

ABSTRACTS

23rd Conference of the International Society for Telemedicine and eHealth and 23rd Finnish National Conference on Telemedicine and eHealth 2017 Helsinki – Stockholm - Helsinki 15-17 March 2018

J Int Soc Telemed eHealth 2018;6:eS3

DOI: <http://doi.org/10.29086/JISfTeH.6.eS3>



Index by Title (Alphabetical)

(Hyperlinked titles – mouse-over and [ENTER] to navigate;
to locate an author - [CTRL][F], type in the surname, [ENTER])

A project for implementation system for diagnosis of the burnout syndrome. Rумыana Stoyanova, Stanislava Harizanova, Rositsa Dimova

A review of gamification in the improvement of oral health knowledge. Mariño R, Wassouf H, Wen W, Wen MJ, Whyte RJ, Vuckovic K, Manton D, Black J, Meredith G, Stranieri A

A structured review of factors for successful patient-provider mhealth project scale up in Africa. Addotey-Delove Michael Nii-Addotey, Richard E. Scott, Maurice Mars

Agile methods in developing a modern search tool for the physicians' clinical resource database. Jukkapekka Jousimaa, Juha Kautto, Juuso Landgren

Assessment of knowledge, attitude and readiness of community health workers to uptake mobile based telemedicine services at rural areas of Ambala, Haryana (India). Kathirvel Soundappan, Shyam Chakraborty, Niranjan Khandelwal, Rajesh Kumar, Meenu Singh

Comparison of the frequency of positive hearing screening outcomes in school-age children from different countries in Africa – telemedicine model. Piotr Henryk Skarżyński, Maciej Ludwikowski, Weronika Świerniak, Kamila Renke, Henryk Skarżyński

Client's self evaluation as a basis of professional support. Sakari Kainulainen, Arto Holopainen, Maiju Tirri, Katriina Kankkunen, Heidi Laakko

Comprehensive approach to the national network of teleaudiology in world hearing centre in Kajetany, Poland. Piotr Henryk Skarżyński, Maciej Ludwikowski, Weronika Świerniak, Kamila Renke, Henryk Skarżyński

Consumer perspectives and the development of standards for telehealth services. Malcolm Fisk, Frederic Lievens, Drago Rudel

Courses on telemedicine technologies of continuous medical education at RUDN-University. V.L. Stolyar, E.A. Lukianova

Culture of experimentation in promoting the development and introduction of digital social and health services. Sihvo Päivi, Hämäläinen Susanne, Jääskeläinen Heli, Aija Hietanen, Jaana Hämäläinen

Deployment of national Kanta services 2010-2017. Jormanainen VJ

Developing an algorithm to detect falls in the electronic health record: a diagnostic accuracy study. Barbara Schärer, Franziska Gratwohl, Nicole Grossman², Jacques Donze, Sarah N. Musy, Michael Simon

Digital care plan makes the patient's health goals achievable. Sanna Solala, Kaisa Sundman, Ilari Richardt, Päivi Metsäniemi

Digital testing platform enables agile social welfare and healthcare trials. Timo Alalääkkölä, Mari Koskinen, Kari Vajus-Anttila, Sanna Virkkunen

Effects of ubiquitous 360° patient counselling environment on cardiological patient's health-related quality of life. Karoliina Paalimäki-Paakki, Anja Henner, Kirsi Koivunen, Maria Kääriäinen

Evaluating ehealth interventions: results and experiences from the pilot of an ICT-based self-management tool for heart failure patients in Norway. Konstantinos Antypas, Frank Larsen

Evaluation of the e-health microg-PUCRS platform as an assistance tool of complementary diagnosis to local teams. Lucas S Boneli, Helena W de Oliveira, Michele S G da Rosa, Maurício M da Rosa

Experiences of chat-doctor services in private sector. Timo Carpén, Päivi Metsäniemi, Sari Riihijärvi

Exploring the multiple uses of video conferencing in child psychiatry. Kirsi Bykachev, Jussi Karppi, Minna Pölkki, Anita Puustjärvi, Hannele Turunen

Feasibility of a web-based, lifestyle intervention in patients with liver disease, cystic fibrosis, oesophageal cancer, or psychiatric disorder. Pfirrmann D, Haller N, Huber Y, Jung P, Lieb K, Gockel I, Poplawska K, Schattenberg JM, Simon P

Games for health Finland: achievements and experience points. Tiina Arvola, Antti Kotimaa

Habitualising mhealth. Marlien Varnfield, Christian Redd, Kevin Saric, John O'Dwyer, Mohan Karunanithi

Improving nursing methods of work by using protocols in intensive care units. V. Lalova, D. Paskaleva, G. Petrova

Increasing need for an ehealth impact framework for Africa. Sean Broomhead, Maurice Mars, Richard Scott, Tom Jones

Indian telemedicine program from concept to completion – towards national adaption. LS Satyamurthy

Interprofessional collaborative urotelehealth program in rural Northeastern Ontario-patients' perceptions. Abara E, Reid C, Abara N, Lacroix M, Thomas C, Wu B, Denton R

IOT and violence against gay people in Brazil: time for action. Angélica Baptista Silva, Monica Siqueira Malta, Bruna Gurgel Benevides

ISAACUS pre-production project: child protection process and placement decision. Taru Hallinen, Erkki Soini, Arja Kekon², Johanna Kotimaa, Minna Nykänen, Jyrki Tirkkonen Markku Tervahauta

Legal aspects of cross border telemedicine between Morocco and the European Union. Ikram Ganetri, Hassan Ghazal, Francesco Sicurello, María Del Carmen García Garnica

Leveraging teletriage in an urban emergency department to improve flow and patient experience. Aditi U Joshi, Frederick Randolph, Judd E Hollander, Megan Sabonjian, Frank D Sites, Alexander Ambrosini

Lessons from the American healthcare data breach records. Niina Keränen, Jari Haverinen, Jarmo Reponen

Living lab platforms in the city of Kuopio and Kuopio University Hospital. Metsävainio Kirsimarja, Kaunisto Merita, Kekäläinen Heli, Kämäräinen Pauliina, Holopainen Arto

Machine learning classification can identify patients at risk of cardiovascular event on action to control cardiovascular risk in diabetes (accord) trial. Kelvin Tsoi

mHealth adoption issues: similarities and differences between patient and health personnel in the developing world – a structured review. Addotey-Delove Michael Nii-Addotey, Richard E. Scott, Maurice Mars

mHealth solutions for managing the Nigerian Army Medical Corps patient inflow using computing edge technology. Ayotunde Joseph Owosho, Idowu Ajigbon, Leke Oyewole, Dipo Odumosu

Mobile application – new telemedicine tools? Piotr Henryk Skarzynski, Justyna Kutyla, Katarzyna Cywka, Beata Dziendziel, Weronika Swierniak, Anna Sztabnicka, Henryk Skarzynski

Multidisciplinary digital intervention for youth and children in Kuopio public oral health care – the ODA pilot project. Anni Riepponen, Heidi Liukkonen, Tuula Miettinen, Maija Rajamaa, Katariina Savolainen

National benchmarking of nursing-sensitive outcomes: initial steps in Finland. Junttila K, Meriläinen M, Tervo-Heikkinen T, Taam-Ukkonen M, Koivunen M, Makkonen P, Ritmala-Castrén M, Lundgrén-Laine H

Necessary skills for professional communication between nurses and hospitalised geriatric patients. D. Paskaleva, V. Lalova, S. Tufkova

Practice audit in urology: the value of electronic health records (EHR) data – a case study. Emmanuel O. Abara

Reaching the unreached: an innovative ehealth initiative in Nepal. Anil K Jha

Results from university hospitals as innovation platforms – project – YSI Co-creation Model and Oulu University innovation process. Pauliina Hyrkäs

Self-care and digital value services as part of comprehensive school aged children and their families' welfare. Sanna Niinimäki, Maiju Tirri, Arto Holopainen, Hanna-Mari Tanninen, Katriina Kankkunen

Smart digital solutions for future ageing. Anthony Maeder, Gary Morgan

Sotenavi – a training project of SMEs and association digitalisation as one of the main cornerstones of the training. Riitta-Liisa Lakanmaa, Anne Rouhelo, Riikka Teuri

Special interest group tel@amazonia: telehealth intervention for security food and nutrition of mothers and babies in the deep rainforest. Angélica Baptista Silva, Lucia Maria Costa Monteiro, Martha Inés Camargo Garzón, Waldeyde Oderilda Magalhães Santos, Pedro Máximo Rodrigues, Ianê Germano Filha, Katherine Mary Marcelino Benevides, Esther Mourão Correa

Tele-emergencies in the Himalayas: a 31 month study from Apollo telehealth services. K. Ganapathy, A. Dhavapalani, S. Premanand, N. Lovakanth

Telefitting in the national network of teleaudiology – chance and opportunity for constant care of CI patients in Kyrgyzstan. Piotr Henryk Skarżyński, Maciej Ludwikowski, Weronika Świerniak, Henryk Skarżyński

Telehealth in India: illustrations from Apollo telehealth services. K Ganapathy, S Premanand, N Lovakanth, Vikram Thaploo

Telehealth nursing research – literature review 2017. Claudia C Bartz

Telemedicine consultation in developing countries. F Ferrari, F Erba, M Bartolo

The availability and EMR integration of decision support systems in Finnish healthcare 2007-2017. Niina Keränen, Maarit Kangas, Jari Haverinen, Päivi Hämäläinen Jarmo Reponen

Towards interactive patient counselling. Anja Henner, Karoliina Paalimäki-Paakki, Kirsi Koivunen

Use of data cloud services in clinical environment. Case: video-eeg. Jukka Laaksonen, Jyri Rajamäki

Using social robotic cat in dementia care: a case study. Anna-Liisa Arjama, Arja Häggman-Laitila, Mari Kangasniemi,

Using technologies to improve the flow of communication in emergency care. Jari Haverinen, Maarit Kangas, Lasse Raatiniemi, Iita Daavittila, Jarmo Reponen, Minna Pikkarainen

Virtual clinic for oral health care (VIRSU). Kaarina Sirviö, Tiia Ranta-Pere, Liisa Suominen, Tiina Joensuu, Jukka-Pekka Skön

Virtual hospital 2.0 – modelled cost-benefit assessment: towards potential economic efficiency with digitalization and customer-responsive services. Saku Väättäinen, Erkki Soini, Sirpa Arvonon

Web-based education quality assessment system in medical higher schools (conceptual model). Kristina Kilova, Nonka Mateva

Zero mothers die in Brazil: building bases for the pregnant e-patient at the institute of women, children and adolescents health Fernandes Figueira. Angélica Baptista Silva, Véronique Inès Thouvenot

A PROJECT FOR IMPLEMENTATION SYSTEM FOR DIAGNOSIS OF THE BURNOUT SYNDROME

Rumyana Stoyanova¹, Stanislava Harizanova², Rositsa Dimova¹

¹ Department of Health Management and Health Economics, Faculty of Public Health, Medical University of Plovdiv, Bulgaria

² Department of Hygiene and Ecomedicine, Faculty of Public Health, Medical University of Plovdiv, Bulgaria

Background: Burnout is a phenomenon that seems to be studied globally in relation to all types of populations. The methods available at present only register the irreversible changes that have already set in the functioning of the individual. A notable advantage of Boyko's standardized method for burnout assessment allows clinicians to detect possible susceptibility to burnout and to use individual approach in the psychological prophylaxis.

Aim: The aim of the project is to create an information system to evaluate the burnout syndrome based on Boyko's inventory in order to better both assess and manage burnout. The information system will be design on the basis of Boyko methodology.

Boyko developed an 84-item questionnaire distinguishing three phases in the syndrome each manifestable with four symptoms. Each item in its positive or negative variant carries a different number of points, which allows the formation of a total score for each of the symptoms. The clarity and uniformity of interpretation of the scales makes this inventory easier for clinicians to compare the obtained results with other psychodiagnostic techniques and it allows that the advantage of ICT being used.

In Bulgaria, so far, there is no information system implemented for diagnosis of burnout. As a result, we initiate that project.

Results: Expected results are: Designing a model to develop an information system for assessing and analysing of burnout. Reducing the burnout rates among employees through accurate and quick diagnosis. Improving the prevention using the information systems' capabilities. Lowering medical care expenses. Promoting exchange of successful problem solving and decision-making patterns between health care providers. The expected results confirm the necessity to create and put into operation an information system in order to better evaluate and manage burnout.

[Back to Contents](#)

IMPROVING NURSING METHODS OF WORK BY USING PROTOCOLS IN INTENSIVE CARE UNITS

V. Lalova, D. Paskaleva, G. Petrova

Department of Nursing, Faculty of Public Health, Medical University of Plovdiv, Bulgaria

Since 1950 intensive treatment has become a separate and independent specialty. The significant technological advances have allowed intensive care units to be monitored through the centralized work of a multidisciplinary team of specialists. Intensive units have been provided cares at different levels of support for intensive patients. To provide patient access to this highly specialized cares, the "Critical care without walls" or "Intensive Care without Borders" theory has been emerged, which is part of the idea of reanimation nurses offering highly specialized cares and support. The development of protocols for the work of nurses, aims to facilitate their day-to-day activities, improving the outcomes and safety of patients and all staff. Following this concept, the role of intensive cares has been rapidly expanded over the last 20 years. The performance of nurses, as an integral part of multidisciplinary teams in ICUs, is evidence that mortality and morbidity can be prevented, thanks to the early recognition of patient` deterioration and rapid resuscitation.

The main objective of this study is to analyse and differentiate the main reasons for the limited use of protocols in intensive care units in university hospitals in Plovdiv, Bulgaria. It is important to assess the activities carried out by the nurses, who do not have experience working in ICUs. We wanted to study their effectiveness and all the benefits for the organization of working process. Have been used documentary and survey methods, data has been analysed by using the software package SPSS v. 17.0 and graphics have been prepared by using the program Microsoft Excel '97.

After this survey, we can say that usage of protocols in ICUs, requires constantly evolving staff, which has to be supported by the physician. Better healing process is accomplished by optimizing the content, using new technologies and techniques, also periodically evaluation of the desired results. We should have developed more flexible framework, which has been accepted by standard, which will improve the quality of cares. Educational programs must be improved and their effect should be studied. There are concerns, that the lack of nurses in ICUs in Bulgaria has been seriously increased.

[Back to Contents](#)

NECESSARY SKILLS FOR PROFESSIONAL COMMUNICATION BETWEEN NURSES AND HOSPITALISED GERIATRIC PATIENTS

D. Paskaleva¹, V. Lalova¹, S. Tufkova^{2,3}

¹Department of Nursing, Faculty of Public Health, Medical University of Plovdiv, Bulgaria

² Second Internal Department, Toxicology section, MU-Plovdiv, Bulgaria

³Medical simulation training centre, MU-Plovdiv, Bulgaria

The nursing profession is a specific activity that requires certain communication skills. For the development of individual, effective plan for medical care and education the nurse can rely entirely on her communication skills. Caring for geriatric patients also require professional competence and specific communication skills. To investigate and analyse the level of communication between the nurse and the patient, as well as his relatives, during the hospitalization. Respondents through an anonymous survey of 392 patients aged over 65 received treatment in surgery, internal and emergency department of the Hospital "St. Panteleimon", Hospital "Plovdiv" - Plovdiv, University Hospital "Caspela" - Plovdiv, University Hospital "Trimontsium" - Plovdiv, University Hospital "Eurohospital" - Plovdiv, University Hospital "Pulmed" – Plovdiv. Statistical evaluation was performed by descriptive statistics to describe the results. The results are represented by an arithmetic mean and a standard error (mean and Std. Error).The data was processed through SPSS statistical software package ver.16.0.

Analysis of the results shows that nurses are able to communicate with patients and no problems during the communication occurred. Disturbing is the fact that not a small percentage of the health professionals do not communicate with the relatives of patients. The respondents placed first as the main reason for disturbances in the relationship between them and the medical staff - the specific age of the patients (51.8%). An essential element in the work of a medical specialist is the ability and knowledge on how to interact with geriatric patients.

In fact, without effective communication, the efforts of the healthcare professional will not have the necessary effect, because in the communicative process, important information, which is the key to quality health care, is exchanged. Regardless of the new technological challenges of the 21st century, the patient will always look for contacts with professionals who will expect human communication, understanding, sympathy, empathy and support.

Key words: professional communication, nurses, geriatric patients

[Back to Contents](#)

LEVERAGING TELETRIAGE IN AN URBAN EMERGENCY DEPARTMENT TO IMPROVE FLOW AND PATIENT EXPERIENCE

Aditi U Joshi, Frederick Randolph, Judd E Hollander, Megan Sabonjian, Frank D Sites, Alexander Ambrosini.
Department of Emergency Medicine, Thomas Jefferson University Hospital

Background: Overcrowding in Emergency Departments leads to increased waits and patients leaving without treatment, resulting in delayed care and a decrease in patient satisfaction. Some institutions have implemented a provider model to help improve on both patient satisfaction while improving upon publically reported metrics. The addition of these providers are costly but has shown to improve on those publicly reported metrics.

Jefferson University has implemented JeffConnect, their telemedicine platform which is used for both direct to consumer and for established patient video visit care. The On-Demand service is staffed 24/7/365 by EM physicians. Methodist hospital is an urban Emergency Department staffed by Jefferson physicians with approximately 40,000 visits a year. It consistently has not met its goals of Time to Provider of less than 18 minutes and Left Without Being Seen of less than 1%. Prior interventions to improve these metrics had included an Immediate bedding process, a physician incentive tied to bonuses for time to provider, staff engagement on the departmental goals.

Aim: In order to improve our metrics without increasing incremental costs, we leveraged use of JeffConnect and its On-Demand telemedicine physicians to tele-triage patients at Methodist Hospital.

Method: The On-Demand Telemedicine provider was setup to remotely triage patients over video during the hours of 11am - 6pm daily. Providers did a brief history and physical and placed appropriate orders. Our primary outcome to impact were the rates of patients that left without being seen (LWBS) and the door to provider time of patients during teletriage compared to other hours. These data were attained through the institutional EMR and was pulled using Qlic. The data was overviewed for redundancies and errors of categorization by the pilot team. Results were taken pre and post implementation.

Results: Rates of door to provider time and left without being seen (LWOBS) were compared from 7/1/15-6/30/16 to the time period 10/1/2017-11/30/2017. Previous year door to provider time was 26 minutes and LWOBS was 3.05%. During the period of teletriage of 10/10/2017 – 30/11/2017, the door to provider time dropped to 14.2 minutes overall and LWOBS 0.09%. It was also noted that the door to admission and discharge length of stay decreased by 15 minutes.

The study was a pilot and used already staffed physicians and the platform was provided at a low price so the additional costs were minimal. Telehealth staff were leveraged for training in the emergency department and could have led to indirect costs.

Conclusions: During the hours of Teletriage we saw a drop in both the rates of door to provider time and left without being seen. Although not part of original study, door to disposition time was also decreased. Teletriage shows promise as a useful tool to improve flow, provider and patient experience likely leading to improved health outcomes and satisfaction.

[Back to Contents](#)

TELEMEDICINE CONSULTATION IN DEVELOPING COUNTRIES

Ferrari F¹, Erba F², Bartolo M³

¹ Department of Radiodiagnostics, University La Sapienza, Rome, Italy

² Department of Clinical Sciences, University of Tor Vergata, Rome, Italy

³ Department of Telemedicine, Hospital San Giovanni-Addolorata, Rome, Italy.

Global Health Telemedicine (GHT) is a non-profit organisation that was set up in 2013 to provide telemedicine services in developing countries, mainly in sub-Saharan Africa. The GHT telemedicine centre collaborates with the traditional healthcare centres and hospitals that are already present in the country. GHT's offer of diagnosis and therapy consists of providing remote teleconsultation by medical specialists working in Europe, to the physicians working in the country requesting the service, who are often general practitioners.

Methods: The existing local health centre is provided with: PC with internet connection; Electrocardiograph with Bluetooth connection; Oximeter with USB connection; Phonendoscope with USB connection Backlit panel (diaphanoscope) for viewing x-rays; D video-camera with USB connection.

During the outpatient medical examination, the local physician obtains all the clinical and laboratory data and images that need to be attached to the request for teleconsultation. The physician connects to the online platform and prepares for the teleconsultation. The physician chooses one or more medical specialities to which to send the request for teleconsultation. He sends the request for teleconsultation through the online platform and gives it a colour code (triage) to indicate how urgent it is. The request appears on the internet in real time.

