

ABSTRACTS

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Session: Pharmacy and m/eHealth

Key Points and Recommendations from the 2016 PGEU eHealth Statement

Jamie Wilkinson

Director of Professional Affairs, Pharmaceutical Group of the European Union (PGEU),
Belgium

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nodofarma - the Pharmaceutical Digital Services Hub

L Martin-Gutierrez

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Nodofarma was released in June 2016 with the mission of housing and supporting a set of pharmaceutical professional digital services allowing the current pharmacy model respond both to citizens and to the healthcare system. nodofarma is going to allow the pharmaceutical profession to be the main character in the digital network of healthcare services, especially those linked to medicines, to be developed at national and European level. The incorporation of services to nodofarma is being conducted gradually. The following services are to be incorporated in the hub: - Systems to record data of research studies of pharmaceutical care services (electronic Case Report Forms: for the moment two systems have been developed, one for a study to evaluate the reconciliation of medication between care levels and another for a study to assess the impact of pharmacist's intervention in the improvement of adherence. - Web services for Bot PLUS (medicines database): it will simplify the access, use and update of the database. - Pharmaceutical Dossier: pharmacotherapy record of patients shared between community pharmacies including data from public and private prescriptions and for non-prescription medicines. - Centralized Pharmaceutical Care Services: centralized record system for the provision of Pharmaceutical Care Services in community pharmacies. - Spanish System for the verification of medicines (SEVEM). - Centralized information centre on the supply of medicines (CISMED). - Electronic veterinary prescription. nodofarma opens new possibilities to the integration and the interoperability and offers support to pharmaceutical professional services, integrating them in a secure and flexible manner and with potential to grow.

Keywords: hub, pharmacy, services, digital, network

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Farmácias Portuguesas App: Increasing Customer's Engagement with the Pharmacy

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Background information: Market trends indicate mobile communications will continue to grow with a significant role of smartphones/tablets as a tool for purchasing goods. In Portugal, pharmacies' online presence is residual with no integration between online platforms and the pharmacies' software. Purpose: Development of an App for the over 2000 Farmácias

Portuguesas. The main goals are: allow the purchase of medicines and health products anywhere, anytime; give access to detailed information about products; extend the pharmacy's portfolio; increase store visibility and stock management flexibility. Methods: Create an App for the main operating systems, with the following: Pharmacy Locator; e-commerce store; Promotional area; Health information; User area; Pill reminder and personal health data record. Results: An intuitive App focused on user experience, bringing the pharmacy closer to its clients. Main benefits: purchase the products that the pharmacy offers and book prescribed medicines, with access to quality information provided by qualified pharmacists that ensure its technical accuracy. One relevant feature is the perfect integration with the pharmacy's software, such as the pill reminder, where the pharmacist can create a certified medication plan in the pharmacy and integrate it directly with the user's App. This integration also occurs when registering user's health parameters and searching the opening schedule of each pharmacy in real time. Conclusions: In the first month of advertisement, the App reached 1st place in the health and fitness category and its downloads have already surpassed 100.000. Importantly, over 1500 pharmacies have been involved in the submission of more than 6.000 online orders. The App's presence in the Portuguese online market is growing consistently and reaching more consumers every day.

Keywords: e-commerce, app, online, pharmacies, health

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Telemedicine: New Tools of Health Prevention for Italian Patients

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Promofarma, Italy

Federfarma, Italy

In this last decade in Italy became crystal clear how the approach to healthcare should radically change its paradigm. The scarcity of economic resources showed as the pivot of healthcare could not be only the hospital. The new password began to be “dehospitalization”, and community pharmacies should have been playing a pivotal role in showing how more than 18,000 pharmacy outlets could become the first port of call for all Italian patients. The scarcity of public economic resource could not be an excuse for our category in order to deploy a range of services helping patients to be more active in their fundamental health prevention activities. This is what we think when we decided to launch our platform of new e-health services offered by community pharmacies to their patients taking into account not only the high value of proximity of our efficient pharmacy network, but even the affordable cost for patients considering the significant level of co-payment set by the National Health Service in our Country. We started to create an ICT platform named Digitalcare Farma and linked to Federfarma web portal in order to provide to all Federfarma members these services. Among these services that one at the moment more developed is the Telemedicine project actually spread in all Italian territory. Our presentation will give to all participants a clear overview of this project, this will include the rationale and the targets of our Association and the real advantages both for pharmacy network and for the entire healthcare system. We will explain the concrete features of the telemedicine service, and the remarkable results we could show to our public of National Health Service in the incoming talks for the renewal of the Contract between community pharmacies and NHS. Finally we will focus our attention to the last project in progress based on the compliance and adherence to therapy to be developed always through our e-tool of Digitalcare Farma.

Keywords: dehospitalization, digital care, telemedicine, integrated care, compliance
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ARMIN: A Medication Management Service in Germany

Stefan Fink

ABDA - Federal Union of German Associations of Pharmacists, Germany

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The Central Role of the Pharmacist: A Disease Management Project with a 7,000 Pharmacies' Network

Gianfranco Mochi, Alessandra Gentile, Florio Bovio

Telecare Europe, Spain

UNICO SpA, Italy

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Tele-ECG Monitoring in Community Pharmacies

Emanuela Burdese

Meditel Italia, Italy

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ePrescribing: An Important Part of Medication Safety

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E-Prescribing is the next service tool that will enable pharmacists and providers the ability to manage a patient's current and historical medications. Allowing the provider to easily send an electronic prescription directly to the pharmacist will help eliminate errors in prescribing, reducing fraud and abuse with narcotics, decrease the waiting time at the clinic and pharmacy, with a focus on patient safety and continuity of care. Going to the doctor can sometimes be tough when your community does not have a permanent provider in the community. The wait time to get an appointment, the time it takes to explain your medical history to a travelling locum, and then the time it takes to get a prescription. After waiting in the clinic office, the patient now needs to go across town to the local or closest pharmacy and wait again for the prescription to be filled. A patient can be waiting up to 2 hours for the whole process to be completed. There has to be a more efficient way to get the proper information, access and care the patient needs. Within the years 2009-2014, there were approximately 655 deaths reported from fentanyl overdoses in Canada [3]. With E-Prescribing, the patient will never touch the prescription, hence minimizing the risk of multiple prescriptions being filled. Instant messaging between the provider and pharmacist will save on fax and phone communication, and allow the right information to be communicated promptly to the right person. The instant communication between a provider and pharmacist can ensure that the drug being prescribed is not going to interact with other medications or if the patient has already filled the prescription. As well as the pharmacist can give details on; what has been the current course of medication, and inform the provider if the patient is going to be covered by their current insurance. While a patient's Health care record is changing from paper to an electronic, we need to ensure we are providing the tools necessary to

help health care providers attain the best health care for patients. Hence we can have an optimal use with E-Prescribing which will ultimately reduce medication error rates and other safety risks.

Keywords: medication, E-prescribing

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"Retail Teleclinics" - A Low Cost Scalable Health Care Delivery Model for Rural India

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Rural India is facing acute shortage of doctors whereas urban India has oversupply of doctors. Many medical graduates are reluctant in serving rural areas due to poor civic structure. By adapting the technology we planned to strike a balance in this disparity. Our project AWISH is a social enterprise. AWISH in Sanskrit means “to reach” which denotes the mission motto-providing medical consultations in rural areas by utilizing telemedicine. We have evolved an efficient, cost-effective, sustainable, scalable healthcare delivery model after pilot project. AWISH retail teleclinics is the brand name. We have identified, recruited and trained the standalone pharmacy owners in rural areas. 5’x4’ space in their pharmacy is earmarked for teleclinic facility. Teleclinic is equipped with a computer, LED TV, printer, broadband internet, pulseoxymeter, glucometer, digital thermometer and BP apparatus. Special videoconferencing software which works on 256KBPS bandwidth provided. Pharmacist is given required training. This approximately cost around 1000USD which is invested by the pharmacist. Free consultations are provided for 3 months. Free medical camp by a visiting GP organised weekly for 3 months. This familiarized the doctor with the patient, also increased pharmacy revenue. Medical consultations were provided by our parent institute-Nightingale Multi-specialty Hospital where a dedicated telemedicine wing has been setup. For all patients general consultations are provided. For required cases specialist consultations are provided. Currently we are operating 10 Teleclinics, planning to scale upto 100 in a year. All the pharmacy owners have recovered their investment. Present average footfalls are 20 per day in each centre. Our audit result on the project’s social and financial impact is excellent. For a developing country with poor primary healthcare in rural areas, the only resort is dependency on quacks which many a times prove to be disastrous to the uneducated population. Our model has proved to be a economical and effective solution.

Keywords: Teleclinics, rural-health, Telemedicine, digital-health, Retail-clinics

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European Pharmaceutical Students' Association Perspective on eHealth

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The session will cover the pharmacy students’ perspective on the topic, in regards of both education and professional use. The European Pharmaceutical Students' Association (EPSA) brought this topic to the attention of its students, aiming to assess their knowledge and find out their opinions related to this emerging area of the healthcare practice. As the next generation of pharmacists, pharmacy students across Europe are highly motivated to engage in the discussing around this evolving trend in healthcare. The evolution in this sector will potentially highly influence the future profession and therefore pharmacy students also believe that both current

and future healthcare professionals should be closely involved in its development and that they should be educated on how to integrate it as part of their daily practice and patient interaction. The European Pharmaceutical Students' Association has recently released a new position paper on eHealth. This position is an update and expansion of the Statement on mobile health, which has been released as a follow-up of its Annual Reception 2014 event in the European Parliament on the topic of mobile health. The European Pharmaceutical Students' Association is an independent, non-profit European umbrella organisation committed to the interests of pharmacy students, and the ultimate benefit of better healthcare society. EPSA represents over 160000 pharmacy students in 35 European Countries through 43 member associations. EPSA operates according to the motto “Bringing Pharmacy, Knowledge and Students together”.

Keywords: eHealth, pharmacy, students, education, profession

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What's the Importance of Portable Monitoring Devices in Patient Therapeutic Adherence?

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In the UK it is estimated that the NHS spends every year almost £100 million in unused drugs and hospital admission costs attributed to patients not taking their prescribed medicine properly was estimated to be between £36m and £197m per year. In the U.S., medication non-adherence is estimated to lead to between \$100 and \$300 billion of avoidable healthcare costs annually, representing 3–10% of total U.S. healthcare costs. Studies show that improving medication adherence may have a greater influence on the health of the population than the discovery of any new therapy. Effective medicines are available for many conditions and yet patients are non-adherent 50% of the time reaching its critical point in certain disease states, such as asymptomatic conditions like hypertension, in which the incidence may approach 80%. Each disease has its special challenges, to answer the question to the non-adherence problem, we must understand that people under certain disease states, are not really aware of the danger when they unconsciously neglect the treatment and stop taking the prescribed medication. With the technological boom over the recent years, we were flooded with gadgets and devices that allow us to do practically everything. The objective of this article is to gather information in order to establish what are the main strengths of nowadays technology to assemble the best: integrated monitoring and control device, for therapeutic adherence. Our proposal is to create a therapeutic adherence monitoring device that consists in a smart blister coupled to a device which has the capacity to collect (from other medical devices) and send data (medicine taking time, blood pressure and oximetry) to a common server every. This allows the clinician to know, with high certain, if the patient is taking his medicine exactly how it has prescribed as well as the schedule of the same. Concluding, therapeutic non-adherence is a public health problem that leads to high economical and health losses. Nevertheless we find that the technological devices fit within the lifestyle of the average person and present themselves as a solution.

Keywords: Internet-of-Things, Non-Adherence, Portable-Devices, Telemonitoring, Patient-Friendly

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Need and Acceptance of Devices for the Control of Therapeutic Adherence

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It has been estimated that health - related productivity loss costs are 2.3 times higher than the direct healthcare costs. In the U.S., medication non-adherence is estimated to lead to between \$100 and \$300 billion of avoidable healthcare costs annually, representing 3-10% of total U.S. health costs. Effective medicines are available for many conditions and yet patients are non-adherent to their medicine 50% of the time. Although some studies reported different ranges of adherence for adult patients 40-60% and children 25-75% showing that only 50% of people take their medicines adequately it reaches its critical point in certain disease states, such as asymptomatic conditions like hypertension, in which the incidence may approach 80%. Patient adherence to prescribed medication regimens is a complex and multidimensional behaviour, and to figure out what is really happening it is important to dissect the problem and intervene on the modifiable factors. To reach this objective we must pursue the reasons for non-adherence. With the technological boom over the recent years, we were flooded with gadgets and devices that allow us to do practically everything, and some of them proved that the difference could be made resorting to this kind of possibility. The purpose of this article is to evaluate doctor's perception regarding the importance of therapeutic adherence, both for patient health and for economy, and also their view on the possible need for integrated monitoring and control devices for therapeutic adherence using telemedicine, to control it. The study was made through an inquiry. The impact of non-adherence to therapeutics is also verified in this survey, as well as the possible need to raise awareness of this issue both in health professionals and in the general population. Concluding, therapeutic non-adherence is a public health problem that leads to high economical and health losses and it is important to know what doctors think about it and what is the perceived place for telemonitoring on this subject, as an instrument to control and fight back this issue.

Keywords: Telemonitoring, Survey, Patient-Friendly, Non-Adherence, Portable-Devices
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Usefulness of a Telemedicine Program in Refractory CHF Patients: The Patients'/Caregivers' and Nurses' Point of View

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Chronic congestive heart failure (CHF) patients undergo frequently to hospital readmission. Home telemonitoring is one effective disease management model able to improve medical care, quality of life, prognosis and to reduce expenditure. Objective of this study was to evaluate efficacy and costs of our telemedicine program and to evaluate patients', caregivers' and nurses' acceptance. Methods. Patients included were high risk/refractory CHF patients and in case of important modification of alarm parameters, the cardiologist decided to inform the emergency department (ED), the patient's General Practitioner or to programme a clinical ambulatory control. Results. Forty-eight CHF patients (males 58.3%; women 41.7%), mean age 80.4 ± 7.7 years, entered this clinical experience. Thirteen patients died a cardiac death (29.5%) and the hospital admissions for HF decreased during the year after the enrolment when compared to the year before (from 35 to 12 acute HF hospitalizations/year; $p=0.0001$). Moreover the accesses to ED for suspect HF reduced from 21/year to 5/year ($p=0.0001$). The economic expenditure reduced from 116.856 Euros to 40.065 Euros/year. The quality questionnaire that explored patients' and caregivers' satisfaction was compiled by 27 patients (61.4%) and demonstrated a high degree of satisfaction (74%). All nurses (13/13) involved in the project answered to a questionnaire which explored strong and weak points of it. Strong point (76,9%) is close monitoring of clinical conditions and a better cardiological follow-up. Weak points are a lack in participation of General Practitioners, the absence of communication with other telemedicine's experiences and their low skills in using technological devices (69%). Conclusions. A telemedicine surveillance in high risk CHF patients allows an early evaluation of signs and symptoms of acute decompensation. The questionnaire directed to patients/caregivers reveals an high degree of satisfaction meanwhile in the answers of nurses difficulties emerged.

Keywords: congestive heart failure, telemedicine

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Do Coronary Artery Disease Patients Use an E-Learning Platform when Provided?

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The RE-Heart Registry: A Prospective, Interoperable, Standardised Clinical Registry of Outpatients with Heart Failure

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Background: Heart failure (HF) is a global epidemic which affects about 5.1 million people only in the US and costs an estimated 32 billion dollars a year. Thus, there is an urgent need for better control of clinical outcomes and costs related to these patients, based on highly accurate data. **Purpose:** To describe the creation and implementation of the RE-Heart Registry, a prospective, interoperable, highly scalable and standardised clinical registry of outpatients with HF. **Methods and Results:** We carried out the steps, as follows: (1) Data standardisation in accordance with national and international data elements. Dataset included all applicable standardized data elements published by the American Heart Association/American College of Cardiology, European Heart Failure Registry and Brazilian national heart failure and demographics datasets; (2) Development of an initial data collection and clinical research workflow; (3) Development of electronic case reports using REDCap and in accordance with the HIPAA privacy rule; (4) Pilot test and validation of the data collection and clinical research workflows and CRFs, (5) Development of automated data quality report using REDCap. Patients are included if they are 18 years old or more and are diagnosed with HF (Boston criteria), and are excluded if they do not agree to participate. Data collection occurs at the outpatient department at the moment of inclusion and every 6 months (phone calls and visits to the outpatients department). Clinical and cost-related outcomes include all-causes mortality, cardiovascular mortality, non-fatal myocardial infarction, stroke, hospital admissions, visits to the emergency department, costs related to the treatment and procedures, and quality of life. **Conclusions:** The RE-Heart Registry represents a comprehensive database capable to represent real clinical practice favouring clinical research, technology assessment, services management and health policies. By using standardised and interoperable methodologies, the RE-Heart Registry allows for data integration among datasets, enhancing datasets and leveraging information to help HF patients.

Keywords: heart failure, interoperability, clinical registries

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Mobile Phone Monitoring of the Patients with Cardiac Diseases Using High Signal Resolution Pulse Wave

Ryszard Krzyminiewski, Bernadeta Dobosz

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The paper presents High Signal Resolution Pulse Wave (HSR –PW) analysis used for home care telemonitoring patients stay at home. This method HSR-PW is based on a special computer program, which increases the resolution of the pulse wave signal and sets the parameter values that inform about the state of the circulatory system. The resolution of pulse wave signal is enhanced by special software using the method of linear transformation based on Fourier analysis and deconvolution of original pulse wave. Thanks to this method, it becomes possible to show the details of the pulse wave, which are invisible in standard record. Based on the analysis of pulse wave peaks, computer calculates values of some parameters defining the state of the cardiovascular system. The pulse waves were recorded using a standard wireless electronic pulse oximeter CMS-50EW, which allows measurement of oxygen saturation and pulse rate with the accuracy: $\pm 2\%$ in stage of 70%-99% for SPO₂ and $\pm 2\%$ BPM for pulse rate. This data and pulse wave curve using special own software for Android were sent by Bluetooth to mobile phone and through the GSM network to server. The server automatically performed analysis of HSR and sent a pulse wave analysis results back to the sender. The data transmission and calculations took over a dozen seconds. The input data, which come from standard pulse oximeter, were collected from patients staying at home through a system of telemedicine network MONTE. During the monitoring recorded the number of incidents related to arrhythmia, the oxygenation deteriorated and resistance of the circulatory system were detected. Thanks this monitoring cardiologists could take the appropriate medical interventions.

Keywords: telemonitoring, puls wave analysis

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CardioAnalyst - A New Approach to Cardiovascular Screening

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Haemodynamics data carry information about both central and peripheral arterial system. Photoplethysmography (PPG) is widely used as a simple diagnostic tool. In this paper we investigate some mathematical methods including parametrization of PPG pulses and classification of different curve shapes to aid diagnosis. We also investigated an alternative method called baroplethysmography (BPG), which records blood pressure signal. Both methods are applied on patient's fingers. We conclude that both measurement methods can be applied simultaneously and the measured signal may provide valuable information transformed into multiple independent parameters, which are used both to long-term stability monitoring of a

particular patient and to classify different patients with respect to their arterial system and related diseases. Integral distributed system CardioAnalyst has been developed to both analyse and parametrize the PPG signal and classify the curve shape to a pre-defined group. A new feature of CardioAnalyst has been introduced: evaluation of systolic and diastolic pressures, calculated directly from PPG curves. The system was tested on thousands of patients and the results were compared with those from screening based on other cardiovascular markers, like cholesterol, HDL cholesterol and LDL cholesterol. This new complex approach under the name of CARDIOSCREEN allows defining cardiovascular risk and, consequently, predicting cardiovascular events, like myocardial infarction.

