Pages patient portal service in 2010–2018

Jormanainen V[1], MD, MSc, Parhiala K[2], MSocSc, Niemi A[3], MD
[1]National Institute for Health and Welfare (THL), Social and Health Systems Research;
[2]National Institute for Health and Welfare (THL), Healthcare and Social Services Evaluation;
[3]National Institute for Health and Welfare (THL), Reforms

O-20 The ideas of older people about usability of the Nao robot in their casual activities

Sanerma Päivi[1], Phd (education), Phd candidate (nursing science), RN
Pakkanen Piiku[2], MNSc, PhD candidate (nursing science), RN
[1]Smart service research Unit, HAMK, University of applied sciences
[2]School of Wellbeing, Degree Program in Nursing, HAMK, University of applied sciences

O-21 Using Cloud Server to Capture Real-time Blood Pressure to Predict the Adaptation of diagnostic digital pathology in Finland

Juha Näpänkangas[1], MD, Teemu Tolonen[2], MD, PhD
[1]Department of Pathology, Oulu University Hospital, University of Oulu, Oulu, Finland
[2]Department of Pathology, Fimlab Laboratories, Tampere University Hospital, Tampere, Finland

Innovaatiotoiminnan käynnistäminen yliopistollisessa sairaalassa

Pauliina Hyrkäs, Suunnittelija
Oulun yliopistollinen sairaala

Launching innovation activities in a university hospital

Pauliina Hyrkäs, M.H.Sc. (Health Admin.)
Oulu University Hospital, Northern Ostrobothnia Hospital District, Finland

Biography Pauliina Hyrkäs

Pauliina Hyrkäs, MHSc (Health Admin.) is the designer and coordinator of Oulu University Hospital innovation activities. She has worked in local, national and international healthcare innovation projects as a project manager, a coordinator and a process designer. With her project team, she developed nationally applicable innovation model for Finnish University Hospitals and their stakeholder's cooperation as well as the Innovation Process for Northern Ostrobothnia Hospital District. Currently, she is coordinating the innovation activities at the Oulu University Hospital, designing the OuluHealth ecosystem innovation process and working on a doctoral dissertation on innovation management in public hospitals.

Innovations in the context of healthcare are something novel and implemented, which improve healthcare processes. On the other hand, innovation activities are all actions aiming to generate innovations. The development of innovations in healthcare is the highest priority, but there has been relatively little research in the innovation activities of the public sector and especially in public hospitals. Finnish university hospitals are at the core of their regional innovation ecosystems. A model for innovation activities, that helps to facilitate innovation co-creation between different stakeholders, is proposed to be one of the potential solutions for Finnish university hospitals to continuously improve their services.

Various stakeholders of university hospitals are constantly producing viable ideas that should be used systematically to develop new healthcare services, products or working methods. Moreover, healthcare customers and professionals have essential knowledge about the development needs that should be utilized in co-creation of better and more efficient healthcare innovations. With a suitable approach, the ideas emerging within the hospital can be refined and developed further into new healthcare solutions, services or processes, either within the organization itself or in co-operation with external stakeholders.

Oulu University Hospital (OYS) started to develop their innovation activities at the beginning of the year 2017 in parallel with the national project University Hospitals as Innovation Platforms (YSI). As a result, the local innovation ecosystem, as well as other hospitals, received formal recommendations about the new policies for co-creating innovative products and services together with the companies (YSI Co-creation model) and also received guidelines to organize the university hospitals' in-house innovation activities (OYS Innovation process).

The OYS Innovation activities were developed by examining the special features and needs of the university hospital context. University hospitals are complex and administratively bureaucratic, hierarchical environments, which creates challenges for identifying appropriate practices for innovation activities. In addition, in university hospitals, the core activities have traditionally been divided into special fields to paraphrase the medical specialties, resulting in a clear need to develop internal cooperation practices within the organization and to improve communication to succeed in innovation activities.

As specialized healthcare is also heavily regulated and hospital services need to be implemented accurately and reliably, appropriate environments and timelines must be devoted to innovation activities. Therefore, hospital personnel and other stakeholders can work creatively to develop new solutions without compromising or slowing down the core functions of the hospital. Those who coordinate innovation activities must be able to act as facilitators, taking into account the specificities of the context, not only ensuring the right conditions for the development of innovations but also acting as messengers, enthusiasts, collaborators and interpreters between different stakeholders.

OYS has implemented innovation activities in accordance with a unified process model. This allows for better awareness of ways of working and a better flow of information between different stakeholders. Unified innovation practices prevent duplication of development work and enables development of solutions for multiple hospital areas simultaneously. To succeed, all stakeholders with the necessary expertise or decision-

making power must be made aware of and committed to unified innovation practices. Additionally, determining smooth cooperation practices between those involved in hospital innovation activities is a prerequisite for managing innovation processes. Thus, in order to be able to coordinate innovation activities successfully, one has to be able to act as negotiators, exemplary actors and supporters for different parties.According to OYS's experience, both external and internal stakeholders are interested in participating in the university hospital's innovation activities. However, it is important to provide a clear and inspirational, easy-to-reach path for presenting and evaluating development proposals. In addition, in order to assess the effectiveness of innovation activity and to report its impact on different stakeholders, adequate documentation must be provided at different stages of the innovation processes.

Together with the unified innovation process, OYS has launched an electronic innovation platform for all personnel to present and develop the needs and ideas emerging from their daily work. Staff representatives from all hospital departments have been chosen to coordinate innovation activities and to support innovation processes. Furthermore, many of the ideas chosen to be developed further are carried over to the innovation, development and testing environment OYS TestLab, which enables excellent opportunities for co-create new solutions in real-life conditions.

OYS's unified innovation activities have started in line with the targets. Since the launch, hundreds of development proposals have been submitted to the electronic innovation platform, which the staff is actively using. According to the feedback from different stakeholders, the strengths of the innovation activities are its unity and accessibility, responsiveness and transparency. Furthermore, unified innovation activities have already been recognized to strengthen multiprofessional co-operation as well as enable greater involvement and empowerment of customers and staff in the development of hospital services.

Kansalaiset innovaatiotoiminnan keskiössä

Pauliina Kämäräinen, Projektipäällikkö
Kuopion kaupunki

Biografia Pauliina Kämäräinen

Pauliina Kämäräinen työskentelee Kuopion kaupungin vanhuspalveluissa projektipäällikkönä. Vastuualueena on teknologisavusteisten palvelujen kehittäminen yhteistyössä asiakkaiden, työntekijöiden ja monialaisten verkostojen kanssa. Hän toimii myös Kuopion kaupungin vanhuspalvelujen Living Lab ympäristössä koordinaattorina edistäen terveysteknologian innovaatioiden käyttöönottoa, kokeilua ja kaupallistamista. Pauliina Kämäräinen on työskennellyt ennen nykyistä työtehtäväänsä sairaanhoitajana sekä perus- että erikoissairaanhoidossa. Hän suorittaa myös hoitotieteen opintoja yliopistossa.

Information and psychosocial support are increasingly important in beating cancer. Majority of cancer Esitelmässä peilataan toimintaa case tyyppisestä Kuopion kaupungin kotihoidon toimintaympäristöön ja sen kehittämiseen teknologisavusteisten palvelujen näkökulmasta.

Ikääntyneiden palvelujen toimintaympäristön muutoksista johtuen kotiin vietäviä palveluja ja ratkaisuja on kehitettävä, jotta ikääntyneiden laadukas ja hyvä asuminen kotona voidaan mahdollistaa. Tämän toteutumiseksi tarvitaan uudenlaisia asiakaslähtöisiä, laadukkaita ja kustannustehokkaita palvelukokonaisuuksia.

Uusien innovatiivisten teknologioiden tuominen palveluihin on yksi ratkaisu hyvän ikääntymisen ja elämän mahdollistumiseen. Kuitenkin on huomattava, että vaikuttavien ja onnistuneiden innovaatioiden kehittäminen vaatii aina yhteistyötä ja etenkin loppukäyttäjän osallistumista ja kuuntelemista.
Miten sitten saadaan kansalaisten, ikääntyneiden ääni kuuluville? Kotihoidossa on mallinnettu teknologisavusteisten palvelujen kehitysprosessia, jossa painotus on asiakaslähtöisissä ja asiakasta osallistavissa menetelmissä. Living Lab palvelut Kuopion vanhuspalveluissa on ollut erinomainen esimerkki loppukäyttäjien tarpeiden kuulemisessa. Tarjoomo –hanke tuo myös työkaluja kansalaisten kanssa tehtävään palvelujen kehittämiseen. Esitelmässä tuodaan muutama case –tyyppi, jossa tarkemmin esitellään tuloksia

Citizens in the center of innovation activity

Pauliina Kämäräinen, Project Manager
City of Kuopio, Finland

Biography Pauliina Kämäräinen
Pauliina Kämäräinen works as a project manager in elderly care in the city of Kuopio. Her main territory is in developing technologically assisted services for the elderly together with clients, staff and with wide network of others. She is also a Living Lab coordinator promoting try-outs and introductions of new innovative health technologies.Prior to her current occupation, she has worked as a registered nurse in both primary and specialized health care. She is also studying health sciences in university.

This presentation gives a case type insight on how the city of Kuopio's home care unit develops technologically assisted services with the elderly citizens.

To enable the elderly to live a good and satisfying life in their own homes, new customer-centric, -high quality and cost-effective services and solutions need to be developed.

Bringing new innovative technologies is one solutions in enabling good aging and living. But it is important to acknowledge that effective and successful innovations always start with the end-user, their inclusion and listening.

How does one hear their voice and needs? Homecare in Kuopio has modeled a development process of technologically assisted services with emphasis on inclusion and customer-centric methods. Living Lab services also gives an important example on inclusion. Tarjoomo -model also gives great tools for developing future services together with the citizens. The presentation will give examples of successful cases of co-development.

Ideasta tuotteeksi - kokemuksia yritystoiminnan käynnistämisestä

Mikko Kokkonen, Toimitusjohtaja
Healthcare Mobile Solutions Oy

Biografia Mikko Kokkonen

Toimitusjohtaja Healthcare Mobile Solutions, röntgenhoitaja KYS Kliininen fysiologia ja isotooppi, taloushallinnon merkonomi. Yrittäjä, jonka tarkoituksena on ratkaista käytännön ongelmia. Kahden hyvin villin pojan isä.

Ideasta tuotteeksi

- Minkälaisia ideoita käytännön työstä syntyy, voiko niitä hyödyntää kaupallisesti, mitkä mahdollisuudet ”massakäyttöön”
- Mitä eri vaihtoehtoja on viedä idea varsinaiseksi tuotteeksi
- Teenkö itse, alihankkijalta vai muuta reittiä
- Yrityksen perustaminen, ideahautomot (Living Lab)
- Mitä apuja saa tuotteen testaukseen ja tuotekehitykseen?

From Idea to Product – Experiences from starting a business

Mikko Kokkonen, CEO
Healthcare Mobile Solutions Oy

Biography Mikko Kokkonen

CEO Healthcare Mobile Solutions, radiographer at KUH clinical physiology and nuclear medicine department, Vocational education in financial management. An entrepreneur whose purpose is to solve practical problems. Father of two wild boys.

From idea to product

- What kind of ideas come from practical work, what are the possibilities for 'mass use'
- What are the options to take the idea to the actual product
- Do I make the product myself or do I use the subcontractor or another route
- Establishing a business, idea incubators (Living Lab)
- What help is available for product testing and product development?

Innovatiiviset hankinnat työn kehittämisen mahdollistajana

Aki Lehto, ICT-arkkitehti
Tampereen yliopistollinen sairaala

Biografia Aki Lehto

Aki Lehto, ICT-arkkitehti, PSHP/Tays. Tuotantotalouden DI, jolla vankka tausta ohjelmistokehityksen tuotekehittämisessä ja ohjelmistohankkeiden ohjauksessa globaalissa toimintaympäristössä. Useita vuosia mukana erityissairaanhoidon digitalisaation edistämisessä sekä sisäisesti sairaanhoitopiirissä että erilaisissa kansallisissa hankkeissa.