The specialists in Italy use the same platform and can answer with therapeutic advice or by requesting further diagnostic tests. The physician thus receives real specialist teleconsultation, which is recorded in the patient's file with the name of the specialist who provides the consultation, and is visible on the internet in real time as soon as it has been sent.

Findings: Twenty-eight Telemedicine Centres in thirteen sub-Saharan countries have been opened in four and a half years. We are able to offer specialist teleconsultations free of charge in 18 medical specialities. We provided 1,553 teleconsultations between 1st February and 31st October.

The specialities requested most were: Cardiology 36.4%; Infectious Diseases 21.2%, Dermatology 10%. The colour code assigned according to how urgent the request was: Green 41.4%; White 27.3%; Yellow 22.5%; Red-Emergency 8.8%.

Conclusions: Since GHT was set up in March 2013, it has provided 5,246 teleconsultations, 1,553 of which during the last 20 months, which is 29.6% of the total, which shows the programme's growing success. The data regarding the urgency of the teleconsultations indicate that our local staff use the telemedicine service above all for outpatients, consultations that are not urgent (68.7% of the total, white + green). The increase in chronic, degenerative pathologies related to the aging of the population is in fact relatively unknown in developing countries and it is creating serious problems for the national healthcare systems of these countries, above all because of the lack of resources available for training specialised medical staff.

The local medical staff have always been trained to manage the most widespread infectious diseases (HIV, TB, malaria) and they are therefore not ready to manage such a large number of pathologies and although these pathologies can be treated in an outpatient setting, they still have to be treated by specialists.

Our programme offers specialists a second opinion and thus guarantees not only a consultation that is certainly useful for the physician and his patient, but also a form of continuous e-training for the local medical staff.

[Back to Contents](#)

LIVING LAB PLATFORMS IN THE CITY OF KUOPIO AND KUOPIO UNIVERSITY HOSPITAL

Metsävainio Kirsimarja¹, Kaunisto Merita¹, Kekäläinen Heli², Kämäräinen Pauliina², Holopainen Arto²

¹ Kuopio University Hospital, Living Lab Project

² City of Kuopio, Living Lab Project

Background: The industry of health and well-being has been growing steadily during last years. Investments for health prevention and care have been recognized both nationally and internationally as an important focus of development. However, testing new health technologies in authentic healthcare environments has been difficult for companies and new procedures are needed. The City of Kuopio and Kuopio University Hospital (KUH) launched Living Lab to enable companies to develop products and services in an authentic healthcare environment. Living Lab is a project (2016-2018) funded by the European Regional Development Fund and the Regional Council of Pohjois-Savo. During the project, a process model and funding structure for Living Lab as a permanent service are being developed.

Aim and purpose: The aim of Living Lab is to facilitate customer-centric development of new innovative products and services utilising health and wellness technology. Collaboration between healthcare professionals and companies facilitates the development of customer-centric and patient-safe products and services. Living Lab also supports innovation process for new ideas arising from health care personnel. The Living Lab services are offered for wide range of partners, from entrepreneurs and startups to large companies as well as research institutes.

The purpose is to develop transparent process for companies to access authentic healthcare environments for getting feasibility of new ideas, co-creating and testing new products as well as accessing clinical research. The process utilises open innovation Quadruple Helix model, where public sector, industry, academia and civil participants work together to co-create the future services and products.

The new process is realised through two Living Lab platforms, City of Kuopio Living Lab and KUH Living Lab. City of Kuopio Living lab focuses on primary social and health care, for example elderly citizens' home care and KUH Living Lab focuses on specialized care that enables also clinical research.

Results: Overall there have been 53 testings' and development processes together in the two platforms until October 2017 from wide range of companies as customers. 79% of companies have been micro enterprises with less than 10 employees, 58% less than 5 year old startups, 48% from the region of North Savo and 9% international companies.

Based on our Living Lab survey, companies (n=35) are interested most from testing products and services (72%), co-creation in the development phase (63%), test run (39%) and clinical research (30%). Companies can use the test results to further develop their products, devices and applications so that they will eventually offer a patient-safe product on the market. The Living Lab services' best practices have been shared openly in national Living Lab and TestBed co-operation network.

Conclusions: Companies have shown growing interest in Living Lab services and the capabilities of authentic testing platforms. Testing in an authentic environment and collaboration with healthcare professionals and patients provide companies with important information and knowledge during the research and development (R&D) process. The Living Lab services have become as an integral part of the KuopioHealth open innovation ecosystem and the collaboration with national, Nordic and global living lab network has begun.

[Back to Contents](#)

TELEHEALTH IN INDIA: ILLUSTRATIONS FROM APOLLO TELEHEALTH SERVICES

K. Ganapathy, S. Premanand, N. Lovakanth, Vikram Thaploo
Apollo Telehealth Services, Greames Road Chennai 60006, India

Aim: This presentation will summarise four representative projects being executed by Apollo Telehealth Services (ATHS) the oldest and largest multi-speciality telehealth network in South Asia. A) Through an innovative first of its kind PPP telehealth services are being provided in the Himalayas to a remote isolated district of 34,000 at a height of 3800 m with temperatures of -25C. On a Program Management Mode (PMM) using Point of Care Diagnostics even 24/7 tele emergency services are provided. Operational details will be discussed. B) 164 e Urban Primary Health Centres were entrusted to ATHS by a state Govt. Deploying state of the art ICT 1.7 million consults were provided of which 0.1 million were teleconsults. The challenges encountered will be highlighted. C) Telemedicine centres have been set up in remotely located Govt of India power stations where providing health care had been extremely difficult. D) Promoting Wellness the eWay is another major

initiative. Health Literacy is being promoted in 10,000 plus individuals. This presentation will discuss how these issues are being addressed deploying ICT.

Methods: A tailor made specific solution was customised for each project after a detailed need assessment study. ATHS took full responsibility for the entire project and was answerable only to the funders. The individual beneficiary did not have to pay for the services provided. Meticulous documentation, regular reviews resulted in real time corrections if required. As all the projects were truly unique there were no precedents to fall back on. The advantage was that there were no legacy systems to disinherit. Though projects were diversified, pro-active measures by dedicated coordinators ensured outreach activities. A specific call centre team ensured follow up studies.

Results: A) Of the 9194 teleconsults given in 31 months 638 were emergencies. 5843 tele laboratory investigations were done. 19 cases of myocardial infarction were remotely diagnosed and six telethrombolysed. Telementoring of 7 cardioversions using a defibrillator was carried out. Telecervical cancer screening was done for 59 women. B) 6.07 of 1.67 million consultations (13 months in 164 centres) were specialist teleconsults in medicine, cardiology, endocrinology and orthopaedics. Introducing EMR and creating a live dashboard for the government @ <http://www.euphc-ap.gov.in/#/DASHBOARD> was a herculean task. C) In 22 weeks 686 teleconsults have been given at the National Thermal Power Corporation Bongaigaon refinery This includes emergencies D) Of the 0.44 million screened for NCD's 3150 had real time teleconsults in a camp mode (from colleges, industries and urban slums). Illustrative cases where the tele consult made a difference will be presented.

Conclusions A Programme Management approach with community outreach, optimized capacity utilization, ongoing impact assessment, process re-engineering, with confidence, knowledge and experience helped make the impossible possible. Remote healthcare delivery, in a PPP mode is socially relevant, financially sustainable and scalable. With the right partners, it is possible to innovate, customise and scale up remote healthcare even in inhospitable terrains. Telelaboratory services and teleliteracy programmes are value added services. From pilots to proof of concepts ATHS is slowly but surely integrating telehealth into the core of the health care delivery system in India and making the impossible possible.

[Back to Contents](#)

SMART DIGITAL SOLUTIONS FOR FUTURE AGEING

Anthony Maeder, Gary Morgan

Flinders Digital Health Research Centre, College of Nursing & Health Science, Flinders University, Adelaide, Australia

Background: People are living longer than ever before: in Australia (typical of developed countries) it is estimated that by 2036 over 20% of the population will be >65yo and average life expectancy will be 85yo. This will have a profound impact on families, communities, society, health systems and the economy. Today's older citizens wish to remain living in their own homes and to pursue an active lifestyle as long as possible, with appropriate support where necessary. We need to develop a variety of approaches to deal with this transformation, some of which may depend on digital technologies.

Aim: This research study identifies the major needs for individuals of a future ageing society which can be potentially addressed by digital solutions. Before developing these solutions it is important to understand their scope and to be able to prioritise and leverage common or related elements of them to derive the best outcomes. This can be achieved by use of a high level framework within which digital solutions for different purposes can be considered: the identified major needs provide the basis for describing such a framework.

Methods: Structured interviews were conducted with approximately 50 Australian business entities representing a wide cross section of organisations involved with services for ageing. These included companies and not-for-profits engaged in community and aged care, hospital and acute care, primary care, nursing and allied health, finance, insurance, technology, software, built environment and urban design. Further consultations involved local and state government departments and peak professional bodies operating in the ageing sector, as well as ageing consumers. A pro forma survey instrument was developed to elicit problem statements and responses were subjected to topic clustering to extract common themes.

Results: Two major areas for digital solutions emerged from the survey: supporting "Ageing in Place" where citizens wish to continue living independently and maintain responsibility for their own health status by accessing external sources of support, and "Ageing with Care" where it is necessary for them to live in conditions of clinical management in specialised ageing facilities with associated in house professional support.

For "Ageing in Place" the dominant needs for solutions were identified as:

- Achieving Personal Wellness (with information gathered from about daily health related lifestyle habits of an individual as well as summary data from digital monitoring sources and records of health check events;

- Maintaining Community Connections (with a social networking online environment to enable individuals to establish and maintain a personalised set of community based group interactions and event participations);
- Reducing Adverse Events (using a “Health Smart Home” platform system for continuous surveillance of occupants, with multimodal sensing and pattern analysis to prompt alerts if anomalous situations are detected).

For “Ageing with Care” the dominant needs for solutions were identified as:

- Personal Health Trajectories (representing and modelling of an individual’s ‘health trajectory’ based on health records and contributed data, mapping their advance through the ageing life course);
- Chronic Disease Management (via a generic software system including data collection and management, analysis of trends and recommendations on actions related to health condition self-care);
- MyCare Consumer Portal (software system integrating information across service providers aligned with health data derived client profiles, and sharing health history and choices with clients/carers).

Conclusions: The focus of this program of work is on creating a capacity that enables us to identify and describe the needs and issues of older people and care providers and which allows us to work collaboratively to design, build and deliver solutions to those who need to apply them or use them. Through the coordination of research and development activities addressing these needs across diverse disciplines, organisations and sectors, innovative solutions can be developed which will create impact at scale.

[Back to Contents](#)

EXPERIENCES OF CHAT-DOCTOR SERVICES IN PRIVATE SECTOR

Timo Carpén, Päivi Metsäniemi, Sari Riihijärvi
Suomen Terveystalo Oy, Helsinki, Finland

Background and Purpose: Terveystalo Oyj is the largest private healthcare service provider in Finland. With its 170 units, 18 hospitals, 9000 healthcare professionals and 4 million annual visits, it provides nationwide network using one common electronic medical record. Terveystalo operates in two major business areas – occupational health care and outpatient clinics serving private customers. During the past decade no healthcare organization has pioneered the third wave of digitalization by making their services easily attainable everywhere via mobile apps or on-line services. At the same time, citizens have grown more comfortable using digital services for complex and sensitive issues such as healthcare. In addition, the authorities of Republic of Finland, such as Kela and Valvira have grown more supportive to digital services in healthcare. Our aim was to make our GP services easily achievable to everyone and everywhere in Finland via digital platform without the need of fixed appointments.

Materials and methods: Terveystalo Online chat was introduced in May 2016, first to occupational health customers. All private customers were included in October 2016. The platform used is Ninchat provided by Somia Reality Oy supplying the highest data protection and data security standards defined by authorities. Patients are personally identified with high security system before chat conversation is started. In addition, the physician uses the Electronic Medical Record of Terveystalo. Usually the conversation is typed in a chat mode but when needed, a video connection is also available. Furthermore, attachments such as photos are possible. Physician can offer guidance, set diagnoses, and deliver information widely in issues regarding the patient’s health issues. The physician can also direct patients to a physical examination in complex situations. The online physician is not allowed to prescribe strong painkillers, sleeping pills and other drugs affecting central nervous system.

Results: The number of customers has grown rapidly, and several hundred patients are treated daily through the chat service. The average waiting time is a few seconds. The average duration of a chat discussion is 8 minutes on average. The greatest demand for chat is on Mondays. The most common health issues are upper airway infections, urinary tract infections, skin problems, conjunctivitis and problems with musculoskeletal system. We have approximately 200 general practitioners in the chat service in order to supply the great demand daily. No major issues with patient safety have occurred.

Conclusions: Terveystalo Online chat is reliable, fast and user-friendly round-the-clock service. There was a clear customer demand for online doctor service and so far this service is the largest worldwide to our knowledge. Online chat is a modern way to supply medical services and a part of general work of doctors, especially of general practitioners. No relevant issues regarding to patient safety has occurred. Quality indicators, such as waiting time, prescribed medications, issued sick leaves and diagnoses must be constantly followed.

[Back to Contents](#)

VIRTUAL HOSPITAL 2.0 – MODELLED COST-BENEFIT ASSESSMENT: TOWARDS POTENTIAL ECONOMIC EFFICIENCY WITH DIGITALIZATION AND CUSTOMER-RESPONSIVE SERVICES

Saku Väättäin¹, Erkki Soini¹, Sirpa Arvonen²

¹ ESiOR Oy, Kuopio, Finland;

² Virtuaalisairaala 2.0 -project, Helsinki University Hospital

Background: Customer-responsive services is a key project in the Health and wellbeing development of Finnish government. An essential part of these new services is Virtual hospital 2.0 (VH2.0, Virtuaalisairaala 2.0), a joint project between Finnish university hospitals, which population responsibility and catchment area cover all Finns. VH2.0 develops client-oriented digital specialised medical care services to citizens, patients and professionals. VH2.0 production and implementation happen in Virtual village (Terveyskylä) together with virtual hospitals (sc. Houses). Service offering information, advice, self-care, symptom navigators, digital treatment pathways, and tools are offered. VH2.0 together with its Innovation farm, Centres of excellence and Health village have been a true Finnish success story, including currently 20 houses for 85 patient groups and some 80,000 visitors/month. Yet, every true social and health care success story must confront a health economic evaluation (HEE) to assess its value for decision makers.

Aim: To carry out a third-party mid-term HEE of VH2.0. HEE's special focus was cost-benefit analysis (CBA) in terms of potential health care capacity freed by VH2.0 at Helsinki university hospital (HUS) and at national Finnish level.

Methods: The CBA was done as dynamic predictive modelling using a decision-analytical modelling approach. The modelling accounted for the expected over-time changes in resource use, unit costs and population structure for two key scenarios: VH2.0 and current practice. The approach covered expected health care visits, treatment letters, calls, e-appointments, e-messages and travelling during years 2017–2021.

The primary outcome was the potential capacity freed with VH2.0 in year 2016 value (i.e., no discounting or indexing was done) vs. current practice. Payer perspective excluding e.g. taxes and productivity losses of customers was applied.

Results: Over the years 2017–2021 at the HUS level, the average potential capacity freed annually with VH2.0 was predicted to be around €42 million for the first five years, summing up to around €208 million potential capacity freed until the end of year 2021. Among the CBA parameters, the five most important key value drivers for HUS VH2.0 in the order of importance were treatment calls, revisits, treatment visits, travelling, and first visits.

Over the years, the average potential capacity freed annually with VH2.0 was predicted to be around €261 million at the national Finnish level for the first five years, summing up to around €1.3 billion in Finland until the end of year 2021. The five most important key value drivers were revisits, treatment calls, travelling, treatment visits, and first visits.

Conclusions: VH2.0 may complement the traditional treatment pathways efficiently, potentially freeing a substantial capacity for other purposes through the production technology change. From the perspective of opportunity costs, such technological revolution is very valuable and capacity freed can produce significant effectiveness elsewhere. However, after these predictions, the implementation, evaluation and assessment of best practices is warranted.

In the larger landscape, VH2.0 is aimed to improve the equality of citizens by making healthcare services available to all Finns regardless of their place of residence and income level, a target supported by the travelling costs of this CBA. Services are expected to be suitable for monitoring the quality of life, symptoms and lifestyle, and long-term illnesses. Hopefully the VH2.0 data will be available through Isaacus, the Finnish national service operator for health data.

[Back to Contents](#)

CULTURE OF EXPERIMENTATION IN PROMOTING THE DEVELOPMENT AND INTRODUCTION OF DIGITAL SOCIAL AND HEALTH SERVICES

Sihvo Päivi¹, Hämäläinen Susanne², Jääskeläinen Heli³, Aija Hietanen², Jaana Hämäläinen⁴

¹Karelia University of Applied Sciences

²Savonia University of Applied Sciences

³Siun Sote, Joint Municipal Health Care and Social Services Consortium in North Karelia

⁴The Municipality of Lapinlahti

Background: The rapidly evolving technology enables the digitalisation of social and health care services. The challenges in the use of digitalisation still include the insufficient implementation of the required changes in work processes and the lack of knowledge on the use of digital services and on the experiments already carried out. The culture of experimentation implemented in multidisciplinary cooperation can contribute to the introduction of new services enabled by digitalisation for

citizens and for social and health care organisations. The DigiSote projects of North Karelia and Northern Savonia (ESR) are working together to promote and develop the digitisation of social and health care services and to solve the related challenges. The projects aim at developing, evaluating and deploying new digital services through quick digital experiments. The duration of the experiments varies from one day to 100 days. The experiments also help to develop the digital competence of the different parties and enable the emergence of new innovations. Authentic project cooperation and network cooperation between the several local actors helps to support the success of the experiments and solve the challenges that have emerged. The projects are implemented by Karelia University of Applied Sciences and Savonia University of Applied Sciences, Savo Consortium for Education, the Municipality of Lapinlahti, and Siun Sote (Joint Municipal Health Care and Social Services Consortium in North Karelia).

Learning through experimenting - from challenges to solutions

It is typical for quick experiments that the planning phase of the experiments is light and, if necessary, the mode of implementation may be changed as the experiment progresses. It has been challenging to perceive what the actual goal of the experiment is. The starting point for a digital solution experiment is the need that has been discovered when analysing the current state. The assumption is that the product or service to be tested will benefit the customer and the organisation. We have discovered that customers' service processes have not always been described from a customer's point of view. In the projects, we have developed tools to help those involved in the experiments perceive both the current and the targeted customer process, to discover problems that could be partially solved with the use of digital tools, and to plan, implement and evaluate the experiment process. Organisations do not necessarily have the required technology, and that is why the projected experiments have tried to maximise the use of technology already in use. Modification of the technology in use can result in new, creative solutions. An open dialogue between the technology provider, the social and health care organisation, and the participants in the experiment can ensure that the plan and the objectives of the experiment are appropriate. On the other hand, social and health care organisation should allow start-up companies in the field of technology to come and test as well as develop their products in an authentic environment together with the users. Multidisciplinary cooperation in experimenting digital services can be fruitful, but it requires respectful and equal attitudes of the parties towards each other.

Customer attitudes, lack of interest, and fears are examples of factors that have been preventing the successful implementation of the experiments. These challenges have been addressed through information distribution and by listening and developing the digital competence. Enabling customers' digital participation has been considered significant and therefore, customers have been engaged in the planning of the experiment from the very beginning and they have, thus, been able to develop one's individual digital competence. Furthermore, the attitudes, fears, competence, and lack of competence of employees are factors that hinder the deployment of digital services. Continuous development of the employees' digital competence, motivation and support are the tools for meeting the challenges of digitalisation and they inspire people to start using these services and tools.

DigiSote project / North Karelia: www.karelia.fi/digisote

[Back to Contents](#)

USE OF DATA CLOUD SERVICES IN CLINICAL ENVIRONMENT. CASE: VIDEO-EEG

Jukka Laaksonen, Jyri Rajamäki,
Laurea-university of applied sciences

Background: The first cloud-based video EEG equipment in the Nordic countries and the cloud computing services they need have been implemented in the Päijät-Häme Center Hospital's operating environment. The use of cloud services is not yet routine health care in Finland due to several factors; eg the suspicion / control of IT departments and the loss of revenue / security features.

Objectives: The aim of this study was to study how the new philosophy of EEG equipment influences the functioning of the hospital's Department of Clinical Neurophysiology and, consequently, to modify the methods and to develop new functions. Currently, cloud services are not used extensively.