Keywords: photoplethysmography, baroplethysmography, haemodynamics, cardiovascular screening

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Heart Institute Telemedicine and Telehealth Initiatives and Perspectives

Rosangela Simoes Gundim, Carlos Alberto Pastore
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The RE-Endo Registry: A Prospective, Interoperable, Standardised Clinical Registry of Infective Endocarditis Patients

Shirley Bellan, Jessica Lopes, Alvaro Guedes, Renato Kalil, Marcelo Miglioranza, Clarissa Rodrigues
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Background: Infective endocarditis (IE) is a severe disease associated with high morbidity and in-hospital mortality. Despite improvements in diagnostic and therapeutic strategies, both the incidence and severity of the disease seem to be unchanged. Purpose: To describe the creation and implementation of the RE-Heart Registry, a prospective, interoperable, highly scalable and standardised clinical registry of patients with EI. Methods and Results: We developed the RE-Endo Registry through the following steps: (1) Data standardisation in accordance with national and international standard variables to allow for interoperability among systems. Our dataset included all applicable standardized data elements such as the Brazilian and European guidelines for IE and the usual local practice terminology; as well as the standard elements proposed by the Endocarditis European Registry (EURO ENDO), and the Brazilian Institute of Geography and Statistics (IBGE); (2) Development of an initial data collection and clinical research workflow; (3) Development of electronic case reports using REDCap (Research Electronic Data Capture) and in accordance with the HIPAA (Health Insurance Portability and Accountability Act) privacy rule; (4) Pilot test and validation of the data collection and clinical research workflows

and CRFs, (5) Development of automated data quality report using REDCap. Patients are included if they are 18 years old or more and diagnosed with IE, and excluded if they do not agree to participate in the study. Data collection occurs at the outpatient department at the moment of inclusion and every 12 months during the follow-up (phone calls and visits to the outpatients department). Clinical outcomes include all-causes mortality, cardiovascular mortality, recurrence of IE and any other comorbidities. Conclusions: The RE-Endo Registry represents a comprehensive database capable to represent real clinical practice favouring clinical research, technology assessment, services management and health policies. Besides to that, by using standardised and reproducible methodologies, the RE-Endo Registry allows for data integration and interoperability among datasets.

Keywords: infective endocarditis, interoperability, clinical registry

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Early Detection of Endothelial Dysfunction with Integrative Telemedical System with Focus on Diabetic Patients

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The objective of this paper is to inform about the results of a new integrative program designed for the early detection of major cardiovascular and cardio-metabolic risk factors both in cities and in rural areas with specific focus on lower limbs perfusion and the corresponding improved chance for the patients to reverse the pathological processes in time. The program consists of both the preventive diagnostics, monitoring and support for therapy adherence of patients in their natural environment. The program also represents a new model of co-operation between healthcare providers of municipal and rural areas, companies operating in telemedicine and funding providers. This program is a result of a joint research and following implementation effected with the support of Vienna Point a.s. – Science and Technology Park and mainly its incubation program focused on telemedicine. In the presentation we will also provide clear updated outcome of the program in terms of improved outcomes for patients (no more amputations) and for the healthcare provider - reduction of costs by more than 30% Longer term sustainability as one of major objective was reached and the basic economic parameters are also discussed.

Keywords: Endothelial dysfunction, telecardiology, rural areas

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RIAM – Multicentre, Interoperable, Clinical Registry of Acute Myocardial Infarction

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Introduction: Ischemic heart disease is the leading cause of death in the world. In Brazil, according to the DATASUS of 2013, acute myocardial infarction (AMI) was the main cause of mortality due to heart disease. A better identification of the patients will serve as a tool to improve the treatment of this pathology within the Brazilian reality. Objective: To expand the database of patients with ST elevation myocardial infarction (STEMI) of the Cardiology Institute (Porto Alegre-RS, Brazil), within the national territory. Methods and Results: The following steps were taken: (1) data elements standardisation in accordance with national and international standard variables to allow for interoperability among systems. Our dataset included all applicable standardized data elements published by the American Heart Association / American College of Cardiology, and Brazilian national datasets standards; (2) Development of electronic case reports (CRF) using REDCap (Research Electronic Data Capture) and in accordance with the HIPAA (Health Insurance Portability and Accountability Act) privacy rule ; And (3) expansion of registration to other referral centers by strengthening partnerships. This study is coordinated by the Cardiology Institute of RS, site where the registry started, and from which has generated several national and international publications. The participating institutions are distributed in the regions of Santa Maria, Passo Fundo, Caxias do Sul all of Rio Grande do Sul, as well as the regions of Santa Catarina and the Distrito Federal in Brasília. In the database, patients older than 18 years with STEMI less than 12 hours of evolution in the hemodynamic services. The data collected will be stored according to the Health Insurance Portability and Accountability Act. Conclusion: The enhancement and expansion of the RIAM Registry to other referral centers is generating data entered by the Principal Investigator directly into the REDCap CRF. The RIAM Registry is a tool with results of longitudinal focus for the treatment of AMI in our environment, which contributes to clinical practice, health services management and policies.

Keywords: myocardial infarction, clinical registry, interoperability

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Predictions of Clinical Application of the Cardiac Dynamics in Monitoring Patients with Acute Coronary Syndrome (poster)

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Two physical methodologies for cardiac dynamic evaluation has been developed, one of them was based in probability and entropy, and the other one was based in the Zipf-Mandelbrot law. These methodologies have allowed the quantitative evaluation of cardiac dynamic, differentiating normality, disease, and evolution among these. In order to simultaneously apply both methodologies for differentiate normality of acute coronary syndrome, a blind study was conducted, taking the holter of 50 subjects with normal cardiac dynamic and 50 with Acute Coronary Syndrome (ACS) who developed Acute Myocardial Infarct (AMI) and Cardiogenic Shock (CS). The value of the maximum and minimum heart rate for each hour was taken, as well the number of beats, at minimum 21 hours. For the first methodology the values of probability, entropy and proportions of the entropy of consecutive pairs of heart rates in numerical attractors

were calculated. For the second, Zipf-Mandelbrot law was applied to cardiac frequencies grouped in ranges of 15 beats/min finding the degree of complexity of each dynamics and establishing its mathematical diagnosis. Subsequently sensitivity, specificity, Positive Predictive Value and Kappa coefficient were calculated to evaluate the concordance between each of the methodologies and conventional clinical diagnosis. It was shown that the methodologies differentiate normal dynamics of Acute Coronary Syndrome who developed IAM and Cardiogenic Shock, with sensitivity and specificity values of 100% and Kappa coefficient of 1, showing that physical and mathematical methodologies can evaluate more specifically the ACS, AMI and CS.

Keywords: cardiac dynamics, predictions, monitoring, patients

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Telecardiology: Democratizing Access to Cardiac Care (poster)

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Department of Anesthesiology, Digestive Disease Group, Belgium

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Contribution of Tele-Operated Robotic Arm during Interventional Procedure of Ablation (poster)

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Session: Business Models, Economics, Evaluation, Regulatory Issues (1)

Smart and Connected in 2025 - A Vision of the Future: How Digital Innovations Will Change Our Daily Life

Isa Hofmann
IHOFMANN, Germany

The lecture will illustrate how digital technologies take the lead as disruption drivers and how digitalization reconfigures the entire economy by giving rise to a new digital culture. In the new smart services world 2025 the focus is on the user (acatech study 2015). The presentation will address the issue of a connected lifestyle and business environment and show what internet of things and internet of smart services means. Topics like smart cities/smart home/smart traffic and mobile life will be covered as well as the progressive use of robots with voice, gesture and emotional control and commands as assistive technologies in healthcare and for the elderly. The human-machine interaction will gain importance, dealing with intelligent machines becoming more self-evident, virtual (VR) and augmented reality (AR) being integrated in all kind of services. Digitalization constitutes a paradigm shift that affects not only our daily life, but also any kind of business model. Apart from smart textile based products for healthcare, training, bodymapping and self-optimization innovative smart products for medical application will be shown. A short excursion of how the strategic use of digital media channels may fuel corporate targets and positively support and increase brand awareness as well as the level of recognition enjoyed by companies.

Keywords: digital transformation, smart health services
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Why Current Business Modelling Doesn't Work for Digital Health - A Proposed Solution

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Over the last 15 years, the term Business Model is increasingly discussed in scientific literature. Also outside of academia, business modelling techniques and frameworks are being used to rationalize how an organization creates, delivers and captures value. Business model frameworks are being applied to innovations and new products across different industries with the goal to help business owners and academics to understand and create possible value capturing processes. The concept is deemed to provide exceptional value for transformative and disruptive Innovations. However, the specific nature of certain industries advocates for a tailored approach. Digital Health, the convergence of the digital evolution with healthcare, not only represents one

of the most innovative sectors but also one with the most disruption potential. At the same time the intricacies of the health sector such as country-specific regulation, third party payer insurance systems, leading to decoupled value creation and unique purchase enabling stakeholders as well as the novelty and transformative power of Digital Innovations in this sector, demand a specialised Business Modelling approach. This paper elaborates on the notion of business modelling and the limitations of current business modelling frameworks for Digital Health related applications, based on workshops with 17 Digital health StartUps. Based on these limitations and insights from the interaction with the startups, “Model S” is introduced as a Digital Health specific business modelling approach that alleviates the weaknesses of current alternatives.

Keywords: digitalhealth, innovation management, business models, entrepreneurship
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Guide and Federate the Telemedicine Actors for the Development of Sustainable Projects

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Telemedicine is facing many public health challenges for which culture of benchmark is essential. In this context, the association “Agir Pour La Télémédecine” (Act For Telemedicine association) wished to develop a collaborative tool providing resources linked to telemedicine projects. The objectives of our platform are to create a dynamic inventory of telemedicine projects, to facilitate the communication between telemedicine actors, to foster the determination/ identification of organizational or medico-economic models, to have a transversal view on telemedicine practices, to help actors to carry out, optimize and evaluate their telemedecine project. The functions of this platform are among others to search for and locate experts (medical, legal, project, ...) in each district, to find a telemedicine project and access to its identity card, to compare the projects / benchmarking, to search for devices /methods to develop durable and efficient telemedicine projects, to search for articles and publications specialized in telemedicine and e-health. This interface will allow both to federate actors, to promote communication between health professionals and to guide efficiently actors thanks to the availability of tools (project management, member directory, database expert, ...). Health professional will be informed in real time without being connected, through a personalized and adapted notification system.

Keywords: telemedicine, benchmark, platform, feedback, database
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Validity of Model for Assessment of Telemedicine (MAST) - A Delphi Study

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Introduction: In 2009 The Model for Assessment of Telemedicine (MAST) was developed within the MethoTelemed project as a framework for description of the effectiveness of telemedicine applications. The goal was for the assessments to be used as basis for decision making in healthcare systems. Since then, MAST has been used in many European telemedicine studies including more than 25.000 patients and is now the most widely used model for assessment of telemedicine. PubMed and Google Scholar now includes 19 and 107 references to MAST. The aim of this study was to assess the face validity of MAST. **Methods:** A modified Delphi process was carried out and included a workshop with a sample of healthcare decision makers. A total of 56 decision makers and experts in telemedicine were invited and 19 persons participated in the two Delphi rounds. 13 hospitals or regional health authorities from 12 European countries and six research organisations were represented in the final sample. The participants were asked to assess the importance of the different domains and topics in MAST on a 0-3 Likert scale. **Results:** All respondents completed the two rounds. Based on the answers, the face validity of all MAST domains was confirmed, since all domains were considered moderately or highly important by more than 80% of the respondents. **Discussion:** Even though the study confirmed the validity of MAST, a number of supplements and improvements regarding study design and data collection were suggested. For example it was suggested to use participatory design and optimization studies to ensure that new telemedicine interventions are matured before assessment of the outcomes are initiated. Similar the use of randomised controlled studies was considered relevant in studies of the effectiveness of telemedicine in general, but also potentially problematic if the randomised design prevented e.g. a hospital from making the necessary organisational changes and thereby increasing efficiency. When considering the results it should be noticed that the sample size was small and larger studies are needed to confirm the results.

Keywords: Assessment, telemedicine, MAST, validity
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Recommendations for Stakeholders in Broadband Telemedicine

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Four EU countries participated in a pioneering project “Connected for Health” from June 2015 to June 2016. The project’s main activity was to establish four pilots, one in Denmark, two in Finland and one in Sweden. The aim of the pilots was to gain experiences on the use of FTTH (Fibre to the Home) and broadband for applications in social care and healthcare (“digital homecare”). The presentation reports about recommendations to support decision- and policy-

makers as well as other stakeholders who plan to establish and/or expand their FTTH/broadband networks to include digital homecare applications. The recommendations are based on the experiences and lessons learned from the pilots. Within the short time span, the project was able to create a real and positive experience for the participants of the pilots, in terms of e.g. empowerment and better quality of life for the end-user, new, efficient processes leading to higher work quality for the staff of care providers; valuable real-life experience for the industry in an expanding market segment; and cost savings for municipalities. Based on the project experiences, the recommendations of the consortium are as follows: 1. Support the deployment of FTTH networks to provide connectivity in rural areas. 2. Promote operator-neutrality, open access for the new FTTH networks, and encourage local government involvement. 3. Define a financially sustainable business model for the homecare services and spread successful experiences and best-practices. 4. Prepare for organisational changes and training programmes necessary for the new digital services to be successfully introduced. 5. Define a specific digital service class for digital homecare services including performance specifications and network requirements for their delivery. 6. Standardise the technical platform for delivery of digital homecare services using a dedicated communication channel.

Keywords: Broadband telemedicine, FTTH, digital homecare

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Management of Standardised, Interoperable Clinical Registries: Visioning Quality of Care and Clinical Research

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Background: The use of clinical registries has been increasing every year since it represents a powerful tool for assistance quality improvement, healthcare services management, technology assessment, health policies and clinical research. However, we still face several challenges in relation to data quality and integration. Methods and Results: We count with a Clinical Research Centre (CRC) which has conducted several national and international multicentre clinical studies. In addition to conducting randomized clinical trials, we founded in 2014 a Sector inside the CRC specific to design and manage clinical registries. Over the past two years we have participated in many adult and paediatric multicentre studies as a site collecting data, and have designed and implemented 14 clinical registries, including local and multicentre studies. Our clinical registries include in-hospital and outpatient studies on acute myocardial infarction, cardiovascular rehabilitation, systemic hypertension, pacemaker and implantable cardioverter defibrillator, electrophysiology and ablation procedures, heart failure, cardiac transplantation, percutaneous cardiac intervention for left main coronary, percutaneous cardiac intervention with drug eluting stents, paediatric systemic hypertension, infectious endocarditis, clinical trials patients, paediatric cardiovascular prevention and adult cardiovascular surgery. Our databases were built taking into consideration national and international standardized data elements to

allow for interoperability among datasets, clinical and research workflows, and is in accordance with the HIPAA (Health Insurance Portability and Accountability Act) privacy rule. Currently, these registries holds data on more than five thousand patients. Integration with other clinical and costs institutional datasets are underway. Data are used for quality assistance control and research. Conclusion: The Clinical Registry Sector has provided data for measuring quality of care and effectiveness. Additionally, the methodology used for building the clinical registries allow for interoperability among systems maximizing the potential of its use.

Keywords: clinical registries, interoperability, cardiology

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OPENHIMIS - How to Build an Open Source Health Insurance Management Information System?

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Universal Health Coverage: ICT-Enabled Monitoring and Evaluation Methods for Sub-Saharan Health Facilities: A Field Study in Rwanda, Burundi, Tanzania, DRC, Mali and Senegal

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Session: International Society for Telemedicine and eHealth

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Session: BRICS (Brazil, Russia, India, China, South Africa) Telemedicine Cooperation and Models of Telemedicine

A Telehealth Strategy for BRICS Countries Based on National Research and Education Networks (NRENs), to Support Mothers, Newborns, Nutrition, Child and Adolescent Health

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Rede Nacional de Ensino e Pesquisa, Brazil
Rede Universitária de Telemedicina (RUTE), Brazil

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Russian Telemedicine Consortium and the International Telemedicine Society BRICS: Establishment of Compatible Integrated Telemedicine Systems in Regions of BRICS Countries

Mikhail Natenzon, I. Sokolov, V. Starodubov, V. Tarnopolskij, V. Tsygankov
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Retraining of Medical and Technical Experts to Support the Work of the Telemedicine Systems in BRICS Countries (Peoples Friendship University of Russia - BRICS Network University)

Dolzhikova, K. Sidelnikov
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Neuronet Based Telemedicine

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BRICS Telemedicine Co-operative Activities - An Update

Saroj K. Mishra

SGPGI Telemedicine Program, Sanjay Gandhi PG Institute of Medical Sciences, India

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Telemedicine Proposal for BRICS - Integration Platform for Novel Multifaceted Model

Carl John Landauer

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Session: Teleconsultation and Virtual Care

Teleconsultations in Integrated Care

Celia von Gossler

Medgate, Switzerland

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Remote Medical Center: Delivery of Telemedicine-Based Services as an Extension to Regular Care

Anna Samson-Zon

Comarch Healthcare, Poland

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Improving Healthcare in Remote Environments via a New Integrated, Online Communication Platform

Simon Marshall, Neil Nerwich, Lars Petersen, Chris Van Straten
International SOS Group

International SOS delivers integrated medical solutions to remote and extreme remote onshore and offshore projects worldwide, using highly trained and experienced medics with a robust system of protocols, procedures and clear escalation criteria to our Topside support centers. To enable improved medical escalations from the remote sites, we have developed a customized, online communication tool called the Digital Topside Platform (DTP). The system was designed to allow simplified telemedical interaction, improved data security, and enable integrated patient care from initial presentation to return to work, with a focus on managing the case on-site, and patient confidentiality. The design process included a focus on user experience and workflow optimization, and an iterative development methodology. The system includes multiple components including: management dashboards, interoperability with existing case management systems, messaging, video and file transfer features, and case data including medical and contextual information via a mix of auto-populated and manual entry data points. The solution was designed for non-urgent cases, which represents >80% of case escalation volume. Initial deployment of the solution to offshore oil rigs in West Africa and the Intl.SOS Johannesburg Response Center has demonstrated 4 key improvements over baseline data. A preliminary analysis of our data shows that 70-80% of the case escalations use the system, demonstrating a high rate of user adoption. The improvements shown were: (1) reduced need for urgent medical evacuation for non-life threatening conditions; (2) increased adherence to evidence based guidelines via more efficient clinical governance processes; (3) faster escalation processes via profile management and system integration; and (4) early escalation of work related injury cases resulting in reduced time off work. Based on evidence to date, the system facilitates improved healthcare management for patients in the remote offshore environment. The system continues to be deployed to additional sites and regions globally, which will generate a statistically significant dataset for further evaluation.

Keywords: telemedicine, offshore, software development, topside
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Oberbruck: The Very First Virtual Teleconsultation Office, Ever!

Jacques Cinqualbre
HOPI Medical, France

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Business Models and Challenges for Teleconsultation Services

Amandeep Hansra
Telstra ReadyCare, Australia

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Financial Incentive: Is it an Effective Way to Increase Teleconsultation Use?

Maria Beatriz Alkmim, Cristiane Pessoa, Antonio Ribeiro, Daniel Vasconcelos, Renato Figueira, Milena Marcolino
Telehealth Network of Minas Gerais, Brazil

The Telehealth Network of Minas Gerais (TNMG) is a large scale Brazilian public telehealth service which assists primary care units in 780 cities in the state of Minas Gerais. Brazilian primary care teams receive funding from the federal, state and municipal government. On April 2016, the State Government of Minas Gerais created some rules for additional funding, based on teleconsultation request by the primary care team. The objective of this study was to analyse teleconsultation request after the creation of those rules. The total number of teleconsultations per month was assessed four months before and after the new rules. The average number of teleconsultations per month was 737 from January to April 2016, and 2616 from May to August 2016 (increase of 254%). TNMG specialists and the teleconsultation coordinator performed qualitative assessment of the questions, and observed some problems, such as insufficient information about the clinical case, broad questions with slightly differences sent by the same primary care practitioner to the same specialist, and same questions sent by different practitioners of the same city. It was also observed that the primary care practitioners did not access 22% of the teleconsultation responses (ie. the teleconsultation was probably requested just to obtain the financial incentive). The large increase in the number of teleconsultations had a negative impact on TNMG specialists' response time and satisfaction with the service. In order to minimize the problems, these first results were presented to the telehealth coordinator of the Health Department of the State Government of Minas Gerais. Standardized responses were created to be used in case of inadequate questions. From October to December 2016, the standardized responses were used in 13.6%, 10.8% and 10.2%, respectively. In conclusion, this study showed that financial incentive is not a suitable strategy to promote teleconsultation utilization. Although it increased the number of teleconsultations, it also increased number of low quality and unnecessary teleconsultations, since they were requested just to obtain the financial incentive.