Pohdiskelua työprosessien kehityskaaresta ja siitä miten kulttuuri ja toimintamallit elävät ajan funktiona. Miten työn kehittämiseen investoidaan ja saadaanko innovaatioilla hankittua tehokkuutta? Mitä innovaatiot oikeastaan ovat ja miten niiden hyötyjä oikeastaan mitataan? Saadaanko innovaatiot sulautettua arjen toimintaan ja mitä innovatiiviset hankinnat vaativat arjen toimijoilta? Minne pyritään näillä hankinnoilla ja koska ollaan valmiita? Voidaanko arkea kehittää innovaatioilla ja innovatiivisilla hankinnoilla?

Luentoni keskittyy suurten kysymysten pohdiskeluun ja nostaa erilaisia näkökulmia aiheen tiimoilta. Esitän enemmän kysymyksiä kuin minulla on vastauksia...

Innovative procurement as a means of developing work

Aki Lehto, ICT-achitect
Tampere University Hospital, Finland

Biography Aki Lehto

Aki Lehto, ICT-architect, PSHP/Tays. MSc in Industrial Management with solid work background in the area of R&D in software development and global product program management. Several years I have been advancing digitalization in special health care both at locally in Pirkanmaa Hospital District (Tampere University Hospital) and in different Finnish national programs.

Reflections on the development path of work processes and how culture and operational models live as a function of time. How do we invest in the development of work and do we get efficiency through innovation? What are the innovations really and how are their benefits actually measured? Can innovations be included in everyday work and what do innovative procurement require from everyday actors? What is the purpose of these procurements and when they are ready? Can we develop everyday work through innovations and innovative procurements?

My lecture focuses on reflecting on big issues and raising different perspectives on the topic. I will ask more questions than I have answers...

O-19: Large-scale implementation, adoption and use of the Finnish national My Kanta Pages patient portal service in 2010–2018

Jormanainen V[1], MD, MSc, Parhiala K[2], MSocSc, Niemi A[3], MD
[1]*National Institute for Health and Welfare (THL), Social and Health Systems Research;*
[2]*National Institute for Health and Welfare (THL), Healthcare and Social Services Evaluation;*
[3]*National Institute for Health and Welfare (THL), Reforms*

Introduction
In Finland, implementation and adoption of the national *Kanta services*' second phase services were carried out step-by-step from May 2010 till December 2017 [1]. The *Kanta services* currently include integrated, interoperable health information from EMR, EHR, PHR and social welfare sources that can benefit patients, care providers and policy makers. *My Kanta Pages* is an online service where citizens can browse their own information recorded in the *Prescription Centre (ePC)* and the *Patient Data Repository (PDR)* regardless of whether they have used public or private health care services. The portal was launched in May 2010. The study objective was to investigate implementation, adoption and use of the *My Kanta Pages* patient portal service in 2010–2018.

Material and Methods
A set of indicators for monthly follow-up reporting purposes were generated. The Finnish national *Social Insurance Institution*'s (*Kela*) *Kanta services unit* collected the indicator material in 2010–2018, and sent these data monthly to *THL*. At the *THL*, indicator data were checked and entered to charts and tables, and reported mainly internally for those who needed to know such detailed information. Monthly and annual indicator time series data are presented. We present also use of *My Kanta Pages* in 2017 as a proportion (%) of adult population by public *Primary Health Care Centres (PHCs)* and *Hospital Districts (HDs)* in maps. The statistical data are based on *census*, and thus, neither statistical testing nor confidence interval calculations were performed.

Results
Cumulatively 2.80 million (M) persons (51% of the Finnish population in general, and 63% of the adults at least 18 years old) had used *My Kanta Pages* 23.24M times (49.20M logins) by 31.12.2018. The number of visits and logins increased in an exponential fashion from 1.1.2010 till 31.12.2018, and use of the service was characteristically lower during summer months (July, especially). Altogether, 6.02M *ePrescription (eP)* renewal requests were sent to health care providers via *My Kanta Pages* by 31.12.2018. Parents and guardians can view medical records of their children <10 years of age, and they had used the service 2.45M times by 31.12.2018. Also children <18 years of age can view their own medical records and they used the service 39,518 times. *Patient Data Management Service (PDMS)* was implemented as part of the *PDR*. By 31.12.2018, the *PDMS* had records of 6.27M informings, 3.34M consents and 93,732 refusals. One can set up a living will and/or an organ donation testament in *My Kanta Pages*. By 31.12.2018, the *PDMS* had records of 467,055 organ donation testaments and 93,484 living wills.
In 2018, *My Kanta Pages* was used by 2.15M persons (48% of the adults) 6.79M times (16.75M logins). Portal use varied by *PHCs* (max. 55%) and by *HDs* (15–47%) in 2017. Proportions of use varied also by EHR in *PHCs* (24–48%). Altogether, 2.01M *eP* renewal requests were sent to health care via *My Kanta Pages* in 2018. Parents and guardians viewed medical records of their children 1.39M times. In 2018, in the *PDMS* there were new entries of 0.70M informings, 0.47M consents, 25,383 refusals, 243,057 organ donation testaments and 37,586 living wills.
Since *My Kanta Pages* does not have a database of its own, it presents one's data recorded in the *ePC* and/or the *PDR*. At 31.12.2018, all (100%) pharmacies and public health care providers send electronic, encrypted, standardized data to the national *Kanta services* at *Kela*. In addition, 1,331 private health care organisations send *eP* and 1,165 also EHR data to *Kanta services* for citizens to browse their own data (or data of their children <10 years of age).

Discussion
Half of the Finnish population in general, and two out of three adults had used *My Kanta Pages* patient portal by 31.12.2018. Since 8.5 years after its launch, the adults' use of the Finnish national *My Kanta Pages* patient portal is still increasing and will approach 50% of the adult population annually.

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[1] Jormanainen V. Large-scale implementation and adoption of the Finnish national Kanta services in 2010–2017: a prospective, longitudinal, indicator-based study. FinJeHeW 2018;10(4):381–395.

O-20: The ideas of older people about usability of the Nao robot in their casual activities

Sanerma Päivi[1], Phd (education), Phd candidate (nursing science), RN
Pakkanen Piiku [2]MNSc, PhD candidate (nursing science), RN
[1]Smart service research Unit, HAMK, University of applied sciences
[2]School of Wellbeing, Degree Program in Nursing, HAMK, University of applied sciences

Introduction

In elderly services robots are newcomers for client entertainment, rehabilitation, company or brighten up casual life. (Perez et.al 2015). Robots can also be utilized in clients´ care or services. New competencies are needed and required from health and social care professionals for planning and implementing digital and modern services. In Kotek-Erko project an educational solution is developed for home care professionals for creating new competences of integrated care. Researching and highlighting of client-centered care are essential in development of new kind of education. Time can be spent with a robot and on the other hand robot can be used in communicating outside of own home. (Perez et.al 2015). Already at the moment, technology enables quite good interaction between user and robot. (IBM 2017). Values behind integrated services are based on good care of client, person-centered care, highlighting client point of view, safety of care and continuity of the care. Client´s trust of the care is one central value in the holistic care. (Øvretveit 2017, Coco et.al, 2018)
Attitudes of client, family members and health and social care professionals towards usage of robotics are crucial in taking new technology into use. Also in planning, constructing, piloting and offering new service models the viewpoint of clients and users should be prioritized. Main purpose of this study is to describe and clarify clients´ experiences and opinions regarding encountering with the robot. In addition, their ideas in utilizing robotics in casual services and everyday activities should be found out. (Zonneveld et al. 2018)

Material and Methods

Activating innovation workshop (n=2) was used as a research method, and reflective activating learning café and brainstorm methods were utilized. In workshops participants were clients´ of day activity center, nursing home units, home care, their family members and professional of elderly care. In the workshop new knowledge was generated with observation and collaborative working. Research questions were 1) How NAO robot can be utilized in elderly services and their casual daily life? 2) How participants in the Innovation Workshop experience encountering with NAO robot. In the workshops interest was in attitudes of different groups of participants in working with the humanoid robot. The work was carried out by HAMK's nursing students (n=4). Activities of the NAO robot were used as activation method of the workshops programmed by nursing student (n=4). Data produced in workshops was analyzed by content analysis method.

Results

According to the results participants saw many possibilities in NAO. Results were divided into three themes; 1) elements of entertainment, 2) casual activities, 3) safety of everyday life. Participants of the workshops initially encountered NAO with skepticism and restraint. After first confusion, they got interested and started to collaborate with NAO in different activities. The encountering was generally felt as a positive. People dared to meet NAO and reactions to it were gentle and curious.

Discussion

The task of education is to show current and future health care professionals how robots, technology and digital services are natural part of the service offering. Expertise related to these services is an integral part of skills of the professionals. As the social and health care field contains more and more cross-sectoral work, a nursing employee must adopt the core competence of nursing, ethical issues and professionalism in working with technological solutions.

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2. IBM 2018. https://www.healthmgttech.com/watson-powered-robot-aims-help-elderly-caregivers
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O-21: Using Cloud Server to Capture Real-time Blood Pressure to Predict the Adaptation of diagnostic digital pathology in Finland

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[2]*Department of Pathology, Fimlab Laboratories, Tampere University Hospital, Tampere, Finland*

Introduction

Technological advances have enabled the introduction of digital pathology (DP) into routine diagnostics [1]. Digital workflow offers many advantages compared with the traditional way of sample assessment using light microscopy (LM) (Table 1). However, slide scanning is an additional step in the laboratory process, and the resulting files are very large, meaning that handling and storing them is expensive. Virtual slides are widely used in teaching, but the adoption of DP into clinical diagnostics has been slow. In this study, we explored the current state, attitudes and the most important barriers of the adaptation of DP in Finland.

Table 1. Benefits of digital pathology compared with traditional light microscopy

Enhanced distribution of slides for diagnostics
Telepathology, remote consultations for frozen sections and other cases
Enhanced laboratory logistics
Better control of laboratory quality
Better ergonomics
Fast comparison to digital archives
Easy and fast annotations (measures, margins etc.) Digital image analysis
Possibility to review slides side-by-side or as image stacks
Color calibration
Faster reviewing of the cases in clinical meetings (tumor boards)
Documentation of immunofluorescent stainings
Effective biobank and other research Possibility to create a national slide archive in *e.g.* Kvarkki

Material and Methods

A web-based questionnaire was sent to the directors and/or persons in charge of digitalization in (all) 17 public pathology laboratories in Finland. The questions covered *e.g.* the attitudes regarding the level of evidence of the safety of digital diagnostics, the presumed benefits of DP, the projected year of reaching 100% DP, the preconditions that would lead to the adoption of digital diagnostics, and the most important barriers preventing the adoption of DP. This was the first comprehensive evaluation of the subject in Finland.

Results

Fourteen (82%) responses were obtained, one from each individual pathology laboratory. Most of the respondents (92.9%) were pathology specialists, and over a half (57.1%) were over 50 years old. DP was used in primary diagnostics in one center; almost all others (78.6%) were interested in shifting diagnostics to the screen. One respondent (7.1%) favored LM as the golden standard, and two (14.3%) were skeptical about the technical maturity of DP. Most of the respondents (75.0%) considered that there is a sufficient amount of validation studies showing non-inferiority of DP compared to LM. The benefits of DP were seen in many applications, including tumor boards (64.3%), logistics (64.3%), diagnostic quality (50.0%), and consultations (64.3%). All except one (92.9%) expected that the level of digitalization reaches 100% in the following ten years in Finland, and 85.8% would like to adopt DP as soon as economically possible. The most important preconditions for the diagnostic shift from LM to DP were the reliability of the system (64.3%), the option to use LM in difficult cases (57.1%), and cost neutrality (50.0%). The price of digitalization in general, specifically the cost of storage, was considered to be the most important factor preventing a large-scale adoption of DP (78.6%).