Methods: Yin (2009) case study was used as a research strategy. The research material was used for hardware and related documentation, the observation during the deployment process, and interviews.

Results: A new type of application enables new and more diversified methods compared to the current (local storage). These include: wireless, cloud, real-time online surveillance of nursing staff and physician without site connectivity. Although the hardware manufacturer has primarily designed the video for EEG recording in homes / hospital hotels, it was found to be well suited for use in hospital departments where ambulatory EEG recordings are needed.

Conclusions: The small size, movability and wireless capability of the device facilitate and streamline the care and patient mobility, etc. The image of two high quality HD cameras enables considerably more current equipment (1pc 640x480) better image quality, which facilitates analysis and analysis accuracy when analyzing take into account the EEG curve and the improvement in image quality (eye / facial movements) of the video corresponding to the deviation of the curve. Cloud storage also allows analysis of results to be carried out anywhere in the world that can be connected to the cloud

[Back to Contents](#)

TELE-EMERGENCIES IN THE HIMALAYAS: A 31 MONTH STUDY FROM APOLLO TELEHEALTH SERVICES

K. Ganapathy, A. Dhavapalani, SPremanand, N. Lovakanth
Apollo Telehealth Services, Greames Road Chennai 60006, India

Aim: Non availability of emergency health care services in mountainous isolated, sparsely populated regions is a universal problem. Commencing from April 2015 Tele Emergency Services (TES) was provided in Keylong and Kaza in the Himalayas at 13,000 ft with temperatures of -30C during winter. This presentation will summarise the operational challenges encountered by Apollo Telehealth Services (ATHS) the oldest and largest multi speciality telehealth network in South Asia in executing this turnkey project, for the Govt of Himachal Pradesh.

Methods: A tailor made specific solution was customised after a detailed need assessment study. ATHS took full responsibility for the entire project. The individual beneficiary did not have to pay for the services provided. Existing rooms in two government community health centres were converted to tele emergency centres by connecting them to a state of the art Emergency Department (ED) at the JCI accredited Apollo Main Hospital at Chennai, India. Training was carried out at both ends. Turn around time for an emergency teleconsult was less than 12 minutes Tele ECG, Spirometry, Xrays and a POCD (Point of Care Diagnostics) for blood biochemistry was available. Meticulous documentation, regular reviews resulted in real time corrections if required. A specific call centre team ensured follow up studies.

Results: In 31 months 638 emergency teleconsults were provided out of 9194 constituting 6.93 %. 353 telaboratory tests were done in an emergency setting. Of the 16 cases of myocardial infarction diagnosed six were thrombolysed thro tele mentoring. Six patients were defibrillated through telementoring. 10 died on site. 174 were stabilised and transferred to higher centres including 13 helicopter evacuations. Detailed analysis revealed that, a single emergency teleconsult actually cost the government only Euro 212.

Conclusions: A Programme Management approach with optimized capacity utilization, ongoing impact assessment, process re-engineering, with confidence, knowledge and experience helped make the impossible possible. A dedicated technology enabled, state of the art ER team with a committed passionate team at the remote end enabled 24/7 teleemergency care in a socially relevant, financially sustainable and scalable PPP mode. Telaboratory services was a valuable adjunct.

[Back to Contents](#)

MACHINE LEARNING CLASSIFICATION CAN IDENTIFY PATIENTS AT RISK OF CARDIOVASCULAR EVENT ON ACTION TO CONTROL CARDIOVASCULAR RISK IN DIABETES (ACCORD) TRIAL

Kelvin Tsoi

¹Stanley Ho Big Data Decision Analytics Research Centre, The Chinese University of Hong Kong

²Jockey Club School of Public Health and Primary Care, The Chinese University of Hong Kong

Background: High blood pressure increases risk of cardiovascular diseases (CVD). Recent studies have suggested blood pressure variability (BPV) is also associated with CVD; however, there is no standard risk stratification method to evaluate BPV.

Aim: Our study aims to cluster BPV into three levels, namely, low, medium and high levels, by a machine learning approach and assess the risk of CVD event based on BPV level.

Methods: The Action to Control Cardiovascular Risk in Diabetes (ACCORD) datasets, which include diabetes patients with hypertension or at risk of cardiovascular diseases, were obtained from a clinical data sharing platform. Participants with systolic blood pressure (SBP) of at least 130 mmHg and an increased cardiovascular risk were randomized to receive intensive treatment (targeting SBP below 120 mmHg) or standard treatment (targeting SBP below 140 mmHg), and blood pressure (BP) were measured and recorded during the follow-up periods. This study included patients with more than 6 visit-

to-visit BP measurement in 24 months. BPV was measured by the deviation between the BP records and the personalized BP trends, and two-dimensional clustering on SBP and diastolic BP were applied. Linear regression fitting techniques and K-means clustering methods were applied. The risk of all-cause of death, CVD death, major coronary heart disease (CHD), nonfatal myocardial infarction (MI), stroke and congestive heart failure (CHF) were assessed regarding the BPV level and presented in terms of hazard ratio (HR) with 95% confidence interval (CI).

Results: With 4,104 patients, the mean age was 62.7 and 52.8% were male. There were 1,635, 1,819 and 650 patients classified into low, medium and high BPV (Figure 1). Compared with patients with low BPV, patients with medium BPV were more likely to have major CHD HR: 1.54 95% CI (1.24 to 1.92), nonfatal MI HR: 1.67 95% CI (1.23 to 2.26) and CHF HR: 1.91 95% CI (1.24 to 2.95). Patients with high BPV were at increased risk of all cause of death HR: 1.66 95% CI (1.13 to 2.45), CVD death HR: 1.92 95% CI (1.02 to 3.65), major CHD HR: 2.05 95% CI (1.58 – 2.67), nonfatal MI HR: 2.30 95% CI (1.61 to 3.28), stroke HR: 3.32 95% CI (1.80 to 6.12) and CHF HR: 4.62 95% CI (2.96 to 7.23).

Conclusions: Machine learning can be used for data clustering on BPV and is able to identify people at risk of cardiovascular event.

[Back to Contents](#)

MULTIDISCIPLINARY DIGITAL INTERVENTION FOR YOUTH AND CHILDREN IN KUOPIO PUBLIC ORAL HEALTH CARE – THE ODA PILOT PROJECT

Anni Riepponen^{1,2,3}, Heidi Liukkonen¹, Tuula Miettinen¹, Maija Rajamaa¹, Katariina Savolainen^{1,4}

¹ City of Kuopio Public Health Center

² Kuopio University Hospital Teaching Clinic

³ University of Eastern Finland Institute of Dentistry

⁴ University of Eastern Finland Faculty of Health Sciences

Background: Oral health habits among the Finnish youth and children are alarming; only two thirds of school girls and less than half of school boys meet the required brushing frequency of twice a day. Persisting poor oral hygiene habits may result in poor oral health. The underlying causes of ill oral health may be consequences or indicators of a wider life issue. Hence, it would be important to recognize and tackle the underlying causes early on. This should be conducted by an intensive multidisciplinary collaboration among healthcare and social services]. However, the current state of practice does not support this workflow well enough. Oral health professionals have only turned to child protection services in case of severe negligence of a child's oral health. Furthermore, the patient's background information can't be pre-inquired and health education is provided only during appointments. Digital patient profiling tools could provide an early, efficient and cost-effective solution for patient pre-profiling, case management, individual intervention and follow-up.

What for is this project: In Kuopio City Oral Healthcare ODA Pilot Project, the aim is to recognize compromised individuals digitally with an interactive oral health anamnesis. Based on the questionnaire, an algorithm creates a patient profile for further care management. Concerning individuals are provided with a fast access appointment to an oral hygiene counselling clinic. At the appointment, the patient's oral health and psycho-social status is evaluated by the professional, who categorizes the patient's level of concern from one to three. The professional creates an intervention plan for oral health and gathers a support team of multidisciplinary professionals. Digital modules are applied for patient-team communication purposes (chat-service) and for oral self-care application (individual dental status, brushing games, photo food diary etc.). The final digital platform will be available in spring 2018. The effectiveness of the project will be evaluated i.e. by monitoring the number of interventions, changes in clinical indexes, invasive treatment need and improvement in self-reported oral health.

Preliminary results and discussion: Currently the treatment flow has been tested during five months in traditional way of practice. Patients are sent to an oral hygiene counselling clinic in case of a concern. The counselling clinic coordinates the previously described interventions. Between 1.6-31.10.2017 there have been 20-45 monthly interventions, which have resulted in significantly improved self-reported oral health. Other indicators will be reported annually. Patient and staff satisfaction have been extremely encouraging. Launching of the digital platform is expected to accelerate the recognition of compromised patients and provide effective, user-friendly tools for patients and professionals.

[Back to Contents](#)

USING TECHNOLOGIES TO IMPROVE THE FLOW OF COMMUNICATION IN EMERGENCY CARE

Jari Haverinen¹, Maarit Kangas^{1,2}, Lasse Raatiniemi³, Iita Daavittila⁴, Jarmo Reponen^{1,2}, Minna Pikkarainen^{1,5,6}

¹ Research Unit of Medical Imaging, Physics and Technology (MIPT), University of Oulu

² Medical Research Center Oulu, Oulu University Hospital and University of Oulu, Finland

³ Centre for pre-hospital emergency care, Oulu University hospital, Oulu, Finland

⁴ Oulu University Hospital

⁵ VTT, Technical Research Centre of Finland

⁶ Martti Ahtisaari Institute, Oulu Business School, University of Oulu

Background: Typically, many organizational stakeholders are involved in emergency care processes. Cooperation and fluent information exchange between several stakeholders like home care, emergency response center (ERC), rescue department, on-duty care and emergency medical services (EMS) is needed. This study was performed in the Northern Ostrobothnia Hospital District region and it was as a part of the Wireless Lab Environment for Business (WILLE) project, funded by the Finnish Funding Agency for Innovation (Tekes).

Aims: The first objective of this research was to identify the current communication bottlenecks between emergency care professionals and understand the technologies behind them. The second objective was to describe the technologies, which can improve emergency care communication.

Methods: The information about current emergency care processes, technologies in use and the need for future technologies were collected from the emergency care professionals through three workshops and five personal interviews. The information about technological solutions for emergency care was collected from literature and five interviews with technology companies.

Results: The key problem in the communication of emergency care is scattered data. For that reason, the common situation awareness for emergency care professionals is missing and the medical history of the patient is incomplete. The reasons behind those problems are many different information systems, which do not communicate with each other and the lack of the availability of a common electronic Patient Care Record (ePCR) to all stakeholders. National level projects called ERICA and KEJO will bring improvements to ERC and EMS information systems by offering more common situation awareness for authorities. With the introduction of KEJO, the ePCR will be adopted. If the consulting doctor has a KEJO terminal in use, double recordings are not needed anymore. The functionality of Kanta services will play the key role in the future emergency care. The ePCR will be stored there and all of the documents, which are stored in its Patient Data Repository, will be displayed to EMS personnel.

Scattered health data is a common problem in Finnish healthcare. For that reason, the UNA and Apotti projects have been set up to reform the information systems of social and health care organizations. The target of the national UNA project is to define modular architecture, which enables supplier independent connections. The Apotti project has a different approach offering a common customer and patient information system to all the stakeholders inside the Apotti consortium.

In addition to voice communication, there are future needs for wireless broadband services for authorities like real-time vital signals and video transmissions from the destination as well as mobile use of electronic patient records (EPR). The VIRVE network used by the authorities has a limited ability to provide broadband services, therefore the solution could be using existing commercial networks alongside VIRVE or even using future commercial networks with private mobile radio network features.

Personal health measurements, sensors, telemedicine and analytics for healthcare will give opportunities to further improve the flow of communication in emergency care, provided those tools can be integrated into decision-making systems. An analytics solution should be a reliable instrument, which will assist professionals in decision-making and communication activities. There is an open issue who owns the measurement data that the citizens are producing: is it the citizen or is it the company, which offers cloud services?

Conclusions: Scattered health data is the biggest problem in the flow of communication in emergency care. The availability of ePCR to all stakeholders and the better integration of EPRs are the key issues to solve the communication problems. ERC and EMS systems will be improved with the introduction of the national projects ERICA and KEJO. Better information exchange between the information systems of social and health care organizations will be introduced with the UNA and Apotti projects.

[Back to Contents](#)

INDIAN TELEMEDICINE PROGRAM FROM CONCEPT TO COMPLETION – TOWARDS NATIONAL ADAPTION

LS Satyamurthy
President Suquino, India

Background: The Indian Telemedicine Program conceptualization, formulation and implementation was primarily spearheaded by the Indian Space Research Organization (ISRO) along with the support of some hospitals, dedicated Doctors, Technologists, state governments and Health Administrators. The Telemedicine being a technology based healthcare delivery system, the challenges for implementation and adaptation was a daunting task since the Health care system in India is primarily the domain of States Governments with federal government responsible only for national policies and funding.

Aim: To provide Telemedicine/eHealth care service adopting the Telemedicine/ehealth technologies for the needy and underserved Rural and remote population of India for augmenting the existing health care delivery system in the country.

Method: The important factor of providing satellite connectivity without charge by ISRO was the harbinger which marshalled the diverse stake holders for the common cause of reaching out the unreached. ISRO along with Ministry Health, Government of India took the major initiative of addressing: Resistance to change to new system, lack of infrastructure, technology adaptation, connectivity/ bandwidth requirements, evolving National Standards for practice of Telemedicine, Creating awareness among Public- Doctors- Hospitals and Health administrators.

Result: India has now one of largest Telemedicine networks connecting various rural district hospitals in most of 25 States connected to several specialty / medical college hospitals located in major cities including several Mobile Telemedicine units. Formation of National Taskforce in by the federal Health ministry, Government of India recognizing Telemedicine as a National Health Mission has been major achievement including the National Tele-Oncology and Tele-ophthalmology networks.

On an average more than 1000 Teleconsultation per day takes place in different medical specialties covering Government and private health care providers.

Many State governments have been establishing the Telehealth networks separately.

The Pan Africa Telemedicine network is another initiative of Government of India covering 50 countries in Africa connected to a group of Specialist hospitals and Medical Institutions in India

Conclusion: More than one and half decades of telemedicine in India has resulted in the good understanding of the nuances of telemedicine/ e Health/ m health system encompassing the technologies, connectivity options apart from point of care diagnostics and Clinical protocols for providing Quality healthcare to Rural, semi rural and Remote population of India.

[Back to Contents](#)

INCREASING NEED FOR AN EHEALTH IMPACT FRAMEWORK FOR AFRICA

Sean Broomhead^{1,2,3}, Maurice Mars¹, Richard Scott^{1,4}, Tom Jones²

¹ University of KwaZulu-Natal;

² African Centre for eHealth Excellence;

³ HISP-SA;

⁴ NT Consulting – Global e-Health Inc.

Background: Efforts by African countries to improve healthcare and citizens' health within challenging resource limitations put considerable pressure on investment decisions. eHealth is believed to have potential to strengthen health systems and is now seen by some entities as a determinant of health, yet its impact is not well estimated in advance or measured after implementation. This is an obstacle to the effective allocation of healthcare resources and limits national and regional ability to develop eHealth and realise its potential in health systems transformation.

Aim: A broad conceptual framework for appraising eHealth impact could help selection of the best course of action by informing individual steps, including: identification of promising initiatives, choosing between eHealth options, managing implementation, preparing for obsolescence, analysing achievements, and promoting sustainability. Such insight could help strengthen and transform healthcare, provide benchmarks for Monitoring and Evaluation (M&E), and improve individual and population health. Such frameworks exist, but do not address the needs of African countries.

Methods: Desktop review of literature gathered during several previous studies on the economic aspects of eHealth initiatives in African countries.

Results: Unique aspects of Africa's health context are clarified, particularly relating to resource constraints and health strengthening priorities. Key issues that influence eHealth development are highlighted, such as addressing affordability, value for money and risk.

Conclusions: The paper presents the role of eHealth impact appraisal in appraising eHealth options for African countries and describes aspects critical for an eHealth impact framework for Africa.

[Back to Contents](#)

ASSESSMENT OF KNOWLEDGE, ATTITUDE AND READINESS OF COMMUNITY HEALTH WORKERS TO UPTAKE MOBILE BASED TELEMEDICINE SERVICES AT RURAL AREAS OF AMBALA, HARYANA (INDIA)

Kathirvel Soundappan¹, Shyam Chakraborty², Niranjana Khandelwal³, Rajesh Kumar¹, Meenu Singh⁴

¹ Department of Community Medicine, School of Public Health, Postgraduate Institute of Medical Education and Research (PGIMER), Chandigarh;

² Oy Trinnect Ltd, Finland

³ Department of Radio-Diagnosis and Imaging, PGIMER, Chandigarh

⁴ Advanced Paediatric Centre, PGIMER, Chandigarh

Background: Provision of healthcare services using mobile based telemedicine (MBT) is a simple and easy to operate technology as it does not need sophisticated machines. Extensive penetration of mobile phones and internet in rural areas makes the mHealth as one of the feasible solution for providing healthcare services in India. The healthcare services at village level are provided by the community health workers namely Accredited Social Health Activists (ASHAs) and Auxiliary Nurse Midwives (ANMs) of public health system. The assessment of training needs and readiness of these community health workers (CHW) is very important before initiation of telemedicine services for sustaining the programme.

Aim: To assess the knowledge, attitude and readiness of the CHW namely ANMs at health subcentre level and ASHA at village level to uptake MBT.

Methods: A cross sectional study was conducted among ANMs and ASHAs working in the rural areas of the Ambala district of Haryana, India. The study participants were selected conveniently and were contacted at subcentre, block and district level during their meetings. A pre-tested semi-structured questionnaire using 5 point Likert scale (strongly agree to strongly disagree or novice user to expert user) was used.

Results: In total, 94 CHW were interviewed. Of these, 42% (39/94) were ANMs and 58% were ASHAs. *Knowledge and attitude:* About 77% (72/94), never heard about the word "telemedicine" [69% (27/39) in ANM versus 83% (45/54) in ASHAs]. Totally, 71% (67/94) agreed that the treatment of patients is possible via telemedicine; 81% (76/94) and 94% (88/94) agreed that telemedicine will increase the accessibility and affordability of health in rural areas respectively; and 85% (80/94) agreed that telemedicine assist in early detection of diseases. About 93% (87/94) of CHW wanted the MBT at each village. *Readiness:* About 62% (57/92) used smart phones directly or indirectly though all had access to any mobile phone device. Among them, 58% (33/57) reported that they are at least competent (competent, proficient or expert) in operating smart phones. 49% (43/87) used internet and 40% (36/91) used WhatsApp videocalls. At least 61% (57/94) reported competent or above in using inbuilt cameras.

Conclusions: The ANMs and ASHAs had positive attitude towards MBT and nearly half of them are ready for uptake of the MBT. Future qualitative research during pilot implementation of MBT may further explore the enablers and barriers for uptake. Similarly, assessment of cost effectiveness of MBT intervention may strengthen the evidence.

[Back to Contents](#)

RESULTS FROM UNIVERSITY HOSPITALS AS INNOVATION PLATFORMS – PROJECT – YSI CO-CREATION MODEL AND OULU UNIVERSITY INNOVATION PROCESS

Pauliina Hyrkäs

Oulu University Hospital / Northern Ostrobothnia Hospital District

Background: The Finnish health innovation system has suffered from fragmentation. A consequence of this is that in Finland, unlike in many other countries, the related investments have not produced the expected added value. However, different stakeholders produce viable ideas every day that should be systematically used in the development of new products,

services or working methods. Healthcare customers and professionals have essential knowledge about the development needs that should be utilized in co-creation of better and more efficient healthcare solutions.

What for is this project: University hospitals are at the core of their regional innovation ecosystems. Ideas emerging within the hospital that tackle a known issue should be refined and developed further, either within the organization itself or in co-operation with the companies, into new healthcare solutions, services or processes. A process that helps to facilitate co-operation between the companies, that develop these new solutions, and the end-users, either the professionals or the customers that provide the expertise, is needed.

YSI-project was executed as a part of the The Six City Strategy (6Aika), in collaboration with Oulu and Turku. University hospitals and universities of both cities were part of this project. In addition, Turku Science Park Oy was working as a coordinator. During the project, Turku built a process that helps to detect, evaluate and propagate requirements that emerge within the hospital, to companies that can develop these ideas further. Oulu's part in this project was to develop a process that could help companies, end-users or other stakeholders to co-create new healthcare products and services together (YSI Co-creation model).