Keywords: Telehealth; Teleconsultation; Primary Health Care

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Teleconsultations in Psychiatry: An Update from Sweden

Fotis Papadopoulos
Svensk Telepsykiatri, Sweden

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Realtime Virtual Medical Visits in the Belgian Healthcare System

Sidar Ok
ViViDoctor, Belgium

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Med-e-Tel 2017

Session: Telenursing, Women's and Maternal Health (1)

Telehealth Nursing in Care Settings and Specialties Worldwide

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The purpose of this paper is to describe an array of telehealth nursing research and practice that demonstrates the depth and breadth of nursing in the telehealth-telemedicine environment. Relevant publications from 2015, 2016 and 2017 will provide the source material. Telehealth nursing uses telehealth-telemedicine technology and applications to deliver nursing care and conduct nursing practice over distances and across barriers. Telehealth nursing emphasizes and leverages the use of audio, video, mobile, real-time and store-and-forward technology to enable and enhance care delivery. Nurses on six of the seven continents are active participants in the advancement of telehealth, demonstrating telehealth nursing's wide-spread potential for transforming care by improving resource-sensitive access to quality care. Considering care delivery across the lifespan, nurses are investigating telehealth applications with children, such as those with leukaemia, and with older adults with dementia or Alzheimer's disease. On the health to illness continuum, telehealth nursing is being used with people who have non-communicable diseases such as diabetes and hypertension and also with people who have mental health needs such as treatment of depression or intervention with persons who may be contemplating suicide. Nursing research is also adding to our knowledge about nurses themselves in terms of willingness to use technology, ability to be creative in applying various technologies, and education for their own use of telehealth technology as well as adoption by care recipients. Telehealth nurses are leading the way in the nursing profession by bridging the digital literacy divide between providers and care recipients through education, care delivery and application of research findings.

Keywords: telenursing, care continuum, illness care
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Innovative Mobile Apps for Maternal Health at the WeObservatory, from Netherlands to Mongolia

Veronique-Ines Thouvenot
WeObservatory, Millennia2025 Women & Innovation Foundation, Belgium/Switzerland

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Remote Prenatal Follow-Up of Hypertension Diseases in Pregnancy

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Telemedicine and New Technologies are the Future of Healthcare - Lessons Learned from Poland and Germany

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Fraunhofer Center for International Management and Knowledge Economy, Germany

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New Challenge and Solutions in Teleaudiology

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In a telefitting method an experienced audiologist from the cochlear implant clinic provides fitting service for the patient in distant, cooperating polyclinic. Teleconference equipment provides audio and video connection while remote desktop application allows to take the control over the distant computer and perform all necessary measurements. This method proved to be a reliable alternative for standard fitting, but it does not save work-time for a clinician and is not a way to cope with the growing number of patients. In expert telefitting mode the idea is to involve less experienced support specialists from cooperating clinics in basic tasks and to leave the decision making in the hands of experts performing their duties via telemedical solutions. In current situation we are planning to expand expert model and introduce it to the rest of the less advanced clinics in the Network. At the same time we are adding 3 new clinics from abroad to the National Network of Teleaudiology – in Ukraine, Belarus and Kyrgyzstan. Aim The aim of this work is to present the advantages of this concept and preliminary data showing outcomes of the new – expert model in telefitting. Material The study group consisted of randomly selected patients: 6 children (age 7-16 yrs, mean 11,2) and 7 adults (age 17-64 yrs, mean 44,7) with CI experience ranging from 18 months to 16 yrs. The control group consisted of randomly selected patients: 9 children (age 3-14 yrs, mean 8,8) and 5 adults (age 21 - 36 yrs, mean 27,2) with CI experience ranging from 6 months to 8 yrs. Method Each patient in the study group underwent expert telefitting procedure: local ENT, structured interview, free field audiometry, local objective and psychophysical measurements. Then a Remote Expert interpreted the results and created a new map. The controls underwent standard telefitting consultation. Results and Conclusions The expert telefitting mode is comparable to the standard telefitting mode in terms of patients' satisfaction and appreciation of the results. It allows substantial saving of time of experienced specialists, and in this way may lead to the reduction of cost.

Keywords: Teleaudiology, telefitting, network, hearing, test

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Hearing Screening in Chosen African Countries

Maciej Ludwikowski, Piotr Henryk Skarzynski, Kamila Osinska, Adam Pilka, Mohamed Ayman Najjar, Henryk Skarzynski
World Hearing Center, Poland

Introduction Hearing problems often may cause troubles with understanding of different sounds, delay the speech development and in consequences can have negative impact on social development of the child. The prevalence of hearing loss in children increases with age and may involve different types of hearing problems that cannot be identified by neonatal hearing screening. It is estimated that 9-10 per 1000 children will have identifiable permanent hearing loss in one or both ears by school-age. Hearing screening programs enables early detection of different types of hearing disorders in chosen age group, early detection of hearing problems in the school-age children allows us to implement the effective medical and therapeutic procedures.

Aim Comparison of the results of hearing screening in children in two African countries.

Material and Methods Hearing screening was performed in the group of 395 children in Rwanda (195 children, average age 9,8 yo.) and Tanzania (200 children, average age 7,9 yo.). All children had videotosopic examination and pure tone audiometry performed on Sensory Examination Platform® with the Sennheiser HDA 200 audiometric headphones. Positive result of the screening test was defined as any hearing impairment greater than 20 dB HL in any ear, at any frequency from 500 to 8000 Hz. All the results were sent via the Internet and collected in a special telemedical database developed for the need of our project.

Results Rwanda – 195 children tested – 28% had positive results of PTA, 44% had positive result of video-otoscopic examination. Tanzania – 200 children tested – 38,5% had positive results of PTA and 44,5% positive result of the video-otoscopic examination.

Conclusions Results shows high rate of positive PTA with 10% difference between 2 countries with similar but very high positive result of 44% in video-otoscopic examination.

Keywords: Hearing screening, school age children

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Managed Services in Aftercare: How Cochlear Link Improves Patient Experience and Clinical Efficiency

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Today, more clinics than ever are looking for ways to improve patient care while cutting down on cost and time. Cochlear Care is an aftercare program for cochlear implant patients that does just that. The service is enabled through a cloud based solution called Cochlear Link. Thanks to this technology, crucial patient data can be securely shared outside the hospital with Cochlear, partners or dedicated care providers. An elaborated privacy consent framework makes sure that

all data is kept and shared in accordance with the European General Data Protection Regulation (GDPR). The service greatly reduces off-air times for patients and eliminates the need to schedule unnecessarily time consuming clinic visits.

Keywords: data, privacy, cloud service, aftercare

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Audiology Measurement Using Telemedical Solution in Central Asia

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Nowadays, the telemetry systems tend to be an alternative to the standard measurement systems. With the decreasing cost of electronic devices, the use telemetry systems is becoming more and more common, as it allows to test remotely and to send the results to the specialized centres with experienced staff. Health care personnel involved with hearing services in less modern locations need consistent training, oversight and feedback by audiologists in order to provide quality services. The aim of the study is to present usage of telemedical tools in diagnostic level between Poland and Kyrgyzstan As method we use in Poland hybrid model of testing in Kyrgyzstan: connection of synchronous and asynchronous method. Before we started a remote ABR testing there were a lot of training courses for Kyrgyz technicians. They were instructed on the correct patient preparation for testing, abrasions of the skin, electrodes sticking, clips attaching and launching the appropriate software. There were prepared instructional materials: information brochure and instructional video. The equipment was sent to the centre in Kyrgyzstan. At the beginning of the project we made numerous mock examinations, after that we started the remote Kyrgyz-Polish testing. The whole process is performed with the use of Team Viewer application. It is a proprietary computer software package for remote control, desktop sharing, online meetings, web conferencing and file transfer between computers. During the testing, we can see the testing room on the video and we can speak with technician depending on our Russian speaking personnel. After the test, the results are collected and sent to a specialist describing the result in Poland. Then the documents are translated and sent to Kyrgyzstan. We can perform up to 20 remote examinations weekly. This technology assist clinicians by making it easier for them to consult with other more experienced audiologists.

Keywords: audiology, hearing test, ABR, telemedicine

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Economic Benefits Gained by Patients of Remote Fitting of Speech Processor for Patients with Hearing Implants

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Med-e-Tel 2017

Session: Primary Care, Telerriage

eVisits for Minor Acute Illnesses: Analysis of Patient Demographics, Prescription Rates and Follow-up Care

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Electronic visits (eVisits) are an increasingly popular option for health care delivery, where patients can obtain medical advice and treatment for a number of specified diagnoses, via communication with a health care provider using asynchronous communication within a secure patient online portal. We conducted a retrospective record review of patients who had an eVisit for a minor acute illness from 3/1/15 through 12/6/15 and reviewed for 30 day outcomes of follow-up (via face-to-face care [at a Mayo Clinic retail based acute care clinic (Express Care) or with primary care team] or non-face-to-face care [telephone call or patient online portal]), emergency department visits, hospitalizations and death for the same or related conditions. Patients were aged 18 months -75 years and were Primary Care empanelled patients. Of the 1,019 eVisits analyzed, 350 (34%) had follow-up within 30 days of the eVisit by any of the above methods, with a mean time until follow-up of 3.5 days. Over half of the follow-up (60%) was with a patient's primary care team (via face-to-face and non-face-to-face care); 69% of the follow-up occurred with a face-to-face encounter (with the primary care team and/or at Express Care). Factors significantly associated with any type of follow-up care included specific advice for follow-up given by the eVisit provider and lack of a prescription given at the eVisit (p-value for both <0.001). Fourteen patients received follow-up care in the emergency department, one patient was hospitalized and zero deaths occurred within 30 days for any patients completing an eVisit. eVisits for a specified list of minor acute illnesses can deliver convenient care with low rates of in-person follow-up, and minimal risk of significant adverse outcomes

Keywords: eVisit, electronic visit

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Mobile Diagnostic Units: A Service for Rural Patients

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Introduction: The literature on the use of mobile diagnostic units for the adult population is limited. Here we report for the first time in Colombia (Latin America) the use of mobile diagnostic units for patients in rural areas and resolution of complex cases via telemedicine. **Materials and Methods:** We developed a program to perform a mobile patient diagnosis in three rural areas of central Colombia. The mobile unit was named Mobile dIagnostiC Unit (MICU). In its interior the unit has: general practitioner, medical stretcher, dresser, washbasin, computer, video conference equipment, satellite connectivity and digital medical equipment: electrocardiogram, stethoscope, oximeter and thermometer. **Results:** The population attended during the three days of the activity, was 108 patients, approximately 36 each day. None of the patients (100%) were familiar with digital diagnostic tools and telemedicine. The entire population attended (100%) were satisfied with the care received, health education, and diagnosis. 96% of cases were resolved at the mobile unit and only 4% required telemedicine support with a connectivity to a highly complex hospital located in a larger city. **Discussion:** Our case report shows that the use of MICUs with the support of telemedicine offers a benefit to the rural population in the geographic zone chosen in Colombia. **Conclusions:** Quality of health care is the common denominator and with greater coverage and access in health patients are the ones who earn more.

Keywords: Telemedicine, DiagnosticUnits, Colombia, LatinAmerica, Mobile
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The Value of Online Doctors-Patients Communities as eHealth Tool for Patient Empowerment and Population Health

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More than half of Italians seeks information on the Internet on topics related to health and well-being. In this context, for more than 16 years, Medicitalia.it strives to ensure the quality, usability and security of the information through new and scientific contents. The core of Medicitalia.it, thanks to a Community of 8,500 physicians in 72 clinical specialties and more than 400,000 active users (patients), is the provision of online consultations (more than 1 million already processed) this allows to trace qualitative considerations regarding cultural and behavioural changes of users with use of eHealth. Observations looking inside Medicitalia.it and effect of use of the Community: a high number of people surf the Web searching for information on personal health and this number grows year by year; through the Community, the users ask, inform themselves, look for prevention and move from a passive attitude about their own health to a more active and proactive one. A significant effect in the last years is the increasing number

of men and aged people who take care of their own health leveraging on trustable information available on the Internet and provided by a certified professional community; so the attention to the personal health involves more people than in the past, when women were especially used to this particular habit. The highest number of consultation requests are related to topics which have impact on the patient's personal life: the cultural heritage many times inhibits people to tell the doctor details about personal life or to talk about specific topics, such as issues related to sexuality, anxiety, etc. This kind of requests are easier explained inside a Web Community, thanks to the anonymity guaranteed by the platform and barriers easily broken. Conclusions: Users are looking for information that will help them to take the best decision about their personal health. This is the reason why a trusted community such as Medicitalia.it can be considered, with 91% patient satisfaction rate and more than 60 Million users per year, one of the main eHealth tools in a constant growth that significantly contributes to a healthier population.

Keywords: web, community, empowerment, consultation, population

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Use of Information Technology in Primary Care through the Virtual Mobile Clinic System in the State of Amazonas, Brazil

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The Amazon is a state of large geographic proportions, hindering access to health care for residents of the most remote areas. The project evaluated the use of Technology of Information in primary care, through the virtual clinic system mobile and a mobile communication device (tablet). The project was developed in 24 months, where in the first 12 months was developed the virtual clinic; selected 30 municipalities: where 15 received the tablet and 15 only have access to the virtual clinic; signing of terms of participation of municipalities; and technical capacitation of the teams involved. The following 12 months were monitoring the teleconsultation and tele-education activities, besides the application of project evaluation form. It was found that between June 2015 and July 2016 there were 386 teleconsultations, of which 250 came from the participating municipalities of the PPSUS project with tablet, 21 (5.44%) without tablet and 115 (29.74%) were from non-participating municipalities of the project. The 15 participating municipalities in the study that received a tablet were responsible for 64.7% of the total number of teleconsultations made in the observation interval. Through the analysis of the evaluation forms and the data of Telehealth Platform, were verified the advantages of use of both, the mobile device and the virtual clinic. Was verified the need for innovation in health practices, especially with regard to care in the State of Amazonas. There is a strong need to institutionalize the use of Telehealth Platform, technical capacitation with updated tools and good internet connection. The project was successful in the development and in the data collection, evidencing the need to improve the health services offered to the population and, the importance of general medical monitoring as a precursor of teleconsultation by medical experts

in order to minimize social and financial impacts, avoiding unnecessary displacement and procedures.

Keywords: telehealth; telemedicine; technology; medical informatics; teleconsultation

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Telemedicine as a Health Promotion Tool: A Multidisciplinary Vision

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Telemedicine is a resource that contributes to improving quality of medical care, reducing the time gap between diagnosis and therapy and helping extend specialized and quality medical services to remote or poor locations. Teledermatology and Telecardiology encompass the application of telecommunication and computer technologies in dermatological and cardiological practice. The objective of this study is to report the integration of a multidisciplinary health team providing remote assistance for diagnosis and management of dermatological and cardiovascular diseases, wherein second opinion is given to teams treating patients with difficulty in travelling to face-to-face consultations. This telemedicine work is carried out by the MicroG Telehealth Laboratory through telehealth missions and is organized by students and professionals from various areas. The local health team conducts a triage of cases for those needing specialist dermatology and cardiology assistance. Data is collected to assist in determining the need and urgency of each case for clinical consultation. The information collected respects the confidentiality of the patient-physician relationship. Details are referred to the Hospital São Lucas, where specialists issue second expert opinions on each case. In this sense, teledermatology and telecardiology reports serve as a tool to assist the general practitioner and family physician in deciding whether or not to refer patients to a specialist service. Internet connection is provided through integration of a mobile phone as the server for three other microcomputers using the MicroG e-Health platform, integrating information from the screening and exam, and ensuring the connection during the data capture process and data sending to the central server. This assistance has proven to be a user-friendly and cost-effective tool, providing experience to students and professionals in remote health assistance and facilitating the integration between different areas.

Keywords: telemedicine, e-health, remote health assistance

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PhotoExam: Review of First Year of Clinical Use in Primary Care

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In 2015, Mayo Clinic released PhotoExam, an internal application which incorporates photography functionality using iOS-based mobile devices into the electronic medical record. The promise with this release was greater access to teledermatology for primary care providers (pcps), with the ability to either order a formal written dermatology eConsult or speak with a dermatologist via phone for a “curbside” consultation and review of the photos. We retrospectively reviewed photo captures taken by pcps from February 16, 2015 through February 29, 2016. Records were reviewed for the following outcomes within 30 days of the photo capture: dermatology input (via ‘curbside consultation’, eConsult and/or face-to-face [f2f] visit), whether biopsy was performed of the finding, biopsy results and who performed the biopsy (if performed). During the study period 1305 discrete PhotoExam sessions were captured with a range of 1-18 photos per session. Number of body sites per session ranged from 1-6. Forty seven percent of sessions were captured by staff physicians, 21% by resident physicians and 32% by nurse practitioners or physician’s assistants. Fifty percent were captured by internal medicine providers, 25% by paediatrician providers and 24% by family medicine providers. Thirty two percent of sessions included dermatology input (either via curbside, econsult and/or f2f visit). Of the sessions that involved dermatology input 38% had a curbside consult only, 14% had a curbside followed by a dermatology f2f visit, 18% had a econsult only, 4 % had a econsult followed by a dermatology f2f visit and 26% had a dermatology f2f visit only. Nine percent of photo sessions had a biopsy performed of the photo site; of these 40% were performed by a pcp. Of the 117 photo sessions that had a biopsy of the site within 30 days of photo capture, 29 patients had a malignancy found on pathology. When photos were obtained without seeking dermatology input we saw instances of serial photos to follow skin infections and photos taken with comments of the intent to consult dermatology if the condition didn’t improve with the treatment recommended by the pcp.

Keywords: Mobile teledermatology, teledermatology
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Telemedicine in Commercial Air Travel

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Telemedicine and Prediction of Extreme Weather Situation to Support the Decision Making Process in the Healthcare System

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Telemedicine and prediction of extreme weather situation may represent an added value to the decision making process in the handling of real time emergency/crisis scenarios. Extreme weather events, such as heavy rain, floods, storms, heavy snow, can cause different hazards that interacting with the humans and natural systems may lead to disasters. Telemedicine and teleconsulting may be helpful in the health care decision making process during such events. Regional Centre for Emergency Medical Research and Development (RAKOS) and SUS (Stavanger University Hospital) in this view is involved in two projects: the EU Project “Anywhere” and “PasMon” (in collaboration with SINTEF). In the “Anywhere”-project, RAKOS is part of the research team with the aim to define tools able to support the decision makers (institutions) in real time to coordinate the emergency management operations during extreme weather situation. The aim of the project is to create tools able to support a faster risk analysis related to the precise event before the event occurs and, by that, have an improved coordination of the emergency management system. The role of RAKOS is also to manage the activities when the tools will be tested in the Norwegian pilot site. In the “PasMon” project RAKOS is involved in the development of a remote diagnostic tool in connection with a model for the communication of patient data in case of emergency medical treatment. The diagnostic care device has the functionality of electronic triage, continuous transmission of physiological parameters, location and alerting in case of modification in the patient condition. This model and diagnostic device has also the aim to solve the challenges in the prehospital services related to listing of patients and their medical condition. The information is available throughout the emergency medical treatment chain so that resources can be exploited optimally and provide a better situation awareness.

Keywords: Telemedicine, extreme weather, electronic triage
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Application Tool for Improvement of the Metrics of Read and Evaluated Teleconsultations of the Telehealth Center - HUUFMA (poster)

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Introduction: The Brazilian Telehealth Networks Programme is an initiative project of the Ministry of Health, which aims at contributing to the quality of services provided by the Unified Health System (Sistema Unico de Saude, SUS). The programme incorporates training and the integration of health workers and professionals through the use of information technology

infrastructure and telecommunication to promote Tele-assistance and Tele-education. In the area of tele-assistance, the Telehealth Centre of the University Hospital of the Federal University of Maranhão (HUUFMA) is also built up on Teleconsultation services, which provide by communication tools the assistance for health actions, clinical procedures and issues related to work processes. The process of a teleconsultation starts with the solicitor asks a question in the Brazilian Telehealth platform, which will be forwarded to the professional capable of answering it to the solicitor based on scientific evidences. All this process must be done within 72 hours, and after that the solicitor must read the teleconsultation and evaluate that within 30 days, otherwise it will become inactive. Previously, the monitoring of this task was done by using digital spreadsheet, which used to require exhausting human effort. By that, it was necessary the development of an application to monitor and manage the unread and unevaluated teleconsultations, and improve the metrics and quality of services. Objective: To create an application capable of organizing by dates the unread and unevaluated teleconsultations, also able to create charts from this data and then point to the manager all the teleconsultations possible to become inactive. Results: Before the development of the system, the Telehealth Centre had 25% of inactive teleconsultations. After the deployment of the system, this number decreased to 0.8% from October to November of 2016. Conclusion: All things considered, the developed system has shown up to be effective in accomplishing the expected result. Significantly, the Centre now has improved the contact with the solicitors through an increased number of feedbacks.