Discussion

A full digital workflow can lead to substantial time savings in the laboratory process compared with an analogical workflow [2]. Also, the speed of digital diagnostics is already comparable to light microscopy [3], and with a full digital workflow and artificial intelligence tools it may even outperform LM. Remarkable overall cost savings are projected when the expected leap in diagnostic quality leads to cost savings in treating the patients (e.g. being able to choose more accurate treatments) [4]. However, despite all the benefits, digitalization seems to progress slowly. In our study, the economic concerns, especially the cumulative long-time archival of digitized slides, were the most important barrier of the adaptation of DP. To overcome this, a substantial governmental financing is needed: the very large virtual slide images of histopathology could be stored to a national image archive (e.g. Kvarkki) after diagnostics. The investments for the individual pathology laboratories would be significantly reduced, which would lead to a rapid large-scale adoption of DP in the Finnish pathology laboratories, resulting in better distribution, efficacy and diagnostic quality, and as a by-product a boost in biobank research.

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Session 5B: Artificial Intelligence & Robotics in Health

Chair: Professor Pasi Karjalainen
University of Eastern Finland

Wednesday 3rd of April 2019

11:00 – 12:30

5B-1 AI in Medical Imaging Diagnostics

Simo Saarakkala, Professor
University of Oulu, Finland

5B-2 AI in multimodality diagnostics of dementia

Jyrki Lötjönen, Chief Scientific Officer
Combinostics Ltd.

5B-3 Robots in Health and Welfare - recent advanced in Japan

Nobuhiro Sakata, Professor
Dokkyo Medical University, Japan

5B-4 Ethical questions using robotics in older people's care

Riitta Turjamaa, Senior Lecturer, PhD
Savonia University of Applied Sciences, Unit of Health Care, Finland

5 min rapid scientific presentations

O-22 Development Path and Training of eProfessionals for Becoming Promoters of Digitalisation in Social and Health Care

Päivi Sihvo[1], MSc, Susanne Hämäläinen[2], MSc, Annikki Jauhiainen[3], PhD, Jaana Nykänen[4], MSc, Aija Hietanen[2], MSc, Jaana Hämäläinen[5], M.Hc, Päivi Franssila[1], MSc, Kaija Tikkanen[6]
[1]Karelia University of Applied Sciences; [2]Savonia University of Applied Science; [3]Independent RDI Specialist; [4]Siun Sote, Joint Municipal Health Care and Social Services Consortium in North Karelia; [5]The Municipality of Lapinlahti; [6]Savo Consortium for Education

O-23 A Biometrics Method to Secure Wireless Body Area Sensor Networks for Telemedicine

Dragoș GLĂVAN, IT&C, Mihai SALCEANU, ER
Central University Emergency Military Hospital

O-24 Strategies for large-scale digital type 2 diabetes risk screening and research participant recruitment

Järvenpää R[1], MSc, Jalkanen K[2], Msc (Pharm), Lindström J[2], PhD, Harald K, MSc [4], StopDia research group
[1]The National Institute of Health, Department of Communications; [2]Department of Pharmacy, University of Eastern Finland, University of Eastern Finland; [3]The National Institute of Health, Department of Public Health Solutions; [4]The National Institute of Health, Department of Public Health Solutions

AI in Medical Imaging Diagnostics

Simo Saarakkala, Ph.D., Professor
University of Oulu, Finland

Biography Simo Saarakkala

Simo Saarakkala has a Ph.D. degree in Medical Physics and he is a Professor of Biomedical Engineering at the University of Oulu, Finland. He also serves as a Scientific Director of the Infotech Oulu Focus Institute, University of Oulu. Prof. Saarakkala has published over 140 peer-reviewed scientific articles on different aspects of musculoskeletal imaging and biomechanics, particularly focusing on osteoarthritis. He serves as an Editorial Board Member in 5 scientific journals, he has acted as a Reviewer for over 25 international scientific journals, and he is regularly reviewing international grant applications. Prof. Saarakkala is an internationally recognized researcher in the field of osteoarthritis imaging. Recently, he has focused his research on machine learning and deep learning for improving the sensitivity of osteoarthritis diagnostics and prediction its clinical progression from radiography and MRI.

Lecture synopsis

AI based methods are becoming more and more popular in the field of medical imaging. In research, the primary target of AI in medical imaging has been to automatically detect and classify abnormalities from the images. Recently, AI has been also applied in generation and enhancement of medical images. In this lecture, some of the most recent applications of AI in medical imaging diagnostics will be reviewed. We will first briefly review a few recent AI studies on automatic interpretation of chest X-rays and automatic detection of fractures from X-rays. Special attention will be given to our research group's work in application of deep learning for automatic diagnosis of knee osteoarthritis from X-rays [1]. Unpublished new results on application of deep learning for prediction of knee osteoarthritis progression will be also presented. Finally, the general discussion about the future role of AI in medical imaging will be discussed.

Reference:

[1] Tiulpin A, Thevenot J, Rahtu E, Lehenkari P, Saarakkala S. Automatic Knee Osteoarthritis Diagnosis from Plain Radiographs: A Deep Learning-Based Approach. Sci Rep. 2018 Jan 29;8(1):1727. doi: 10.1038/s41598-018-20132-7.

AI in multimodality diagnostics of dementia

Jyrki Lötjönen, Chief Scientific Officer
Combinostics Ltd.

Biography Jyrki Lötjönen

Jyrki Lötjönen holds PhD degrees from Helsinki University of Technology (Finland) and INSA of Lyon (France). He was a principal scientist in the ICT for health research area at VTT Technical Research Centre of Finland (2000-2015) and currently he is chief scientific officer at Combinostics Ltd and adjunct professor at Aalto University (Finland). Combinostics manufactures software tools for clinical decision support in neurological diseases. His research interests are in machine learning with a focus on image quantification and clinical decision support especially in neurodegenerative diseases. He has been a coordinator in the PredictAD and PredictND FP7 EU-projects and a work-package leader in the VPH-DARE@IT and TBIcare FP7-projects. He has co-authored more than 130 international peer-reviewed scientific papers.

Diagnosing neurodegenerative diseases is not easy. Data from different sources are acquired for characterizing patients, such as clinical and neuropsychological test data, magnetic resonance or computerized tomography images but possibly also either FDG-PET, amyloid-PET or SPECT images, and biomarkers from cerebrospinal fluid or blood. Although Alzheimer's disease is the most common neurodegenerative disease causing dementia, there is a high number of different other diseases or indications that may explain the symptoms of the patient. A clinician needs also to consider different background factors as they affect how the data should be interpreted. Finally, economic constraints and availability may dictate which tests are can be performed. Today, clinicians combine all this information in their minds. Such complex problem is an attractive application area for artificial intelligence.

This work presents a clinical decision support system (CDSS) developed for differential diagnostics of neurodegenerative diseases and for predicting the disease progression. The key driver in the development has been clinical utility. In other words, how to develop a machine learning based tool that is accurate but is not a black-box for its clinical users. The CDSS developed consists of two modules. The first module quantifies brain magnetic resonance images and the second module combines the imaging biomarkers from the first module with other test data, compares them to large databases of previously diagnosed patients, and measures and visualizes graphically the similarity to different diagnostic groups.

The CDSS can detect patients from four diagnostic groups in accuracy higher than 80 % (guessing gives only 25 % accuracy for four groups). The progression from mild cognitive impairment can predicted in the accuracy of about 80 % over about 18 months. In addition to multiple retrospective studies, the tool has been validated also in a large multi-center prospective study showing that the confidence of clinicians in making diagnoses increases.

This work demonstrates the use of AI in dementia diagnostics. The CDSS tool developed is already in clinical use.

Robots in Health and Welfare - recent advanced in Japan

Nobuhiro Sakata, Professor
Dokkyo Medical University, Japan

Biography Nobuhiro Sakata

Professor of Department of ICT Education & Research. Director of Center for Information, Communication and Technology, Dokkyo Medical University. The Japanese Prime Minister Award in the 6th contest of educational practice using the Internet (The Ministry of Education, Culture, Sports, Science and Technology. Executive Committee of Internet-based Educational Practice Competition) 2006. Encouragement Award in Japan e-Learning Award 2011 (e-Learning Award Forum) 2011. The Best Award in the pepper app challenge 2015 (Softbank Robotics) 2015. The Special Category Award for Education using Virtual Reality in Japan e-Learning Award 2018 (e-Learning Initiative Japan) 2018.

In Japan, along with social structural changes in recent years (population decline, aging society), shortage of human resources in medical care and nursing care has become a big issue. In order to compensate for shortage of human resources, various approaches are required such as using new technologies (A.I., IoT, Robot, etc.).

We are now interested in using robots in the medical and nursing care fields. Especially, communicative robots are also expected to be utilized in the fields. We are interested in what kind of place or situation we can use the communicative robots. Recently, the Ministry of Health, Labor and Welfare and the Ministry of Economy, Trade and Industry also support the development and practical application of nursing care robots. In fact, cases of using robots in nursing care facilities and medical facilities have been increasing. From those cases, it is also suggested that the behavior change of people occurs by using communicative robots. We believe that communicative robots have an interesting presence to cause behavioral changes. It is presumed that its presence includes the robot's size and shape, as well as expressions such as verbal and non-verbal communication.

We also believe that human resource development for intermediate users such as nursing care staff is important in the utilization and social development of robots. If the intermediate users understand the advantages and disadvantages of using robots, we believe that more effective use will be possible.

In this presentation, I would like to explain the outline of the communicative robot and the possibility of utilization in medical and nursing care fields.

Ethical questions using robotics in older people's care

Riitta Turjamaa, Senior Lecturer
Savonia University of Applied Sciences, Unit of Health Care, Finland

Biography Riitta Turjamaa

PhD, RN, Senior Lecturer in Nursing. She is in charge of coordinating Master in Digital Health Programme at Savonia University of Applied Sciences, and she leads social and health care field in Savonia's multidisciplinary master programme team. She has had eHealth projects, and she has written many articles both in scientific and professional journal. She is post doc researcher in University of Eastern Finland and main research interests are related to digital solutions and robotics in the context of older people's home care.

The majority of older people are healthy and are remaining in their own homes for longer. Robotics has found to support older people's living at home with healthy aging and independence. Robots are being developed to meet the shortfall in care, and also to assist those providing unpaid care.

Robots might be used in older people to relieve loneliness by providing companionship. Robots also helping older people assist a normal routine in daily tasks and to help monitor their behavior and health or in supporting them through the process of rehabilitation. However, in the context of using robotics, significant ethical challenges such as privacy, autonomy, dignity, and safety, are important to consider when support older people's living at home with robotics.

In this presentation ethical questions using robotics in older people's care will be observed from the viewpoint of privacy, autonomy, dignity and safety.

Based on literature, there is a growing interest in robots to help older people, assist them in the care with particular needs, and try to improve the quality of life. At the same time, there is many ethical issues that arise when dealing with an older population.

View of privacy use of robots in older people's care raise questions about which data are collected, how they are stored, who owns them, and what happens to them.

Perspective of autonomy, using a robot enabling the older people to do tasks on their own are important elements to supporting and maintaining autonomy. Autonomy also reflects the right an older people have to make decisions based on use of robotics in daily care. On the other hand, the loss of autonomy can impact older people's sense of personal dignity. A robot that provides too much assistance or simply does the task for the people can lead to a loss of autonomy and thus a loss in personal dignity.

View of safety robots should not harm older people. Robotics for older people's safety is related to physical circumstances at home, physical activity and social isolation and loneliness.

Privacy, autonomy, dignity and safety are critical elements for ensuring the well-being of an older people. More, using robotics require a new perspective on many ethical issues, because of their embodiment, and their often life-like appearance. Therefore, it is essential to take into account older people's rights of self-determination in the context of making decisions about their care and use of robots at home.