Results: Oulu University Hospital and the actors of the innovation ecosystem received formal recommendations about the new policies for co-creating new products and/or services together with the companies (YSI Co-creation model) and also guidelines to organize the hospital's in-house innovation activity (OYS Development- and innovation process).

An observation was made, that the process made to drive innovation must be based on empowering co-operation between the stakeholders of the innovation network above all. The organization responsible of these activities has to be able to recognize the stakeholders, both internal and external, that might affect the operation of the process: different kinds of work cultures as well as different kinds of goals in the process. In addition, the organization responsible must create the means to communicate, that promote mutual understanding between the stakeholders. It is also important to detect possible collaborating partners, like companies and universities that are potential producers of added value in the process. Roles and responsibilities must be transparent between stakeholders. A process, that works efficiently, is built by taking everyone's needs and opinions into account within the innovation process and integrating them together while taking into account each stakeholder's rights and responsibilities.

During the project, the first version of the intended development- and innovation process was produced for Oulu university hospital. YSI-project's main result, company co-operation enabling YSI Co-creation model, has been included in the innovation process of the hospital. YSI-project lasted until the end of 2017. During the YSI-project, several other projects have already proceeded developing the innovation activity within the hospital. These projects include the Future Hospital OYS 2030 -programme, national Virtual Hospital 2.0 -project and international InDemand-project. The results gained from the YSI-project were utilized on local, national and international levels while the project was still executing.

[Back to Contents](#)

TELEFITTING IN THE NATIONAL NETWORK OF TELEAUDIOLOGY – CHANCE AND OPPORTUNITY FOR CONSTANT CARE OF CI PATIENTS IN KYRGYZSTAN

Piotr Henryk Skarżyński^{1,2,3}, Maciej Ludwikowski¹, Weronika Świerniak¹, Henryk Skarżyński¹

¹ World Hearing Center, Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany, Poland

² Heart Failure and Cardiac Rehabilitation Department, Medical University of Warsaw, Warsaw, Poland

³ Institute of Sensory Organs, Warsaw/Kajetany, Poland

Background: Hearing implants' fitting is a key component of postoperative patients' health-care, by providing the optimum auditory nerve electrical stimulation parameters. It often entails long travel to the medical centre, associated with costs and time-consuming. To reduce patients' burdens, the World Hearing Centre's team introduced in 2009 the National Network of Teleaudiology (NNT). Nowadays NNT consists of 21 cooperating centres in Poland and 4 abroad in Kyrgyzstan (Bishkek), Ukraine (Odessa and Lutsk) and Belarus (Brest). The centre in Kyrgyzstan is sufficiently equipped however programming of cochlear implant system, cannot be conducted by the team there due to a lack of trained specialists and limited experience.

Aim: The aim of this study is presenting the usage of telefitting between Poland and Kyrgyzstan.

Methods: The Internet allows specialists from Poland to set up a teleconference for audio and video contact with the patient and support specialist, and allows remote desktop software to access a remote computer and perform fitting. Every node is equipped with teleconference terminals from Polycom Inc. with LCD screens, zoomable and movable Polycom cameras, connected to a system with symmetrical Internet connections. There is also a PC computer equipped with clinical interface boxes with appropriate fitting software. The 'Logmein.com' application is used for remote control.

Results: In the Institute Physiology and Pathology of hearing teleconsultation procedure includes ENT examination, preparation stage and telefitting. During the preparation stage, a support specialist does a structure interview with the patient concerning hearing benefits, communication skills, and usage schemes in daily life. Afterwards is psychoacoustic measurements. The last step of preparation is consultation with speech therapist.

Conclusions: Optimal fitting of cochlear implant system is necessary for implanted patients to obtain maximum possible hearing benefits. Fitting of the system usually requires frequent visits in the International Centre of Hearing and Speech and repetitive fitting sessions. However, tiredness connected with long travels very often affects the reliability of psychophysical tests and fitting sessions. Moreover, the costs of frequent travels are significantly high for many families. Fortunately, development of informatics and telecommunication technologies opens new possibilities for the patients and the specialists. The telefitting model increased accessibility to hearing care services in Kyrgyzstan.

[Back to Contents](#)

COMPREHENSIVE APPROACH TO THE NATIONAL NETWORK OF TELEAUDIOLOGY IN WORLD HEARING CENTRE IN KAJETANY, POLAND

Piotr Henryk Skarżyński^{1,2,3}, Maciej Ludwikowski¹, Weronika Świerniak¹, Kamila Renke¹, Henryk Skarżyński¹

¹ World Hearing Center, Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany, Poland

² Heart Failure and Cardiac Rehabilitation Department, Medical University of Warsaw, Warsaw, Poland

³ Institute of Sensory Organs, Warsaw/Kajetany, Poland

Background: Treatment of hearing impairments nowadays makes use of the numerous state-of-the-art technologies, such as hearing aids and various auditory implants, allowing hard-of-hearing and deaf people functioning in the word of sounds and communicating with others. These modern treatment methods usually entail complicated set-up, regulation and adjustment procedures requiring frequent consultations with an experienced specialist with access to dedicated equipment, usually available in specialist centres and hospitals. The treatment results are to a high degree dependent on the good organization of the medical care and rehabilitation. Patients' visits in the specialist centre often entail long trips from their domicile; they invest their time, sometimes take a full-day leave from work, and cover the cost of travel, which for many families may be a problem. Additionally, patients, particularly children and persons with collateral mental disorders, after the long travel are tired, irritated and unwilling to cooperate with the specialist. To remedy these problems and improve the quality of patient care, the Institute of Physiology and Pathology of Hearing (IFPS) developed and implemented into the clinical practice the National Network of Teleaudiology, a specialized network allowing the use of the internet and modern IT tools to provide medical care, rehabilitation and technical support for patients visiting a subsidiary or one of the affiliated polyclinics of the Institute.

What for is this project: After success in Poland we started cooperation with different centres in another continents. Such example is Odessa in Ukraine where there is cooperation with Black Sea Centre of Hearing and Speech "Medincus". Currently, NNT consists of 21 cooperating centers in Poland and 4 abroad in the Ukraine (Odessa and Lutsk), Belarus (Brest) and Kyrgyzstan (Bishkek). There is possibility to diagnose patients with complicated ear diseases with videotoscopy and objective hearing assessment (for example ABR). In Bishkek Kyrgyzstan there were first telefitting between World Hearing Centre as well as ABR assessment. In another countries there was hearing screening in children performed with automated database analysis. Coded date was sent and there was feedback information to centres which took part in research. Such project was realized in Tajikistan and Kyrgyzstan. In Africa there are in progress another project connected with screening and assessment (Senegal and Nigeria). In addition, the WHC is equipped with integrated system for audio and video recording. All telemedical connections used in everyday medical/clinical practice, such as telerehabilitation, telefitting, teleconsultations, are registered in a central data base. All surgical procedures can be registered and archived in a central surgical register. The whole video network works in Full HD resolution that ensures the picture of high definition and quality. The system allows to transmit live surgeries to any room in the Centre. This creates outstanding educational possibilities, trainees can watch transmission on computer and projection screens. Thanks to this state-of-the-art videoconference system we have a capability to connect with centres all over the world and realize live transmissions from operating and conference rooms.

Results: As a sum up we claim that telemedicine is very good way of support for less experienced centres where during such consultations there is high possibility for education of local specialists.

[Back to Contents](#)

COMPARISON OF THE FREQUENCY OF POSITIVE HEARING SCREENING OUTCOMES IN SCHOOL-AGE CHILDREN FROM DIFFERENT COUNTRIES IN AFRICA – TELEMEDICINE MODEL

Piotr Henryk Skarżyński^{1,2,3}, Maciej Ludwikowski¹, Weronika Świerniak¹, Henryk Skarżyński¹

¹ World Hearing Center, Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany, Poland

² Heart Failure and Cardiac Rehabilitation Department, Medical University of Warsaw, Warsaw, Poland

³ Institute of Sensory Organs, Warsaw/Kajetany, Poland

Background: Hearing screening have an extremely important preventive task, being the primary means of secondary prevention. They allow for an early detection of hearing disorders, thus enabling treatment and eliminating or minimizing the negative consequences associated with this type of dysfunction. Hearing-impaired children often experience delayed development of speech, language and cognitive skills, which may result in slow learning and difficulty progressing in school. For many years the Institute of Physiology and Pathology of Hearing has undertaken a variety of initiatives in countries across continents, which include screening for hearing.

Aim: The primary goal of the program is early detection of hearing impairment, especially in children who start school and at raising awareness among parents and the school environment about hearing problems. These efforts are aimed at improving the state of medicine abroad, especially in African countries, enabling access to health care and promoting healthy lifestyle.

Methods: Hearing screening was performed in group of 1713 children in 8 African countries: Cameroon – 260 children, Congo – 210 children, Ghana – 170 children, Ivory Coast – 132 children, Nigeria – 340 children, Rwanda – 183 children, Senegal – 206 children, Tanzania – 212 children.

Screening was performed using the Sensory Organs Platform; based on an audiometric hearing threshold measurement procedure. A modern platform developed by the Institute of Sensory Organs is essential for the affordable and universal study of a large population of children. The threshold values for air conduction were determined in the frequency range of 0.5 - 8 kHz. The abnormal test result was the threshold value for air conduction of 25dB HL and more for at least one frequency in at least one ear. Moreover, a subjective assessment was conducted on the basis of questionnaires for parents. In addition in some countries the protocol of study was extended with OAE and video-otoscopy. Results

An abnormal screening result was found in 18% to 34% of the children tested. Most of the hearing loss was benign or moderate, most often among all ears with abnormal hearing screening in children with high frequency hearing loss. In addition, there was a large number of unilateral hearing loss. In most cases, parents were not aware that their children had hearing problems. Studies have shown that the scale of hearing impairment among school children is significant in all countries participating in the program.

Conclusions: Pilot hearing screening has shown that the organizational model of screening developed in Poland and the methods, devices and information systems used in the studies can be successfully implemented not only in European countries, but also in African countries. It should be emphasized that hearing screening performed outside of Poland was the first hearing screening test conducted in schools in the surveyed countries.

The results confirm the high incidence of hearing problems in school children. Based on the results, it is strongly recommended to implement hearing screening in the countries concerned as a routine procedure in medical care.

[Back to Contents](#)

TOWARDS INTERACTIVE PATIENT COUNSELLING

Anja Henner, Karoliina Paalimäki-Paakki, Kirsi Koivunen
Oulu University of Applied Sciences

Background: Societal and health care needs and services are rapidly changing. The responsibilities of medical professionals and patients will be different in future hospital and primary care environments. Currently, patients are not satisfied with the provided information and they do not understand the counselling material, which is often written from the point of view of professionals. Patients should be informed of the benefits as well as the potential radiation risks of the radiological procedures they undergo. It is important to focus on what a person in the patient's position would like to know about the risks and benefits of an examination involving radiation exposure, instead of focusing on what a physician thinks the patient might want to know. Due to the aforementioned reasons, it is important to rethink and re-develop the treatment pathway, counselling materials and methods as well counselling environments of a patient. Patients should be in a central role also in the production and continuous development of both counselling materials and patient pathways.

Aim and Purpose: The diagnostic pathway of a coronary artery disease (CAD) patient from the first symptoms to the diagnosis and treatment is dependent on the risk classification of a heart attack. Different diagnostic pathways of CAD patients will be analysed from the patient registers in the specific catchment area of Oulu University Hospital (OUH, five central hospitals). Group of patients will be interviewed using different serving design tools (e.g. patient interviews, visualization, context mapping, shadowing, service safaris, stakeholder maps, customer journey maps). Patient profiles lay the groundwork for the developed counselling environment and describe different types of patients. These personas will be made according to the process of service design and they are concrete descriptions of patients with CAD. Personas comprise not only demographic characteristics, but also patients' needs, values, lifestyle, culture, health status and personal background. Personas help to focus on real users when designing new counselling material and methods for diagnostic pathways in cardiology. Personas help patients to commit more into self-care, which releases the attention of health-care professionals to patients with critical condition. Social and healthcare costs during 2016 will be find out on two areas. The aim is develop modern, interactive, and personalized patient-centered counselling environment for and with patients.

Results: Patient counselling materials and forms will be based on results of the patient register analysis, interviews of patients and relevant experts (e.g., healthcare professionals), and systemic literature reviews. Data collection and analysing are going on and the first results will be reported in poster in the congress.

[Back to Contents](#)

USING SOCIAL ROBOTIC CAT IN DEMENTIA CARE: A CASE STUDY

Anna-Liisa Arjama, Arja Häggman-Laitila, Mari Kangasniemi
University of Eastern Finland

The main goal of dementia care is to improve the quality of life because there is not available cure for dementia. Development of care is topical right now because the incidence of dementia is increasing dramatically. Social robots are one option to support individuals with dementia because they can be used as tools for communication and to offering positive emotional experiences. The aim of this study is to describe formal and family caregivers' perceptions of individuals with severe dementia with an interactive robotic cat.

We used case study with an intervention as a method. The material was collected in two dementia-care-units in Southern Finland in 2016. On the intervention three individuals with severe dementia had robotic cat for 12 weeks. During the intervention, the formal caregivers observed reactions of the participating individuals. Assessing of agitation symptoms was conducted by Cohen Mansfield Agitation Instrument (CMAI) scale and quality of life using the QUALID scale. The measurements were analysed by comparing the average of measurements in different stages (baseline, intervention and follow-up). We used thematic interviews to collect data concerning the formal and family caregivers' perceptions and experiences of the robotic cat in the participants' daily lives. Interviews were analysed using qualitative content analysis. Based on our results the scores of CMAI and QUALID remained the same during the intervention and follow-up. The scores decreased with one participant during the intervention and follow-up. The scores of the third participants' got higher during the intervention and follow-up so each individual reacted differently to the use of the robotic cat.

Based on our results, family caregivers' and formal caregivers' found that the reactions of the participants towards the robotic cat were unique and there were variation according to the individual, timing and situation. The perceptions concerned the functionality of a robotic cat in dementia care, the reactions towards the robotic cat and implementing care with robotic cat. Ethical consideration was an important part in each category. Robotic cats can be a useful tool for communication and by using them it is possible to relieve the agitation symptoms and offer positive emotional reactions for individuals with dementia. The caregivers' attitude, know-how and prejudices together with experiences during the intervention affected the eagerness to use the robotic cat.

This case study highlighted the importance of individual care. In the future more knowledge is needed of the wellbeing of individuals with dementia. It is also important to explore data collection methods in dementia care. In addition to the importance of getting new information of the use of social robotic cat, the intervention studies are a good opportunity to increase the knowledge of technological innovations among caregivers.

KEYWORDS: case study, content analysis, dementia, quality-of-life, social robot, thematic interview

[Back to Contents](#)

SELF-CARE AND DIGITAL VALUE SERVICES AS PART OF COMPREHENSIVE SCHOOL AGED CHILDREN AND THEIR FAMILIES WELFARE

Sanna Niinimäki, Maiju Tirri, Arto Holopainen, Hanna-Mari Tanninen, Katriina Kankkunen
City of Kuopio, Social and Health

Background: The general wellbeing of Finnish population has improved in recent decades, but at the same time psychosocial support needs of families and socioeconomic differences have increased between population segments that have impact in the daily lives of families with children. It is extremely important to take socioeconomic differences into consideration to provide equal services for all and to increase community resilience. At the moment Finland is ongoing one of the biggest ever administrative and operational reform in health, social services and regional government. The reform affects the services of every citizen in the country. Digitalisation has a major role in the reform and promotes the user-centric approach in the services.

The Finnish Government has initiated a key project (2016-2018), self-care and digital value services (in Finnish “Omahoidon Digitaaliset Arvopalvelut”), which is driven by a vision of a new service model in healthcare and social welfare services. The project is a joint effort of twelve Finnish cities and two hospital districts. The City of Kuopio is one of the pioneers that contribute to the project.

Aim and Purpose

The aim is to provide tools for psychosocial support for the comprehensive school aged children and their families’ concerns related to their welfare by applying operational changes and new digital services. The purpose is to enable identification of possible risk factors and the potential need for support at an early stage. The current operational process where different stakeholders meet child/family separately will be changed so that multiprofessional stakeholders will gather together with the child/family.

Methods: The mandatory extensive health check-ups at school health services that covers entire age group was chosen as starting point to identify risk factors from check-up questionnaires (in paper form). Data was collected from the extensive health check-up questionnaires for parents (n=475, collected from 8 primary schools with more than 300 pupils, children born 2005). According to data, 24% of these families raised concerns about family / child wellbeing. This data enabled to develop method for nurses to identify family concerns and their support needs. At the same time service process was adapted for digital services to provide decision support for the professionals based on digital data (paper forms replaced).

Results: As a result, new multiprofessional operational processes have been implemented. When needed, families are able to meet more easily all the professionals together; school health services, social services, dental health care, student services and services for families with children. Interventions have been intensified by using specific statistical code for concerns for identification. New e-services for child/families are being implemented: welfare control, self-care plan, welfare coaching, assessments of symptoms and welfare, welfare plan.

Conclusions: Self-care and digital value services are already here. New services provide new tools and approaches that will help to provide targeted support for comprehensive school aged children and their families’ welfare concerns. At best, digital services bring services more accessible for the customer and can provide new tools to reach help when needed. In the long term we expect that the most expensive child protection costs will decrease.

[Back to Contents](#)

ISAACUS PRE-PRODUCTION PROJECT: CHILD PROTECTION PROCESS AND PLACEMENT DECISION

Taru Hallinen¹, Erkki Soini¹, Arja Kekoni², Johanna Kotimaa², Minna Nykänen³, Jyrki Tirkkonen³, Markku Tervahauta²

¹ ESiOR Oy, Kuopio, Finland

² City of Kuopio, Kuopio, Finland

³ Istekki Oy, Kuopio, Finland

Background: Health and wellbeing development of Finnish government is aiming at e.g. customer-responsive services and digital use of healthcare data. An essential part of this development is data–analysis–knowledge management–communication chain, data and analytics being the key components of knowledge production and dissemination. Isaacus, a service operator that will provide wellbeing data and open data from different information sources and registers on a one stop-shop basis, will be a crucial element of the chain. Sitra-funded Isaacus pre-production projects were aimed at preparing the national Isaacus service operator. City of Kuopio initiated an Isaacus pre-production project “Well-being information on children and young people”. During the pre-production, a data lake was developed to compile data that is scattered in various

databases. The data includes the new social welfare and healthcare reporting system ‘service packages’ (nowadays called as ‘information packs’) information as well as client and guardian data. Remote-use platform for the data lake was tested and is being developed to support efficient secondary data use.

Aim: To assess the social and child protective care process and predictors for resource use (placement decision).

Methods: The data consists of the family social services arranged by the city of Kuopio between 1st January 2013 – 31st August 2017 for individuals aged 0–17 years. The social care was complemented by health care data, and included key client and caretaker characteristics (e.g. number of guardians, number of dependants, family type). Generally, the Finnish family social services follow so-called RAD process: 1] request for inquiry, 2] assessment of need for support and 3] decision. Thus, and to maintain the track of process, we restricted the analysis to clients with at least one request for inquiry to the social or child protective services (the first inquiry in the data being the index event). Multivariate logistic regression modelling for the placement decision was done with Stata statistical software.

Results: 52.7% of the clients (total N 5554) were male, 83.8% of 5318 clients with residence information were Kuopio residents, and 4.2% of the clients had been taken into custody before the index event. At the time of index event, the clients were on average 8.7 (SD 5.3) years old. The number of siblings, who were also clients of the family social services, was on average 2.9 (SD 1.6; n 4030). 50.6% of the families with data (n 4083) were sole provider families. For the index event, the most typical reasons for inquiry included domestic violence/threat (15.5%) and intoxicant use by the parent (13.7%), and inquiries were frequently given by 17.9% police or 16.0% emergency centre. Common assessment types included social care need assessment and services, and open care need assessment, child protection and different types of placements. After the first inquiry, clients’ (n 4085) had an average 5.3 (SD 8.1) decisions. Robust, statistically significant multivariate predictors for child placement included inquiry reasons (child-parent disagreements, domestic violence or its threat) and initiators (emergency centre, child him/herself, social worker, family caretaker). The effect of some inquiry reasons (child’s violent behaviour, child being left without a guardian) and initiators (other social service provider, other health care service provider) was statistically volatile.

Conclusions: Child protection process was defined from the data and robust placement drivers were found. Isaacus together with Virtual Hospital 2.0, Innovation village, and Self-Care and Digital Value Services (ODA) are the key value drivers in the knowledge-based improvement of the quality and efficiency of Finnish care, and equality of citizens. Isaacus will hopefully enable the monitoring of quality of life, symptoms and lifestyle, and long-term illnesses.