Keywords: telemedicine, telehealth, tele-assistance, tele-education

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A Clinical Management Center Value in Triage of COPD Telemonitoring Patients (poster)

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Background: A triage system allows the management of clinical priorities. Telemedicine is the systematic collection of clinical data from the patient's home and its examination by a healthcare team. It is mainly important in patients who live in rural areas because it allows access to clinical information in real time. COPD exacerbations contribute to disease progression and worse prognosis. Aim: to describe the value of a specialized clinical management centre (CMC) composed by health professionals, who will triage the received alerts, notify the doctors only regarding the confirmed exacerbations, and stratify them according to their level of severity. Methods: 15 male COPD ("c" and "d" GOLD) patients were followed. They were given devices to remotely measure pulse oximetry, heart rate, blood pressure and temperature. For each one, individual alert thresholds were calculated. A clinical alert is described as at least one registered bio signal outside of the threshold and a technical alert as the absence of received measurements. Clinical alerts led to a telephone contact with the patient to evaluate symptoms through a clinical questionnaire. This allows the confirmation of an exacerbation according to clinical criteria and

its classification, by the use of an algorithm, as level I, II or III in order to refer the patient to the right level of care. If a technical alert was detected, the patient was contacted to support in problem solving. Results: During 18 months, 1137 clinical alerts were detected but only 4.3% were true positives. Of these, 55.1% were level I, 36.7% level II and 8.2% level III. 1202 technical alerts were recorded. Alerts related with patient's lack of knowledge regarding technology decreased along the study period. Increased compliance to telemonitoring was shown by the low number of technical alerts due to demotivation: 4,4%. Conclusion: Not all bio-signal alterations are translated into an exacerbation, so clinical triage is essential. In this study, a CMC played an essential role in identification of real alerts and its referral to the doctor of a small fraction of critical patients, increasing the efficiency of clinical follow up.

Keywords: telemedicine, clinical management center, COPD

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InfoSAGE: Information Sharing Across Generations and Environments (poster)

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Currently, there is poor understanding of how independent elders seek and utilize healthcare information, especially personal health information (PHI) such as that contained in electronic health records. In addition, little is known in regard to how elders' PHI information seeking behaviour and utilization changes as they transition from full independence to family- or institutionally-supported care. At the Division of Clinical Informatics at Beth Israel Deaconess Medical Center, we have developed a "living laboratory" named InfoSAGE (Information Sharing Across Generations and Environments), to explore and study the information needs of elders, their adult children, and relevant caretakers. The platform currently provides digital tools to support communication, coordination, and collaboration of care within complex and costly care environments. The goal of InfoSAGE is to gain an understanding of the healthcare information 'ecosystem' that can support the special needs of the independent elder, yet also be capable of supporting an incremental transition to shared management of information, decision-making and communication, particularly in the case of elderly patients who face diminishing cognitive function. Participant enrolment has encompassed the senior care system at Hebrew Senior Life in Rosindale, Massachusetts, and efforts are underway to longitudinally study patient and family collaborative interactions and information management behaviours in the context of real healthcare decision-making and care tasks. Ultimately, preliminary and future results are expected to inform future design of electronic health information resources.

Keywords: Telemedicine, ageing, primary care, mHealth

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Med-e-Tel 2017

Session: User Perspectives and Awareness

Developments in and Standards for Telecare and Telehealth

Malcolm Fisk
De Montfort University, UK
Telehealth Quality Group, UK

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Coalescing the Perspectives of Health Professionals on Telehealth - What it is and What it can Achieve

Robert Floyd, Donna Floyd
The Crag Business Group, USA

Despite efforts to develop a standardization of definitions of both terms and capacities for telehealth, there remains inconsistency in the understanding of this tool among both frontline and leadership healthcare providers. This session presents a descriptive report of the trends and definitions noted from multi-country interviews with persons from multiple disciplines and levels of familiarity with, and expectations for, telehealth. While there is strong optimism from several quarters it is noted that there remains far reaching misconceptions and continued skepticism. The interviewers share the common threads that, it is hoped, will lead to more unified understanding of telehealth and appreciation for the possibilities it brings to the lives of our patients.

Keywords: clinicians, standardization, capabilities, barriers, opportunities

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Improving Technology Awareness in Managing Chronic Diseases: A Review of the Literature

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This paper investigates recent studies of ways of using technology tools and/or strategies to improve adult's awareness related to chronic diseases in managing the condition. Studies included were those involving an adult: users/parents/caregivers/family member, who cares for a

young patient or is has a significant self management role. The studies were conducted into available technologies, their use and their effectiveness in a range of situations. Studies included both the use of the technologies per se and the strategies employed for the use of technology. The synthesis of outcomes of research studies is designed to inform those attempting to reduce the impact of chronic disease through technology and to identify areas not presently covered well by research outcomes. Two types of secondary data were gathered. Firstly a set of academic studies were obtained through peer reviewed sources to ensure quality of the studies. The databases used were, Medline, Web of Science, PubMed, and Google scholar. Select journals were examined for relevant intervention studies and those were: BioMed Central journal, Journal of Medical Internet Research. The second type of publication non-academic sources (sometimes called “grey sources”) as strategies for technology use (techno-strategies) were not found often in the academic literature. The aim of using this type of material was to generate a list of strategic approaches without analysis of the efficacy of those strategies. Five criteria used to identify relevant quality research studies. Initial search of research terms returned 907 studies. An examination in detail, of those produced exclusion criteria that identified 27 focused on the intended issue. Studies were classified by location, study design, disease or condition and population. This allowed identification most commonly studied Chronic Disease with respect to technology use. The analysis discriminated between studies of patients and studies of carers. The study found that techno-strategies could be categorised into one of education clinics or communication platforms. By examining grey literature a list of issues requiring strategic response was generated.

Keywords: Awareness, Technology, chronic disease, management

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Standards, Older People's Needs and the Standardisation Process: Challenges and Dilemmas for the PROGRESSIVE Project

Malcolm Fisk
De Montfort University, UK
Telehealth Quality Group, UK

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Incorporating Quality Telehealth Care into Practice: Balancing Quality Care with Professional Demands (poster)

Lisa Bell, David Chmielewski, Mamta Singh, Andrea Hannan
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Health care providers face a host of challenges leading to burnout, inclusive of both internal stressors (e.g. demands of the practice, administrative issues, personal work-life-balance) and

external stressors (e.g. healthcare reform, law/policy, patient demographics). Notably, the rising number of patients seeking access to healthcare is a leading factor in claims associated with physician burnout. Recognizing the issue of increased patient cases and needs as common components of stress/burnout, which consequentially lead to decreased professional satisfaction, quality of care and attrition; are integral considerations in proposing plausible means to addressing issues of organizational change and counter-burnout methods. Utilizing telehealth in practice to intervene in the phase where potential antecedent stressors might arise, may aid in balancing care for the rising number of patients and assist providers in meeting professional demands. Telehealth affords healthcare access opportunities, whereas otherwise limited or inaccessible healthcare negatively impacts healthcare accessibility. Both synchronous and asynchronous acquisition, transmittal and assessment methods permits the Veterans Health Agency (VHA) system to utilize health informatics, disease management and telehealth technologies to target care/case management thereby facilitating access to care and improving the health of its patients Through the utilization of telehealth, providers from all disciplines and spanning across vast geographic locations are able to collaborate in the diagnosis, treatment and management of patient care. VHA health care providers have the opportunity formally learn about telehealth during their clinical rotations and continuing education training programs. Providers are also afforded with the opportunity to learn more about the telehealth services available and how to help patients best utilize these services which are available to them. Dissemination of most-current empirical and qualitative data as it relates to patient utilization, patient satisfaction scores, training/development outcomes and provider utilization will be presented as part of the symposia.

Keywords: metric, practitioner training, transformative telemedicine

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Technology in Health: Knowledge, Opinion, Necessities and Adherence of Populations to Telemedicine (poster)

André Mendes, Miguel Castelo Branco Sousa

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Telemedicine is an area where we apply technological knowledge to health. Telemedicine is being used for some decades. Since the beginning, technology evolved immensely and the uses and indications also. Nowadays, all that equipment became cheaper, accessible and reliable. Improvements have been made, not only in solving geographical problems, as to improve efficiency of healthcare providers. This being said, with telemedicine climbing its way up in our lives, and with the latest developments in this field it is important to evaluate the knowledge of populations about telemedicine, if they are capable of defining the concept and if they are conscious of its width and presence in daily health activities. As in some cases the use of telemedicine alters the normal function of health systems, it is useful to ask about the opinion of populations, what they think about it and who will benefit the most from it. As we live in a region with low demographic density and sparse populations with lack of specialists, it is relevant to inquire about health necessities and if people think it is possible to solve them

through telemedicine. In order to have adherence from population to new projects we have to search for their concerns and fears and come up with ideas to surpass them. This study will take place in Covilhã, Portugal and will be based on an inquiry, focusing the four aspects previously referred (knowledge, opinion, necessities and adherence about telemedicine), applied to patients of the city hospital.

Keywords: Telemedicine, Knowledge, Opinion, Necessities, Adherence

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Survey Study: Reality Check of Internet & Telemedicine Use in Iraqi Hospitals(poster)

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Mercy Hands for Humanitarian Aid, Iraq

Thirteen years after US invasion of Iraq, the healthcare system remains in shamble, due to inherited and emerging problems. The main inherited problems are the underfunded governmental socialized healthcare services, which represent the backbone of healthcare system in Iraq, and virtually the nonexistence of health insurance practices in Iraq. The main emerging challenges that face the Iraqi healthcare system are insecurity and immigration of healthcare personnel. A few solutions have been proposed to overcome these problems, telemedicine is one of them. The Iraqi Telemedicine Centre designed a study to investigate feasibility of applying telemedicine in Baghdad. It is a survey-based study conducted by field visits and direct interviews with administrative representatives of fourteen randomly selected hospitals in Baghdad, eight of them are governmental and six are nongovernmental for-profit hospitals. This study explores the hospitals' internet services in terms of type, use, and access. Results showed that 71% (10/14) of the hospitals have access to the internet and the type of internet for all these hospitals is cable (fibre optic) internet – small business package plan. 60% (6/10) of the hospitals that are provided with internet offer Wi-Fi to their physicians and potentially their patients, and most (5/6) of these hospitals are nongovernmental for-profit hospitals. Only 21% (3/14) of the interviewed hospitals' representatives were familiar with the concept of telemedicine; however, upon further questioning, 36% (5/14) of the hospitals were utilizing some aspect of telemedicine. 43% (6/14) of the hospitals were interested in participating in projects utilizing telemedicine, including the five hospitals that were utilizing telemedicine. These results are probably generalizable to the rest of Iraq, as the healthcare system and internet services are the same. In conclusion, despite of all the challenges, telemedicine is feasible in Iraq, especially if it was affordable and the technology can operate on low-bandwidth internet. Moreover, the private healthcare sector seems to be better suited for applying telemedicine.

Keywords: Iraq, telemedicine, hospitals, survey

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Med-e-Tel 2017

Session: Mental Health

Adoption of Telemental Health Services in a Canadian Regional Mental Health Centre

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The Royal Ottawa Health Care Group, Canada

The Royal Ottawa Health Care Group (ROHCG) is a specialized regional mental health organization within Eastern Ontario. The ROHCG provides a broad range of specialized inpatient, outpatient and community mental health services within a multidisciplinary model of care. In 2010, the ROHCG embarked on a substantial expansion of its telemental health services in order to better serve the mental health needs of a large and diverse catchment area. Change management strategies and rapid PDSA (Plan, Do Study, Act) cycles were utilized and resulted in a tenfold increase in the use of telemedicine. The strategies have resulted in a high degree of engagement amongst physicians and staff in the use of telemedicine as well as innovative uses of the technology to provide client care. Surveys have demonstrated high satisfaction rates with respect to telemedicine for both clients and staff. This presentation will elucidate the change management strategies and outcomes achieved at the ROHCG with respect to telemedicine adoption and innovation. Valuable lessons learned will be explored and may be beneficial for clinicians, administrators, and organizations wishing to initiate or expand their own telemedicine services.

Keywords: telepsychiatry, rural, access, satisfaction, outcomes

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The Presence and Future of Telepsychiatry

Fotis Papadopoulos
Svensk Telepsykiatri, Sweden

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Tele-Social-Rehabilitation as a Tool for Individualised Recovery Programs for Citizens with Mental Illness

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The WHO has estimated that in any given year, 25% of Europe's population will be affected by mental diseases. In 2013, the Danish municipality of Esbjerg began a research project called the

“Video Assist”, which uses tele-social-rehabilitation as a tool to assist citizens with mental illness. The target group for the research trial are persons diagnosed with depression, schizophrenia, paranoia and bipolar disorder who have been discharged from hospital. The aims of the project are: (1) to reduce readmission of these persons to a psychiatric hospital, and (2), to prevent worsening of symptoms by providing citizens with the possibility to communicate virtually with a team of social workers on a 24/7 basis. The citizens have video software installed on a Windows PC. Citizens are enrolled in the tele-social-rehabilitation program after being discharged from psychiatric hospital. The social workers formulate individualized recovery plans for the citizens in order to help them back to an everyday life. A total 57 persons (30 females average age 35.3 and 27 males average age 39.7) were enrolled, and they used the system over a period of 6-18 months. Aim: The aim of the study has been to explore the impact of using video communication technologies between social workers and citizens as a tool in rehabilitation of mentally ill persons. Methods: A triangulation of data collection techniques has been used: document analysis, qualitative interviews with social workers (n=10) lasting 45-65 minutes and participant observation (n=43 hours). Interviews have been transcribed and notes taken from observations. All data were analysed using NVivo 10.0. Results: The social workers reported that the video technologies helped save transportation time so that social workers need not come to the citizens’ home; that recovery plans could be tailored to the client’s needs in a more individualized way, and that they facilitated more independent living skills for the citizens. Conclusion: The social workers found the use of virtual technology to be effective, allowing them the possibility to tailor recovery plans to citizens and as a useful supplement to conventional psychosocial support.

Keywords: Tele-social-rehabilitation, mental illness, social workers

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Pronto Fácil: A Software for Patient Data and Health Service Management for Clinical Psychologists

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Introduction: Clinical and management data need to be stored in a manner that allows easy, safe and real time access. Objective: Develop a software for patient data and health service management for use on clinical psychologists’ smartphones, tablets and computers. Method: This is a research, for applied technology production with a software application development, which was carried out in five steps: (1) Preliminary survey; (2) Target public contacts retrieval and pilot research; (3) Definition of development’s basic aspects and questionnaire preparation for final research; (4) Initial development, beta testers and final questionnaire; (5) Application’s final version development. Results: (1) Low records registration and methods used by clinical

psychologists. (2) Reasons for low records registration and helping factors to change this. (3) Chosen a software language which was able to be used as platform independent when developing to Windows, Android and iOS, easy-to-read text fonts for everyone, pleasant colors and intuitive user interface. (4) First software version, group of testers and final questionnaire. (5) Application is able to manage patient records and appointments, together with financial and tax registries, and tax collection formularies. Conclusion: The proposed psychological records strategy has resulted in a key factor to tackle the barriers raised against recording psychological treatment in medical records, being also a great ally for private practices' management, as clinical psychologists, liked the versatility in handling and scope, such as appointments, registration of clinical records and financial control. The application will be freely available on Microsoft Store for Windows 10 users and in the future on Play Store (Android).

Keywords: software, psychology, medical records systems

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Occupational Health Initiatives for Resident Physicians (poster)

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Despite the fact that health promotion is a shared mission among physicians, the occupation has historically been characterized by extended work-hours, sleep deprivation, and poor or absent self-care. Although contemporary U.S. graduate medical education programs no longer expect resident physicians to live within hospitals caring for patients 24/7, new interns, residents and fellows (house officers) still notoriously encounter high-stress working conditions, often managing life-and-death circumstances working long days, nights and weekends in the ritualistic right-of-passage to becoming a physician. In 2003, the U.S. Accreditation Council for Graduate Medical Education (ACGME) capped resident work hours at 80 hours a week for all residency training programs, a move prompted by national attention on patient deaths and medical errors. Despite these efforts, approximately 300-400 doctors still commit suicide each year, or an estimated one physician/day. Physicians are more than twice as likely to kill themselves as non-physicians. This presentation will highlight ongoing efforts to reduce burnout and promote emotional resilience among new resident physicians, including: institution-sponsored employee wellness programs, provision of mental health counselling via telemedicine, targeted education, and socialization initiatives, both in person and mobile health. Although comparative effectiveness data on different occupational health initiatives is limited, high economic costs of burnout, depression, or death within the medical profession warrant greater efforts to improve occupational health among physicians.

Keywords: telemedicine, occupational health, wellness, professionalism

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Using Tele-Education for Professional Training in Mental Health Primary Care in Brazil (poster)

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In 2006 the Brazilian Ministry of Health identified various experiences in the country involving Telemedicine and Telehealth, and a national telehealth pilot project encompassing the experiences was created named Brazil Telehealth Networks [Telessaúde Brasil Redes], to improve the quality of primary care delivery in Brazil's Unified Health System [Sistema Único de Saúde] (SUS). Meanwhile, starting in 2001, the Brazilian Psychiatric Reform had begun to make major changes in Brazil's hospital-centred mental health care model which previously focused on hospital stay – eliminating asylums and creating Family Health Support Centers [Núcleos de Apoio à Saúde da Família] (NASF) and Psychosocial Care Centers [Centros de Atenção Psicossocial] (CAPS), directing mental health assistance towards primary care. The objective of the present study was to identify Brazil's tele-education programs offering professional training in Mental Health Primary Care over the last two years. This is a descriptive review of the literature, using information from the websites of Brazilian Telehealth Centers registered with the Brazil Telehealth Networks. The study identified 18 telehealth centers located in all regions of Brazil, run by state and federal universities, with the largest number being the Northeast. Of the 18 centers found, 11 offered tele-education programs in mental health; two had no website; and five offered no mental health services. Of the 11 centers offering tele-education programs in mental health, two had courses targeting a specific professional category; while the other nine offered courses encompassing the multidisciplinary team. Our findings suggest that telehealth in Brazil is well-structured, targeted to all primary care sectors, with tele-education providing support for professional training in mental health, disseminating courses free in all regions of Brazil. Brazil's telehealth service were also found to be keeping up with the health panorama in the country and the world, operating in line with the points raised in the Brazilian Psychiatric Reform, helping to reduce stigma and prejudice towards mental health patients and qualify the care they receive.

Keywords: tele-education, mental health, primary care

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Evolution of Activities of Daily Living Using Inertial Measurements: Lunch and Dinner Activities

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In the context of the design and the development of home care services for fragile people, we propose to monitor and assess their activities of daily living (ADL) in order to prevent and anticipate loss of autonomy and situation changes. The availability of non-stigmatizing sensors such as smartphones allowed the use of inertial data to evaluate the people autonomy in their daily life. The aim of the service is to develop an unconstrained and non-intrusive system which makes it possible to anticipate abnormal behavior of the person. For this purpose, inertial data are used to identify the user's activities during the day from postures sequences. We present in this paper a method to determine the correlation between postures and activities to deliver an index of daily activity specific to each person. The method was validated through experimental tests. Experiments were conducted on 8 elderly persons over a three-month period. The results showed that we could identify the "feeding" activity in real situation with acceptable performances.