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O-22: Development Path and Training of eProfessionals for Becoming Promoters of Digitalisation in Social and Health Care

Päivi Sihvo[1], MSc, Susanne Hämäläinen[2], MSc, Annikki Jauhiainen[3], PhD, Jaana Nykänen[4], MSc, Aija Hietanen[2], MSc, Jaana Hämäläinen[5], M.Hc, Päivi Franssila[1], MSc, Kaija Tikkanen[6], PhD

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Introduction

Digital technology is changing social and health care work and customer services in the field. Digitalisation affects all social and health care professions and everyone's competence in the field, and it can cause uncertainty about one's own competence and the up-to-date nature of it. The development and deployment of digital services requires e.g. training, support and enthusiasm by the pioneers to motivate employees. The development of digital services in social and health care requires professionals with special expertise in predicting the need for digital services, innovating, developing, training and counselling.

The concept of "eProfessional" was created in the planning phase of the DigiSote projects (ESF) in North Karelia and Northern Savonia based on previous project work. In the project plans, the duties of an eProfessional included the following, for example: training, introducing and supporting employees in digitalisation, monitoring national development work in digitalisation, predicting future development and competence needs, cooperating with different actors in developing the services, and developing new services and working methods.

The purpose of the development work was to describe the need for eProfessionals as well as their duties and competence in social and health care, and to model a development path and plan a training package.

Material and Methods

The development work consisted of two parts: 1) Defining the duties and competence of eProfessionals, 2) modeling a development path and planning a training package.

The material for defining the competence (1) included the following: project workshop (n = 9) materials and digital service test reports (n = 7), theme interviews (n = 17) for public, private and third sector managers in the field of welfare, and expert evaluation (n = 35) on the areas of expertise and requirements for the competence. The material also included (2) assessment of curricula, feedback from the training pilot, and memos of service design work.

Results

The duties of eProfessionals included acting as a change agent, planning and developing service processes in a user-oriented way, supporting the deployment of digital services, and training both customers and professionals.

The competence of eProfessionals was seen as special expertise. The competence was divided in seven fields of competence: technology and knowledge management competence, interaction and communication competence, guidance and counselling competence, competence in the development of services and applications, multidisciplinary collaboration and networking competence, ethical competence, and self-management competence. These fields of competence formed the basis for eProfessionals' competence map.

The development path and the training progresses from basic digital competence towards the competence of an eProfessional. The competence map of eProfessionals is utilised in the learner's self-assessment and in the planning of training. The extent of the training is 15 credits and it consists of three main modules: 1) use of digital technology in social and health care work, 2) digital or multichannel interaction, communication and counselling, and 3) development and deployment of customer-oriented digital services. The training can be performed as a whole package or in parts according to the needs and objectives of the learner and the organisation.

Discussion

The training of eProfessionals is the solution to the challenges of digitalisation in social and health care organisations. During the development work, the need for eProfessionals has become evident. Organisations should have trained eProfessionals in each unit monitoring digitalisation, developing the services, and introducing and training employees and customers in the use of these digital services. The modular training model enables the development of demand-driven competence towards becoming an eProfessional. Karelia University of Applied Sciences and Savonia University of Applied Sciences organise the training in cooperation with each other. According to this experience of cooperation, the role of universities of applied sciences as trainers and promoters of digitalisation is significant.

O-23: A Biometrics Method to Secure Wireless Body Area Sensor Networks for Telemedicine

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Introduction
The development of the wireless body area sensor network (BASN) is imperative for modern telemedicine, but security remains a formidable challenge yet to be resolved. As nodes of BASN are expected to be interconnected on or in the human body, the body itself can form an inherently secure communication pathway that is unavailable to all other kinds of wireless networks.When telemedicine was first proposed in the early 1970s, its function was often limited to, for example, patients seeking medical consultation . Nowadays, the implication of the word telemedicine has been broadened to using telecommunication technology to provide medical information and services for a multitude of purposes, such as diagnosis of illness, transfer of medical data and records, monitoring rehabilitation or treatment processes, and even conducting surgical operations.Advances in wireless communications technology have overcome most of the geographical, temporal, and even organizational barriers to facilitate a completely roaming way of transferring medical data and records . In order to fully utilize wireless technology in telemedicine, the real challenge lies in the need to develop another type of wireless area network: the body area senor network (BASN).

Material and Methods
The technique is developed based on a symmetric cryptosystem, which assumes that a robust and secured key distribution scheme is available. In this respect, it's proposed using a group of similar random numbers generated from the properties of the human body at different sites (i.e., a biometric trait) to encrypt and decrypt the symmetric key for secured distribution of it. Since the biometric trait captured at different locations of the body should have slight variations, they employed a fuzzy commitment scheme to ensure that errors in a recovered encryption key can be tolerable to certain degree.As the biometric trait is used to encrypt the symmetric key, a major concern would be whether its degree of randomness is sufficient for cryptographic purposes. Insufficient randomness would open up the possibility for invaders to guess the coded trait and thus obtain the encryption key for decrypting the confidential medical data.

Results
The method was tested on 99 subjects with 838 segments of simultaneous recordings of electrocardiogram and photoplethysmogram. By using the interpulse interval (IPI) as the biometric trait, the system achieved a minimum half total error rrate of 2.58 percent when the IPIs measured from signals, which were sampled at 1000 Hz, were coded into 128-bit binary sequences. The study opens up a few key issues for future investigation, including compensation schemes for the asynchrony of different channels, coding schemes, and other suitable biometric traits.

Discussion
We select the Hamming distance as the metric for the proposed biometric trait because it works well with the bitwise XOR operation, which is one of the most common operations used in cryptosystems. By using this distance metric, we can be sure that the performance shown in this study reflects the situation where the biometric trait is actually used in securing BASN (e.g., using some of the previously discussed communication protocols for entity authentication or distribution of the cipher key).

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O-24: Strategies for large-scale digital type 2 diabetes risk screening and research participant recruitment

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Introduction

Stop Diabetes (StopDia) research has developed a digital, scalable model to support healthy lifestyles and to prevent type 2 diabetes. The StopDia model operates by three levels of action: individual, living environment and society. At individual level, people at increased risk to develop type 2 diabetes are identified by digital risk test (FINDRISC) and offered lifestyle coaching. Over 3000 people have participated in randomized controlled study. The results of the intervention and the cost-effectiveness of the model are currently being analysed.

Material and Methods

StopDia risk screening website (www.StopDia.fi) was opened in March 2017, and a recruitment strategy to increase visibility, coverage, reach, yield, and retention was developed. Various recruitment facilities (health care and social service units, pharmacies, other municipal services) and communication channels (e.g., social media, newspapers, radio, TV, websites, face-to-face in public events) were used in engaging people to visit the StopDia screening website. Digital (videos, banners, emails, SMS messages), and printed materials (posters, flyers, FINDRISC measuring tape) were created. Digital marketing (paid advertisements) was placed on Facebook, Youtube, as display advertisements at Google Display Network and web video network Ruutu.

StopDia risk screening website includes questions on the respondents' background and where they learned about the StopDia project. The answers on pre-determined and free text fields have been categorized to analyse the effectiveness of different recruitment channels further, using logistic regression model to predict variables affecting the willingness to participate in the research. Cost-effectiveness analysis will be performed to study which methods are the most effective for engaging different population segments.

Results

So far, the screening page has been visited 200 000 times nationwide, and 120 000 respondents have got an estimation of their risk of getting type 2 diabetes in the future. Altogether 60 000 had increased diabetes risk and were provided with instructions on how they could reduce their risk. Of the people at risk, 17 000 were living in the StopDia implementation areas and were given an invitation to participate in the randomized controlled study.

Based on the data comprising information from the 200 000 respondents, we can study the effectiveness of the different information channels and activities in subgroups, e.g., by gender, socioeconomic status, age, area, and type 2 diabetes risk level.

Discussion

Preventing chronic diseases such as type 2 diabetes by cost-effective and patient-centered means is one the biggest challenges facing the health care systems worldwide. Digital screening and prevention provide possibilities to offer population-wide interventions. Despite the research evidence, large-scale implementation of risk identification followed by preventive intervention have previously proved to be challenging. In overall, research on cost-effectiveness of screening and prevention programs of chronic diseases is scarce. StopDia research seeks to address this research gap and to provide information for evidence-based policy decisions in the future. Emphasis will be placed on answering the question of what are the best methods to engage people that tend to be less represented in the prevention programs – namely men and people with lower socioeconomic status. Digital screening and phenotyping offer novel methods for gathering data for health research and can eventually offer means to alleviate health inequalities as well as overall population health. Nevertheless, the ethical aspects as transparency, data privacy, and informed consent will need to be continuously addressed when studying or implementing digital health risk assessments.

Session 6: Visions of Future Health

Chair: Principal Lecturer and Vice-President Pirkko Kouri
Savonia University of Applied Sciences and
International Society for Telemedicine and eHealth

Wednesday 3rd of April 2019

14:00 – 15:30

6-1 The digital transformation of Health and Care

Marco Marsella, Head of the eHealth Unit
European Commission

6-2 Telemedicine in Japan now and future

Hiroshi Kondoh, Professor
Tottori University, Japanese Telemedicine and Telecare Association, Japan

6-3 Enhanced Health Expertise through Artificial Intelligence

Timo Honkela, Professor
University of Helsinki, Finland

The digital transformation of Health and Care

Marco Marsella, Head of the eHealth Unit
European Commission

Biography Marco Marsella

Marco Marsella is Head of the "eHealth, Well-being, and Ageing" Unit in the Directorate General for Communications Networks, Content and Technology (DG CONNECT) of the European Commission. From 2016 to June 2018, Marco Marsella was leading the Unit responsible for the Web Accessibility Directive, Safer Internet and Language Technologies. He has worked on policy development, innovation and research implementation in the areas of digital content, technologies for learning, e-inclusion and assistive technologies.

Digital transformation of health and care can turn demographic change into an opportunity for Europe. Digital health solutions such as artificial intelligence, high-performance computing, robotics, wearables and mobile solutions will be instrumental for addressing current health and care challenges related to the rise in chronic diseases, increasing demand, rising costs and shortages of medical staff.

The European Commission is working with the EU Member States to explore how the new and emerging digital technologies can be harnessed to improve the health and care of EU citizens in a sustainable way.

With the Communication on enabling the digital transformation of health and care in the Digital Single Market [1] adopted in April 2018, the Commission committed to a range of actions designed to take full use of health data and new technologies for the benefit of European citizens and society:

- To facilitate the secure access to and sharing of health data across-borders for all citizens and to develop the interoperability of electronic health records in the EU, the Commission has adopted on 6 February 2019 a 'Recommendation on a European Electronic Health Record exchange format' [2].

- The Commission will support the use of health data to advance research and develop personalised medicine, which should offer significant benefits for patients and healthcare systems. In fact, The Commission and the EU Member States have started setting-up a voluntary coordination mechanism for sharing genomic and other health data. Twenty EU Member States have already signed the Declaration 'Towards access to at least 1 Million Genomes in the EU by 2022' [3], aiming to reach a cohort of 1 Million sequenced genomes accessible for research and personalised medicine in the EU by 2022.

- The Commission is also working on empowering citizens and patients, on bringing digital person-centred solutions to the market and on promoting large-scale deployment of digital solutions. The Commission is taking measures to incentivise the uptake of digital health innovation amongst health care providers and provide support for start-ups and innovators that wish to scale-up their digital health solutions across borders.

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Telemedicine in Japan now and future

Hiroshi Kondoh, Professor
Tottori University, Japanese Telemedicine and Telecare Association, Japan

Biography Hiroshi Kondoh

Professor and Director Div. of Medical Informatics Tottori University Hospital, Yonago, JAPAN. Introduction of Electronic Patient Record 2003 (first university Hospital EPR in Japan). Development of Homecare and Disaster medical support system with satellite communication (2995-2008). EPR and PACS sharing system with XDS and XDS-I. President of Japanese Telemedicine and Telecare Association.