[Back to Contents](#)

MOBILE APPLICATION – NEW TELEMEDICINE TOOLS?

Piotr Henryk Skarzynski^{1,2,3}, Justyna Kutyba¹, Katarzyna Cywka¹, Beata Dziendziel¹, Weronika Swierniak¹, Anna Sztabnicka¹, Henryk Skarzynski¹

¹ World Hearing Center, Institute of Physiology and Pathology of Hearing, Warsaw/Kajetany, Poland

² Heart Failure and Cardiac Rehabilitation Department, Medical University of Warsaw, Warsaw, Poland

³ Institute of Sensory Organs, Warsaw/Kajetany, Poland

Background: Due to the growing interest in new technologies, the developers of mobile applications have created a series of tools that can be potentially useful also in the clinical practice. More and more applications are introduced in the audiology field, utilized for instance in the assessment of hearing or helpful in reducing the severity of tinnitus.

Aim: The aim of the study is to check the effectiveness of selected applications in the field of audiology.

Methods: The first study with uSound application involved 20 people aged 17 to 67 years of age. None of the respondents reported hearing problems. The second study with ReSound Relief application involved 30 people aged 19-65 hospitalized due to tinnitus at the Institute of Physiology and Pathology of Hearing. All patients used the application for 3 months. The results obtained with the uSound application were compared with the results obtained with the device used conventionally for performing hearing screening tests. The second application - ReSound Relief – was created to help patients reduce the severity of tinnitus. Due to the subjective nature of the problem of tinnitus, the effectiveness of the application was evaluated based on the results of standardized questionnaires.

Results: The preliminary results indicate that uSound application is helpful in establishing the hearing threshold of adult patients without hearing problems, comparably to the currently used devices routinely used in the hearing screening programs. The ReSound Relief application seems to be effective and patient-friendly tool enabling for tinnitus severity reduction.

Conclusions: The possibility of using mobile applications in everyday practice is a relatively new direction of research in the audiology field. Current data suggest their effectiveness in different hearing-related domains.

[Back to Contents](#)

DIGITAL CARE PLAN MAKES THE PATIENT'S HEALTH GOALS ACHIEVABLE

Sanna Solala, Kaisa Sundman, Ilari Richardt, Päivi Metsäniemi
Suomen Terveystalo Oyj

Background: Care plan is a fundamental tool in healthcare. Traditionally, it conveys information between healthcare professionals (HCPs). There is growing evidence on its usefulness also between HCP and patient, since it makes the patient an active subject on his/her own care. It is of major importance that it takes the patients goals into account, thus empowering the patient.

The Finnish national authorities have included the care plan as a part of healthcare legislation. Every patient with a long term health condition should have an up-to-date care plan. In occupational health care, a health and work ability plan is a legal prerequisite.

In the era of digitalization, an ideal care plan should be transparent, interactive, easily modified, supportive, efficient and safe.

Aim and Purpose: We developed and implemented an early version of a digital care plan that focuses on the patient's own health goals. The focus population consisted of Terveystalo's 670 000 occupational healthcare users. Of this population, approximately 20% come to health check-ups to an occupational health nurse every year.

In the care plan (Own plan, Oma suunnitelma in Finnish), the patient chooses which health issues she/he is ready to concentrate in, and together with the occupational health nurse chooses the relevant actions by which to achieve the goals. The plan is generated to Terveystalo's patient portal, Oma Terveys, and can be followed both by all healthcare professionals concerned with the customer's treatment and the customer herself. The care plan combines information from various data sources: health check-up questionnaire, patient portal, and the EMR. The plan then sends reminders to the patients and allows both the patient and the professional to see how well the goals are achieved.

In this work, we primarily look at the first phase of the digital care plan, its implementation and continuous improvement process, and factors leading to its usage or neglecting it from the HCP's point of view.

Results: Since the implementation in August 2016, some 73 000 care plans have been made. The majority of health goals are related to weight loss and exercising more, wellbeing at work and managing pain, lowering cholesterol or blood pressure and smoking cessation.

We now know that occupational health nurses are able to do a digital health plan during the health check-up. We have also identified reasons that prevent making the plan: primarily not having the time and not knowing how to set the goals with the patient. We are focusing on user experience both on the HCP and the patient end in order to achieve continuous use of the plan, and we want to show how continuous improvement of user experience is achieved in this project.

In next phases, we will be able to analyse the effectiveness of the new process of health check-ups.

[Back to Contents](#)

LESSONS FROM THE AMERICAN HEALTHCARE DATA BREACH RECORDS

Niina Keränen^{1,2}, Jari Haverinen¹, Jarmo Reponen^{1,2}

¹ Research Unit of Medical Imaging, Physics and Technology (MIPT), University of Oulu

² Medical Research Center Oulu, Oulu University Hospital and University of Oulu

Background: American health institutions have a mandate to report breaches of protected health information (PHI) affecting more than 500 individuals. Some of this information is provided for public use through a breach portal, which includes records of over 2000 breaches in 2009-2017. A somewhat similar reporting requirement of personal data breaches, including identifiable health data, will come into effect in EU with the General Data Protection Regulation GDPR. It will come to force 25 May 2018 and will require data controllers to report a breach of personal data within 72 hours to the supervisory authority.

Aim: Assess the typical types of data breaches and the trends over time. Evaluate potential improvements if a similar portal were to be implemented in the EU.

Methods: Data from both completed cases and cases under investigation was downloaded on 6.12.2017 and analyzed in Excel. Data from 2010 on was evaluated. When practical, data from 2013 was treated separately due to minor changes brought into the reporting process by the Health Insurance Portability and Accountability Act (HIPAA) omnibus final rule.

Results: The number of yearly breaches has increased from 199-278 in 2010-2013, to 356 in 2017. 71% of the reported breaches from 2013-2017 have been from healthcare providers. The total number of affected persons per year varied between 2,8-16,7 million, except in 2015, when three major hacking incidents brought up the total to 113 million. There was a slight upward trend in the number of breaches but, excluding 2015, no obvious trend in the number of persons affected. Up to and including 2014 most loss of PHI was attributable to causes other than IT/hacking; since 2015 IT/hacking has been the leading breach classification. Breaches by unauthorized access/disclosure have also increased, with particular increase in disclosure through email. Breaches by theft have decreased. Information of the type of data lost (eg. billing information, social security numbers, passwords, medical history) is available through the portal only for some cases, and not in a structured form, and was not evaluated.

Conclusions: The breach tool is a valuable resource for evaluating the state of PHI security in the USA. Creating a similar tool in the EU would be beneficial. Open access to systematically gathered breach statistics could help focus counter-measures, to prevent subsequent incidents. Additional features that might make such tools more useful include listing both the primary type of breach and possible additional types; and listing the types of data lost. Structured follow-up data and structured updates of actions taken would also be useful for trend analysis. Increasing use of health-IT has increased the risk of major breaches, as seen in 2015. Apart from the three major incidents of 2015, the analyses show a major change in the type of breaches and a slight upward trend in the number of incidents, without a significant change in the typical number of persons affected.

[Back to Contents](#)

THE AVAILABILITY AND EMR INTEGRATION OF DECISION SUPPORT SYSTEMS IN FINNISH HEALTHCARE 2007-2017

Niina Keränen^{1,2}, Maarit Kangas^{1,2}, Jari Haverinen¹, Päivi Hämäläinen³, Jarmo Reponen^{1,2}

¹ Research Unit of Medical Imaging, Physics and Technology (MIPT), University of Oulu

² Medical Research Center Oulu, Oulu University Hospital and University of Oulu

³ National Institute for Health and Welfare

Background: Clinical decision support (CDS) systems assist healthcare professionals in clinical decision making-tasks. Potential for this assistance is one of the major clinical benefits of electronic medical records (EMR). Styles of decision support vary, from e.g. the traditional marking of laboratory results outside the reference range, to automatic integration and offering local care protocols as the next step.

Aim: To evaluate the availability and integration of typical clinical decision support systems in Finnish healthcare.

Methods: The National eHealth availability survey was conducted in 2017 and targeted at Finnish hospital districts, primary healthcare units, and private healthcare providers. Responses on the questions regarding patient-oriented services were obtained from all 21 hospital districts, 121 out of 141 primary healthcare units, and a sample of 26 out of 46 approached private healthcare providers. A similar national survey has been used to assess the situation in 2007, 2011, and 2014. In 2017 CDS systems were evaluated as three categories: Drug interaction systems; diagnosis support systems; and care pathway support systems. Four degrees of depth of integration with EMR were recognized: 1) External support system (eg. links to an external database on the computer desktop); 2) Navigation from the EMR system to a support system; 3) Graphics and reminders within the EMR (with no patient-specific suggestions); and, 4) Automatic integration of the EMR system and a knowledge database (including patient-specific suggestions). The deepest depth degree was used in subsequent analyses. Prior to 2017, the CDS categories for diagnosis support and care pathways were referred to by the names of typical Finnish services. This was changed to broader categories to account for the changing landscape and to allow for international comparisons. The results of 2011 and 2014 have been mapped to correspond to this system.

Results: In 2017 the availability of clinical decision support systems ranged from 50% (care path support in private healthcare) to 100% (drug interaction databases and diagnosis support in hospital districts). The availability of drug interaction databases has reached a saturation point in all hospital districts, and now an automatic integration for drug interaction CDS is used in 62% of hospitals. Historically the increase in availability and deepening integration has been steady in hospitals, from drug interaction CDS availability at 81% and automatic integration at 14% of the hospitals in 2007. In public primary care and in private healthcare the progress has been less stable. Care path support was the rarest type of CDS, and automatic integration for care path support was available in under 10% of the units. Both care path support and

diagnostic support have also seen a steady rise in availability since 2011. All in all the prevalence of CDS systems was highest in hospitals and lowest in private healthcare.

Conclusions: In public healthcare organizations the uptake of clinical decision support systems has increased, and fully integrated systems are in common use. Further development is needed especially with regards to support for care pathways, and for integration into EMR systems used in private healthcare. The classification system produced logical results and could be used in assessment in other countries.

[Back to Contents](#)

GAMES FOR HEALTH FINLAND: ACHIEVEMENTS AND EXPERIENCE POINTS

Tiina Arpola, Antti Kotimaa
Savonia University of Applied Sciences

Background: Games for Health Finland –network was established in the year 2014 to provide a framework for SME’s innovation activities and growth and to generate start-up companies. The network supports SME’s product and service development and utilization of new commercial technologies in order to meet the public health challenges.

Games for Health Finland provides ongoing multidisciplinary experiment culture as well as the new development together with entrepreneurs, the educational and research institutions, students and other professionals. The network enables co-creation of Games for Health field using existing testing environments for health games, technologies and prototypes. The network supports sharing of knowledge and information as well as deepens the collaboration.

What for is this project: The Games for Health Finland network engages international value networks, gathers entrepreneurs and operators in the Games for Health field, promotes the development of products and services and organizes networking events and education. Innovations start at a local level, driven by entrepreneurs who have an inspiration to solve problems. Cities and healthcare sector provide an endless supply of areas to improve upon but it can be difficult to know where to start. Game Jams or Hackathons are solutions for crowdsourcing this innovation process.

Gamification is used because when we achieve new levels in games, the brain releases dopamine which prompts excitement, encourages exploration to try new things, and helps combat the stagnation caused by failure. Gamification gives us clear goals, proper challenges, interaction and rules for engagement, motivation, participation and inspiration for better life management.

Entrepreneurs may bring their own innovations to be tested in practice and further developed in a real user environment. We also provide various technology to the developers to build their solutions. Expensive technology may be hard to get for students or startups, but our support enables the development in growing areas such as mixed reality.

Results: Games for Health Finland has organized three national open innovation challenges and 16 smaller ones. The first was about linking mobile services to the Finnish Health account, to give individuals a personal toolkit where all information connected to your health and well-being is stored online and the interface is gamified. In the second challenge the Games for Health Finland and the city of Kuopio organized MY LIFE – Game Challenge that invited everyone to innovate new ideas on self-management, gamification of a tool used by professionals, how things could be done differently. And in the third challenge the City of Kuopio looked for innovative digital services to make citizens life easier. At the same time the game developer scene in Kuopio has been growing.

Health Game Jams have been an open education environment for at least 250 innovators and over 90 usable prototypes have been created to be developed further. Open innovation challenges bring customer focus, imagination, collaboration, courage, expertise, inclusiveness, multidisciplinary thinking and transparency to the fundamental health care sector. With every challenge we get closer to inclusive and resilient solutions, which that can help citizens to find the best and easily accessible services available to their needs.

The themes of game jams have been for example virtual hospital, diabetes, mood recognition, water safety and nutrition. The jams are arranged with a varying theme around health, wellbeing, prevention and sustainability, with a commercial mindset.

[Back to Contents](#)

EFFECTS OF UBIQUITOUS 360° PATIENT COUNSELLING ENVIRONMENT ON CARDIOLOGICAL PATIENT'S HEALTH-RELATED QUALITY OF LIFE

Karoliina Paalimäki-Paakki¹, Anja Henner¹, Kirsi Koivunen¹, Maria Kääriäinen²

¹ Oulu University of Applied Sciences

² University of Oulu

Background: Ubiquitous environment means an environment that is present throughout the merging technology, enabling individual learning and counselling to its user at an appropriate time and in an appropriate manner. In this study, the ubiquitous environment is a 360 ° panoramic photo-based network environment, incorporating digital materials that enable versatile authentic counselling.

Aim: The purpose of the study is to evaluate the effectiveness of the ubiquitous counselling environment in the health-related quality of life of the patients with coronary artery angiography.

Methods: In the planning phase of the intervention, a systematic literature review describes the ubiquitous counselling environments and their effectiveness in long-term patients.

In the evaluation phase of the intervention's feasibility a) the ubiquitous counselling environment with its materials will be developed in cooperation with cardiac patients, healthcare and IT professionals and health care students b) the usability of the environment will be pretested in the pilot: the cardiological patients (n = 10), the cardiological health care professionals (n = 10), health care students (n= 30) and an information technology expert (n = 1) use ubiquitous counselling environments for a month, after which they are interviewed on a structured form. The interview explores user experiences on the feasibility of the ubiquitous control environment. The material is analysed by deductive and inductive content analysis.

In the evaluation phase of the intervention, Oulu university hospital's coronary artery angiography patients will be randomized in RCT-study design to the test and control groups (50-60 patients / group). The test group is counselled in the ubiquitous environment, the control group receives counselling in accordance with current practice. The data is collected with a valid health-related quality of life instrument (eg RAND-36) before and after the intervention, assessment takes place before, 6 and 12 months after counselling intervention. The data will be analysed statistically using the SPSS software package.

Results and Conclusions: Data collection and analysis is going on, the first results will be reported as a poster in the congress. The research faces the challenge of health care digitalization and is important both nationally and internationally. Comparable patient counselling environments using similar technology have not been reported nationally or internationally in previous studies. The research will be carried out in a multidisciplinary Tekes-funded project, in cooperation with healthcare staff and students as well as information technology industry representatives. The wider usage of the developed environment is significant.

[Back to Contents](#)

DEVELOPING AN ALGORITHM TO DETECT FALLS IN THE ELECTRONIC HEALTH RECORD: A DIAGNOSTIC ACCURACY STUDY

Barbara Schärer¹, Franziska Gratwohl², Nicole Grossmann², Jacques Donze², Sarah N. Musy^{3,4}, Michael Simon^{3,4}

¹ Inselspital Bern University Hospital, Head office of Nursing, Medical-Technical and Medical-Therapeutic Ares, Nursing Development, Switzerland

² Inselspital Bern University Hospital, Department of Internal Medicine

³ Institute of Nursing Science, University of Basel, Switzerland

⁴ Inselspital Bern University Hospital, Nursing & Midwifery Research Unit, Switzerland

Background: Fall events are among the most common adverse events and are linked to undesired outcomes, such as prolonged hospitalization, disability or even death. To reduce falls, it is essential to accurately measure them. Currently used methods (e.g. voluntary incident reporting) suffer from underreporting. Fall detection algorithms for electronic health records (EHRs) may facilitate the task in an efficient and cost effective way.

Aim: The objectives were: 1) to develop an algorithm to identify fall events in the EHRs of a Swiss University Hospital; and 2) to determine the diagnostic accuracy of the algorithm using voluntary incident reporting and the Global Trigger Tool (GTT).

Method: This retrospective study included a sample of 120 randomly selected patients in a general internal medicine department over 6 months. The algorithm was developed using structured query language (SQL) and text mining

approaches. Sensitivity, specificity and predictive values were compared to falls identified with the GTT and voluntary incident reporting.

Results: The patients' mean age and length of stay were 70 years and 14.6 days, respectively. The algorithm identified 11 fall events, whereas two events were missing in the GTT and seven were missing in the incident reporting.

Conclusion: The newly developed algorithm produced higher sensitivity and precision than GTT and voluntary incident reporting. Further evaluation with a larger sample are needed, with the goal of using it in real-time to monitor fall events in the whole hospital.

[Back to Contents](#)

PRACTICE AUDIT IN UROLOGY: THE VALUE OF ELECTRONIC HEALTH RECORDS (EHR) DATA – A CASE STUDY

Emmanuel O. Abara

Division of Clinical Sciences, Northern Ontario School of Medicine, Sudbury/Thunder Bay, Ontario
Richmond Hill Urology Practice & Prostate Institute, Richmond Hill Ontario, Canada

Introduction and Objective: Electronic Health Records (EHR), a software that captures data of patient encounter has gained traction, with varied applications, in the past decade. We adopted the use of EHR in 2013. The aim of this study is to describe the value of Electronic Health Records Data in Practice Audit with a focus on Ureteroscopy.

Methods: Data recorded in the physician's clinical notes, OR records and follow-up assessments were reviewed and extracted. Data collection and analysis was from 2001 to 2004 and included patient's age, sex, presentation, stone features, OR, and fluoroscopy times, stent or no stent, stone free rates, and complications. Data was transferred to and analysed by a random number spread sheet function.

Results: There were 192 procedures-149 'stent' and 43 'No Stent' (3:1). These two groups were comparable -patients, stone features, stone free rates, complications. Mean stone size was 8.5 +/- 2 mm. Stone free rate at 6 weeks was 100% in both groups. After 2 days, lower urinary tract symptoms. (LUTS) were less in patients with 'no stent' in contrast to 'stented' patients. These results are similar to published literature.

Conclusion: We identified comparable outcomes in Ureteroscopy 'Stent' or 'No Stent' – a situation that remains controversial. EHR as a tool in practice audit is invaluable. It is a welcome alternative to a 'paper' audit. There are limitations. Other uses of EHR data in research, quality improvement and population studies are promising.

[Back to Contents](#)

INTERPROFESSIONAL COLLABORATIVE UROTELEHEALTH PROGRAM IN RURAL NORTHEASTERN ONTARIO-PATIENTS' PERCEPTIONS

Abara E, Reid C, Abara N, Lacroix M, Thomas C, Wu B, Denton R

Rural Hospitals in Northeastern Ontario-Hornepayne, Iroquois Falls, Kirkland Lake, Sensenbrenner.
Division of Clinical Sciences, Northern Ontario School of Medicine, Sudbury/Thunder Bay, Ontario

Introduction and Objective: Found in several locations across the Province since 2006, Ontario Telemedicine Network (OTN) offers face to face information sharing by instant videoconferencing adding significant benefit to timely health care delivery to patients in rural and remote communities. We encouraged inter-professional collaborative care where the patient, the relatives the primary health care provider or support worker and the specialist (urologist) all meet at the point of care by Telemedicine. By January 2015, we attempted to determine through a questionnaire survey how the patients and their relatives perceived this pattern of care.

Materials and Methods: Approval was received from the Ethics and Review Boards of the Kapuskasing and the Kirkland Lake hospitals. Data were collected by paper and pen questionnaire Informed consent was obtained from participants. Diagnosis, Treatment, Number of Telemedicine encounters and outcomes were recorded. Information regarding computer and internet use among the patients' relatives was also obtained. Quantitative and qualitative data were analysed using the Statistical Analysis Software (SAS) and conceptual matrix respectively.

Results: 124 patients have completed the survey- 74 men and 48 women aged between 31 and 92 (average 64) years. Cancer diagnoses and the elderly with multiple co-morbid conditions were predominant. Spouses comprised 90% of all accompanying relatives. There were 8 primary health care providers/care givers. Patients and relatives were satisfied with the care provided with timely access nearer home; cost saving (gasoline, food, time off work) and minimal travel time especially during the winter.