Keywords: inertial measurements, ADL, postures, autonomy

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Next Generation Personal Alarm and Remote Support Solutions

Frans Hermes
Spectator Video Technology, The Netherlands

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A Web of IOT Sensors to Automate Quality Control in a IVF Embryology Lab

Maninder Sra, Kaninika Panda, Satish Prasad Rath
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Background: IOT is the concept of internet-of-things involving sensors which can communicate data to internet for realtime data insights from the device. This can be very helpful in quality

control situations, especially monitoring lab conditions for performance based labs such as IVF where right temperature, humidity and VOC content present are critical to human embryo growth. Objective: The objective was to enable the quality monitoring of an IVF lab to maintain critical parameters like temperature, VOC in working range. Methodology: The sensors were deployed at Santaan Fertility Centre and Research Institute to detect temp, humidity, VOC, vibration and lab entry. Real-time data received on mobile with triggers to alert for deviations. Results : The results in terms of live data conveyed the trends in the lab for the above parameters, giving crucial insights on the levels of VOC and humidity at various times of the day and the relation between door opening and VOC levels to manage the lab better. Better management of air-conditioning is now possible by looking at the 24 hour temperature trend to maintain optimum range resulting in power savings. Conclusion : IOT sensors working as standalone devices can be great supporting network of accurate sensors to streamline quality control in fertility labs where maintaining temperature, humidity and VOC levels is crucial for the fertility lab success. This system can also serve as an accurate feedback loop to trace back quality control lapses and figure out the anomalies for smoother operations and consistent results in the lab.

Keywords: IOT, Quality Control, IVF

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Digital Technologies to Help People with Autism: How to Increase Everyday Comfort

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Autistic pathology is a cognitive pathology which affects, as a neurological dysfunction and through different types of hypersensitivity, the functioning of the brain. This alters the ability to recognize expressions, social and emotional codes. Autism is a pervasive developmental disorder that results in difficulties in creating social relationships and communicating, as well as behavioural disorders. People with autism need concrete and visual information, structured over time, that is, they must be guided by giving them the opportunity to prepare for what will happen, to unforeseen changes. Technology can promote comfort and security at home and thus improve the daily life of any user. In the case of people with autism who aspire to partial autonomy, this support can be implemented when the person is young to raise awareness and create habits and benchmarks that will allow him to evolve over the long term. Today, many methodologies exist to adapt the housing environment for different kinds of disabilities or pathologies (in particular for people with reduced mobility). However, rearranging the environment for people with autism cannot be done in the same manner as for people with physical disabilities. Even if some building structure modification still has to be taken into account, most part of the autistic pathology resides more on a psychological level than a physical level. Our methodology then consists in four steps. Firstly, we study the person's behaviour and habits to derive the priority parameters. The second step is the analysis of the housing environment in order to partially reorganize it. The third step is the recommendation of home automation and ICT systems that could help to reach the priority parameters. The last step then

consists in adapting the environment in terms of psychological and sensory aspects and interactions. Basically, the last step is derived from the Snoezelen concept. In particular, we make some adaptations of the housing environment in terms of colours (walls, furniture), guiding signs, scents and sounds selected to appease, scenarios and ambiances directly based on the pathology and sensitivity of the autistic person.

Keywords: comfort, autonomy, autism, digital technologies

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Application of Internet of Things in Health Care

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The paper focuses on continuously growing area of Internet of Things and its application to health care. We discuss several important aspects, namely quality, and relevance of data acquired. We illustrate IoT by a case study of diabetes mellitus personalized treatment. Modern type 1 diabetes mellitus therapy is now unimaginable without intensive glycaemia monitoring. In the last decade the possibility of real time continuous glucose monitoring (RT-CGMS) was realised along with integration to some types of insulin pump. Currently the research focuses on continuous glucose monitoring systems that have following advantages: non-invasiveness, high customer acceptance; comfort in use; ease in use; accuracy; long-term measurement up to 4 weeks; calibrating unit integrated; alerts for low or highs of glucose level; enabling higher lifestyle flexibility, e.g. physical activity, food, medication; wireless data and energy transmission; infection risk is minimized. Obviously several sensors are necessary to acquire the contextual data, in particular vital parameters, physical activity, and stress. All measured data must be collected and evaluated in parallel. The aim is to identify the mutual relations in measured parameters, the differences among patients and finally the most important parameters for development of personalized data models.

Keywords: data quality, diabetes mellitus

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An Innovative AAL Light System for Ambiance, Guiding and Security

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For centuries, human life has been strongly correlated to sunlight. When cavemen discovered fire, they used it to illuminate their environment and to ensure their security against threats. Since Antiquity, well-being provided by light has been identified to reassure, guide and alert

people thanks to various factors affecting mind and feeling. Since electricity has been discovered, blinking, flashing and intensities of light has been used to inform and sometimes revitalize people according to the moments of the day. Nowadays, the light is mostly used for lighting. Most part of the time, all the benefits that could be provided with colours, intensity, modes and frequency of flashing and blinking is not emphasised. For example, we now see bright path systems, baseboard LEDs used as ornaments, and connected bulbs that can change colours and intensities. The first ones are often used for AAL purpose in particular for elderly or disabled people who have to be assisted at night. The two other systems are, for now, sold as gadgets (for Christmas, etc.). Our concept is based upon the design of a 3-in-1 lighting plinth available in various versions depending on the intended building or structure (private housing, medical building, hotel), and associated functionalities. The proposed equipment includes a backlit part for guiding, a direct lighting for ambiance and comfort, and a blinking/flashing central zone for guiding in emergency situations. Colours and intensities can be chosen and modified through a remote controller or a smartphone or web application. Blinking frequency of the central zone can also be configured. From the point of view of its integration into the building, the equipment is proposed in an entry-level version that just has to be plugged in a classical power plug. A luxury version enables the plinth to be embedded inside a wall or a decorative cornice. At the entry level, the equipment is made of white plastic less expensive and easier to maintain (and to clean in a hospital for example). The luxury version can be designed with several hubcap materials (wood or personalised colour). A foot lamp version will also be available.

Keywords: Light, Guiding, Ambiance, Security, Well-being

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A Framework to Develop Intelligent Agents to Support Sentiment Analysis

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Many people including elderly people live nowadays alone with a high tendency toward depression diseases including loneliness. Most of the times the social networks are their unique way of expressing their sentiments and to speak freely about their feelings and intentions. However the posted posts are most of the times seen by non specialists and important information is lost or the adequate reaction is not provided. The main issue of this paper is to propose a framework to develop intelligent agents that will be trained to crawl the social networks, to analyse sentiments according with posted expressions which will be classified according with an ontology of emoticons and send alerts to a specialist who will provide the adequate psychologic and social support. These intelligent agents can work like a team, developing collaboration work and developing skills and competences similar to Darwin theory of biological evolution. The expressions classification will be a priori annotated by a panel of experts and these annotation will be used to train the intelligent agents. The system will also use an ontology not only to reason the concepts but also to find new association of terms and

expressions that will be presented to the experts to get their classifications. The final outcomes will be an evolutive eco system of intelligent agents capable to gather knowledge and use their competences to analyse sentiments according with an ontology of emotions. The proposed framework is based on a literature review, technological state of the art and includes the global architecture, the technology and the implementation training to get a fully functional system. Some foundation concepts, methods and technologies will be reused in this framework including emotion ontology (Janna Hastings, 2016) , and ontology editor Protégé , a text mining information extractor and classifier and a platform to develop intelligent agents , JADE .

Keywords: ontology,elderly people,loneliness,networks

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Animals, Human Beings and Technologies: New Relations and New Interactions for Improved Efficiency

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Sixty million of French people, sixty three million of pets, seventy two million of mobile phones: we are all connected in one hand to our mobile phone and in the other hand to our dog or cat. For centuries, we have a close historic relation with animals. They were first used for works and then became companions. More recently, the human-machine interaction is also very close since connected objects and interfaces have been invented. However, until now, interaction between only two components mostly exist. In a human-animal relation, a sheepdog can group the herds. More affectively, serenity is brought to the people by a cat's purring. From the human-technology point of view, we strongly personalize our smartphone or tablet in an ubiquitous manner and use these interfaces daily. Technology can be used for animals also, for example for connected cat flaps. Our concept proposes a new interaction in which one member of the triptych (human, animal or technology) provides added value not directly to another member but to the relation existing between the two others. We started from the guide dog and his blind master for whom the relationship is very tight since the animal is a worker and also a companion. How could technology be useful in this relation? We propose here a technological solution as a connected collar coupled with a digital application. The application can be parameterized to define a security area around the master and his animal. If the animal goes too far from his master (usually at earshot distance), the master is warned by a sound signal and can then call his animal back. Simultaneously, the dog can be trained and also warned to go back to its master by a sound signal. In a further version, the application will propose an estimated relevant area size (through a GPS) according to the place you are (a crowded city street, a city park, or a safer place in the countryside for example). And the concept can of course be enlarged to all people having a pet, not only blind people. Therefore, this system allows to keep an eye on an animal without seeing it, thus guaranteeing its safety and the master's serenity.

Keywords: Relation, Localization, Safety Area, Technology

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@CALM-e: A 4-in-1 Chromotherapy, Aromatherapy, Light Therapy, Music Therapy Product for Well-being of People

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Everyone sometimes feels, depending on seasons and daily stress, a lack of energy and motivation and thus needs to recover well-being. Right now, products and services already exist to overcome this problem, but they are mostly seen as therapeutic solutions since they are sold in pharmacies or specialized health centres. We propose here a connected product for well-being at home, playful and usable by everyone. It combines luminous variations, smells and sounds that are meant to appease the users. The product is presented as a set of interconnected awakening of senses through four means which are used to create global predefined atmospheres. These sensitive means are usually called chromotherapy (which uses colour variations to transfer energy to the body), aromatherapy (which uses essential oils to stimulate sense of smell), light therapy (which simulates motivation, envy and well-being for example by reproducing sunlight effects) and music therapy (which seeks to use vibrations to stimulate the brain) but are used in a more playful way (and a less "therapeutic" meaning). @-CALM-e (assistant Chromo-Aroma-Light-Music through eTech) is a pack composed of a connected platform designed as ornament that can be harmoniously integrated in a private housing environment. The platform works on-demand on the same principle as a coffeepot with capsules with which one would choose an aroma of coffee (stronger coffee in the morning, or decaffeinated coffee after lunch). Our principle is based upon the same approach. You can choose your capsule among a wide range of predefined atmospheres and scenarios that combine scents and odours, music and sounds, colours and light/luminous variations. For example, if you want a "seaside atmosphere", you will select a capsule simulating sunset colours, wave sounds and smell of the swell. Just insert the capsule into the platform to obtain the atmosphere wanted. In a future version, it will be possible through a smartphone or web application to personalize capsules by creating colour, smell, light and music settings and scenarios on demand. @-CALM-e will then help you to appease and satisfy your senses and improve your well-being.

Keywords: Senses, Capsules, Well-being, 4-in-1, e-technology
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Digital Services Supporting the Sense of Security for the Home-dwelling People Living with Memory Disorder (poster)

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Background: A key goal in Finnish social and health policy is to promote elderly people's possibilities for accessible and safe living at home for as long as possible. In Finland the population is getting older faster than it is in several other countries. Due to that, the prevalence

of memory disorders is increasing. Although age is a risk factor, memory disorder also touches younger people. Memory disorder substantially impairs people's independent functioning in daily life and thus threatens their safe living at home. Living at home safely requires the diversification of in-home services and forms of assistance for people living with memory disorder. Technology can help create a barrier-free home environment which increases a sense of security, enhances the person's daily functioning, supports informal caregivers and lengthens safe living at home for as long as possible. Aims of the project The project aims to increase the sense of security of people living with memory disorder and support their self-care and independent living by means of digital services in their own homes. Digital services that will be developed in this project enable tailored selection of products and services from different manufacturers for the clients' individual needs. Digital services will be designed to support the sense of security and quality of everyday life for the people living with memory disorder and their family members. In addition, the measurement tool will be developed to evaluate and profile the sense of security and life management of the person living with memory disorder. Results The experiences of the project will be presented in the conference.

Keywords: digital services; memory disorder; security

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Thermal Based Smart Bandages (poster)

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Chronic wounds are an increasing problem in modern society. Millions of people are affected with chronic skin ulcers and treatment of these wounds has been estimated to cost billions annually. Poor care and follow up of these wounds can lead to infections, amputation and even death. A close follow-up of these wounds is necessary in order to deal with these problems. Nowadays, assessment and monitoring of chronic wounds is based on a visual inspection by medical professionals. This method is subjective and its reliability depends on the assessment criteria of the treating doctor. A thermal based Smart bandage can change this. By combining flexible sensors, printed on textile, and a smart measurement system, using the Transient Plane Source method, the thermal characteristics of the wound can be measured. This allows us to develop a compact and mobile system for monitoring wounds. Important parameters from the wound like wound exudate, thermal conductivity, wound size, wound closure,... can be determined in an easy and non-invasive way. The advantage of this system is that it allows patient monitoring in his familiar environment and wound monitoring without clinicians having to remove the bandage from the wound.

Keywords: smart, textile, thermal, wound, monitoring

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Excluding Indecisive Decisions by Bringing Machine Learning and Sensor Fusion Together in Wound Management (poster)

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Monitoring and analysing wounds is still primarily based on visual inspections and interpretations of medical professionals. By maintaining this method there is a high chance of misinterpretation due to diverse ways of examining the wound. Further, for each assessment the wound dressing needs to be removed which results into an intermission of the healing process. The solution to this consists out of two components, firstly the need to monitor the wound going consecutive through each and every wound healing stage is a necessitous part of this research. Besides determining in which stage a wound is in and analyse the behaviour of the wound in each of those stages it is equally important to monitor the conditions in which the wound is healing in. This gives us a two-way monitoring system, on the one hand a long term monitoring system is set-up where the phases of wound healing are the point of focus. On the other hand there is a short term monitoring system, this system gives real-time feedback of critical data on how the wound healing is progressing. In addition to all of the measurement techniques which result into a large dataset, classification and regression machine learning algorithms are used to predict the healing rate of a wound. The goal is to determine a mathematical model, based on existing data as a training set. By looking at patterns of labelled values from the training set different types of machine learning algorithms are used to make statistical reasoned decisions.

Keywords: bio-impedance, wound monitoring, machine learning
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Med-e-Tel 2017

Session: Education, eLearning (1)

Battling Isolation: Reaching out to Health Professionals in Distant Areas

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It has been discussed for a few decades now, how traditional higher education is distancing itself from the reality of the modern world that uses technologies increasingly. Students are very much ahead of the established “status quo” and therefore conflicting with the availability of technologies and the way education is delivered. Although telemedicine and telehealth is growing in many countries and areas reaching many more health professionals, it is still not as

widely spread as it should be expected, and in many places, it is not perceived as an added value worth of investing despite several initiatives and successful examples. One of the reasons, is because universities are not investing in the use of technologies and teachers are not comfortable using this new model and rejects its use due to their own inadequacy. Brazil is one of the few countries that has adopted a National Programme for Telemedicine and Telehealth and in five years has created a network that encompasses 24 out of its 27 States. The Brazilian Unified Health System is a unique decentralized system focused on strengthening primary health care and its most successful family health program. The Brazilian Unified Health System also invests in disease prevention; delivery of medicines and vaccines; strengthening surveillance; building capacity and development of human resources for health, and intensifying technological development and research. With the explosion of ICT, new approaches to delivering health care begun to take shape using ICT as an enabler. Brazil has invested in telehealth to reach health professionals stationed in distant areas, so they can face isolation and are provided with up-to-date information and can discuss a case with colleagues taking into consideration the increasing connectivity and ICT. This presentation proposal will highlight the beginnings and expansion of the Brazilian Telehealth Programme and discuss its implementation process and importance for capacity building of health professionals from the Unified Health System. It will also discuss how tele-education is growing, taking shape in many states and is a big part of the process.

Keywords: telemedicine, telehealth, ict, distance education

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Description of a Professional Master's Program on Research Processes and Innovation in Healthcare in Brazil

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OpenMRS is an open access online platform of registering data of patients, with the ability of importing and exporting them in order to better organize the system of data and protect them in a structured, easy access way. It was introduced by the military of USA to later find its implementation in the Third Introduction: Healthcare represents one of the largest industries in the world and the professionals have to be well prepared. Objective: To describe a Professional Master's Program on Research Processes and Innovation in Healthcare in Brazil. Methods and Results: The Brazilian national coordination for the improvement of higher education personnel (CAPES) approved our master's course in 2013 and the first class started in 2014. Course takes 2 years including 360 class hours plus thesis. Required disciplines include: biostatistics, epidemiology, bioethics, technology and innovation in healthcare, intellectual property and seminars of thesis. Besides, the students can choose among a range of disciplines the ones they prefer to take, such as: systematic review and meta-analysis, tele health and distance education, databases, etc. The master's thesis must be inside one of the work fields: (1) Applied research processes and methodologies, where we have conducted a large number of systematic review and implemented a significant number of local and multicentre clinical registries, among others; and (2) Technology and innovation in healthcare, where we have mostly developed projects in

partnership with industry to create new products for the market and validation studies for new products. Students can have different backgrounds such as health area (medicine, nursing, etc), management, law and engineering. Along the course, students work together and in partnership with other institutions and companies on multidisciplinary projects. For the next year, we will offer the students the opportunity to specialise, during the master's program, in some predefined areas. First areas will be: cardiac surgery, cardiovascular nursing and clinical research. If they choose to specialise, they will take the required disciplines followed by theoretical and practical rotations inside hospitals, industry and research centres in the chosen area. Conclusion: The master's program prepares professionals for the need of the market, and connects research, clinical practice, industry and government; working in a multidisciplinary team to improve quality and innovate in healthcare.

Cardiothoracic Surgery: Distant Learning through Interactive Real Time Intra-operative Telemedicine

Carl John Landauer
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An Audit of Academic Activities at the School of Telemedicine & Biomedical Informatics, SGPGIMS (Lucknow, India)

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Attendance and Certification Modules in the Management System for Tele-education of the Telehealth Center - HUUFMA (poster)

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Introduction: The Telehealth Brazil Networks Programme is a national action that seeks to improve the quality of care and primary care in the Unified Health System (SUS), integrating

teaching and service through information technology tools, which offers conditions to promote Tele-assistance and Tele-education. One of the major Telehealth areas, Tele-education, is based on the use of information technologies to provide web conferences, courses, classes, and chat discussions. Due to the limitation of the broadcasting platforms to track the detailed users information, to then generate certificates and provide data for better decision taking in terms of lectures themes (according to the variety of professional areas), it was necessary the development of the attendance and certification modules to automatically accomplish these tasks, avoiding exhausting human effort. Objective: To keep record of all the users attendance in the web conferences activities, automatically generate certificates and send them to the participants by email after the activity is done, and based on the collected data, use the users professional areas and location information to focus on suitable lectures and take better decisions related to the tele-education activities of the Telehealth Center of the University Hospital of the Federal University of Maranhão (HUUFMA). Result: The current releases of these modules enable users to register in web conferences activities attached to the system. All the information such as email, professional area, location, personal info are in the database, so the system can track all the activities the user has participated and then automatically generate certificates at any time after the end of the activity. Conclusion: The management system has turned out to be a powerful tool as it minimizes the human-effort tasks, in this case, certificate all the web conferences participants and have real time data of who they are and what they do. All these mentioned features are important to the center, as they support the improvement of content production and management of daily-based tasks.

Keywords: telemedicine, tele-education, telehealth

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Self-Assessment Survey: A Tool for Data Mining in the Virtual Learning Environment (poster)

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The Open University of the Unified Health System, of the University of the State of Rio de Janeiro (UNA-SUS / UERJ), has as focus to meet the training needs and ongoing education of health professionals. In view of this premise, the object of study is to analyze the student's route in the virtual learning environment (VLE) and measure the degree of satisfaction in the completion of the self-instructional course "Approach of Violence in Home Care". Thus, for this analysis the following questions were applied: How was the route in the course? Was it difficult to access didactic materials in VLE? Did you stop studying some subject, opting to move to another unit? Was the content presented with clarity and ease of understanding? Did the content reach your learning expectations? Were the activities requested based on your learning in the course? Were the teaching materials presented useful for learning? The methodology used was the action research, quantitative, and the instrument analyzed was the Self-evaluation survey. The collection was carried out in the period from August 4 until October 10, 2016, in which 65 participations were analyzed. According to the data, it was observed that 88.89% of the students

followed the course in the order of the units of each book, and, 85.71% reported that they did not stop studying any subject choosing to move to another unit. It was noticed that 66.67% did not have difficulty in accessing the didactic materials in VLE, and that 80.95% indicated that the content was presented with clarity and ease of understanding. In addition, 73.02% reported that the content of the course met their expectation of teaching and learning, and that 80.95% of teaching materials were useful for learning. It was observed that the analysis, through the applicability of the Self-evaluation survey, obtained positive data regarding student satisfaction in the course, as well as the course designed to aid in access to content and navigation to VLE. After this study we realized that the survey applied and the metrics collected in the VLE will be guiding for the construction of new projects, and will help us in the planning and development of new courses.