Tele-pathology and Tele-radiology were started in 1990s and had been used for national insurance since 2002 in Japan. In 2010, Japanese government planned the differentiation of hospitals by their functions for efficient medical services and supported the introduction of regional EPR sharing system. Since the Japanese government demanded to use the Japanese standard of SS-MIX based on HL7, SS-MIX became popular as a standard output form of electronic medical records in Japan. However, since it was a vendor-dependent SS-MIX introduction and sharing system, the standardization of contents was delayed. In recent years online research projects gathering by SS – MIX revealed the fact and were progressing standardization of contents.

In 2018 Japanese government started to adapt national insurance for the remote medical consultation by real time video mainly used by smart phone. These systems sometimes use remote monitoring systems of blood pressure, body weight and so on for home care. These data are stored servers and are planned to be used for dicision surpport system by artificial intelligence as big data.

In addition, the author reports his experience since in 1997, the author conducted a research projects for EPR sharing system and a project for homecare and Tele-consultation system with satellite communication. The recent EPR and PACS sharing system was using the global standard XDS / XDS-I and Japanese standard SS-MIX2 on cloud technologies and showed higher displaying PACS images between hospitals on Internet than in intra-hospital PACS.

Enhanced Health Expertise through Artificial Intelligence

Timo Honkela, Professor
University of Helsinki, Finland

Biography Timo Honkela

Since the beginning of 2014, Timo Honkela has served as a professor for research in digital resources at University of Helsinki. This field of study includes research into the use of linguistic and other resources in the humanities and social sciences, as well as development of new kinds of methods and approaches for representing and analyzing humanistic research data. In particular, Honkela is interested in the subjectivity involved in human understanding and behavior, stressing the role of mathematical and computational modeling that takes into account the complexity and dynamic natural of linguistics, cultural, mental and societal phenomena. Earlier Honkela served as a chief research scientist at the Department of Information and Computer Science, Aalto University School of Science, where he was the head of the Computational Cognitive Systems research group. Honkela has published close to 200 scientific papers in which methods of natural language processing, text mining, statistical machine learning, neural network and cognitive modeling have been applied in different scientific disciplines including linguistics, cognitive science, psychology, educational research, sociology, organizational research, health sciences, religious studies, history, media art, and philosophy. Honkela received his PhD degree at Helsinki University of Technology in 1998. Since 2017, Honkela has focused on the concept of Peace Machine in which different components of artificial intelligence are applied to promote peaceful conditions. The book Peace Machine was published in Finnish (Rauhankone) in October 2017 and translations into various languages including English is in progress.

POSTERS

P-1: Electronic database for animal health records

Eva Kaisti [1], DVM, Head of Global Petmeddata Project
[1]*Finnish Net Solutions*

Background
The medical data of animals is scattered around in different vet clinics and practice management systems. Petmeddata is an electronic repository of domestic animals, such as pets and horses, care documents and health care history. It is a mobile optimated web application, hence working on a large range of devices. A microchip guarantees the unique identification of the animal, and it is advisable to microchip animals. The staff of the animal clinic may scan the chip of the animal before allowing data transfer from this specific clinic, but this is not necessary when the customer and animal are known to the staff. Via Petmeddata the animal owner always has access to the animal's medical data.

The animal owner can record notes, files, photos and videos, and veterinary health specialists may see them too. By sharing the animals profile the owner can grant others, such as friends or the animal's caregivers, access to the profile. The veterinarians having their Practice Management Systems integrated to Petmedchain can easily read the animal's history from their own device. Seeing into the animal's whole medical history enables better treatment and gives less room for mistakes. Important partners are researchers that can use the animal's anonymous data. Research results in better understanding of illnesses, and faster and more specific research on treatment. Information on the animal's owner is not provided. Information specifying the animal, such as the name or microchip number are extracted from the data. Petmeddata, the web application, utilizes blockchain technology, the Petmedchain.Partners are sold nodes of their own, in order to tie them into the web of nodes. Interfaces can be used to interact with the blockchain. Many partners can simultaneously import or retrieve information from the blockchain. The search of the Big Data can be narrowed with Artificial Intelligence.

What for is this project
Petmeddata unites people involved in the caregiving of animals: the animal owner, vets, health care specialists such as physiotherapists or massage therapists, researchers, as well as different service providers in the animal industry. Access to the data makes animals lives healthier in the short term as well as in the long run. The service is initiated and provided by *Finnish Net Solutions*, an IT-company based in Finland.arjama

Results
The global interest among animal owners as well as health care specialists and the industry has been very big. The product was launched on 28.11.2018. To date 7.2.2019 twelve (12) vet clinics had joined. The Animal Hospitals of University of Helsinki and University of Tartto are about to join in early 2019. Petmeddata is going global in 2019, starting in Estonia and Sweden, as well as other countries.

P-2: Cloud services in the field of Electroencephalography equipment

Jukka Laaksonen[1], BBA, Masters degree program, Jyri Rajamäki[1], PhD, D.Sc. (Tech.)
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Introduction
In recent years eHealth services and cloud based (public/private) computing has gained a lot of attention in healthcare business and/or services. Despite of that, it is well-known fact that the healthcare industry has fallen behind when comparing many other fields in the deploying of information technology and Cloud computing technologies. Security has been presented as the main reason why public cloud services should be avoided, but what is the actual truth behind that? This study is a continuation of the study "Use of Data Cloud Services in Clinical Environment - Case Video-EEG" presented in eHealth2018 - The 23rd ISfTeH International Conference's.

Material and Methods
Surveys related to this study have been made to people who have conducted interviews / surveys / experience surveys in hospitals in Sweden, Norway and Denmark. In Finland, similar actions have been taken by the author and his colleague. Interviewees were responsible for the Electroencephalography (EEG) equipment in hospitals or were hospitals' ICT operators, i.e. mainly external partners (Managed IT services, MITS).

Results
Managed IT service providers are not keen to accept public cloud services but rather private clouds provided by themselves. Most common argument is the lack of security. No one denies security problems what cloud computing business has had, but nowadays it's impossible for cloud service providers to do business if security issues occur, such as patient's data privacy and secure transfer of medical data (Abbas et al. 2016, AbuKhousa et al. 2012). This study also clarified for hospital staff and ICT practitioners the operating principle of the EEG equipment, which in this case is Software-as-a-Service (SaaS). The cloud service models can be identified in a variety of contexts, but there are three basic models for describing service entities: Infrastructure (IaaS), Service Platform (PaaS) and Application Platform (SaaS) (Baun et al. 2011). SaaS is the top layer of a three-tier cloud service model and usually it is meant to be used as "pay per use", in other words, user pays only what he/she uses (Salo, 2010). In this case, hospital pays EEG acquisition, review and other analyzing options, videos etc. when needed.

Discussion
This study does not take the stand on what kind of cloud model (public / private) hospitals should be introduced, but mainly to highlight different perspectives. It is understandable that MITS providers want to play a part in growing markets, and public cloud service providers are their competitors. "According to an International Data Corporation (IDC) Health Insights IT spending forecast report, IT spending by the Western European healthcare sector is projected to increase from $12.9 billion in 2016 to $14.1 billion in 2021. Hospitals represent around 62% of total Western European healthcare IT spending, and that is expected to grow at 1.9% Compound Annual Growth Rate (CAGR) to 2021" (IDC, 2018).
A very general concern about cloud services is cyber security, but ignorance of the issue affects people's thinking and, consequently, the business idea world. Jiří Hanák (Hanák, 2015) has listed five most common fears of the cloud: 1. Fear of change when there's no going back, 2. Fear of data security, 3. The fear of accessibility, 4. Fear of high expenses, 5. Fear of losing control**.** Cloud specialist David Linthicum has said wisely "Your data is only as vulnerable as your security protocols, cloud or not" (Linthicum. 2015).

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P-3: Constructing an Intelligent CSCW System in Telemedicine with IM

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Introduction
In this paper, the CSCW (Computer Supported Cooperative Work) technology, IM (Instant Messaging) in Telemedicine is discussed, and a novel telemedicine solution is introduced. The new solution is based on IM, using the XMPP (Extensible Messaging and Presence Protocol) protocol and Jini technology. XML in XMPP helps us to communicate and make various configurations. This IM system makes the medical care information exchange more sophisticated and convenient.

Material and Methods
Telemedicine has been defined as the use of telecommunications to provide medical information and services (by Perednia and Allen, 1995). It also improves access to care, particularly for beneficiaries who face transportation barriers as a consequence of distance or disability. Currently, there are two main kinds of technological dealing methods in Telemedicine. One is of store-transfer manner and an un-synchronized solution. Another is based on interactively, bi-direction transferring, visible technology. Either solutions have some shortcomings, such as being expensive to deploy, lack of mobility, lack of devices support, poor integration ability and so on. Instant Messaging, by enabling us to know the availability of our peers, provides improved communication compared to other technologies. Nowadays, voice, video, SMS transferring are its basic functions. We can integrate more exciting functions into IM. The IM system we referred to uses the open-source protocol XMPP advised by Jabber community. Any IM system based on the protocol can communicate with each other.

Results
In this system, any participants, such as doctors, nurses and the one on the contract can easily communicate with each other. Users can know and access the remote useful devices. We can easily add more plug-ins, such as audio, video, SMS and so on. SMS function enables the doctors and nurses to use their mobiles/PDA to send SMS when they walk through the sickrooms and have no pc to use. Video function helps the doctors and patients make a face to face talk. More importantly, we can integrate all the plug-in functions together.

Discussion
The new IM uses the open-source-XMPP protocol; therefore, it's easier to communicate with other XMPP systems. With the wide portability, inter-network mobility, good integration ability, and low maintenance, it facilitates the people-to-people, people-to-intelligent devices, intelligent devices-to-devices cooperating work.

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P-4: Validation of indicators to assess the effectiveness of digital health and social services

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Introduction

Digital services and patient portals provide patients with tools to better manage and understand their well-being and health status [1-2]. Utilizing good implementation practices builds health professionals' competence [2]. The development of digital services requires reliable ease of use indicators to support change. Here, we focus on the validity of indicators. Validity is defined as the extent to which an instrument measures what it purports to measure [3]. Validity is not a property of a test itself. Instead, validity is the extent to which interpretations of the results of a test are warranted, which depends on a test's intended use [3]. Content validity, which addresses how well items operationalize a construct, provides an adequate and representative sample of all items that might measure the construct of interest [4]. The goal of this study was to determine the validity used in the national Self-Care and Digital Value Services (ODA) Project. The aim was to use the findings to strengthen future measuring instruments.

Material and Methods

Measures used in the ODA Project's 38-development pilots were examined in this study. We created a checklist based on Van de Velde and colleagues' [5] report to validate the main indicator of each pilot project. The four domains of this checklist were: 1) the context, 2) the content, 3) the system and 4) the use of indicators. The potential indicators were validated using the Delphi method to collect expert opinions [4]. A multidisciplinary group spanning health management, health economics, and health and human services informatics discussed the importance of indicators and reached a consensus about what follow-up actions were required. There were six participants and two rounds of Delphi. The first round was carried out with documents, and the second round comprised consensus discussions.

Results

The Delphi panel reached consensus on the majority of domains. The panel agreed that all indicators were relevant in their context (1) and the content of indicators was evaluated practical, but they were rather narrow views (2). Electronic health and social records were commonly used, but the interoperability of information systems were low (3). Initiated measurements were remarkable in the ODA Project, and so by expanding the indicators and proportion information at regional and national level is important in future (4).

Discussion

Aging populations and increasing healthcare costs pose a challenge to digital health and social services initiatives, especially in regard to keeping clients at the center of healthcare services and improving their quality and availability while minimizing costs and working time [1-2]. Our findings suggested that the ODA Project has made a remarkable contribution to the development of digital services, especially in term of the indicators, it has used to show changes in action [3,4]. The multidisciplinary Delphi panel provided a rewarding basis for analytical discussions. Despite good progress of digital services, there are technical challenges, such as the interoperability of information systems [5].