Conclusion: This study suggests that patients and their relatives value Telemedicine assessment because it helps to minimise travel, reduces cost, time off work and provides appropriate care by the “Care” team. Further experience with this pattern of care and its ramifications is required. Visits to Physicians offices for minor assessments may soon become virtual in time and space.

[Back to Contents](#)

TELEHEALTH NURSING RESEARCH – LITERATURE REVIEW 2017

Claudia C Bartz,

Telenursing Working Group International Society for Telemedicine and eHealth

Background: Nurses work in many telehealth-telemedicine settings, from ambulatory care to intensive care. However, telehealth research literature has not been reviewed specifically to discover nurse researchers reporting on their work in telehealth.

Aim: The aim of this study is to present information about nurse-led research in telehealth.

Methods: A medical librarian who regularly reviews dozens of tables of contents of health-related publications forwarded to this author all telehealth research publications found in her ongoing systematic reviews. Telehealth publications from 2017 were then evaluated and those papers with a nurse as first-author were used as the basis for this study. More than 40 papers were then reviewed for source country(ies), research purpose, research design and findings.

Results: Seventeen countries from five continents were represented by one or more papers. The research purposes described in the papers always concerned aspects of telehealth-telemedicine but they were quite diverse. More than 30 different topics were represented in the sample; diabetes, chronic disease, hypertension, parents, and patient-provider dyad were each studied more than one time in this sample but the remainder of the papers addressed single-study topics. Qualitative/descriptive designs were most common, with reviews of literature, technical evaluations and quasi-experimental designs also represented. Findings included information about mHealth users’ perceptions; nurses receiving remote direction for stroke assessment and intervention; phone counselling; mHealth interventions for orthopaedic surgery rehabilitation, weight loss, hypertension management, online support of urine catheterization, suicide prevention and pain management; smartphone use among nurses and physicians; electronic health record implementation; evaluation of apps and platform availability and efficacy; and nursing students’ use of mHealth for care delivery. The findings were mixed, with some positive results from interventions but more often no differences were found with the interventions or between intervention and control groups. The health-related apps evaluations found the apps insufficient and the one evaluation of mHealth platforms found them unsatisfactory.

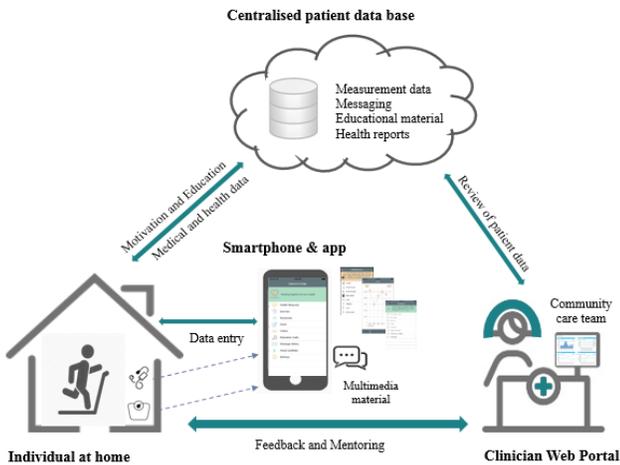
Conclusions: These studies represent a good cross-section of nurses researching telehealth-telemedicine by country and by topic. Continued work is most definitely needed to demonstrate telehealth nursing interventions that result in positive outcomes such as decreased length of stay and decreased re-hospitalization for people with healthcare needs. More intervention-control studies are needed. A reference list will be provided with the presentation.

[Back to Contents](#)

HABBITUALISING mHEALTH

Marlien Varnfield, Christian Redd, Kevin Saric, John O’Dwyer, Mohan Karunanithi
 Australian eHealth Research Centre (AEHRC), Commonwealth Scientific and Industrial Research Organisation

Background: The rapid development and uptake of mobile phone technologies is making a huge impact on the delivery of healthcare services. Smart phone applications (apps), online portals and many emerging ambulatory devices can connect patients to their providers and their personal health data to ensure high-quality, collaborative care. Scientists at AEHRC have developed an mHealth platform comprising of smartphone and Internet technologies, tailored to support self-management in a range of chronic conditions (outlined below).



MoTER: home-based cardiac rehabilitation care model being offered alongside traditional centre-based model, allowing for patient individual preference.

m-COPD: platform to integrate COPD (chronic obstructive pulmonary disease) guidelines to improve uptake of self-management by patients, and adherence to structured care management by clinicians.

PD-Buddy: remote care model to improve peritoneal dialysis service delivery through improvement in patient adherence, health outcomes and optimal staff utilisation.

MOTHER: support for women with first time diagnosis of gestational diabetes and improved multidisciplinary care co-ordination between their healthcare practitioners.

Motivation: The 'Health Assisting Bio-Bot Internet

Technology (HABBIT) concept was conceived as a means of encouraging greater treatment adherence by patients through extending the existing mHealth platform to produce real-world, observable outcomes in response to patient behaviour. HABBIT acts as a novel means of motivating patients, utilising advanced analytic approaches such as machine learning and artificial intelligence, to offer opportunities for better health outcomes. A literature review and consultation with experts were performed on how to best leverage contemporary research in gamification and motivational methods to encourage greater treatment adherence.

Results: From our findings, we have developed a tried-and-true gamification method, coupled with the development of an experimental real world, visually appealing, robotically-controlled bio system. This system is administered through a patient’s smartphone and rewards them for treatment adherence according to goals that are set during consultation with their treating clinician, encouraging perseverance.



Given the enormous costs of non-adherence, efforts to employ novel techniques to encourage treatment adherence could result in cost benefits to healthcare providers and government, both in reduced lifetime healthcare costs and increased public engagement and productivity.

[Back to Contents](#)

ZERO MOTHERS DIE IN BRAZIL: BUILDING BASES FOR THE PREGNANT E-PATIENT AT THE INSTITUTE OF WOMEN, CHILDREN AND ADOLESCENTS HEALTH FERNANDES FIGUEIRA

Angélica Baptista Silva¹, Véronique Inès Thouvenot²

¹ Oswaldo Cruz Foundation, (FIOCRUZ) National Institute of Women's, Children's and Adolescents' Health Fernandes Figueira, Telehealth Laboratory;

² Millennia2025 Foundation “Women and Innovation”, PuF, The Women Observatory for eHealth, WeObservatory

Background: The 2030 Sustainable Development Goal on health reinforces the fight against maternal mortality, which is a problem in developing countries¹, including Brazil².

Aim: This research intends to translate and adapt the Zero Mothers Die mobile application to the Portuguese Brazilian language with the participation of institutional actors. As well, we will listen to mothers and pregnant users of the service about the usefulness and the potentiality of this tool in its daily life.

Methods: As methodology, we are using the technique of ethnographic research called participant observation³ in the phase of translation of the platform by health professionals. Afterwards, we will conduct semi-structured interviews in groups with users of the health service. Our expected results are the dissemination of the methodology used for peers in scientific publication and the provision of the application for pregnant women and mothers in general.

Results: An international agreement was formed with a work plan and a research project was appreciated by a Ethical Committee. MD students, researchers and health professionals forms a multisectorial group⁴ to check and adapt the translation. ZMD is translated to Brazilian Portuguese language with this multidisciplinary team checking the clinical procedures.

Conclusion: We conclude that there are some clinical differences of treatment of the newborn⁵ that must be respected in order to guarantee the maternal and baby health in different cultures^{6, 7}.

Keywords: Telemedicine; Women's Health Services; child health services; Quality Assurance, Health Care

[Back to Contents](#)

IOT AND VIOLENCE AGAINST GAY PEOPLE IN BRAZIL: TIME FOR ACTION

Angélica Baptista Silva¹, Monica Siqueira Malta², Bruna Gurgel Benevides³,

¹ Oswaldo Cruz Foundation (FIOCRUZ), National Institute of Women's, Children's and Adolescents' Health Fernandes Figueira, Telehealth Laboratory; Brazil

² Johns Hopkins Bloomberg School of Public Health, Health, Behavior & Society Dept, EUA and Oswaldo Cruz Foundation, Sergio Arouca National School of Public Health, Department of Social Science; Brazil.

³ National Association of Transvestites and Transsexuals; Brazil

Background: Transgender Europe (TGEU) reveals in the Trans Murder Monitoring (TMM) project that 78% of all murdered trans and gender-diverse were reported in Central and South America between 2008 and 2016. It is a global public health problem. In Brazil, only in 2017, 172 transgender were killed¹.

Aim and Purpose: This work is a result of the national research Divas² with the FIOCRUZ, Johns Hopkins University and the Brazilian Department of Surveillance, Prevention and Control of STIs, HIV / AIDS and Viral Hepatitis, with financial support from UNESCO. It is to combat the transphobia³ with telehealth activities in Brazil. The principal aim is to elaborate, in a participatory way, a strategy of intervention through digital health tools that allow the LGBTI population to inform themselves, denounce, register, confront and avoid various forms of violence to which this population is subject. We will use the network of physical devices, smartphones and tablets, to implement and potentialise this action with the support of big data analytics.

Results: Focal groups with the population³ indicates three integrated activities:

- a. To develop two mobile applications, one aimed to transsexual women and transgendered men, and one aimed at the LGBTI population in general, which allows these individuals to report, record, confront and avoid many forms of violence, in addition to establishing support networks for victims.
- b. To use different web-based applications such as specific website, blogs (eg youtube), micro-blogs (eg Twitter) and social networks (eg Facebook) in order to inform LGBTI people about different forms of violence, laws in force, addresses and support networks for the care of victims, among other related matters.

- c. To hold a national meeting with the objective of presenting the project results and building, together with the LGBTI population, leaders and NGOs, strategies for fighting against the increased violence that LGBTI people are subjected to in the country.

We are developing for IOS and Android, using the prototyping techniques based on design thinking⁴, which may be just screen navigation or have all possible interactions in the mobile application.

[Back to Contents](#)

SPECIAL INTEREST GROUP TEL@AMAZONIA: TELEHEALTH INTERVENTION FOR SECURITY FOOD AND NUTRITION OF MOTHERS AND BABIES IN THE DEEP RAINFOREST

Angélica Baptista Silva¹, Lucia Maria Costa Monteiro², Martha Inés Camargo Garzón³, Waldeyde Oderilda Magalhães Santos⁴, Pedro Máximo Rodrigues⁴, Ianê Germano Filha¹, Katherine Mary Marcelino Benevides⁵, Esther Mourão Correa⁵
¹ Oswaldo Cruz Foundation, (FIOCRUZ) National Institute of Women's, Fernandes Figueira Children's and Adolescents' Health, Telehealth Laboratory, Brazil

² Oswaldo Cruz Foundation, National Institute of Women's, Fernandes Figueira Children's and Adolescents' Health, Brazil

³ Health Ministry, Colombia

⁴ State University of Amazonas, Brazil

⁵ Nutrition and Children Dept., Health State Secretary of Amazonas, Brazil

Background: The Brazilian state with the largest number of indigenous people is the Amazon, representing 55% of the total of the North region of the country. The literature shows a nutritional and anthropometric profile with high prevalence of height and malnutrition deficits in indigenous children in Brazil, associated with poor socioeconomic and environmental conditions. Malnutrition in the indigenous population is one of the biggest public health problems of the country and one of the main causes of morbidity and mortality among indigenous children. Other causes that raise indigenous mortality rates are infectious and parasitic diseases. In order to fight against this problem this problem, we will carry out an experimental study in which there will be activities of permanent education with primary health care professionals and midwives. Updated guidelines will be provided on food for pregnant women and mothers with children accompanied by the childcare service in the indigenous areas of the state of Amazonas, where there are telehealth units.

Aim: The main objective is to help achieve the normal weight of the indigenous population 0-5 years, based on nutritional counselling with an emphasis on the nuclear family. The specific goal is to create differentiated menus, which supply the nutritional deficiencies according to the tradition and beliefs of the territory.

Methods: The intervention to be implemented will be a series of online meetings through the internet between the multi-professional and international team of researchers aimed at healthcare professionals and midwives at the telehealth centres in the state of Amazonas. As a proposal to monitor the intervention, the prevalence of weight deficit will be observed among the children attending the child care clinics of the participating health units, as well as the changes in the health practices of the participating health professionals through qualitative verification in focus groups online.

Results: Three Special Indigenous Health District (DSEI) were chosen to compose the case-control study, during 18 months: (1) Alto Rio Negro, (2) Alto Rio Solimões and (3) Médio Rio Purus. The DSEI Médio Rio Purus, with 87 indigenous villages and 9 ethnic groups, doesn't have telehealth centre to assist the healthcare local network. It will be our control arm of the study. The DSEIs Alto Rio Negro and Alto Rio Solimões, with 862 indigenous villages and 30 ethnic groups, have telehealth centres and border with Colombia.

Conclusion: Preliminary results of the literature review point to underreporting of local healthcare data and there is low adherence by professionals to recommendations, regarding nutritional counselling. The control-case study showed be the best research design to monitor and evaluate the telehealth intervention, but it has its limits to present this complex reality. This is a great challenge for the multidisciplinary team.

Keywords: Telemedicine; Women's Health Services; Child health services; Breastfeeding; Health Services, Indigenous

[Back to Contents](#)

mHEALTH SOLUTIONS FOR MANAGING THE NIGERIAN ARMY MEDICAL CORPS (NAMC) PATIENT INFLOW USING COMPUTING EDGE TECHNOLOGY

Ayotunde Joseph Owosho¹, Idowu Ajigbon², Leke Oyewole³, Dipo Odumosu⁴

¹ Headquarters Nigerian Army Medical Corps (HQ NAMC). Department of BioMedical Engineering, Faculty of Basic Medical Sciences - College of Medicine of the University of Lagos ² National Space Research and Development Agency (NASRDA), Abuja, Nigeria.

³ Amethyst Healthcare and Diagnostic Centre. Lekki, Lagos

⁴ MedCorp Technologies, Lagos

The Nigerian Army Medical Corps (NAMC) and by extension the entity of the Armed Forces of Nigeria (AFN) Medical facilities combined have built and developed over many years the most extensive and widest coverage of medical infrastructure network across Nigeria investing valuable Nigerian resources in the training and equipping of Army personnel in all medical fields of specialty. Considering the availability of smart phones and internet penetration which has increased significantly in the Nigerian population statistically by about 70% and 55% respectively, and with a niche/mission to put the NAMC Infrastructure to the overall common good of both troops and the Nigerian Citizenry via mHealth Solutions; the proposed Medcorp mHealth app was conceived/perceived as a viable solution to tackle challenges being faced in the healthcare sector in Nigeria and Africa at large thereby not only meeting the basic healthcare requirements of every Nigerian for a healthy Nigeria but also further aid the spread and practice of Telemedicine & eHealth in the Sub-Saharan African Region.

As such in this paper, the development of a mobile app for the management of patient inflow is described. This focused on the design, implementation and installation of the application on a portable mobile android device. The application allows patient to input their vital signs, forward the information to a doctor with the same app; the information is processed and the patient attended to immediately and those that require visiting a hospital are put on appointment. The exchange of data is done backend and frontend through highly encrypted web services to provide data security.

The application was tested on a software simulator in Eclipse IDE with the android development kit (ADK) serving as the virtual interface devices. Final validation of the designed application was done on a mobile phone running the android operating system.

Keywords: Nigeria, AFN, NAMC, Medcorp, mHealth, Mobile device, Patient management, Mobile application development, Android application, Virtual software simulator, Eclipse IDE, Android Development kit.

[Back to Contents](#)

FEASIBILITY OF A WEB-BASED, LIFESTYLE INTERVENTION IN PATIENTS WITH LIVER DISEASE, CYSTIC FIBROSIS, OESOPHAGEAL CANCER, OR PSYCHIATRIC DISORDER

Pfirmsmann D, Haller N, Huber Y, Jung P, Lieb K, Gockel I, Poplawska K, Schattenberg JM, Simon P.

Background: Regular physical activity is generally recommended to healthy people, but also improves the clinical picture of different diseases. In order to increase the physical fitness or to delay the disease related symptoms, medical societies recommend up to 150 minutes of aerobic endurance training of moderate intensity. Additional strength training should be performed two times a week. However, lack of interest or loss of motivation are common barriers for many people to achieve these guidelines. If a web-based solution is an effective and motivating method for delivering tailored exercise recommendations to patients in their home environment, is the objective of this article.

Aim: Our objective was to gain new insights in different user behaviours of our web-based interventional concept (expressed as login rate and login duration) and to assess the physical activity level (expressed as minutes per week) in patients with liver disease, cystic fibrosis, oesophageal cancer, or psychiatric disorders.

Methods: Four clinical trials were carried out (iPEP study: internet-based perioperative exercise program; HELP study: hepatic inflammation and physical performance in patients with NASH; EXDEP study: exercise in depression; COMMED study: cystic fibrosis online mentoring for microbiome, exercise & diet). All patients were monitored and supported over the same platform and received tailored recommendations and activity goals in weekly intervals. The study participants had full access to the content of the homepage, including a discussion forum for peer support.

Results: Five patients of each clinical trial (20 patients in total) were compared in terms of their using behaviour and their physical activity level over eight weeks. There was a significant decrease in the using behaviour across all studies (login rate $P < .001$; duration $P < .001$). However, focusing on the single trials, there was a significant decrease only in two studies (HELP

study (P=.004; P=.002); iPEP study (P=.021; P=.001)) and no significant change in the other two investigations (EXDEP study (P=.583; P=.378); COMMED study (P=.867; P=.558)). Physical activity levels did not change across all studies over the eight weeks (P=.311). However, in the HELP study, the physical activity level increased steadily over the period analysed (P= .045).

Conclusions: Exercise manuals and video tutorials could be downloaded from the website. This aspect could at least partly explain the decrease in the using behaviour. With the help of the developed program/ platform, it was easily possible to integrate the exercise program into the patients' daily routine and to provide a flexible and individual support in time.

[Back to Contents](#)

LEGAL ASPECTS OF CROSS BORDER TELEMEDICINE BETWEEN MOROCCO AND THE EUROPEAN UNION

Ikram Ganetri¹, Hassan Ghazal¹, Francesco Sicurello², María Del Carmen García Garnica³

¹ University Mohammed Premier, Oujda/Nador, Morocco

² International Institute of Telemedicine, Milano, Italy

³ Faculty of Law, University of Granada, Granada, Spain

Telemedicine becomes cross-border if the patient or the healthcare provider using or delivering telemedicine services are residing in different countries. Cross-border telemedicine presents opportunities for health systems but poses additional legal obstacles. This work examines the regulatory challenges associated with cross-border telemedicine in general and between Morocco and the European Union in particular. For a national exercise, the question of the place of delivery of the service is minor but it is more complicated when it is a cross-border one as countries present number of differences in legislation, implementation, technology, planning, terminology, semantics, and language. The cross-border practice of telemedicine seems compatible with the rights of the patient as stated by the Directive 2011/24/EU on the application of patients' rights in cross-border healthcare. There are key specific legal issues related to the provision of cross-border telemedicine: licensing/registration of health professionals performing cross-border telemedicine services, the conditions for legal processing of health data and data protection, the right of reimbursement of a cross-border telemedicine act, the determination of potential liability, and the identification of the relevant competent jurisdiction and applicable law. Cross-border healthcare can have advantages for market healthcare as competition from foreign health care providers can increase efficiency. However, reimbursement of cross-border telemedicine is unclear. In Morocco, in order to allow cross-border telemedicine, the policymakers are called to update and extend the national law of telemedicine to include cross-border telemedicine. This can be envisaged within the frames of the European Moroccan Association treaty in the context of the advanced status of Morocco. Alternatively, bilateral agreements with the European member states should address the issue.

Keywords: Cross border telemedicine, legal issues, Morocco

[Back to Contents](#)

A REVIEW OF GAMIFICATION IN THE IMPROVEMENT OF ORAL HEALTH KNOWLEDGE

Mariño R¹, Wassouf H¹, Wen W¹, Wen MJ¹, Whyte RJ¹, Vuckovic K¹, Manton D¹, Black J¹, Meredith G², Stranieri A²

¹ Melbourne Dental School, University of Melbourne,

² Federation University

Aim This study was undertaken with the purpose of systematically reviewing Apps containing gaming elements to improve oral health knowledge and to assess their embedded behavioural change techniques.

Methods: A systematic search was conducted using four major electronic databases to search for papers investigating educational games research applied to oral health and the ability to improve oral health knowledge in children and adults. This review included papers published between January 2000 and June 2017. The Critical Appraisal Skills Programme criteria were used to assess the relevance and results of each published paper in this literature review.