Keywords: e-learning, self-assessment survey, permanent education
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SAITE STORE: An Innovative Tool to Democratize Health Knowledge in Portuguese-Speaking Countries (poster)

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In order to make health knowledge public and accessible and to encourage permanent education, Brazilian Group for Research in Health, Innovation, Technology and Education, the SAITE group, developed a tool for m-Learning (Mobile Learning): The SAITE Store. It is a virtual library that contains books in several thematic areas, such as Public Health Management; Health Surveillance; Pharmaceutical Care; Health Care Networks; Dentistry; Health of the Elderly; Nephrology; Primary Care; Scientific Methodology; Distance Learning; and Portuguese. The material is available in Portuguese, which guarantees access to thousands of speakers of this language in the different countries in which it is used. Recently the store has reached the number of 100 eBooks, and as the launchings are continuous, many others are in production. Specialized and renowned professionals coming from Brazilian universities are responsible for elaborating the contents. In addition, all material is standardized based on extensive research on educational applications, iconography, and instructional design. SAITE Store is available for Android and iOS operating systems - with downloads at Google Store and Apple Store - and in a WEB version. Both the SAITE Store and its eBooks are completely free. Another advantage is that Internet access is only required to download the store and its eBooks, and then the user can exploit all the content, which is dynamic, interactive and rich in animations, in offline mode. This feature mainly benefits users who live in places where internet services are limited. The number of SAITE Store downloads has grown rapidly, reaching an average of 700 per month, having already reached almost 10,000 downloads only on Google Play. The user rating is mostly

positive, which confirms the acceptance of the tool by its target audience. SAITE Store emerges as an innovative educational tool for democratization of health knowledge in Portuguese-speaking countries. Improvements to the store are already underway, such as the availability of content also in English and Spanish, in order to increasingly advance in its internationalization process.

Keywords: mlearning, mobile devices, application, health education

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Telementoring to Teach Surgical Burn Management Techniques (poster)

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Burn injuries are a worldwide problem, affecting almost 11 million people every year, which is a higher incidence rate than HIV and tuberculosis combined. In the developing world, there are limited numbers of experienced burn specialist. This project utilized a telemedicine communication system including surgical field cameras to share views of the surgical field from a burn operating room to distant academic sites. This technology could be used to telementor surgeons during specialized burn wound management procedures, lectures or postgraduate training of surgeons. This system has high applicability for far forward deployed military surgical teams where specialty surgical care, such as burn or other soft tissue wound management could be telementored to a general surgeon.

Keywords: telementoring, telemedicine, vitom, teleburn

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Structure and Utilization of Information and Communication Technologies for Permanent Education - Teledentistry Brazil (poster)

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The strengthening of Primary Care and the expansion of the Family Health Strategy have led to the need to offer quality services for health promotion. In this context of reformulation and need for qualification through effective actions of Permanent Education in Health, Teledentistry emerges from Telemedicine, which can be defined as the use of Information and Communication Technologies (ICTs) for the exchange of data and information in health and provision of health services in situations where it is necessary to overcome geographical, temporal, social and

cultural barriers. In view of the need for a structuration in the health units for the use of the ICTs in order to qualify the work process of dental surgeons in the family health teams, we outlined as the objective of this study to identify the existence of equipment in the health units and to verify the use of the Telehealth by oral health teams in Brazil. This is an exploratory descriptive study with a quantitative approach, in which secondary data from the 1st Cycle of the Program for Improving Access and Quality in Primary Care for the year 2011/2012 were used, which were organized in Excel® Software, observing its variables and analyzing its percentage. The results of this study indicate that 19,889 (51%) of the health units evaluated presented computers and 13,748 (35%) had internet access. Among the professional dental surgeons evaluated, 254 (76%) pointed out that there is permanent education actions in their municipality, and they attended, in increasing order, to on-site courses 213 (84%), exchange of experience 150 (59%), tutoring and preceptory 56 (22%), Telehealth 54 (21%), Distance Learning / Open University of the Unified Health System 51 (20%) and Telemedicine University Network 9 (3.5%). It is concluded that the deficiency in the Brazilian regions in relation to the acquisition of computer equipment and connectivity capable of guaranteeing the use of information technologies becomes an obstacle to the digital inclusion of health professionals and permanent education actions related to Telehealth.

Keywords: Telehealth, Teledentistry and Permanent Education

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Med-e-Tel 2017

Session: Standards, Security (1)

Blockchain for Consent Management in the e-Health Environment: a Nugget for Privacy and Security Challenge

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In our digital world, access to personal data has become an item of concern, with challenging security and privacy aspects. Occurrences of hacking intentions and privacy violation make digital trust a top challenge. This is true in the e-health area where patient's health data management must comply with many regulations, while remaining accessible to duly authorized health practitioners. A critical point is thus for a patient to be able to grant authorized persons a selected, partial or total access to her (his) personal data. This is called consent management and is a key point for e-health. Existing solutions pretending to face the related challenges (governance, granularity, traceability) show low suitability due to one or many disadvantages (confidence based on a single solution provider, consents not being auditable by third parties, respect of privacy being in an "everything or nothing" mode). Due to its intrinsic features (decentralization, built-in consensus, cryptographic techniques) Blockchain can be an innovative

way to address the consent management topic. That's why it was chosen to implement our patient consent management function integrated in a medical data collection chain including a multi-vital sign device (Gogo Earbuds providing heart rate and walked steps count), a Continua compliant gateway and platform. The Blockchain solution used to develop the functionality is Hyperledger, which provides a consortium type Blockchain. In such a solution, one must be invited to become a "node" and be part of the transaction and blocks validation process. This provides a native security management, a membership service and a modular architecture (customizable consent) and is moreover industry oriented. The consent management is implemented within smart contracts. Due to these features, a consent management function was demonstrated, providing a finer grain for a patient to manage his consent (at the vital sign level, contrarily to existing solutions), which improves digital trust (since the consent data recorded in the Blockchain distributed ledger are not under the responsibility of a single actor, but validated by a whole set of consortium partners).

Keywords: digital-trust, Blockchain, privacy, security, auditability

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Implementation and Preliminary Results of an Interoperable, Standardised Clinical Registry on Cardiovascular Surgery

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Introduction: The implementation of a Clinical Registry in a hospital environment becomes a challenge in face of different types of treatment, care culture and non-standardized records. **Objective:** To describe the implementation and preliminary results of the Clinical Registry of Cardiovascular Surgery in Adults. **Methods:** The Registry includes patients older than 18 years undergoing coronary artery bypass grafting, valve repair or replacement, aortic surgeries, congenital heart disease and cardiac transplants, at the Cardiology Institute of RS - Brazil. Data elements are nationally and internationally standardized (STS Adult Cardiac Database and Bypass - Brazilian Registry of Cardiovascular Surgery in Adults). Electronic data collection (RedCap), remote access via web interface, centralized data and access management, different levels of database access, change tracking, automatic calendar for patient follow-up, automatic data quality reports. To the implementation, clinical and research workflow were analysed; data elements were standardised and defined; training of the clinical team to fill out the clinical records. Data are collected at pre, trans and immediate postoperative period, intensive care unit and hospital discharge and 1 and 6 months and annually after surgery. **Results:** Dataset includes 650 variables; and a team of approx. 18 professionals are involved in data collection and management. The first year of data collection were completed in November, 2016, reaching 1000 patients. Male prevalence (66.4), mean age at 62 years, use of the Single Health System (67.8), myocardial revascularization surgery (60, 9), valve surgery (39.6), aortic surgeries (10.5), congenital heart disease (1.8), heart transplantation (0.2). **Conclusion:** The institutional culture and the involvement of the coordinators of the surgical team is essential for the prospective, continuous and reliable data collection. The registry allows the identification of measures to

evaluate care quality and cost efficiency. The follow-up of this patient and the potential interoperability with other registries in cardiology, will contribute to new discoveries and quality care improvements.

Keywords: cardiovascular surgery, clinical registries, interoperability

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Towards an Improvement of Patient Safety: A Framework for Clinical Decision Support Systems

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Patient Safety is a very important issue for the healthcare team. Patients are concerned that their healthcare providers will provide accuracy in diagnosis, adequate treatment plans with the most efficiency and effectiveness. On the other hand, the healthcare providers are balancing the costs with the quality of the services. The payers are willing to get the maximum return of the investments and operational costs. All these issues point to the facts that the healthcare providers should follow the best practices and the resources allocation must be planned according to the predicted needs. The Clinical Decision Support Systems can recommend practices according to accepted guidelines that were previously defined, validated and approved and these systems should be the “compass ” for health professionals. The guidelines should be uploaded to the health facility computer systems and written in languages that can be shareable and processed by different software applications. This paper presents a case study that includes a review of the main features of a syntax to describe clinical guidelines and a framework of concepts, methodologies and technologies to improve the clinical decision support systems.

Keywords: Guidelines, CDSS

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From Muecci to Jobs: a Brief History of the Evolution of mHealth

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It is 141 years since the first telephone call and 44 years since the first mobile phone call. With the evolution of the mobile phone from a simple calling and receiving device to the smartphone, its ubiquity, and the burgeoning number of medical applications, use of mobile phones is growing. Its use in clinical practice for communication, data, image, audio and video transmission, and subsequent management decisions raises the standard legal, regulatory and ethical concerns of telemedicine; confidentiality, privacy, data security, data storage, consent,

etc. But are these issues new? All that has happened is that the communication technology has changed from analogue to digital and from fixed line to wireless. The legal and ethical issues, while nuanced, remain the same. This paper explores problems encountered with the introduction of the telephone in clinical practice and subsequently the mobile phone, and compares them. Concerns of confidentiality and privacy have moved from shared party lines, operator assisted calls and fixed line private medical telephone networks to password protected devices, open networks, instant messaging groups and end-to-end encryption. Police intrusion during calls now relates to electronic eavesdropping, and police and security forces demanding decryption of data on phones. Telephone use for tele-ecg transmission in 1905, tele-auscultation in 1910 and a personal electrocardiogram transmitter allowed transmission of images and sounds, applications that we consider modern. The risk of cross infection from contaminated hand pieces of public telephones, remains with reports of contamination of health workers' mobile phones. Abuse of the telephone by patients for cheap consultations raised a call for remuneration and concerns about quality of care. The need for a prior doctor patient relationship before a telephonic consultation, ergonomic design and overuse injuries, and telephone addiction are not new. There is much to learn from the analogue age.

Keywords: mhealth, history, ethics, regulation, telephone

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Implementation of a Management Registry for Storing Clinical Data in a Research Centre

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Introduction: In clinical research (CR), there is great concern with the storage and veracity of electronic data to ensure the accuracy of information. **Objective:** To implement a management registry for storing study data in the cardiovascular area, conducted in a clinical research center (CEPEC). **Methods:** This is a retrospective registry and prospective joint study conducted from September 2014 to December 2015. An electronic database was developed using REDCap software. Data elements were standardised in accordance with the American College of Cardiology Foundation and American Heart Association (ACC / AHA). Data were extracted from research participants from the clinical studies conducted in our Institution with records of cardiovascular diagnosis that were monitored by the health team from 2009 to 2015. **Results:** The registry was composed of eight sessions: demographic variables, diagnostic tests, laboratory tests, cardiovascular risk factors (CV), comorbidities and pharmacological treatment used, and outcome of patients. Each session consisted of sub-items, totalling 113 variables. Phase III (57.8) and phase IV (36.8) studies with mean follow-up of 2 four years were predominant. We used data from 490 participants randomized to 25 studies, 63 percent men, aged 63 ± 10 years, hypertensive (81.4), with dyslipidaemia (56.5), and diabetes 48 (36.3). Most had previous myocardial infarction (72.7) and underwent coronary angioplasty (87.2). **Conclusion:** This study showed that the construction and implementation of an electronic database of research on participants with cardiovascular disease, through REDCap software, was applicable and

reproducible in clinical practice, being a low cost and very useful tool to store and share data from multicentre studies of medium and large scale.

Keywords: clinical trials, clinical registry, interoperability

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Genomics-Robotics-Informatics-Biometrics-Real World Evidence Proposals for the Future Direction of Public Health Monitoring & Allocation of Limited Resources

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Med-e-Tel 2017

Session: Business Models, Economics, Evaluation, Regulatory Issues (2)

Review of High Quality Economic Evaluations of Home Monitoring for Patients with Chronic Diseases

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Introduction: Telemedicine has been suggested as solution to the demographic challenges that the health care sector in many European countries are facing. The basis of this suggestion is reviews of studies of telemedicine interventions showing that telemedicine reduces the costs per patient. However, a large proportion of the economic studies of telemedicine suffering from methodological weaknesses making them inadequate for drawing conclusions about the economic potential of telemedicine solutions. The objective of this study was therefore to examine the results from high quality economic evaluation of home monitoring for patients with chronic diseases in order to identify the true economic consequences of telemedicine applications. Methods: High quality economic evaluations are here defined as economic evaluations based on randomised controlled trials that include description of data collection, mean use of resources per patient, prices and costs in accordance with the Drummond (2005) guideline. Economic evaluations were identified by a systematic literature search in the PubMed

database. Results: 84 economic evaluations were identified. Of these nine economic evaluations of high quality of home monitoring for patients with chronic diseases were identified. Six of the nine studies (67%) found higher costs when telemedicine in used. Meta-analysis showed a statistical significant increase in total costs per patient of DKK 907 (p value = 0.04). No clear tendency was observed with regard to the types of costs that was reduced or increased when a telemedicine intervention was introduced. Discussion: This review shows that telemedicine is often associated with higher costs per patient, mainly because of high costs of investment in telemedicine devices. This indicates that more attention should be given to costs and price of the telemedicine devices. Notice that the study was not designed to address questions of cost-effectiveness as only the cost side was studied. Thus, studies showing an increase in the costs per patient can still be describing a cost-effective technology if the intervention is effective.

Keywords: Telemedicine, costs, investment, randomized

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eHealth as a Core Lever in the InsurTech Evolution: Insurers Move from "Payer" to "Player"!

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The health insurance sector is getting a considerable amount of attention all around the world and in particular in developed countries. This is partly because of the ever growing costs related to certain health issues like aging and chronic disease and, on the other hand, due to the reshaping of Public Welfare. The common factor at an international level is that the Insurers are trying to move from a simple “Payer role” to become a reference point (a “Player”) for all the health-related needs of their customers. In light of the above, Connected Health (from wearables to m-health) presents great potential for the insurer. Such potential should be harnessed in a profitable way by targeting less risky clients and presenting them with an improved, better-priced value proposition. For this to happen, the Insurance Company will have to seek partners from both the technological innovation sphere and medical providers, keeping in mind that its role in the health system is changing from “payer” to “pivot”. The trend is now clear as Companies are becoming more of a 360° health “counselor” that assists the insured in taking the best decisions based on digital solutions. This helps in differentiating their offer and also allows to manage the profitability levels. There are five main value creation levers to take into consideration: 1) Risk selection, enhancing the underwriting phase with a temporary monitoring based on dedicated devices; 2) Loyalty and behaviour modification programs, leading the client toward risk-free behaviour; 3) Value added services, developing client tailored ancillary services that allow the Insurer to play as an omnichannel medical concierge; 4) Loss control, developing a broad approach to mitigate claims; 5) Risk-based pricing, developing insurance policies with pricing linked to client behaviours. The winning InsurTech proposition will be the one which is able to propose to the clients insurance components together with “e/m health” modular services made available in a single, easy to use and complete UX accessible via a mobile app: wellness, medical network access and medical services.

Keywords: eHealth, mHealth, wearables, insurance, behaviour
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Financing Telemedicine in France: A Descriptive Retrospective Study

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Introduction: Deployment of telemedicine has been supported in France by the Ministry of Health since 2011. The development of routine telemedicine practice however, relies on the financial compensation provided for healthcare professionals. The objective of this study was to describe financing of telemedicine in France since 2011. Method: Financial specifications were identified using the State Health Insurance ('Assurance Maladie') and health legislation in France. The retrospective descriptive study covered the date of initiation, financial status, phase, disease type, telemedicine activity, financial scheme, and amount. Results: Diabetic retinopathy screening is the first and only telemedicine service with routine financial compensation in France. Ophthalmologists are compensated 11.30 euros per screening to provide biennial screening for diabetic patients (<70 years old). Compensation for telemedicine services in chronic and/or complex wound care management was introduced at an experimentation phase in 9 regions of France in 2015. Teleconsultation and tele-expertise performed by medical doctors were compensated 28 euros and 14 euros per consultation respectively. In April 2016, teleconsultation and tele-expertise for long term illness patients from home/medico-social care were introduced to replace chronic and/or complex wound care management. Medical doctors were compensated per consultation (general practitioners: 26 euros, specialists: 28 euros, psychiatrists: 43.7 euros). Services in tele-expertise were compensated 40 euros per patient annually. Tele-monitoring of chronic heart failure (CHF), chronic kidney failure (CKF) and chronic respiratory failure (CRF) were later approved at an experimentation phase through package and performance schemes. With this scheme, medical doctors are paid 110 euros for CHF and 73 euros for CKF and CRF per patient, per semester. Conclusion: Routine financial compensation is currently provided in only one telemedicine service in France. With two at an experimentation phase, the impact of financing telemedicine still needs to be assessed.

Keywords: telemedicine, financing, France, chronic disease
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Comparative Analysis of Regional Medical Information Systems in Japan, the US, and UK from the View of eHealth Economics

Masatsugu Tsuji
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The regional medical information network connects medical institutions in the region to share residents' medical data such as images of x-ray and endoscope, diagnosis, past history of medical

treatment, medication, and so on. As a result, it leads to promote efficiency and reduction of medical expenditure by preventing double medical checks or medications. Toward the age of big data or AI, the network becomes more important. This paper is based on the field research on regional medical information networks in Japan, the US and UK and compare with them in terms of their aims, operation, information systems, and effects to medical institutions, clinics, and residents. Cases compared are Ajisai (hydrangea) Net in Nagasaki, Japan, Healthix in In New York, US, and CMC in London, UK. Ajisai Net connects 282 hospitals and clinics in the regions and about 50,000 residents are registered. One of its characteristics is for clinic to access to medical data of patients who were transferred to large hospitals and see their real time medical situations. The costs to clinics include initial fees which are JPY 83,000 (USD750) and monthly fees which amount to JPY4,000 (USD36). The network of Healthix connects about 500 medical institutions which share the health records of 16 million residents which include diagnosis, medication, examinations, allergy, and so on. In addition to prevention of double medical examination, or double medication, the network contributes to promotion of efficiency of medicine, and the data accumulated in the network is used for “Population Risk Management” to predict diseases. In London, UK, the network of CMC (Coordinate My Care) also shares medical information of residents and supports care at home. As a result, the aged or patients registered in CMC tend to have less emergency calls or hospitalizations than non-registered residents. Based on three field surveys, the paper discusses issues and how to the regional medical information network in Japan by considering the roles of the networks in the US and UK.

Keywords: Ajisai Net, Healthix, CMC, information system, population risk management
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Opportunities for Telehealth through Understanding the Regulatory Barriers in Home Health and Hospice

Donna Floyd, Robert Floyd
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While telehealth sees continued conversation and development of applications, software and tools, the healthcare payor and regulatory managers continue to lag behind in both understand and practical implementation. This session presents a descriptive report on review of both regulatory and payer perspectives on the efficacy, efficiency and future of telehealth in hospice and home health in both the US and Great Britain. Trends and opportunities noted from research of current accepted definitions, uses and payment for telehealth are combined with results of interviews with those in leadership both for payment and regulatory oversight of home health and hospice in these countries.

Keywords: homecare, regulatory, payment, implementation, barrier
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Strategy for Simultaneous US Licensing of Non-US Telehealth Practitioners

Dave M. Allburn
National Fingerprint, USA

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Cost-Effective FLOSS Solutions to Satisfy National Healthcare Priorities in the Developing and the Developed World

Tom Kane
Edinburgh Napier University, UK

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Legal Issues of Cross Border Telemedicine in the Euro Mediterranean Space

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University Mohammed Premier (Oujda/Nador), Morocco
Faculty of Law, University of Granada, Spain

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Cost Sensitivity Simulators (Decision Tools) and Innovation Models

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This presentation aims to propose an implementation strategy on the type of decision tools developed with the cost sensitivity simulators from Huttin endepusresearch Inc. Health care technologies. The prototypical developments in asthma /COPD disease models show that physicians' narratives on new type of economic information called cost cognitive cues, can be possibly of use to sensitivity and calibration of modelling for health systems. The proposed decision tools aimed to reconcile political and business intelligence, using similar types of countervailing information to influence or persuade decision makers in a national framework with multi-stakeholders. Several experiences of deliberative process for health care financing reforms will be used such as Ontario and South Korea. such decision tools could benefit from such deliberative policy process, with professional and public forms of participation to identify

the changes in decision points in the transformative innovation of biomedical technologies (e.g. from symptom to long term remission in immunology or disease progression stages towards personalization of medicine in oncology).