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P-5: A Structural Equation Model for Health Workers' mHealth Adoption in the Developing World.

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Abstract

The study aims at developing health workers mHealth adoption model for the developing world based on structural equation modelling. In this study, a health workers' mHealth adoption questionnaire (HeMAQ) previously developed through structural review of literature with five constructs, namely, multi-sectorial engagement and ownership, staffing and technical support, reliable infrastructure, usefulness and stewardship, and intention to adopt, was used.

The HeMAQ questionnaire consisting of 20 parameters was issued to 104 nurses and midwives in the Ewutu Senya district of the Central region of Ghana who had used mHealth (Mobile Technology for Community Health-MoTeCH) to deliver maternal health services to mothers in their catchment zones. A convenience sampling method was used to select nurses and midwives with previous MoTeCH experience for at least six months. Data was collected through self-administration in the months of September – October, 2017. The data was analyzed using SPSS v20.0, and SPSS Amos 23.0 for the structural modelling. The study tested five hypothesis and all were found to be statistically significant. It was found that all the parameters impacted on health workers' adoption of mHealth in the developing world with a mean value of 6.23 for a 1 to 7 likert scale. The analysis shows that there exists a strong positive correlation among the latent variable with the strongest existing between usefulness and stewardship and intention to adopt.

This study presents a useful model for future mHealth implementation for health workers in the developing world.

Keywords: mHealth, Adoption, Telemedicine, Health Worker, Developing World, e-Health, Structural equation model.

P-6: Health Workers' mHealth Adoption Scale for the developing World.

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Introduction
Health workers adoption of mHealth is critical to the success or failure of clinician based mHealth technologies in the developing world. The adoption of mHealth by the health worker is affected or promoted by certain factors peculiar the developing world. Identifying these factors and statistically evaluating them will help develop a valid and reliable measuring instrument for more successful mHealth adoption in future.

Method
A health workers' mHealth adoption questionnaire (HeMAQ) was developed based on seven constructs identified through structured review of literature and later reduced to five, namely: multi-sectorial engagement and ownership; staffing and technical support; reliable infrastructure; usefulness and stewardship; intention to adopt.
The instrument was approved for data collection by the Biomedical Research Ethics Committee of the University of KwaZulu-Natal and the Ghana Health Service Ethics Review Committee after face and content validity were achieved. The instrument consists of 20 items and 5 latent variables.

It was administered to 104 nurses and midwives in the Ewutu-Senya district of the Central Region of Ghana using convenience sampling procedure between the months of September to October, 2017.The data was analyzed using SPSS version 20.

Results
The KMO value was acceptable at 0.706 and Cronbach's alpha value for reliability was found to be 0.868. The Bartlet Test of Sphericity was also found to be significant, meaning the constructs were found to be valid.

Conclusion
The study presents a valid and reliable instrument to serve as a trustworthy scale for future health workers' adoption measurement in the developing world.

Keywords: mHealth, Adoption, Health worker, assessment scale, e-Health, Telemedicine, Developing world

P-7: Developing welfare services with social robots

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Introduction
The workshop focuses on using social robots in care and on developing new robot-enabled care services. The workshop features services designed and used in Robots and the Future of Welfare Services (ROSE) project in Sipoo and the upcoming pilots in HyvinRobo project in Kuopio. Digitalisation and automation play a major role in solving current societal challenges, such as aging of the population and development of welfare services. Supporting the well-being and independent living of senior citizens with new generations of social robots and care robots is a part of this development.

Material and Methods
From a research point of view, social robots have rarely been used in welfare services in Finland. The social robot service offerings in Finnish market are limited, and rarely suitable for pilot research with user groups that have special needs, such as senior citizens or people with disabilities. Instead of using existing offerings, researchers have the option of developing the services and the software required for pilot deployment themselves. While current generation of social robots makes service development relatively easy in terms of technology, the process from ideation to implementation features other challenges.

Results
Co-creation allows service developers to acknowledge their users' needs and to create services that are purposeful for the users. However, social robots are largely unfamiliar technology among care workers. Unfamiliarity with used technology results in difficulties in providing useful input towards ideating and developing services. The workshop features learnings from ROSE project and invites the participants to generate new service ideas for the upcoming HyvinRobo project pilot experiments.

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P-8: Robot –a friend or a threath? Customers and Staff's thoughts about robotics in services houses in Nortern Savo area

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Introduction
The possibilities of robotics are inreasing quickly in social and healthcare. There are a need of increase knowledge and education about robotics. The project Hyvinrobo was created to full fill that need in Northern Savo area in years 2018-2019.

Patients and methods
This survey was madeas a part of the Hyvinrobo-project in Kuopio. Our aim was to find out/examine what kind of thought and ideas healthcare professionals and customers have about robotics and how they could use them in their daily lives. We interviewed 37 staff members and 70 customers in five service homes of the housing foundation for intellectually disabled in Northern Savo. The interview were made in groups staff members and customers. The interviews also included action sessions with NAO and Alpha robots.

Results
Customers saw the robotics mainly positively, they were very interested about them. Robots could be their friends, who you can talk and who could make them happy. Also they thought that they could be cativating tool in their daily life. Some of them thought robots are frightening.
Staff members saw a lot of possibilities in robotics. They could be motivators and activators to customers. Also robots could be action controllers in different situations, such as in morning routines. Having a robot as a working mate it could light the work load and it could active ergonomics during work. It could also orientate new staff. They also saw robotics a little bit scary and expensive. But mainly robots were seen as possility to have more time with the curstomers while robots could do basic dayroutines.

Conclusion
Robots are seen as possibility among customers and staff members. We still need more experiences how to use them effectively in caring others. In future we need more innovative experiments. Also we need to increase knowledge about available tehcnology and the multiple ways to use it in services homes.

P-9: Eating competence associates with lower prevalence of obesity and better insulin sensitivity in Finnish adults with increased risk of type 2 diabetes – The StopDia Study

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Introduction
Healthy diet is a key component in prevention of type 2 diabetes (T2D), however, following it is demanding for many individuals (1). Eating competence is a concept that emphasizes positive and flexible attitude towards food and eating and it aims to health promotion (2,3). The aim of the current study was to investigate whether eating competence, that assess eating attitudes and behavior, associates with the lifestyle and metabolic risk factors for T2D and prevalence of T2D in individuals screened online for T2D risk.

Material and Methods
All study participants had increased risk for T2D (≥ 12 points in the Finnish Diabetes Risk Score [FINDRISC] (4) or history of gestational diabetes, impaired glucose tolerance, or impaired fasting glucose), which was identified via an online risk screening and recruitment site (www.StopDia.fi) without face-to-face contact. Altogether 3271 Finnish adults aged 18–74 years participated in the baseline examinations of the Stop Diabetes (StopDia) study. The participants answered the web-based StopDia Digital Questionnaire (n = 3147), including the Satter Eating Competence Inventory 2.0™ (ecSI 2.0) (3) and a food intake questionnaire (5). Anthropometric and laboratory measurements were performed, and blood samples were taken in primary health care centers as part of their routine actions.

Results
Overall 37% of the participants were classified as being eating competent (≥ 32 points in ecSI 2.0). Eating competent individuals had more regular meal frequency and better quality of diet (all P values < 0.05). Additionally, being eating competent was associated with a lower prevalence of obesity (P <0.001), less abdominal obesity (P < 0.001), less hypertriglyceridemia (P = 0.009) and less T2D (P = 0.029) adjusted for age, gender and sociodemographic factors. Eating competent participants had also lower insulin resistance based on Matsuda insulin sensitivity index (P = 0.002). Furthermore, score for contextual skills, a subcomponent of eating competence, associated most strongly with metabolic factors.

Discussion
Eating competence associates with the lower prevalence of T2D and obesity and less insulin resistance in adults with increased risk for T2D based on an online risk screening. Although cross-sectional, the analysis suggests that enhancing eating competence, especially contextual skills, which mean for instance meal planning and scheduling eating, might be a promising strategy in lifestyle interventions targeted at people with high T2D risk. Future study will focus if the lifestyle intervention delivered through the digital "BitHabit" application and the face-to-face group coaching in which the model of eating competence was also applied, affects the risk of type 2 diabetes.

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P-10: A survey of open access databases suitable for machine learning analytics

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Background
Machine learning algorithms require large amounts of high-quality data. Therefore, the scarcity of these remain to be one of the greatest challenges in the data intensive fields of medicine, partly due to the high level of patient data privacy and slow research permission request process. Especially deep learning paradigm requires massive datasets of a size often unattainable in biological studies[1]. This study was undertaken to systematically review open access databases which were qualified as suitable for machine learning analytics with the following criteria:

1) licensing of the dataset allows use for academic, scientific purposes (noncommercial use).
2) dataset is large enough to be analyzed by machine learning. The required sample size is dependent on the purpose of the study, applied algorithm and the number of features to be analyzed, but an estimate of the needed sample size can be estimated using statistical heuristics[2,3].
3) availability of metadata (description of data attributes).

Results
A systematic search was conducted with ten major medical and health dataset collections. The datasets from these collections were evaluated with the abovementioned criteria and described with the following attributes: brief description of data, sample size, number of features, web link and representative example(s) of the published papers based on the dataset.
A list of evaluated datasets will be presented in the poster session, together with the dataset attributes and estimated suitability for clustering, regression, recognition, deep learning or other (e.g. default task). Majority of the found datasets have already been studied in detail using conventional statistical methodology, but some have not been studied with machine learning approach to their full potential. The dataset collection will be available in ResearchGate.

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P-11: Testing services improving skills of the future workforce

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Introduction
Savonia University of Applied Sciences has two main tasks: education & training and R&D and innovation (RDI). Savonia has a focus area of applied health technology. We are responding to the need for reform of the social and healthcare sector and increased efficiency and quality of social and healthcare services. This will be achieved through the promotion of the development and commercialization of technological applications, improving professionals' skills for e-services, and applied research into the digitalization of social and healthcare services.

Material and Methods
Health care is coming more and more digitalized. Companies are developing more products and services to help customers to be healthier and support health care professionals on their work. At the same time social and health care employers expects the graduating new work force to bring the knowledge about these new ways to do the work and ability to use and apply health technology in health care services. New technologies are coming faster than we expect available to health care and it is important that social and health care professionals are familiar with different technologies and can handle the basics in the most common technologies user interfaces for e.g. VR, AR and tablet/mobile computers.
Savonia University of Applied Sciences coordinates Kuopio Health Lab -project that develops services for health technology companies to test products usability and suitability for health care. We are also evaluating new service ideas and combine digital and traditional healthcare services. Services are part of the Kuopio Living Lab services.

Results
Students and their teachers are helping companies to develop different health games, apps and other software. Students and specialist are working in multi-professional teams testing different technologies and evaluating their suitability in health care. Engaging students and teachers to the testing and developing new products and services also increases the student’s knowledge about technologies and it’s opportunities regarding the future work life. At the same time companies developing future healthcare solutions get important information about how to improve their products and services. Companies are getting a lot of help for their R&D and get better and more effective products at the market faster.

Discussion
As so far, our testing services made by students has received good feedback from customers and students. Savonia University of Applied Sciences has hundreds of students available for testing, so service is fast and adaptive. To give proper service for the companies, they must be properly coordinated. Kuopio Health Lab project is developing offered services intensively to the end of the year 2019. At the same time projects aims to engage the whole Savonia University of Applied sciences to be one big Living Lab. Living Labs are both practice-driven organizations that facilitate and foster open, collaborative innovation, as well as real-life environments or arenas where both open innovation and user innovation processes can be studied and subject to experiments and where new solutions are developed.

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P-12: Creative economy developing future health care

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Introduction
Creative economy emphasises the significance and added value of culture and creativity in the national economy. Exploitation of the skills, products and services of creative industries has become a significant competitiveness factor for Finland. Also effective health promotion involves the creative cultivation of physical, mental, social, and spiritual well-being. Social restructuring, sustainability gap, cultural fragmentation, exclusion due to inequality, mental illnesses and health issues are wicked problems.