Results: 296 records were found in the initial search. After title and abstract screening, and elimination by full text review, seven articles fitting the criteria were identified. Both interactive dental video games and non-video games were as effective as traditional, non-interactive educational methods in improving oral health knowledge in selected children and adult populations. Nonetheless, participants' feedback reflected a higher level of satisfaction in learning through games. The

quality of the studies was limited due to small samples, limited age range of participants, length of follow-up periods to review knowledge retention, and poor follow-up attendance.

Conclusions: Educational games are used scarcely in the promotion of oral health, and little reliable data is available to confirm their efficacy. Most studies involved children. While gamification has been successful, further studies are required using more rigorous designs, evaluation and follow-up. Additionally, because of differing learning styles, more studies involving adult are recommended to identify effective gamification strategies.

[Back to Contents](#)

NATIONAL BENCHMARKING OF NURSING-SENSITIVE OUTCOMES: INITIAL STEPS IN FINLAND

Junttila K¹, Meriläinen M², Tervo-Heikkinen T³, Taam-Ukkonen M³, Koivunen M⁴, Makkonen P⁵, Ritmala-Castrén M¹, Lundgrén-Laine H⁶

¹ Helsinki University Hospital

² Oulu University Hospital

³ Kuopio University Hospital

⁴ Tampere University Hospital

⁵ Turku University Hospital

⁶ Central Finland Central Hospital

Background: In its eHealth Action Plan 2012-2020, European Commission defines that the aim of eHealth services is to use them to improve clients' health, the effectiveness and productivity of health services, and the social and economic value of health. eHealth services embrace the interaction between clients and health care service providers, the transfer of information between health care organizations or peer to peer communication between patients and/or health care professionals. Thus, benchmarking is crucial in continuous quality improvement and can be used to evaluate patient safety and quality performance in health care organizations. Internal benchmarking is used to identify and compare best practices within an organization, and to compare performance over time. External benchmarking is essential for accreditation purposes, and can be seen as a process of seeking out and implementing best practices by collaborating among several organizations. Successful benchmarking requires careful planning of the process, monitoring of the relevant indicators, and - to enhance learning and continuous improvement - staff involvement. The eHealth Strategy 2015-2020 of the Finnish Nurses Association outlines that information generated through the interaction between clients and professionals will be used e.g. for development purposes. Every nurse will have the same possibilities to access the information and the competence to utilize it. Best practices in nursing will spread rapidly nationally and internationally.

Aim and Purpose: In Finland, the National Institute for Health and Welfare offers a platform to compare performance indicators within e.g. specialized health care. However, these indicators do not cover nursing-sensitive outcomes which reflect the quality of care given by nurses, and are of great interest and importance among nurse leaders. Therefore, to fulfil the aim given by the Chief Nursing Executives of the five Finnish university hospitals, nursing developers / experts in those organizations started to explore the possibilities of benchmarking relevant nursing-sensitive outcomes.

The following steps have been taken: 1) selection of relevant outcome indicators that are also consistent with international accreditation programs, such as Magnet® Program; 2) identification of potential obstacles in uniform data production; 3) decision on a relevant schedule for producing benchmarking data; and 4) search for potential vendors to build up the database and reporting system.

Results: So far, consensus has been reached to include the following nursing-sensitive outcomes in benchmarking: patient falls, pressure ulcers, risk of malnutrition, pain management, catheter-associated urinary tract infections, central line-associated bloodstream infections, nursing-sensitive patient satisfaction, nurses' organizational engagement (work satisfaction), hand hygiene, and safety of medication process. Data of nursing-sensitive patient satisfaction has been collected three times in 2017 with a one week period. Data of nurse engagement will be collected in February 2018. The future steps in data collection will be decided on in the beginning of 2018. So far, all the university hospitals and one central hospital are involved in data collection.

The organizations are in different phases in implementing best practices regarding the aforementioned issues. Therefore, continuous electronic data production through e.g. nursing documentation is not possible. Manual data collection using prevalence approach is time-consuming, and cannot be the final solution. Also, finding an outside vendor is essential for analysing and reporting. Data of the nursing-sensitive patient satisfaction will be analysed so that they can be reported in the presentation.

[Back to Contents](#)

VIRTUAL CLINIC FOR ORAL HEALTH CARE (VIRSU)

Kaarina Sirviö¹, Tiia Ranta-Pere², Liisa Suominen³, Tiina Joensuu⁴, Jukka-Pekka Skön¹

¹ Faculty of Health Care, Savonia University of Applied Sciences

² Service area of Health Care, City of Kuopio

³ School of Medicine, University of Eastern Finland

⁴ Department of Dentistry, Kuopio University Hospital

Oral health care services are an important part of the ongoing social and healthcare reform. One of the main goals is to improve the citizen's ability to take care of their own health and life. The importance of digitalization in health care services needs to be strengthened. In addition, in oral healthcare, digital service models change traditional service activities and challenge the development of personnel skills and the changing of job images and work structures so that the use of technological applications becomes part of their job.

The VIRSU project aims to utilize virtual and augmented reality environments and gamification methods to develop virtual clinic for oral health care. In addition, new models for digitalization oral health care services will be investigated and tested in the city of Kuopio. Further, project aims to accelerate the development of the market for digital oral health care services in Finland.

The VIRSU project will be realized in cooperation with Savonia University of Applied Sciences (coordinator), University of Eastern Finland, Kuopio University Hospital, City of Kuopio, Futudent Oy, Hammaslääkäripalvelu Savodent Oy, Esteettisen Hammashoidon Klinikka Oy Hannu Vesanen, Suun Terveyspalvelut HYMY Oy and Plandent Oy.

[Back to Contents](#)

CONSUMER PERSPECTIVES AND THE DEVELOPMENT OF STANDARDS FOR TELEHEALTH SERVICES

Malcolm Fisk^{1,2}, Frederic Lievens^{1,3}, Drago Rudel^{1,4}

¹ Telehealth Quality Group (TQG), UK/Belgium/Slovenia

² De Montfort University, Centre for Computing and Social Responsibility, UK

³ International Society for Telemedicine & eHealth (ISfTeH), Belgium

⁴ MKS Electronic Systems, Slovenia

Telehealth services come within the wider reference frame of 'digital health'. They are defined by the Telehealth Quality Group (www.telehealth.global) as 'the means by which technologies and related services concerned with health and well-being are accessed by people or provided for them irrespective of their location'. What is significant about this definition is that it regards telehealth services neither in technological nor in purely clinical terms. Instead it sees telehealth services as 'accessed by' as much as 'provided for' the people who use them. It signals a move from a mindset that regards service users as 'patients' or dependents to one that recognises a constituency including consumers able to exercise choices and control over the services they use. Finally, the definition, by reference to 'well-being', positions telehealth services at least partly in the arena of public and preventative health and is, therefore, concerned as much with behaviours and lifestyles (of people of all ages) as with acute health events or the treatment and management of long-term conditions (disproportionately experienced by older people). Developments in telehealth are, however, very rapid. Technological changes (notably exhibited in the form of mobile devices, video-communications and wearable sensors) are revolutionising our thinking about, not only how we access health-related services, but about how we can take more control over our health. Older, technology-based (or driven) services that are narrowly configured according to management needs of service provider organisations (be they local authorities or health trusts) can, therefore, be increasingly seen as unlikely to meet the changing aspirations and needs of tomorrow's service users. Small wonder that new rafts of services, mostly in the private sector, are emerging to meet some such needs – with their foci extending from tele-psychiatry to medication reminders. This paper notes a range of standards, quality marks and codes of practice that relate to telehealth services. These extend from those that are more prescriptive (often top-down and technology-driven) about service operation; to a few that offer a consumer-driven perspective (concerned with choices and options). It is argued that the changing mindset for telehealth must relate to a mainly consumer rather than service provider (or technology) perspective. Following from this, it is suggested, a clear contribution can be by standards for telehealth services where people (and 'patients') can be empowered and for whom at least the preconditions will be more in place for them to maintain healthier lifestyles and behaviours. Attendees will be guided in an exploration of

the impact of technological changes on the way people access services relating to their health and well-being and gain insights into the world of standards and their growing role in the field of health and well-being services.

[Back to Contents](#)

AGILE METHODS IN DEVELOPING A MODERN SEARCH TOOL FOR THE PHYSICIANS' CLINICAL RESOURCE DATABASE

Jukkapekka Jousimaa, Juha Kautto, Juuso Landgren
Duodecim Medical Publications Ltd.

Background: The EBM Guidelines (EBMG; in Finnish 'Lääkärin käsikirja ja tietokannat') is a concise and easy-to-use collection of clinical guidelines for primary care, integrated with the best available evidence. The EBM Guidelines are continuously updated to follow the latest developments in clinical medicine and to bring evidence into practice. The collection is an essential point-of-care source of practical information to be applied in primary care. The pilot version was launched as early as in 1989 on a floppy disk. The first CD-ROM was published in 1991, and finally the internet-based EBMG database was published as a part of the Health Gate portal (in Finnish 'Terveystieto') by the year 2000. Several translated and localized versions have been developed in a number of countries since then. In 2017, more than 15 million articles were opened in the EBMG and the integrated auxiliary databases by the Finnish health care professionals. The use of these databases has become a standard in information-seeking for the majority of Finnish physicians.

Aim and Purpose: Changes in the user interface must be carried out with extreme care so as not to confuse the busy clinicians. However, many technical solutions from the earlier years of the database are obviously becoming outdated, and their maintenance is time-consuming. Support for mobile devices is not at a satisfactory level. Thus, a project was launched in order to

1. enhance the usability and the user experience but at the same time preserve features that work well in the old version
2. improve the search engine to produce better matching hits faster
3. develop an interface that is completely mobile and tablet device compatible
4. better utilize the wide screen properties of displays while also maintaining compatibility with older screen
5. apply modern programming technologies (Angular 5 and NodeJS) to achieve better performance and less maintenance work
6. fine tune Visual Interface to provide better user experience.

This project is a collaboration with the EBMG editorial team, the Duodecim ICT department and the programmers from the companies Nitor and Roxeteer. User testing will be carried out by the company Eficode. The agility principle applied in this project means that new pilot versions are launched at short intervals, even several times a day, for testing and commenting in order to speed up the development process.

Results: In this presentation, the improved EBMG program version with the new features will be presented. The importance of the agility principle in the development process, as well as the collection and utilization of pilot user feedback, will be discussed.

[Back to Contents](#)

COURSES ON TELEMEDICINE TECHNOLOGIES OF CONTINUOUS MEDICAL EDUCATION AT RUDN-UNIVERSITY

V.L. Stolyar, E.A. Lukianova
RUDN-University, Department of Medical Informatics and Telemedicine

Background: Telemedicine consultations have a number of advantages, including the possibility of obtaining a "second opinion" in the best world clinics for clarifying the diagnosis and determining the optimal tactics for treating. Updated Russian Federal Law No. 242-FZ of July 29, 2017 and normative acts of Russian Ministry of Health will create the necessary legal conditions for organizing and conducting consultations using telemedicine technologies. The available developments in telemedicine can be successfully applied to the teaching tasks of students in both medical and pharmaceutical fields. For several years, within the framework of the school on Telemedicine we studied what theoretical questions should be included into the curriculum, and what practical skills must be mastered first queue.

Aim and Purpose: Telemedicine is actively being introduced into the doctors' practice, however, a basic knowledge of the possibilities and limitations of modern telemedicine technologies is needed, as well as practical skills in the preparation and conduct of video conferencing. In Medical Institute of RUDN-University, the conditions necessary for the implementation of continuous medical education (CME) - a simulation training center where physicians can improve their practical skills and the Telemedicine Centre for video conferencing equipped with all modern ITU standards - have been created. Distance learning provides the opportunity to acquire new knowledge without interruption of working, it is convenient and flexible. Using videoconferencing for personification of interactive distance learning in CME, which will allow physicians to study at the workplace is perspective for distance learning development on the basis of modern telecommunication technologies.

Results The educational module "Telemedicine" for students of 4-5 courses and two distant professional educational programs for physicians have been developed.

I) Educational module "Telemedicine" for students of 4-5 courses

The developed training module includes the following topics: The fundamentals of telemedicine, and the world trends in its development; Technological equipment of telemedicine events; Hardware and software of telemedicine; Economic and legal aspects of telemedicine; Scenarios of telemedicine activities such as: "Home telemedicine (monitoring and patient-doctor interaction)"; "Preparation, implementation and documentation of remote video conferencing (including cross-border)"; "Organization of remote mentoring during operations or diagnostic procedures"; "Organization of a remote interactive lectures from PFUR to the country of graduates".

Students receive practical skills in the course of business games in preparation and conduct of video conferencing. We demonstrate to students the technologies of remote interactive learning (lectures and master classes from the leading clinics of Russia, countries of Europe, India, Brazil and Canada).

II) Distant program "Telemedicine Technologies in Healthcare Practice"

During this course basic concepts and definitions, goals and objectives of modern telemedicine are given. It tells about development of telemedicine. Successes and causes of damage of telemedicine projects are analysed. The main forms of work in telemedicine: consultation, lecture, master class, scientific and practical conference, patronage, monitoring, supervising are considering. An idea about the Internet portal as an environment for organizing telemedicine events, as well as about the technical means of mobile telemedicine is given. The standards of encoding/decoding information as well as image and sound quality are considered in detail.

III) Distant program "Telemedicine in the health care system"

This program includes such special sections of telemedicine as tele-radiology and tele-cardiology, ethical and deontological aspects of telemedicine, the protection of personal data during telemedicine activities, remote access to the medical information system (MIS). Standards of storage and transfer of graphic information about patients are being studied. The principles of PACS (Picture Archiving and Communication System) have been given. Since pathomorphological examination is carried out at a distance using a video monitor instead of light microscope image, attention to the technological equipment for telepathology is paid. Students receive basic knowledge of the legal and economic relations of subjects in telemedicine.

Keywords: telemedicine, videoconferencing, interactive education, distance learning

[Back to Contents](#)

CLIENT'S SELF EVALUATION AS A BASIS OF PROFESSIONAL SUPPORT

Sakari Kainulainen¹, Arto Holopainen², Maiju Tirri², Katriina Kankkunen², Heidi Laakko²

¹ Diaconia University of Applied Sciences

² City of Kuopio

Background: In Finland, social and health centres, hospitals, private companies and organizations provide public services. Their activities are governed by various regulations. Organizations use different information technology systems in their operations management and customer service. In addition to organizational diversity, the services provided are influenced by many professions and their working cultures. The multidisciplinary service system and multiprofessional work combined with non-integrated information systems pose many challenges for practical work. The ongoing reform of the public social and health services aims to clarify the situation and the high expectations of digitalisation.

It has been shown that a small part of the population uses most of the services. The result must be understood; most of us have a specific problem and we want the service to help. When there is fever, we get medicine and salute. The process is clear, easy to organize and affordable to produce. Often, however, the needs are more complex or those that do not have direct service from the service system. People who need many services at the same time make a challenge to the service

system. The city of Kuopio, as a pioneer in the ODA project launched by the Finnish Government, applies a self-assessment methodology for the life situation of a school child and their parents and a right-time access to early childhood support.

Aim and Purpose The aim of the experiment is to test the usefulness of 3X10D Survey in practical work. 3X10D Surveys is a tool for self-assessment of life situations applied to schoolchildren and their parents. Self-assessment is made holistically for all of the key areas of life. In this case, the customer's own needs will be displayed before the start of a face-to-face service process. During the spring of 2018, the extent to which digitally pre-filled self-esteem could be used to facilitate the identification of needs and the better targeting of experts' work.

Methods The experiment is based on a 3X10D self-assessment measure developed for the 16-29 age group [1,2]. Original measure was further elaborated measures for schoolchildren and their parents. The measure estimates the typical life domains of each age (or family). The defendant evaluates the life domains in a 11-step scale, whose extremities are "very dissatisfied" and "very satisfied". The wording of the extremes of the ranges varies from self-assessments to under 14 years by questions. In addition, there is a self-assessment of oral health due to a multidisciplinary experiment. There are three schools in Kuopio, where multi-professional student care is available. This also makes it possible, if necessary, to arrange multi-professional meetings when it is necessary because of self-assessment or other reasons. An online 3X10D Surveys is sent to children and their parents before the annual health check-up. The child and the parents send the self-assessments to the nurse to see before the meeting. The nurse is preparing to discuss in particular the areas of life where satisfaction ratings are low.

Results Our hypothesis is that electronic self-assessment promotes multi-professional collaboration when looking at the customer's needs globally and does not break into too complex entities. Likewise, we assume that the customer's pre-information can be more quickly processed to the needs of his support.

Conclusions If the results show the self-evaluation of meeting school health care to bring benefits to the client process and provide faster assistance to children and families, the method would greatly enhance the right-timing delivery of support for schoolchildren and the functionality of the service system.

[Back to Contents](#)

WEB-BASED EDUCATION QUALITY ASSESSMENT SYSTEM IN MEDICAL HIGHER SCHOOLS (CONCEPTUAL MODEL)

Kristina Kilova, Nonka Mateva

Department of Medical Informatics, Biostatistics and E-learning, Faculty of Public Health, Medical University of Plovdiv, Bulgaria

Quality and its assessment are essential for modern management of the educational process. It is included in the mission, goals and tasks of every higher school detailing in collection, analysis of the needed information and consequent adequate management decisions. Constructive student feedback, establishment of systems of continuous control, and implementation of changes based on a scientific conceptual framework will help the education to move from quality assurance to quality improvement. The quality of education is a responsibility of all participants – lecturers, students, institution management. Automating the feedback process with students will lead to a faster analysis of the results, making adequate management decisions in order to achieve the ultimate goal – improving the quality of higher education.

In the present paper the need for regularly providing students with the opportunity actively to participate in the management of quality of education is justified. The paper deals with the automation of collection, analysis of the needed information and consequent adequate management decisions. A conceptual model of “Web-based education quality assessment system” in medical higher schools with a focus on the survey and its design are also presented.

Keywords: quality assessment, medical higher schools, education, conceptual model, web-based system.

[Back to Contents](#)

EVALUATING eHEALTH INTERVENTIONS: RESULTS AND EXPERIENCES FROM THE PILOT OF AN ICT-BASED SELF-MANAGEMENT TOOL FOR HEART FAILURE PATIENTS IN NORWAY

Konstantinos Antypas^{1,2}, Frank Larsen²

¹ Norwegian Center of E-health Research, Tromsø, Norway;

² University of Oslo, Norway;

³ University Hospital of North Norway, Tromsø, Norway

Background As the number of eHealth tools increase and their use is getting more and more popular, the development and implementation of good evaluation methods for these tools becomes very important. The fast pace of technological development, the economic interests, the societal needs and several other factors push towards shorter alternatives to traditional evaluation approaches. In this climate, it can be challenging to balance the quality requirements of good scientific conduct. The Norwegian Center for E-health Research, in collaboration with partners from Israel and Switzerland has been engaged in the evaluation of the pilot of the SENACA ICT-based self-management tool for chronic diseases developed in Switzerland by European Medical Network AG.

Aim The aim of our study was to evaluate the effect and the user-acceptance of the tool, by developing and implementing the appropriate evaluation method. A secondary aim of this study was to reflect on the fitness of the methodological choices we made and to share our experiences.

Methods We recruited 12 patients with Heart Failure living in Northern Norway. We collected data through questionnaires at baseline, at day 50 and at day 100 after baseline. We have also collected daily data regarding weight, blood pressure and activity. We analysed the data with non-parametric methods, such as Friedman test.

Results The median age of the users was 61 (IQR 57.5, 69.5). There was no statistically significant difference between the difference time points in weight (Chi-Square=3.11, df=3, p=0.428), activity in steps (Chi-Square=6.7, df=3, p=0.084), diastolic blood pressure (Chi-Square=2.5, df=3, p=0.475) or systolic blood pressure (Chi-Square=6.528, df=3, p=0.089). User acceptance was generally positive at both timepoints (day 50 and day 100) and did not change significantly (Chi-Square=0.4, df=1, p=0.754). The evaluation method proved to be adequate for providing information regarding the feasibility of the tool, but the small sample as expected limited the potential for generalizations.

Conclusions The evaluated tool was safe and seemed to deliver the expected functionality, helping patients to maintain weight, and level of physical activity over time. Users also seemed to be satisfied with the tool. Our evaluation method served its purpose and can be reapplied in the evaluation of other pilots of similar tools.