Keywords: Decision tools, innovation models, financing

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Intellectual Property (IP) of Humanity versus Artificial Intelligence (AI) Ethical Personalised Decisions with the Help of Innovative Technology for Economic Growth

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Med-e-Tel 2017

Session: Disease Management, Rehabilitation, Remote Monitoring (1)

2 Years of Experience in Implementation of mobiREH Remote Rehabilitation System Supporting Patients and Physiotherapists

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The aim of this work is to characterise the process of developing mobiREH telemedical rehabilitation system which was created as a result of cooperation between mReh start-up team and the scientific team from the Academy of Physical Education in Kraków. The most significant global and local challenges for health services are: the increasing number of patients awaiting rehabilitation, the increasing waiting time for rehabilitation, and decreasing number of medical specialists. MobiREH rehabilitation system is a system that supports home based rehabilitation and helps solving those problems. The system consists of (a) mobile application and (b) wearable sensors for patients, and (c) web-based platform for medical specialists. We started our project in 2014 with the following aims: (1) assuring safety of the home based rehabilitation, (2) improvement of the efficacy of the final outcome of the home based

rehabilitation process, (3) development of the tool for efficient motivation of the patient, (4) providing the physiotherapist with the clinically significant medical data regarding the rehabilitation process of the conducted patients, as well as (5) streamlining of the communication between the patient and the specialists. In order to achieve those goals we have performed research and analyses applying mHealth technologies, as the most adequate tool for those aims. We have conducted research work, during which we have created mobile application and web-based platform. After several tests we have chosen 3D graphics as the proper way of visualisation of exercises and developed a Java-based editor, allowing for creation of individualised exercises by the physiotherapist. As a result of lack of such solutions on the market we have created our own wearable sensor which monitors the movement of the patient. The sensor is based on the 3-axis: accelerometer, magnetometer, and gyroscope. Raw data is being processed by a mathematical algorithm, thanks to which (I) these data is being presented in real-time to the patient and (II) is being sent to the physiotherapist for the monitoring purpose.

Keywords: mHealth, rehabilitation, telemedicine, remote, monitoring

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Experimentation of 'Link for Health', A New Telehealth Application in Cochin Hospital, France

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Orange and Cochin Hospital have experimented 'Link for Health', a new Telehealth application in Oncology service of Cochin Hospital, France. This new application allows a complete Telehealth service combining mobile application, sensors and questionnaires to send by internet to healthcare team. BACKGROUND Cancer treatments can improve patients' survival and quality of life but are associated with severe toxicity. The safety profile depends on cancer and therapy characteristics (type of primary cancer, drug regimen and dosing) but also on patient's characteristics (age, comorbidities, concomitant medications and general health status) and varies for each patient. Therefore, Telehealthcare, involving personalised healthcare over distance, may improve care for cancer outpatients. AIM Experiment the effectiveness of 'Link for Health', a Telehealth service in oral and intra venous cancer therapy to improve clinical and process outcomes. TELEHEALTH SERVICE 'Link for Health' allows a complete Telehealth service combining: • Mobile application (mobile medication reminder using 2D barcodes, acknowledgment of drug intake, appointment management, interface with hospital platform) • Withings scale and manual Tensiometer • Questionnaires for general health and side effects reporting graded with the NCI-CTCAE criteria. METHOD Experimentation involved patients with various cancer treatments. Questionnaires and measurements were sent by internet to healthcare team for reporting with a complete list of side effects. Results were analysed in terms of degree of patient satisfaction, medical team satisfaction, service ergonomics and benefits for therapy process.

Keywords: Telehealth, mHealth, medication, anti-cancer therapy
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TelecareBox – A New Approach to Chronic Disease Management

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Development and Pilot Test of a Telerehabilitation Program for Patients with Heart Failure: The Future Patient Project

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Patients with heart failure (HF) suffer from a chronic and progressive disease. HF patients show symptoms such as leg swelling, fatigue and shortness of breath, all of which cause a rapid deterioration of their condition that leads to a high degree of hospital readmissions. Scientific studies of home-based monitoring among HF patients show that measuring blood pressure, pulse and weight is not sufficient to detect the worsening of symptoms. Previous telemonitoring systems have not provided the kind of data that could help patients understand that their status has changed. Further, without adequate instructions on how to manage a worsening condition, patients may not feel motivated to undertake the kind of self-care changes that could prevent HF exacerbation. The goal of the Future Patient study is to investigate whether the monitoring of several additional parameters, such as physical activity, sleep, night pulse, blood pressure, pulse, weight and questions about symptoms and well-being can help to identify deteriorating condition at an earlier stage, and then motivate patients to manage their disease in a more individualized and optimal way. Aim: To develop and pilot test a telerehabilitation program (TRP) for HF patients. Methods: Participatory design has been the overall method. Workshops (n=7) of 3 hours with HF patients, relatives, healthcare professionals, companies and researchers has been conducted. Focus-group (n=7) with workshop participants has been conducted. Mock ups have been developed and evaluated throughout the process at the workshops. Qualitative interviews (n=4) with pilot test patients has been conducted. Results: An interactive web portal, Hjerteportalen.dk and a three step TRP program have been developed and pilot tested by four HF patients. During qualitative interviews, the patients found the portal to be user-friendly, and they viewed the TRP as a useful tool for managing their own disease and as an effective communication platform between them and healthcare professionals. Conclusion: Further research is needed to demonstrate the potential of the TRP, which is now being tested in a randomized controlled study.

Keywords: Telerehabilitation, Cardiac patients, participatory design
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InspectLife Platform for Noninvasive Healthcare Management from Home

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Intelligent Parkinson's Disease Early Detection Guiding Novel Supportive Interventions: The i-PROGNOSIS Project

Estelle Huchet
AGE Platform Europe, Belgium

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Opinions from "Smart Mountain Village" Telemedicine Users - Experience from Portugal (poster)

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Over the last few years, all over the world, telemedicine has been gaining momentum, and became more accepted by both the health workers and patients as an essential tool in medicine. There has been a considerable number of studies whose results show the benefits of telemedicine programs, not only in cost reduction, decreasing the number of exacerbations and hospital admissions, but also in improving health outcomes, with the patients having a better understanding of their illness and how they can manage it. This study is based on a tele monitoring programme being carried out in the village of Sabugueiro in Portugal. This village is one the first “Smart mountain villages” in the world, and besides having the concept of Internet of Things” applied to its infrastructures, it also has a tele-monitoring component, where blood pressure, blood glucose levels and weight of part of the population are monitored, in both healthy and unhealthy individuals. Abnormal changes of these parameters are very prevalent in our society, being responsible for a great deal of the national health system expenditure and being an important risk factor for cardiovascular events, the number one cause of death in our country, Therefore, their correct management is of vital importance in order to reduce costs, morbidity

and mortality related to these events. However, this programme results fell short from what it was desired, with low compliance by the patients, who did not make the recommended number of measurements. The main goal of this study is trying to understand what can improve the compliance of a telemonitoring patient, in order to trace the profile, based on several variables, of the individuals that would benefit the most from this kind of program, as well as studying its reproducibility in other regions. In order to achieve these results, an inquiry, based on the theoretical model “Technology acceptance model”, will be handed out to the participants

Keywords: telemedicine, knowledge, opinion, necessities, adherence

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Med-e-Tel 2017

Session: Big Data: New Tools to Harness Data for Public Health

How Does the National Centre for Excellence in Research on Parkinson's Disease Benefit from Forward-thinking IT Infrastructure and Data Capture?

Reinhard Schneider

Luxembourg Centre for Systems Biomedicine, University of Luxembourg, Luxembourg

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Data Protection: A Threat to Big Data or Was it the other Way Round?

Georges Wantz

Deloitte, Luxembourg

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Improving Quality and Management of (Bio)Medical Data: Bridging the Valley of Death towards Personalized Medicine

Andreas Kremer

ITTM (Information Technology for Translational Medicine), Luxembourg

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Assistance-Insurance and Health Data Exchange in Conformity with the new European Regulation (GDPR)

Jorge Tellez
QualyCloud, France

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Big Data in Health: Current and Future Initiatives of the European Commission

Roger Lim
Policy Officer (Seconded National Expert), DG Health and Food Safety (DG SANTE), European Commission

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Tools Facilitating Data Analysis and Exploitation in the Laboratory Domain

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Laboratoires Réunis, Luxembourg

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Session: Standards, Security (2)

Digital Pathology and Telepathology in Transplantation: Feasibility with the EHR

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Digital pathology and telepathology play an emerging role conveying the anatomic pathology diagnostic images in the Electronic Health Record. We sought to focus our attention to an innovative project, while identifying standards and practices between clinicians and the EHR (Electronic Health Record). The project aims at developing a second opinion network, based on telepathology, between two major transplantation centres. The Health Authorities involved are the Hospital Trust of Verona and of Padua (Italy) during two years. According to official

documentation, the total number of renal and liver transplantations reached 376 cases for both centres during 2015. We expected to improve significantly the transplantation workflow after combining the digital pathology platform with its proper and timely application to the telepathology network. First it will allow the real time second opinion between pathologists in order to assess the suitability of the donor organs, avoiding the glass-slide transfer, with potential damage or loss. The technical partners delivered two slide scanners, software solutions to enable virtual microscopy and web-based digital slide sharing with storage resources. In addition, the project comprises an online survey which focuses on the accountability of the system, the user perception and the concordance study for the project outcomes evaluation. The technical transactions between all the main actors and digital slides will be reviewed and updated in order to meet the integration standards and guideline according to IHE (Integrating the Healthcare Enterprise) initiative, Digital Imaging and COmmunications in Medicine (DICOM) and Health Level 7 (HL7). According to the first comparisons, we believe that the efforts to provide this new diagnostic imaging area to the actual EHR developments, will be rewarding and effective for the saving-life transplantation processes.

Keywords: digital pathology, telepathology, EHR, eHealth

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Kidner – A Worldwide Decentralized Matching System for Kidney Transplant

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Individuals suffering from kidney failure today face significant challenges in order to obtain a transplant. Currently each person is registered in a centralized database specific to their country or region within that country. They are then placed on a waiting list in an inactive or active form and ranked by priority in hope that a kidney from a deceased donor is a transplant match. The average waiting time is 3 to 6 years and during this time the person has to go through a heavy process of dialysis at least 3 times a week, negatively impacting their normal social and work life balance. Illness may worsen during this time and in the worst case, they may even die. These people do have another option: a living donor; someone they know, family or friend, who is willing to give them a kidney. Because many factors like blood type and HLAs need to be the same, these people may not be a transplant match. This situation of mismatched donor-recipient pair is happening around the world. However, there is a solution, a “Kidney Exchange Program” or a “Kidney Paired Donation program.” In these programs, if two mismatched pairs (living donor and kidney recipient) can be grouped together so that they become transplant matches, both kidney failure patients can receive a kidney. While a great solution, these programs have a significant pitfall. They are limited to the specific registry regions participating in their program. The Kidner project was developed to help these exchange programs better detect life-saving opportunities and enable more people to access kidney transplants. It uses a decentralized non-profit system deployed world-wide to expand the pool of mismatched live donor-recipient pairs. Through the use of this innovative technology, these exchange programs will not only identify

transplant matches faster they will also be able to identify better matches. Thus, improving patient care and outcomes.

Keywords: transplant, P2P, blockchain, kidney, security

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A Reproducible and Standardised Clinical Registry for Clinical and Economic Outcomes of Heart Transplantation Patients

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Background: Patients undergoing heart transplantation need close assistance from health professionals due to the high incidence of complications and comorbidities, and can be very costly for the health systems. **Purpose:** To describe the creation and implementation of an prospective, reproducible and standardised clinical registry of outpatients who underwent heart transplantation. **Methods and Results:** The following steps were carried out: (1) Data standardisation in accordance with national and international standard data elements; we used data standard elements proposed by the American College of Cardiology/American Heart Association, European heart failure Registry, and Brazilian national heart failure and demographics datasets; (2) Development of an initial data collection and clinical research workflow; (3) Development of electronic case reports using REDCap and in accordance with the HIPAA privacy rule; (4) Pilot test and validation of the data collection and clinical research workflows and CRFs, (5) Development of automated data quality report using REDCap. All patients undergoing heart transplantation in a reference cardiological hospital are included. Patients are excluded if they do not agree to participate in the study. The registry was designed to and is planned to expand to multicentre in the future. Data are collected at the moment of the inclusion (hospital admission), at hospital discharge, 1, 3 and 6 months and yearly after surgery. Clinical and cost-related outcomes include all-causes mortality, cardiovascular mortality, non-fatal myocardial infarction, stroke, hospital admissions, visits to the emergency department, organ rejection, infection, need for reoperation, any adverse event, costs related to the treatment and procedures, and quality of life. **Conclusions:** This registry represents a powerful tool for assistance quality improvement, healthcare services management, technology assessment, health policies and clinical research since it contains comprehensive and representative data of the clinical practice and allows for interoperability and data integration with other datasets.

Keywords: heart transplantation, clinical registries, interoperability

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Customization of OpenMRS for Leishmaniasis Research and Treatment Center in Ethiopia

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In this era of evidence based medical practice, low and middle income countries (LMICs) are significantly affected by the scarcity of locally generated data. This is mainly due to the absence of electronic medical record systems even in large medical and research centres. Most still use paper-based patient registration and documentation. However, the shift to digital records can benefit both clinicians and patients. Developing countries need health information technology more than other countries due to the challenges in patient tracking and exchanging data even within one medical centre. In Ethiopia, similar to other LMICs, medical recording, patient transfers and consultations are all done with paper-based documentation, and electronic medical records are not implemented in the majority of the country's facilities. The first attempt to select and contextualise an open source electronic health record (EHR) system at the Leishmaniasis Research and Treatment Centre, University of Gondar, Ethiopia is described.

Keywords: electronic health records; open source; low-resource settings; Ethiopia;
Leishmaniasis

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OpenMRS - The Case of Kosovo

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OpenMRS is an open access online platform of registering data of patients, with the ability of importing and exporting them in order to better organize the system of data and protect them in a structured, easy access way. It was introduced by the military of USA to later find its implementation in the Third World/Africa, especially in the Kenya, Rwanda and other examples. This online platform was introduced also in Kosovo, on February of 2016, by the team of WebMed in collaboration with IVEH office and has been overtaken by three medical students and one engineer to run the platform and implement it in the Institute of Oncology in UCK-Kosovo. Methods and Methodology OpenMRS is designed to fill the needs of the Health Care system in the Kosovo whose data system is HISS, thus the designed system of it is developed under these requirements. It requires the Linux, Windows or Mac OS X systems. The whole work of the OpenMRS is based on the examples of Rwanda and Kenya and their guidelines with the help of the system of Telemedicine Centre of Kosovo who have supported us and the Institute of Oncology in the systems, providing us with strong internet system and unlimited access. The design of platform involves: the users based in their roles, the necessary data needed for patients, the HISS combined with other modalities data and other modalities related to imaging data and others with access only from users responsible of entering data in the system. It

is open to the patients without the ability to change data. The train of the staff has been carried on by the OpenMRS group of students and they are in constant contact till its implementation. The main problem is the resistance of Ministry of Health to allow the system running and other technical problem that have elongated the whole process. Conclusions: Due to the increasing number of patients diagnosed with neoplasms and the necessity to have a faster access to their data, we find OpenMRS crucial to the whole system of UCCK in obtaining data of diseases and protecting them.

Keywords: openmrs, oncology, open access, hiss, Kosovo
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Med-e-Tel 2017

Session: Education, eLearning (2)

Dental Trauma Tracker: A Mobile Phone Application for the Epidemiologic Surveillance of Dental and Maxillofacial Trauma

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In the broad field of injury and traumatology, injuries affecting the maxillo-facial region have an important role: dental trauma (DT) makes up 35% of facial injuries, and 31-39% of dental emergencies are consequences of DT. Dental trauma is a kind of dental injury which includes the soft tissue injury and teeth Injury. Although in majority cases dental trauma is not fatal, it still may cause some psychological or physical influence for the victims. Consequently, DT is recognised as a major dental public health problem worldwide. In the meantime, lack of data leads to the slow development in dental trauma researches. To promote the development of the researches in dental trauma area, the ‘Dental Trauma Tracker’ project is established. The aim of this project was to implement a mobile phone-based application for the epidemiologic surveillance of dental and maxillo-facial trauma. The Dental Trauma Tacker application integrates the advantages of mobile phones with dental trauma data collection (text, photo, video, and audio) for epidemiologic surveillance of the dental trauma. As this project is a long-term project, this presentation will describe initial work to activate larger scale, long-term studies. The goal in the initial stage is to present the development of a working prototype system collecting dental trauma data to provide an overview of the nature and extent of DT, letting the researchers to view and summarise the collected data, and greater use of the data at local level (e.g., educating on the best first aid, identifying high-risk locations and activities).

Keywords: dental trauma, mHealth, surveillance, teledentistry
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Telemedicine in Graduation: A Vision of the Medical Courses in a Developing Country

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Brazil is one of the biggest countries among the development of telemedicine and telehealth. Many projects of the Ministry of Health have encouraged the use of technology on education and professional performance. Nevertheless, medical graduation students little get to know about this topic during their formation. Thus, the goal for this present study was to analyze the curriculum and to map the brazilian medical schools that could have a possible discipline related to Telemedicine and/or Telehealth during the graduation. It was done a survey of the medical schools in Brazil (number equal 268) and a curriculum analysis in order to find these disciplines with some kind of relation to the topics. The research was held on the university's websites by eight independent evaluators. Data such as city, state and source of financial maintenance were collected. As an eligibility criteria, subjects containing the words related to the use of health informatics were selected such as innovation, technology, telemedicine and more. 87 medical schools were found within the inclusion criterion, such that 35.63 percent of the institutes were Federal, 12.64 percent State, 3.45 percent Municipal and 48.27 percent Private. These colleges were distributed according to the following regions of the country: Southeast (39.08 percent), Northeast (31.03 percent), South (13.79 percent), North (10.34 percent) and Midwest (5,75 percent). The highest number of public schools was found in the Northeast region (42.22 percent), meanwhile the Southeast had the highest number of private colleges (55.45 percent). Therefore, approximately 32.46 percent of medical schools have potential subjects related to telemedicine and telehealth in their curriculum during the graduation period, being similar its source of support (48.27 percent private and 51.72 percent public financing).

Keywords: undergraduate, medicine, telemedicine, curriculum, analysis
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Development of a Solution for OLED Display Smartphones for Pilot Training in Low-Visibility Flight Scenarios

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Visual illusions and spatial disorientation are common causes of air accidents and incidents, especially during low-visibility flight conditions in small aircraft. It is therefore essential that

pilots receive training regarding adaptation of the visual and vestibular systems to the aerospace environment. This project aimed to develop a device capable of simulating different visual illusions and aspects related to central and peripheral vision (colour and visual acuity), through the use of smartphones with OLED display technology (model: Galaxy S5 SM-G900M, screen: 5.1 inches, 1080 x 1920 pixels resolution, 432 pixels per inch). The phone was coupled with augmented reality glasses (model: ColorCross 3D Virtual Reality) with a 70 mm focal length lens, supporting devices of 4 to 6 inches. The smartphone is attached to the front of the glasses, giving an impression of three-dimensionality, and the visual tests are either transmitted from a computer or saved on the device itself. The images and videos selected, such as the Farnsworth-Munsell 100 Hue Test and Cambridge Colour Test, are commonly used in pilot training and are validated for use in clinical ophthalmology. Technical adaptations were necessary so these tests functioned adequately on the smartphone. Both tests are designed exclusively for use on a computing platform and, therefore, the Trinus VR application was first used to convert the computer image to 3D, before making it available on the smartphone screen. This solution for training pilots in visual illusions during low-visibility flight scenarios using smartphones with OLED displays is easy to implement, user-friendly and low-cost. Mobile technology adaptation for use in aviation training is of great value, as it can have a positive influence on the reduction of human errors that can result from alterations in human physiology secondary to exposure to the aerospace environment, thereby reducing the occurrence of air accidents and incidents.