So what can be the role of creative sector in dealing with these challenges? The creative sector have invited people to participate in experiencing the world from new and unexpected perspectives, stimulated reflection and encouraged social dialogue. The creative sector helps us to understand alternative futures, scenarios. By creating cross-disciplinary scenarios, we make the decision-making process even more impressive. This is how we prepare ourselves for the health challenges of the future on a more sustainable way.

Material and Methods
Savonia University of Applied Sciences coordinates the creating of regional development program for creative industry, culture and arts. During this two yearlong "LUOVA VETO! Creative industries for improving Northern Savo regions competitiveness and wellbeing –project" Savonia will also implement experimentations to create business activities and employment, increase networking and enhance the operating conditions.

The region needs own support structure and multidisciplinary co-operation so the creative industries regional economic importance grows, the international activity multiply, the availability of the well-being services will improve and the whole region becomes more attractive for the businesses and the citizens.

Creative economy make difference to people's health and well-being and to how they feel about, and interact with others and with the environment. This project is bringing experts from creative field to do fast experiments in different places, people and goals. Through these experiments municipalities get new possibilities to improve inhabitants' wellbeing and see the value that creative economy can add to society and future health care sector.

Discussion
New technologies are essential part of the future scenarios in global change. Design thinking is a human-centered approach to innovation that draws from designers´s toolkit to integrate the needs of people, the possibilities of technology and the requirements for business success. The creative sector combines design thinking to future scenarios and technology development.

Creative economy developes future health care solutions from three viewpoints: participation, creative design and human-tech-interaction. Participation means co-creation work between customers, users, doctors, nurses, programmers etc. Creative design means all kind of design work of artists, product and service designers, interface designers and visualization. Human-tech-interaction means e.g. social media, games, experimental technologies, XR etc.

Technology provides new possibilities for creative economy – in the creation of their works, as new outlets for their creativity, and as a means of promoting and distributing their work. But we need creative industries to make the information understandable, usable and visual.

P-13: Secured Cloud based Telemedicine

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Introduction
Telemedicine connects patient and specialized doctors remotely and also allows them to share the sensitive medical records. Irrespective of the mode of data exchange, all types of media are vulnerable to security and performance issues. Remote data exchange during an emergency situation should not be delayed and at the same time should not be altered. While transit, a single bit change could be interpreted differently at the other end. Hence telemedicine comes with all the challenges of performance and security issues. Delay, cost and scalability are the pressing performance factors whereas integrity, availability and accountability are the security issues need to be addressed. This paper lights up on security without compromising quality of service. Telemedicine is on track from standard PSTN, wireless Mobile phones and satellites. Secure Cloud based Telemedicine (SCT) uses Cloud which could free the people from administrative and accounting burdens.

Material and Methods
Main objective of SCT is to provide, quality medicine to each and every corner of the rural places without revealing the sensitive medical records to an unauthorized user. Also focuses on protecting the deployed application and data storage from availability attacks. In the Reputation based Service for Cloud User Environment (RESCUE) architecture shown in figure 5, the request from the users will be accepted by a proxy server which performs entry level authentification. Man and machine are distinguished by their problem solving skill .the request initiator will be invited to do minor computations such as puzzle solving or factorization which do not consume much of the user time.After this phase, the bad traffic is trashed and others are given to a component called Resource Overload Monitor (ROM). Based on the volume of requests, ROM will detect the presence of flooding. Upon flood detection and resource overload, the flow routers at datacenter perform flow analysis and feed the result to the Coordinator Router (CR). The CR compares the inputs from all flow routers. If the requests with similar contents are valid requests, they are concluded to contribute Service Level flooding. Invalid requests contribute to Network Level Flooding. The details of discarded and accepted flows are communicated to the ROM and it will add or deduct credits of users accordingly.

Results
SCT could achieve cost benefits and secure from unauthorized access. Regional language implementation could attract even a lay man and all human irrespective of their environment receive a quality medicines. Telemedicine can be promoted easily to all.

Discussion
Rescue has to be tested in real-time for Telemedicine which has different skilled and even zero skilled people. Rescue could protect the server from attacks and improves the resource availability. Without availability telemedicine could not reach people. In future, this will be deployed in real time and the scenario will be tested. Upon successful deployment in a trial mode, this will be brought into action.

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P-14: Security Analysis and Implementation of Web-based Telemedicine Services with a Four-tier Architecture

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Introduction
Security of Telemedicine applications is not often given adequate importance by the developers and healthcare administrators primarily to reduce cost. Though some security safeguards are employed by these applications to comply with existing medical data security and privacy regulations, these are not adequate in today's context. Moreover, in a web-based application environment not only the data but also the application itself is vulnerable to attackers. Keeping these concerns in mind, we present the design of a web-based, four-tier Telemedicine System which is accessible over desktops as well as handheld devices. We have illustrated how the proposed system differs from existing three-tier web applications.

Material and Methods
In this paper we present the architecture of a web-based four-tier telemedicine system which has been developed with a major emphasis on security. Our work extends the existing three-tier application architecture to incorporate an additional layer of security. In this architecture we are able to protect not only the medical information but also the application components from hackers. We have illustrated how the proposed four-tier architecture imparts security, flexibility and robustness into the application. We also present an analysis of the security of the proposed system in the context of some common web-application vulnerabilities. Emphasis on application security has been given due to the recent rise in hacking incidents at the web application level. Thus, our approach looks into the four-tier architecture from an attacker's viewpoint and presents a simple road map for developing secure e-health application.

Results
It is to be emphasized that the proposed four-tier architecture presents several advantages over existing three-teir applications. Firstly, let us consider the case of a typical threetier web application where the application logic / presentation logic is hosted on a public computer . This computer communicates with an Internal Database which is protected by a firewall. Since the web server is always hosted in the DMZ it is vulnerable to hacking attempts. If this server is compromised, the database is no longer hidden to the attacker. The attacker can easily modify the application components to perform arbitrary operations on the database. Moreover if the web application consists of codes written in the scripting languages the entire application logic is exposed to the hacker. In comparison, the proposed four-tier system hosts the application components securely behind a firewall. The Web Proxy Layer consists of only executable codes. Hence the application logic is never visible to the attacker.

Discussion
The proposed system, differs from existing web-based telemedicine services due to its architecture and its emphasis on application level vulnerabilities. We have illustrated how the introduction of the fourth layer or the Web Proxy Layer reduces the risk for many types of attacks. The advantages of the proposed four-tier architecture over existing three-tier architecture have also been highlighted. The security measures incorporated at various layers of the application shows how such a four-tier application can be protected against common web application vulnerabilities. Furthermore, how users can access healthcare data in the proposed system from any location using desktop computers as well as handheld devices has been discussed.

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P-15: Wireless-enabled telemedicine system for remote monitoring

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Introduction
Telemedicine services are increasingly utilized by patients, clinicians, and institutions. In this paper we describe the design and implementation of wireless-enabled telemedicine system using Bluetooth. Our proposed system will provide doctors with the ability to monitor, diagnose and help their patients in case of emergencies remotely over the Internet. The system is capable of receiving a serial stream of data and extracting relevant packets from the measurements of the patient's vital signs. The implemented software allows patients to easily access their doctors and to send their data via Internet. The system is fairly low-cost, fully functional and user friendly.

Material and Methods
Our wireless enabled system offers a two way communication between the patient and the doctor. In this system, we made a package of two systems, one for the patient and the other for the doctor. The patient's system provides him with two options. The first option is to transmit his vital signs wirelessly via Bluetooth to the computer where the data is sent through the internet to the health organization database where it can be saved. The doctor can later access this data from his computer. The second option employs the use of a PDA instead of the computers to send the data. So we used mobile phone technology, namely, short message service (SMS) instead of the internet to send the patient's information to the doctor.

Results
We believe that it is very important to start such a technology in Romania. Of course the system needs further work to improve its functionality and to be able to manufacture and market it. We could make further improvements by adding the capability of sending and displaying images as well as videos through this system. This will necessitate making the system integrable with HIS, PACS and RIS. Being extremely cost effective, gives the system very good edge when compared to the products available in the market.

Discussion
In this paper we presented the prototype of a system that allows any patient especially an elderly to be monitored by his far away doctor. The system also allows the doctor to monitor, diagnose and help their patients in case of emergencies remotely over the Internet. A patient could measure his vital signs through a module connected wirelessly via Bluetooth to his computer. The patient could then send his data through the internet to be saved on a database in the healthcare organization. At any time the doctor could log in and access the data of his patient. He could chat with the patient or consult with another doctor. The implemented software allows patients to easily access their doctors and to send their data via the Internet. The system also allows the patient to send his doctor his data through an SMS if the patient does not have a computer around so he could use any PDA for this purpose.

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Workshops

Developing welfare services with social robots

Workshop will be held in two parts on Tuesday 2nd April 2019:
13:50 – 15:20 Developing social robots and role in Finnish welfare services
16:00 – 17:30 Developing new services (Participation to first part is mandatory)

The workshop focuses on using social robots in care and on developing new robot-enabled care services. The workshop features services designed and used in Robots and the Future of Welfare Services (ROSE) project in Sipoo and the upcoming pilots in HyvinRobo project in Kuopio. Digitalisation and automation play a major role in solving current societal challenges, such as aging of the population and development of welfare services. Supporting the well-being and independent living of senior citizens with new generations of social robots and care robots is a part of this development.

From a research point of view, social robots have rarely been used in welfare services in Finland. The social robot service offerings in Finnish market are limited, and rarely suitable for pilot research with user groups that have special needs, such as senior citizens or people with disabilities. Instead of using existing offerings, researchers have the option of developing the services and the software required for pilot deployment themselves. While current generation of social robots makes service development relatively easy in terms of technology, the process from ideation to implementation features other challenges.

Co-creation allows service developers to acknowledge their users' needs and to create services that are purposeful for the users. However, social robots are largely unfamiliar technology among care workers. Unfamiliarity with used technology results in difficulties in providing useful input towards ideating and developing services. The workshop features learnings from ROSE project and invites the participants to generate new service ideas for the upcoming HyvinRobo project pilot experiments.

Sosiaaliset robotit hyvinvointipalvelujen edistäjänä

Työpaja järjestetään kahdessa osassa 2.4.2019:
13:50 – 15:20 Sosiaalisten robottien kehittäminen ja rooli Suomen hyvinvointipalveluissa
16:00 – 17:30 Uusien palveluiden kehittäminen (edellytys edelliseen osioon osallistuminen)

Työpajassa tutustutaan sosiaalisten palvelurobottien käyttöön sosiaalityön tutkimuksessa sekä kehitetään uusia robotilla toteutettavia palveluideoita. Työpaja kytkeytyy Robotit ja Hyvinvointipalvelujen Tulevaisuus-hankkeen jo toteutettuihin pilottikokeiluihin sekä HyvinRobo-hankkeen tuleviin pilotteihin. Digitaalisaatio ja automaatio ovat keskeisessä roolissa pyrittäessä löytämään uusia ratkaisuja ajankohtaisiin yhteiskunnallisiin haasteisiin, kuten väestön ikääntymiseen ja hyvinvointipalvelujen kehittämiseen. Tekoälyn ja robotiikan kehitys tarjoavat keinoja vastata näihin haasteisiin. Uuden sukupolven hoivarobottien ja sosiaalisten robottien mahdollinen käyttöönotto ikääntyneiden hyvinvoinnin ja kotona selviytymisen tueksi sekä palvelujen uudistamiseksi on osa tätä kehitystä.

Sosiaalisten robottien käyttö hoito- ja hoivatyössä Suomessa on toistaiseksi ollut vähäistä. Tutkimuksen kannalta todellisista ympäristöistä saatavat käyttökokemukset ovat kuitenkin keskeisiä. Nykyään markkinoilla olevasta sosiaalisen palvelurobotiikan tarjoamasta osa soveltuu erityisryhmien, kuten seniorien tai kehitysvammaisten parissa toteutettaviin lyhyisiin pilottikokeiluihin. Valmiin tarjonnan hyödyntämisen vaihtoehtona tutkimuksen toteuttajille on kehittää palvelut itse.