[Back to Contents](#)

DEPLOYMENT OF NATIONAL KANTA SERVICES 2010-2017

Jormanainen VJ

National Institute for Health and Welfare (THL), Health and Social Care Systems, Social and Health Systems Research

Background: Kanta is the name of the Finnish national data system services for healthcare services, pharmacies and citizens. The Kanta Services form a unique statutory service concept, which has been introduced for the use of citizens, healthcare services and pharmacies in phases. Legislation became effective 1 July 2007. The main services include the electronic prescription, My Kanta pages, Patient Data Repository, and Pharmaceutical Database. Fairly soon the services will include social care data, too.

Methods: Electronic prescription. The first electronic prescription was written in Turku in 20 May 2010, it was dispensed in a Turku pharmacy, and data were stored in the ePrescription Service. Some 98% of the pharmacies (815 pharmacies and subsidiary pharmacies) subscribed the ePrescription Service in due time (by 31 March 2012). Some 95% of the public healthcare providers subscribed the Service in due time (by 31 March 2013). Private healthcare providers were due to subscribe ePrescription Service in two phases according to the Parliament degree: providers that prescribe more than 5000 prescriptions annually were due to subscribe the Service by 31 March 2014, and the rest by 31 December 2017. In Finland electronic prescription became mandatory 1 January 2017.

Patient Data Repository. A production pilot of the Patient Data Repository service was run in Kuopio from mid-November 2012 till mid-February 2013. The Patient Data Repository service was first subscribed by East Savo Hospital District in early November 2013, and a large scale deployment in public healthcare started in March 2014. There were 57 (33%) public healthcare subscribers by 31 August 2014 (deadline set by the law) covering a population of 1.6 million. All public

healthcare providers had subscribed the service by early December 2015 (100% population coverage). The first Patient Data Repository user in private healthcare subscribed the service in early February 2016.

My Kanta pages. At the same time Kanta Services were opened My Kanta pages were available for citizens via internet web-service (www.kanta.fi or www.omakanta.fi). In the beginning, My Kanta pages were available for adults (i.e., 18-year-olds or older) only, and just recently for caregivers of up to 10-year-old children.

Results: Electronic prescription. In May 2010–November 2017 physicians wrote 132.0 M electronic prescriptions in their EHRs that were transmitted as encrypted messages to the national ePrescription Service. Some 226.7 M purchases based on electronic prescriptions have been dispensed at the pharmacies. Physicians wrote in January–November 2017 a total of 29.477 M prescriptions, out of which 28.5 (96.6%) M in their EHRs and 0.29 (1.0%) M with Kelain prescription web-service. In addition, they wrote 0.25 (0.8%) M paper and gave 0.12 (0.4%) M telephone prescriptions that were turned into electronic prescriptions by the pharmacies. In 2017 till 30 November there have been 55.7 M dispensing/purchasing events of prescription medicine at the pharmacies (100% from electronic prescriptions). All the public and 1262 private healthcare providers have subscribed the ePrescription Service by 30 November 2017. Patient Data Repository. All public and 265 private healthcare providers have subscribed the Patient Data Repository service by 30 November 2017. There were 944.35 M patient documents registered/archived of 505.3 M service events from 5.75 M persons in the Repository by 30 November 2017. In 2017 there have been 345.02 M documents registered in the Repository. Persons have given 5.52 M informings, 2.84 M consents, and 0.07 M denials. In addition, persons have registered 0.27 M wills. My Kanta pages. There have been 31.32 M logins by 15.92 M visits by 2.34 M persons at the My Kanta pages by 30 November 2017. In addition, there were 3.76 M requests for electronic prescription renewals, and 0.98 M visits on behalf of another person (children <10-year-old) in/via the service. In November 2017, there were 1.33 M logins by 0.60 M visits, and 0.20 M electronic prescription renewal requests. Data Repository for Social Services. There are currently five pilots ongoing, the purpose of which is to start national Data Repository for Social Services production in spring 2018. A state sponsored project has already produced 1630 registration coaches and 21 networks that have further facilitated registration events based on education and web-modules for 8199 social care professionals. According to the programme schedule, the pilots will start service production in spring and the others in autumn 2018.

Conclusions: The Finnish national Kanta Services are deployed, and their use has increased in function of deployed services and number of subscribers. They will be further enlarged and modified according to the needs of patients and customers, professionals, organisations and other stakeholders.

[Back to Contents](#)

EVALUATION OF THE E-HEALTH MICROG-PUCRS PLATFORM AS AN ASSISTANCE TOOL OF COMPLEMENTARY DIAGNOSIS TO LOCAL TEAMS

Lucas S Boneli¹, Helena W de Oliveira¹, Michele S G da Rosa¹, Maurício M da Rosa²

¹Telehealth Lab. Microgravity Centre. Pontifícia Universidade Católica do Rio Grande do Sul - PUCRS. Brazil

²Department of Computer Science. Centro Universitário Ritter do Reis - UNIRITTER. Brazil

The use of Telehealth as a medical assistance tool has gained notoriety once it turns possible the medical care at remote regions, where the lack of physicians and hospital equipment represent a barrier to an efficient service. This is a retrospective study concerning the Telehealth missions performed by the Telehealth Laboratory of the Microgravity Research Centre in cooperation with the Telehealth League of PUCRS (LITESA) and with the help of doctors from the São Lucas Hospital of PUCRS, at the São José Hospital located in Palmares do Sul (RS, Brazil).

The missions at Palmares do Sul started in 2015 and, until the present moment, they reached a total of 86 medical appointments, of which 66,3% refer to the area of Cardiology and 33,7% refer to the area of Dermatology. The appointments are divided in two moments, initially a screening is completed, which consists of collecting the patient's personal data and habits in general, and then the patient is led to the specific appointment in the areas of Dermatology or Cardiology. All the information regarding the patients are recorded on the E-Health platform of MICROG-PUCRS, which allows access to all professors and students from the Telehealth Laboratory of the Microgravity Research Centre and two specialist doctors from the São Lucas Hospital of PUCRS, following data confidentiality and measures of the Ethics and Research Committee (CEP). In order to facilitate the job of the specialist doctors, the appointments in Palmares do Sul include an electrocardiogram exam which is performed through the program WinCard and the photographic register of the dermatological injuries; both, the ECG and the photographic register are forwarded to the doctor through the E-Health platform of MICROG-PUCRS.

The medical appointments are considered of great value by the employees of the São José Hospital as well as by the patients who were assisted by the missions. In remote and poor regions, like Palmares do Sul, the presence of a specialist physician is very a distant reality, however the use of Telehealth turns itself in an important and efficient tool besides necessary.

[Back to Contents](#)

A STRUCTURED REVIEW OF FACTORS FOR SUCCESSFUL PATIENT-PROVIDER mHEALTH PROJECT SCALE UP IN AFRICA

Addotey-Delove Michael Nii-Addotey^{1,2}, Richard E. Scott^{1,3}, Maurice Mars¹

¹TeleHealth Department, University of KwaZulu-Natal, Durban, South Africa

²Pentecost University College, Accra, Ghana.

³NT Consulting – Global e-Health Inc., Calgary, Alberta, Canada; University of Calgary, Calgary, Alberta, Canada

Background: Hundreds of mHealth projects have emerged over the years in Africa intended to improve the quality of healthcare and extend service delivery to underserved communities. However, many of these projects do not get scaled up beyond the pilot stage due to a number of factors. Identifying these factors is key to ensuring success in adoption, service delivery, sustainability, and eventual scale up.

Aim: To identify factors necessary for scale-up of mHealth projects for patient-provider communication.

Method: PubMed and Scopus databases were searched in December 2017 to identify studies reporting issues affecting patients or health workers use of mHealth in Africa and which either promoted or impeded scale-up. The search found 316 studies published in English between 2000 and 2017. Of these, 90 met the inclusion criteria after the retrieval of full text papers.

Results and discussion: Included papers were categorized into three groups of patient and provider mHealth use: health providers alone (n = 50), patients alone (n = 28), and both patients and providers (n=12). The methods used in these papers were quantitative (n= 46), qualitative (n = 37), and mixed methods (n= 7). The papers were grouped as follows, consultation and data collection (n =30), HIV/AIDS adherence and management (n = 24), phone use among health workers (n=12), maternal and postnatal issues (n= 10), adherence to malaria treatment guidelines (n=6), TB adherence and management (n = 5), and mHealth for learning (n= 3). The dominant factors identified after analysis and synthesis of common themes were, inter- and intra-organizational capability that supports the exchange, regulatory compliance, and affordability and ownership of phones.

Conclusions: These finding will inform future successful mHealth implementations in Africa.

Keywords: mHealth, Adoption, Telemedicine, Health Personnel, Africa, Patients, Developing World, e-Health, Scale-up.

[Back to Contents](#)

DIGITAL TESTING PLATFORM ENABLES AGILE SOCIAL WELFARE AND HEALTHCARE TRIALS

Timo Alalääkkölä¹, Mari Koskinen², Kari Vajjus-Anttila³, Sanna Virkkunen⁴

¹ Northern-Ostrobothnia hospital district, Administration

² BusinessOulu

³ Northern-Ostrobothnia hospital district, IT administration

⁴ Northern-Ostrobothnia hospital district, IT administration

Background User-cantered development of products related to social welfare, healthcare and medical technology and services requires an infrastructure that encourages innovation. It is essential for the companies developing new solutions for the healthcare industry, that a connection between the users is present at all times during the innovation and testing processes. Also healthcare professionals working in the public sector, who come up with new innovative ideas that incorporate digital aspects, need support in order to assist them to bring new ideas to practice. In addition, the Future Hospital of 2030 renovation project is going to incorporate the newest technologies available. In order to test these new solutions, Oulu University Hospital needs a sophisticated space and processes necessary to test these solutions efficiently.

Objectives To fulfil these needs, test environments are necessary to test new technology and services emerging in social welfare, basic healthcare, and specialized healthcare sectors. The aim for this project is to create a digital testing platform that

is able to replicate a similar realistic infrastructure that the production side of the hospital has in place. The digital testing platform provides possibilities for the companies to test their solutions in an agile way, without the restrictions set by the legislation or other national audit requirements.

Results With the digital testing platform, it has been demonstrated that combining and displaying information from arbitrary patient health record systems (PHR) is possible. Related to this, integration between three major PHR systems present in Finland was developed. The integration gathered patients' risk, diagnostics, and medicinal information. This information was able to be shown in an aggregated view. This aggregated view enabled the clinician to view important information related to the patient in an easily readable and coherent way.

In addition, an implementation has been developed that makes it possible to tap into the data streams that many eHealth devices e.g. sensors and other IoT devices provide. These information streams can be imported from the sensor manufacturer's cloud services into the existing test PHR systems available in the digital platform in real-time. Real-time data exchange means the healthcare professionals are able to see an up-to-date view of the patient's physiological measurement data at all times. This data includes for example information about the patient's body temperature, body weight and blood pressure readings. Recent implementations include a sensor that is able to transmit data about the pain level of an infant child. The digital integration platform has proven to be very effective in developing various proof-of-concept level designs. As an indirect result, the digital testing platform has evolved to provide a large variety of information systems due to successful company co-operation. Assimilating new technologies into the digital testing platform enables even more diverse and complex integrations between hospital information systems, e-health appliances, and other mobile devices.

[Back to Contents](#)

mHEALTH ADOPTION ISSUES: SIMILARITIES AND DIFFERENCES BETWEEN PATIENT AND HEALTH PERSONNEL IN THE DEVELOPING WORLD – A STRUCTURED REVIEW

Addotey-Delove Michael Nii-Addotey^{1,2}, Richard E. Scott^{1,3}, Maurice Mars¹

¹ TeleHealth Department, University of KwaZulu-Natal, Durban, South Africa

² Pentecost University College, Accra, Ghana.

³ NT Consulting – Global e-Health Inc., Calgary, Alberta, Canada; University of Calgary, Calgary, Alberta, Canada

Background: In many developing countries, there are inadequate numbers of health personnel, limited health facilities, poor road networks, poverty, etc., making it impossible for a large section of the population to access quality healthcare. mHealth is believed to be a solution to the numerous healthcare challenges facing the developing world. The introduction of mHealth into healthcare settings brings new challenges and opportunities to both the health personnel and patients who use the systems.

Aim: To identify similarities and differences in factors affecting mHealth use among patients and health personnel in the developing world.

Methods: The PubMed and Scopus electronic databases were searched systematically for studies conducted in the developing world to identify factors affecting use of mHealth by patients and health personnel. The search was performed in December 2017 for papers published between 2000 and 2017. Full-text articles were then retrieved. In total 103 of 1176 papers met inclusion criteria. Each author verified and reviewed papers, findings were collated, and inclusion based on discussion and consensus.

Results and discussion

The analysis of results followed an interpretive synthesis approach based on 9 main themes and 18 sub themes. The findings revealed some similarities in mHealth use issues affecting both patients and health personnel. They were multi-sectorial engagement, strong community participation, political commitment and funding, privacy and confidentiality, available infrastructure, training and motivation, mobile phone ownership, and user friendliness of device. There were however, a few issues unique to each of the two groups. For Patients issues were language barrier, and health worker's competence and willingness to use technology, while issues for health personnel were adequate staffing, receiving technical support, and a flexible communication platform to interact with patients.

Conclusions:

This review highlights issues affecting mHealth adoption in the developing world by patients and health personnel. These findings will help shape policy on mHealth implementation and use in the developing world.

Keywords: mHealth, Adoption, Telemedicine, Health Personnel, Patients, Developing World, e-Health.

[Back to Contents](#)

REACHING THE UNREACHED: AN INNOVATIVE eHEALTH INITIATIVE IN NEPAL

Anil K Jha

Department of Dermatology, Nepal Medical College & Teaching Hospital Attarkhel, Jorpati, Kathmandu, Nepal
DI Skin Health and Referral Center Pvt Ltd(DISHARC), Maharajgunj-03,Kathmandu, Nepal

Since 2009, we have launched an initiative utilizing innovative technologies as a platform for providing services aimed at overall community development. A real-time tele-conferencing setup is used to provide consultation services for patients with skin diseases and the same infrastructure is also used to provide education and other skill development training services to rural communities as per their needs. Our vision is to improve the living conditions and livelihood of people through sustainable community development- planned, designed and implemented jointly with their context in partnership with individuals and communities. Our mission is to improve people's overall quality and standard of life, through health, education and services through tele-health and e-Health, long term integrated rural community development programs. And special focus is given on the poor, marginalized, deprived and disadvantaged people and community groups in remote, difficult to reach such communities

[Back to Contents](#)

EXPLORING THE MULTIPLE USES OF VIDEO CONFERENCING IN CHILD PSYCHIATRY

Kirsi Bykachev¹, Jussi Karppi^{2,3}, Minna Pölkki³, Anita Puustjärvi³, Hannele Turunen^{1,3}

¹ Department of Nursing Science, University of Eastern Finland, Finland;

² School of Medicine, University of Eastern Finland, Finland;

³ Kuopio University Hospital, Finland.

Background Transnational eHealth Services for Child and Adolescent Psychiatry (eCAP) project was launched in October 2015 for improving the quality and availability of child and adolescent mental health services in sparsely populated Northern peripheral areas, namely, in parts of Norway, Scotland, Sweden and Finland.

In the region Pohjois-Savo, Finland, the focus has been on developing *a video conferencing (VC) service for remote child psychiatric consultations*, allowing the primary healthcare professionals in scattered municipalities to flexibly consult the specialists of the Department of Child Psychiatry at the Kuopio University Hospital (KUH). The objective is to support early detection of mental health problems of children (under 14 years) as well as to contribute to timely intervention and treatment close to the natural developmental environments of children, irrespective of geographical distance to child psychiatric specialist healthcare.

The developed VC service consists of an online booking system (VideoVisit eInvite) and a VC solution (Vidyo) provided by Istekki Ltd. Since January 2017 over 225 primary healthcare professionals have received training and materials about how to use the service, and webcams (Microsoft LifeCam Cinema for Business) and loudspeakers (Logitech S150 Digital USB) have been installed to over 110 workstations to facilitate the VCs. However, in the 12-month period the demand for video consultations has been low, and new uses of VC in child psychiatry have been innovated, e.g. clinical supervision and tutored peer groups.

Aim In January – September 2018 different child psychiatric services based on VC will be offered free of charge to primary healthcare professionals working with children in the Pohjois-Savo region. The aim is to explore the different ways how VC can be used in child psychiatry for supporting primary healthcare workers in early detection, timely intervention and appropriate treatment of mental health problems of children.

Methods For assessing the feasibility of the offered services, data are being collected in multiple ways. In order to find out the opinions and experiences of the target groups about the provided training and materials, an electronic survey was administered in December 2017 – January 2018. After the actual VC meetings, the participants are asked to fill in an electronic feedback form with questions about the aim, topic, technical quality and overall satisfaction with the VC. In addition, short telephone interviews are conducted with those primary healthcare professionals who received VC equipment for their use. Finally, closer to the end of the project, some non-users will be contacted by phone for inquiring the reasons for not utilizing the services.

Results The respondents of the survey (n=89, response rate 44.7 %) considered the provided training and materials sufficient (75 % agreed, 22 % partly). No one had used the service after the training, yet they were still positive about the VC: 36 % of the respondents said that they *will use* and 53 % *might use* the service in the future.

Also the gathered feedback after the meetings (n=9) demonstrates favourable attitudes towards VC in child psychiatric consultations and clinical supervision: all respondents said they could do the VC again. According to most respondents, it was convenient to talk in the VC and the goal of the meeting was reached well, despite in some cases there had been problems with the video connection (33 %).

In the telephone interviews most interviewees said they were satisfied with the provided training, but there just had not been a need for a child psychiatric video consultation. Many also acknowledged a certain psychological barrier to start using a new method. In contrast, the offered opportunity of clinical supervision in VC was eagerly welcome by many interviewees, and the tutored virtual peer groups have also aroused interest.

Conclusions As the project is still ongoing, it is too early to draw conclusions, but already our preliminary results suggest that video conferencing may be a useful tool for child psychiatric specialist healthcare to support primary healthcare in managing locally the mental health problems of children (as postulated by the ongoing social and healthcare reform in Finland). However, more experience and further investigations are needed to judge whether VC is most suitable for consultations, clinical supervision, joint patient appointments or some other form of collaboration and information exchange between primary and specialist healthcare. Moreover, the feasibility of different approaches may vary between municipalities, professions and roles of health workers.

[Back to Contents](#)

SOTENAVI – A TRAINING PROJECT OF SMEs AND ASSOCIATION DIGITALISATION AS ONE OF THE MAIN CORNERSTONES OF THE TRAINING

Riitta-Liisa Lakanmaa, Anne Rouhelo, Riikka Teuri

Health, social services and regional government reform is a large administrative and operational overhaul in Finland. The reform impacts social and health care sector's micro-enterprises, SMEs and associations broadly.

In the future, they will have a big role as producers of welfare services. The reform means that the structure, services and financing of health and social services will be reorganized. This entails different kind of challenges, requirements and needs to the target group of the project (micro-enterprises, SMEs and associations). The main aim of the project is to increase work welfare and productiveness by providing diverse methods of training and networking known to be important from the viewpoint of work welfare and productiveness.

The project wants to:

1. Develop the skills of the target group. Skills to be developed are related e.g. to work welfare, productiveness, management of change, digitalization, marketing and service design.
2. Create and build local and national networks between different actors and utilize different methods (e.g. mentoring).
3. Plan, develop and assess best practices and good procedures in order to increase the work welfare and productiveness in the enterprises and associations.
4. Find out how to measure the work welfare and productiveness of the target group.

The project will:

1. Examine a present state of the work welfare and productiveness
2. Arrange local training workshops
3. Arrange national seminars
4. Create a mentoring programme based on the needs of the target group
5. Build local and national networks
6. Implement and assess the best practices in order to increase the work welfare and productiveness

As a concrete result, the project will produce a digital navigator, which includes tools that help the target group to increase the work welfare and productiveness. The tools are related to topics like service modelling, how to improve the management of change in the organizations and ways to advance the digitalization, marketing and communication skills of the organization.

In the beginning of the project, we gathered information with the survey for development of the training project e.g. of the challenges of the digitalization in the SMEs and associations. Following results were founded: the participants believe that digitalisation will help them in their daily work and will give them new usable tools for their work. Especially documentation, reporting, contacting and interaction possibilities will increase. On the other hand they are afraid of that they

will miss the time from the clients in becoming familiar with the new technology (programs, application, equipment). The participants think positively digitalization as a change to create new possibilities to develop organization processes. The European Social Fund funds the project. The project has started 3/2017 and will be finished 2/2019.

[Back to Contents](#)