Palvelujen kehittäminen yhdessä käyttäjien kanssa tekee palveluista tarkoituksenmukaisempia sekä hyödyllisempiä käyttäjilleen. Sosiaaliset palvelurobotit ovat kuitenkin vielä laajalti vierasta teknologiaa hoivatyössä. Teknologian rajoitteiden ja mahdollisuuksien heikko tuntemus aiheuttaa haasteita palvelujen ideoinnissa sekä toteutuksessa. Työpajassa esiteltävät, ROSE-hankkeessa kehitetyt palvelut perustuvat pitkään palvelujen kehittämisen prosessiin, jonka pohjana toimii vuonna 2015 aloitettu laadullinen tutkimus. Vuoden 2018 loppuun mennessä hankkeessa on toteutettu useita tutkimukseen pohjautuvia pilottikokeiluja. Työpajassa käydään läpi sosiaaliselle robotille toteutettavien palvelujen kehitysprosessia ja siitä saatuja oppeja. Työpajan aikana kehitetään uusia ideoita HyvinRobo-hankkeen piloteiksi sekä peilataan hankkeen kehityssuunnitelmia ROSE-hankkeen kokemuksiin.

Finnish special competence for healthcare information technology

Jarmo Reponen[1,2], Professor
[1]*FinnTelemedicum, Research group for medical imaging, physics and technology, University of Oulu, Finland;*
[2]*Chairman of the committee of the special competence for healthcare information technology*

Background: Healthcare information and communication technology has become an everyday companion for medical doctors and dentists and it serves as a strategic tool for change. 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). During the forthcoming Finnish social and health care reform digitalization is playing a major role, and the expected outcomes are related to the success of digital services. However, the education process of medical doctors and dentists 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 since 2015 to dentists, too. The vision is that medical doctors and dentists could use their clinical expertise in the development of healthcare information and communication technology as well as eHealth and mHealth solutions (3). 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.

Methods: In order to qualify for the special competence program, one has to become first a qualified medical specialist consultant. A five years experience in clinical work without specialization is enough for dentists (and in exceptional cases for physicists, if one has proven special achievements in related areas). Anyhow, a minimum of five years clinical experience is needed after a licenciate degree. The special competence requires then cumulatively 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.

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, respectively. (4)

Results: In January 2019 already 125 doctors and dentists have been enrolled to the program. There are 13 dentists and 112 physicians among them. Of those enrolled, 72 physicians and 13 dentists 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.

Conclusions: This new special competence gives already graduated doctors and dentists 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 piloting eHealth course for medical students (5).

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Suomalaisten lääkäreiden ja hammaslääkäreiden terveydenhuollon tietotekniikan erityispätevyys

Jarmo Reponen[1,2], Professori
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Terveydenhuollon tietotekniikan (e-terveyspalvelujen) ammatillinen erityispätevyys edistää lääkärien ja hammaslääkärien kiinnostusta ja sitoutumista terveydenhuollon tietoteknologian hyödyntämiseen ja sähköisten terveyspalvelujen kehittämiseen. Suomi perusti tämän erityispätevyyden ensimmäisenä maana Euroopassa lääkäreille joulukuussa 2012, hammaslääkärit liittyivät mukaan vuonna 2015. Pätevyyden saavuttaminen edellyttää yhteensä kahden vuoden työskentelyä sähköisten terveyspalvelujen alalla sekä teoreettisia opintoja. Pohjakoulutuksena edellytetään pääsääntöisesti erikoislääkärin tutkintoa ja osaaminen osoitetaan rakenteisella portfoliolla. Tavoitteena on siten tarjota pätevöitymismahdollisuutta jo käytännön työssä kokeneille toimijoille. Koulutukseen oli vuoden 2019 alkuun mennessä ilmoittautunut yhteensä 125 henkeä ja pätevyyden oli näistä jo loppuun suorittanut 72 lääkäriä ja 13 hammaslääkäriä. Valmistuneet saavat valmiudet toimiakseen johtavina asiantuntijoina tai hallinnollisissa tehtävissä kehitettäessä sähköisten tai mobiilien terveyspalvelujen prosesseja alueellisissa tai kansallisissa hankkeissa. Erityispätevyydestä vastaavat yhdessä Suomen telelääketieteen ja eHealth seura, Suomen Lääkäriliitto ja Suomen Hammaslääkäriliitto.

The International Society for Telemedicine & eHealth (ISfTeH)

Mission Statement

The International Society for Telemedicine & eHealth (ISfTeH) was founded in 1997. The 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. The ISfTeH works as a non-governmental organization.

The International Society for Telemedicine & eHealth 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, coordinate and support of telemedicine projects and activities throughout the world. Furthermore, IsfTeH cares for the widespread use of ICT tools and solutions in health and social care in order to:

- improve access to healthcare services
- improve quality of care
- improve prevention
- 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.

Join our network of member organizations from over 90 countries around the world (…and growing). The ISfTeH is your door to the global Telemedicine and eHealth community. Through its various activities and members, the ISfTeH can assist you in the promotion and dissemination of your research; help you to enhance your healthcare services with new ICT tools and technologies; provide ideas to broaden your educational programs and courses; and widen your international business network.

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NGO in official relation with WHO

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- Jarmo Reponen, MD, PhD, Professor, University of Oulu, Vice-President, FSTeH (Vice-chair)
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- Elina Kontio PhD, Principal Lecturer, Turku University of Applied Sciences
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- Kati Haaraoja BBA, training coordinator, Kuopio University Hospital
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- Merja Miettinen, PhD, Professor, Executive Vice President for Customership and Services, Kuopio University Hospital

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- Joni Nuutinen, Savonia University of Applied Sciences

Finnish Journal of eHealth and eWelfare

Finnish Journal of eHealth and eWelfare

http://www.finjehew.fi

FinJeHeW on Suomen Telelääketieteen ja eHealth-seuran ja Sosiaali- ja terveydenhuollon tietojenkäsittely-yhdistyksen yhteisesti perustama tieteellinen lehti, joka palvelee myös jäsenlehtenä.

Lehden tarkoituksena on edistää tieteellisten perustajaseurojensa Suomen Telelääketieteen ja eHealth-seuran (STeHS) eli Finnish Society of Telemedicine and eHealth (FSTeH) (www.telemedicine.fi) ja Sosiaali- ja terveydenhuollon tietojenkäsittely-yhdistyksen (STTY) eli Finnish Social and Health Informatics Association (FinnSHIA), (www.stty.org) edustamien tieteenalojen tieteellistä julkaisutoimintaa, kokouksia ja seminaareja. Se toimii myös seurojensa jäsenten ja muiden asiasta kiinnostuneiden tiedotuskanavana ja yhdyssiteenä sekä valistustyön ja koulutuksen tuottajana ja välittäjänä. FinJeHeW:lle on vuodesta 2010 myönnetty vuosittainen Tieteellisten seurojen valtuuskunnan julkaisutuki.

Lehti ottaa vastaan tieteellisiä artikkeleita sekä muuta aineistoa sosiaali- ja terveydenhuollon informaatioteknologiasta, telelääketieteestä ja eHealth-alalta. Kirjoitusohjeet ovat lehden sivustolla. Lehti on pääasiassa suomenkielinen, mutta siinä on artikkeleita, niiden tiivistelmiä ja muuta aineistoa englanniksi. Lehti noudattaa käsikirjoitusten arvioinnissa kahden refereen menettelyä. Lehden sisältö julkaistaan avoimesti syksystä 2017 lähtien. Lehti ilmestyy neljänä numerona vuodessa.

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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.

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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

AJANKOHTAISTA

- IHE Finland järjestää seuraavan työkokouksen 19.3.2019
- IHE Europen Connectathon ja IHE Symposium Rennesissä Ranskassa 8.-12.4.2019
- Projekti meneillään olemassaolevien profiilien hyödyntämismahdollisuuksien selvittämiseksi
- Taustatietoja ja -kartoituksia saatavilla, mm. Suomen IHE-toimintamalli ja kuvantamisen keskeiset IHE-määrittelyt sekä TEKES:in ja Terveysteknologian liiton (FiHTA) IHE-hyödyntämisselvitys

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!

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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

WHAT'S NEW

- Next IHE Finland work meeting 19.3.2019
- IHE Europe Connectathon and Symposium in Rennes / France 8.-12.4.2019
- Project for analysing the IHE profiles available currently for their applicability in Finland
- IHE support project going on to regularize IHE activities in Finland
- Background information, such as description of IHE procedures in Finland, essential IHE specifications in imaging as well as IHE utilization report by TEKES and FiHTA

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
- Workshops organized to define focus points
- Support for concrete development projects
- IHE Finland workshops are open to IHE Finland members
- Attend training events organized by IHE Finland
- Profiles and reports are free for evaluation and use
- To follow and participate
  http://www.hl7.fi/hl7-finland-liity-yhdistykseen
  http://www.hl7.fi/sig-toiminta/ihe-sig/
- Join our mailing list and LinkedIn group!

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SAVONIA
UNIVERSITY OF APPLIED SCIENCES

Savonia University of Applied Sciences is one of the largest and most versatile Universities of Applied Sciences in Finland. Our organization of experts educate strong professionals in six different fields of study. Our versatile Degree Programmes offer the students the opportunity to study as a fulltime student or alongside their job (Master's Degree and specialised studies) or flexibly in the Open University of Applied Sciences. Our campuses are located in Kuopio, Iisalmi and Varkaus.

Savonia offers degree programmes also in English. In 2019 Savonia offers four Bachelor's programmes including Bachelor's Degree Programme in Nursing, are Bachelor of Engineering in Internet of Things, Bachelor of Engineering, Mechanical Engineering and Bachelor of Business Administration, International Business. Furthermore, one Master's programme is offered: international Master's Degree Programme in Digital Health, which is totally virtual programme. The master programme can be studied simultaneously when one is working.

The selected focus areas are Applied Wellbeing Technology, Innovative Engineering and Energy Industries, Responsible Food Production and Water Safety. The unifying theme in these areas is digital solutions. The philosophy of the focus areas is built on product development, creative experiments, entrepreneurship, innovations, business expertise and internationality.

As Savonia UAS is a multidisciplinary university of applied sciences, it naturally has high-quality core mission-based activities outside of the focus areas. Savonia has both international and national ongoing projects with the higher education institutes and business.

www.savonia.fi

KuopioHealth

Open Innovation Ecosystem

KuopioHealth is a network of healthcare professionals committed to advancing health technology expertise, research, business life and awareness of the area. Kuopio Health promotes development, research and innovation based on customer needs and serves as a platform for new products and services.

KuopioHealth is an open innovation platform enabling co-creation and transfer of knowledge and technologies for the benefit of society. We offer excellent health technology competence, training, infrastructure anda business network for domestic and international health technology companies and innovators.

www.kuopiohealth.fi

KUH KUOPIO European Union European Regional Development Fund European Social Fund Leverage from the EU 2014–2020 Regional Council of Pohjois-Savo supports a successful region UNIVERSITY OF EASTERN FINLAND SAVONIA UNIVERSITY OF APPLIED SCIENCES

GAMES FOR HEALTH
FINLAND

Games for Health Finland is a creative network of game developers, designers, health professionals and technology. We also organize activating events like Hackathons and Game Jams to create prototypes to promote health and well-being.

Games for Health Finland is coordinated by Savonia University of Applied Sciences. Innovate, develop and implement together with the us!

sht.savonia.fi

gfhfinland
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SAVONIA
UNIVERSITY OF APPLIED SCIENCES

igda Kuopio

European Union
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Leverage from the EU 2014–2020

List of participants

Finnish Society of Telemedicine and eHealth Board of Directors

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