Keywords: Visual illusion, pilot training, mTechnology

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A Demonstration of the Vitom to Provide Post Laceration Repair Follow Up Using Telemedicine Technology (poster)

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Telemedicine has been deployed to provide specialty care to remote or austere sites for both civilian and military uses.^{1,2,3,4,5} In remote, deployed locations, telemedicine could provide access to specialty surgical providers for assessment of the injury and telementoring during treatment. An example of such use would be rapid assessment by a hand specialist in a tertiary care center achieved through the use of telemedicine linking to the remote primary care provider. This communications could allow the specialist to guide the care plan or coordinate evacuation of the patient for surgical repair. Various telecommunications methods have been used including image transmission with cell phones.^{2,3} This paper describes the use of the Vitom endoscopic microscope (Karl Storz Endoscopy America, Inc. El Segundo, CA) to provide surgical microscopy images of a hand wound for telemedicine care.

Keywords: Vitom, telemedicine, remote surgery
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UNASUS Amazon - Telehealth and Health Teleducation Using Mobile Platforms (poster)

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UNASUS Amazon, Brazil

The UNASUS (SUS Open University) project aims to meet the training needs and continuing education of health professionals working in the SUS (Health Unic System), offering courses with practical and dynamic perspective using trivial clinical events. But, one of the characteristics of UNA-SUS courses up until then was online access, making it difficult to professional connection of the most remote and underserved areas, specifically in isolated municipalities, indigenous areas and throughout the Legal Amazon. Because of this problem was implemented the UNASUS Amazon project, which seeks to address the issue of access to training and information, through the development of technologies, including mobile applications, that provide educational resources offline. The solution is based on local data storage and synchronization (upload and download) when available connection, always taking into account the displacement of the professional. In addition, the project aims to incorporate new interactive technologies, such as virtual reality environments and extended reality, where are used the tools Leap Motion© e Oculus Rift©/Gear VR©. Your applications can range from virtual simulation environments up to 360 degree videos for easy observation of hostile environments or difficult to view by the user, such as the digestive and respiratory systems and surgical approaches.

Keywords: UNASUS Amazon, telehealth, mobile applications
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Clicktrauma: App about Trauma in Primary Dentistry (poster)

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Federal University of Maranhão, Brazil

Health education is a group of actions aimed to promote quality of life. In the modern world an update in the education methodologies is necessary. The globalization and the technological progress requires excellent results in a reduced time what stimulates the society to create new reliable tools as guideline and searching browsers. Among the various technologies developed one of the most famous is the app. It is a device created to improve the accomplishment of a specific job. There are many advantages as: simple use, optimize navigation what allows the user not waste a lot of time searching and less access cost because the interface is adapted to the

device. Nowadays dental trauma is one of the major causes of tooth loss including in the primary dentition. The trauma diagnosis is a discussed subject because of its complexity and sometimes it is necessary to search in the literature for a better comprehension about this topic. The aim of this study was to develop an app for dental students, dentists and paediatric dentist. This device works as a guideline to resolve questions about trauma diagnosis in primary dentition during dental clinical routine. The content is safe and based on scientific evidence about the subject. For the development of the app was necessary to use a program called Just in Mind, a team of paediatric dentist and a designer. At the end, it was obtained a prototype that can be used on cell phones with IOS or Android operating system that will be tested in a dental undergraduate class in Rio de Janeiro State University.

Keywords: Mobile App, Dental trauma, mHealth

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Online Academic Journey: Students Profile and Evaluation through Different Digital Medias in Dentistry Area (poster)

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The aim of this study was to present an academic event in the online version and evaluate the users' profile who have signed up and different digital medias used by them. The development of technology has enabled the emergence of new methods of teaching and learning allowing a dynamic and comprehensive access to information. In this new world distance learning has occupied an increasing space and the emergence of online courses grows exponentially. Based on this premise the Dentistry School of State University of Rio de Janeiro, held in the year 2016, the first Online Academic Journey. 05 courses have been made available in Dentistry areas: Computerized Tomography, Endodontic, Aesthetic, Implantology and Periodontology. The results showed that most of the participants were from the Southeast region of Brazil (80.6%), professional dentist activity (70.1%), with graduation academic level (89.4%). At the qualitative evaluation, 80% of respondents expressed satisfaction with the courses. The results obtained using data from Facebook, Youtube, Moodle Platform and Google forms showed that: the Facebook posts about the event reached approximately 7,500 people with only one (01) month of publication. The quality of publication was estimated at 80 % as good or excellent and the origin of information occurred in 53.1 % through Facebook and 31.1% through friend's indication. 69 % of users were female sex aged between 18 to 35 years. The device most used by users to watch the courses was the computer (70 %) followed by smartphone (21%). In addition, the academic journey was attended by users in different states of Brazil, a member of Colombia and obtained views in Portugal and Australia. We conclude that the methodology used was an innovative experience and provided quality information to different profiles in different regions and the use of different media and technological tools for conducting an online academic journey provides very important resource in disseminating quality academic content, not only for users of the institution that performs as well as geographically distant locations.

Keywords: e-learning, telehealth, education, dentistry
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Med-e-Tel 2017

Session: Promoting Telemedicine/eHealth Practice: ISfTeH Student Webconference Session and Contest

Telegerontology: Knowledge Exchange between Brazilian and Portuguese Universities Related to Elderly Healthcare

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Telegerontology (Telegero) is one of the educational activities promoted by the e-Health Lab/MicroG, in cooperation with the Postgraduate Course in Gerontology and Geriatrics at PUCRS. This initiative began more than 10 years ago through videoconference connections, aimed at publicizing the activities of different Brazilian teaching and research centres in the area of geriatrics and gerontology. A total of 6 Brazilian states (São Paulo, Rio de Janeiro, Amazonas, Rio Grande do Sul, Pernambuco, Paraná) and Portuguese educational institutions participate in Telegero, all linked through a server. The thirteen representative members, doctors/professors and other collaborators promote interaction between the Brazilian and Portuguese universities. This work occurs on a monthly basis, from January to November, with lectures focused on topics related to care of the elderly, and based on scientific projects and clinical experiences. A mediator guides group discussions in the videoconferences and time is set-aside during the presentations for questions to the speaker, resulting in greater interaction between the Brazilian and Portuguese participants. Researchers from the engineering area, who are part of the e-Health Lab/MicroG, provide specialized technical support for the videoconferences. The communication system consists of a computer connected to the internal network of PUCRS (intranet) and Teleport Software, connected to peripherals (microphones, sound system and video camera), which guarantees a secure and dynamic connection between the research groups.

Keywords: Telegero, Videoconference, Elderly Health, eHealth
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Developing a Model of Community of Practice Among Health Informatics Professionals in South and Southeast Asia

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There is still debate on whether communities of practice (COP) can be formed or created. Many have claimed that they provide a venue to share knowledge which translates to action. In South and Southeast Asia, international development partners have invested in many capacity building initiatives to set-up and/or improve eHealth implementations in countries. While interest and resources for this increase, many challenges are still left unresolved due to repeated mistakes and undocumented experiences. The Asia eHealth Information Network (AeHIN) is a community of health informatics professionals organised to share knowledge and improve the use of ICT in health systems strengthening. Objectives: This study examined how AeHIN emerged as a knowledge sharing platform, identified best practices it adopted, and developed a model that could sustain itself as a COP. Methods: A sociometric survey was used to map knowledge sharing connections of pioneer members with interviews to substantiate findings and a 20-hour participant observation to triangulate data. UCINET 6.0 was used to analyse social network data while qualitative data were coded. Results: Defining roles of health informatics professionals inside the COP influences the type of information, resources, and capacities that can enter a network. The nature of its subgroups determines potentials and barriers to the network. Twelve best practices were identified to sustain a health informatics COP. It is recommended that a learning network is an appropriate model for this type of COP and an understanding of country-specific political structure is important to support participation. Conclusion: AeHIN is a COP model whose activities have a life of their own. While some prove successful, others die down or are discontinued. This unique design proved to be fitting for a group of health informatics professionals as it accommodates success and failures crucial for project implementations.

Keywords: Asia; capacity building; medical informatics; knowledge; social support
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Portable Multi-Peripheral Telemedicine Kits to Expand Clinical Services of Relief Organizations in Contexts of Disaster

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Objectives: This study aims at exploring the potential benefits and practical aspects of portable telemedicine kits that make them specifically suitable for enabling humanitarian relief organizations to provide healthcare to larger numbers with better quality as well as more specialized medical services in disaster conditions. It also attempts to compile a list of major /essential criteria and components of the portable telemedicine unit that make it particularly ideal

for use in disaster relief situations. Methodology and data collection: The study is a descriptive one relying on secondary data. Data were extracted by review of published research and manufacturer documentations, beside reports from field experiences of a number of humanitarian organizations. Results: The study revealed that the portable telemedicine kits were particularly useful and practical in disaster situations. They help deliver timely, high-quality, and safe general and specialty medical service. Moreover they increase the capacity of serving larger numbers of affected people. A list could be compiled from reviewed data to describe a suggested standard disaster portable telemedicine kit. Conclusion: Portable telemedicine kits are promising innovations and are particularly beneficial in disaster situations. They expand the capacity of the delivered healthcare service of a humanitarian organization qualitatively and quantitatively. A portable telemedicine kit with standard disaster-specific criteria is recommended for relief organizations.

Keywords: telemedicine, portable kits, disaster, humanitarian
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Telepsychiatry - From a Dream to Reality in Bangladesh

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The governments of Low and Middle Income Countries are struggling with poverty, political instability, social inequality and inadequate health care facilities. Mental health services never get adequate attention to overcome all of these priority issues. These countries are stressed with a wide mental health treatment gap and there is no sign of adequate initiatives to minimise this gap. However, Information Communication Technologies (ICT) sectors show explosive growth. The landscape of ICT in the health sector is expanding every day. Most developing countries have no national mental health data base or electronic health record. With the help of ICT countries can collect real time data, and record the data from mobile devices in a cost effective manner. The problem of lack of trained mental health professionals, wide geographic area coverage and the large number of patients can be overcome by using telepsychiatry services. People can contact a psychiatrist or psychologist from their mobile phone whenever they need help. It removes the cost of travelling, the need to wait for an appointment and avoids the fear of being stigmatised as being mentally ill. Electronic algorithm based diagnostic systems provide professional expertise and can assist poorly trained personnel in primary care settings. Millions of people can be contacted at a time using Short Message Service (SMS), Interactive voice response (IVR) and video clips. This can be used to reduce the stigma and improve treatment adherence, two important obstacles in mental health service in low income countries. Social Networking Sites like Facebook have opened new horizons for understanding mental health conditions and providing interventions. Friendsourcing is interesting area to for mental health. All these aspect can transform mental health in Low and Middle Income Countries with their available resources.

Keywords: telepsychiatry
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Telepsychiatry for Transforming Mental Health Scenario

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Low and Middle Income Countries are struggling with poverty, political instability and inadequate healthcare facilities. Mental health hardly gets adequate attention and is relegated by other priority issues. The countries are stressed with a wide mental health treatment gap without any sign of adequate initiatives to minimise this gap. However, Information Communication Technologies (ICT) have shown promise in this regard. With the help ICT the problem of lack of trained mental health professionals, wide geographic area coverage and huge number of patients can be overcome. People can contact a psychiatrist or psychologist from their mobile phone whenever they need help. It removes the cost of travelling, overcomes the need to wait for an appointment and by-passes the fear of being identified as mentally ill during a visit to the psychiatrist. Millions of people can be addressed at a time using Short Message Service (SMS), Interactive voice response (IVR) and video clips. All these can reduce the stigma of mental health and can improve treatment adherence, two important obstacles in mental health service in low income countries. Social Networking Sites like Facebook have opened new horizons for understanding mental health conditions and providing interventions. All these initiatives indicate the potential of telepsychiatry to transform the tragic mental health scenario in Low and Middle Income Countries.

Keywords: telepsychiatry; treatment gap, Facebook
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Med-e-Tel 2017

Session: Disease Management, Rehabilitation, Remote Monitoring (2)

Use of Home Telemedicine to Optimise Insulin Therapy in Patients at their Self-management of Diabetes Type 2

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DIABSCREEN: Screening and Diagnostics of Diabetes

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NovioSys, The Netherlands
KBSoft, Slovak Republic
BIOCONS, Slovak Republic
Trilobyte Statistical Software, Czech Republic
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Despite the fact that health promotion is a shared mission among physicians, the occupation has historically been characterized by extended work-hours, sleep deprivation, and poor or absent self-care. Although contemporary U.S. graduate medical education programs no longer expect resident physicians to live within hospitals caring for patients 24/7, new interns, residents and fellows (house officers) still notoriously encounter high-stress working conditions, often managing life-and-death circumstances working long days, nights and weekends in the ritualistic right-of-passage to becoming a physician. In 2003, the U.S. Accreditation Council for Graduate Medical Education (ACGME) capped resident work hours at 80 hours a week for all residency training programs, a move prompted by national attention on patient deaths and medical errors. Despite these efforts, approximately 300-400 doctors still commit suicide each year, or an estimated one physician/day. Physicians are more than twice as likely to kill themselves as nonphysicians. This presentation will highlight ongoing efforts to reduce burnout and promote emotional resilience among new resident physicians, including: institution-sponsored employee wellness programs, provision of mental health counseling via telemedicine, targeted education, and socialization initiatives, both in person and mobile health. Although comparative effectiveness data on different occupational health initiatives is limited, high economic costs of burnout, depression, or death within the medical profession warrant greater efforts to improve occupational health among physicians.

Keywords: diabetes, screening, continuous monitoring
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A Systematic Review of Randomized Controlled Trials of mHealth Interventions in Two African Countries

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The African healthcare system is fraught with a number of challenges. These challenges range from inequality in access to health care and an increasing of health services to inadequate health facilities and a shortage of personnel. Particularly, the continent is burdened by such diseases as HIV/AIDS, tuberculosis, high maternal and child mortality rates among others. Mobile health (mHealth) is the application of mobile technologies in providing health services and information. Studies have shown the feasibility of mHealth in improving health outcomes in many African countries, especially in the light of the pervasive nature of mobile technologies in the region.

However, effectiveness studies seem elusive. Hence, this paper systematically reviewed literature evaluating the effectiveness of mobile health interventions in two of sub-Saharan Africa's largest economy – Nigeria and South Africa. A literature search of academic databases such as PubMed, ScienceDirect and EbscoHost was conducted. The search focused on empirical studies on mobile technologies and healthcare carried out in Nigeria and South Africa between 2011 and March 2016. The search and initial pruning yielded 39 papers, but ten papers adopting randomised controlled trials were eligible for review. It was revealed that text messages (SMS) are the primary mobile technology adopted for causing an improvement in health actions or triggering behavioural changes. mHealth interventions can cause an improvement in health outcomes and possibly transform health systems. However, there is no sufficient evidence to conclude that the use of mobile phones caused significant improvement in health outcomes. For mobile health (mHealth) projects to scale and be sustainable in Nigeria and South Africa, there is a need for more studies to provide clear evidence on the effect of such mHealth interventions on health outcomes.

Keywords: mHealth, RCTs, behaviourchange, Nigeria, SouthAfrica
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Prospective Clinical Registry to Evaluate Clinical Outcomes of Hypertension Patients in a Multidisciplinary Clinic

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Background: The prevalence of hypertension is higher than 30 percent, reaching 50 percent in the elderly. The lack of control of this condition is correlated to a low adherence to its therapies. Clinical registries are necessary to define public policies for treatment and prevention, by providing highly accurate and interoperable data. **Purpose:** To describe the implementation of a prospective, computerized, interoperable and multidisciplinary clinical registry to evaluate the clinical practice and outcomes of hypertensive patients. **Methods and Results:** We created and implemented the RE-HYPER registry by following the steps: (1) Data standardisation in accordance with national and international standard variables to allow for interoperability among systems. Our dataset included all applicable standardized data elements published by the American Heart Association / American College of Cardiology, and Brazilian national datasets standards; (2) Development of an initial data collection and clinical research workflow; (3) Development of electronic case reports (CRF) using REDCap (Research Electronic Data Capture) and in accordance with the HIPAA (Health Insurance Portability and Accountability Act) privacy rule; (4) Pilot test and validation of the data collection and clinical research workflows and CRFs, (5) Development of automated data quality report using REDCap. The database includes hypertensive patients over 18 years old. Patients with stroke, myocardial infarction, kidney failure or going through surgery are excluded. Outcomes evaluated are: quality of life, therapy adherence, hospital admissions, cardiovascular events (stroke, myocardial infarction and acute renal failure), stress and depression levels and physical activity. Data collection occurs at baseline and every two months until one year is completed. Patients are

assisted by physicians, nurses, psychologists and nutritionists. Conclusion: The RE-HYPER registry has the potential to improve patient adherence to the treatment by its multidisciplinary approach, besides providing high quality data for the assessment of quality of care, clinical research, technology assessment, and health policies.

Keywords: hypertension, clinical registries, interoperability, standards

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Facilitation of Life of Patients During Rehabilitation in Physiotherapy Through Video Link in Prizren, Kosovo (poster)

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Physiotherapy is mainly based on rehabilitation of patients after problems that they have during many kind of medical conditions on their past. It is important for the patients during the rehabilitation to have the best conditions to fulfill their exercises program. So we have tried a new way to implement group rehabilitation for exercises that don't need medical supervision to help the patients to do their rehabilitation right away from home, via group video conferences we had 10 patients. We created a schedule where the patients connected online and we have do some of exercises that did not need medical supervision but help in the right way rehabilitation of patients, because they were very happy for this and full of inspiration, because while they were rehabilitating they were also in their home, they did not spent time to travel from their home to the clinic because not all the hospitals have their rehabilitation and physical medicine clinics. After two weeks of this rehabilitation technique we have taken a survey and their level of satisfaction with this method was high about 88.2%. They said that they did not spent money and time and they were also rehabilitated very well because they were motivated to achieve highest results of their exercises for rehabilitation. To implement this study was really easy because internet penetration in Kosovo is high, as high as in developed countries of Europe, in Kosovo, 84.81% of family economies have internet, as EU has mentioned in one of their reports in developed countries internet penetration is about 84% so Kosovo is equal state as developed countries regarding the internet penetration. So in the near future is really easy to implement this kind of exerises and rehabilitation that do not need medical supervision, and the money and time spent for this is low, because in countries with low income economy is essential that with a little amount of money to achieve more success. We can do miracles with Telemedicine.

Keywords: Telemedicine, Physiotherapy, Kosovo, Viedo, Prizren

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A Study of the Internet Use by Parents of Children with Chronic Kidney Disease (poster)

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Introduction: The use of Internet can bring benefits to health care when used as a source of information for health and also as a social support to promote individual's empowerment. This fact can be very important for parents of children with chronic kidney disease (CKD). In children, the chronic kidney disease may cause several impairments, presenting high mortality rates compared to healthy children, mainly for individuals who are undergoing dialysis. The needs for continuous care demand skills and abilities that are rarely previously delivered to parents/caretakers. Several studies have shown that Internet has become an important source of health information for impaired children and their parents. We aimed to investigate how the Internet has been used by parents of CKD children to look for health information. **Methods:** The results were obtained by means of interview-based survey of 111 parents of patients attending a Pediatric Nephrology Service in São Paulo, Brazil. Information regarding internet use was collect and the results were performed using the statistics package SPSS. Ethics approval for this study was obtained from the local ethics committee. **Results:** Regarding the 89 parents who performed an internet search about health, 80 (90%) had looked about their child's health condition. More than half (66%)(53/80) of these parents/caretakers use the Internet daily. The most common reason (94%) for using the Internet was to find more information about of the child's condition. Ninety-three percent found the Internet useful. Seventy-eight percent found that the Internet provided further understanding into their child's condition. However, more than half (52%) prefers not to talk to the physician. **Conclusion:** It could be concluded that there is a large interest for use of the internet amongst parents of children with chronic kidney disease. The results obtained may support to the development of further educational and informative contents that use information and communication technology to support parents/caretakers of CKD children.

Keywords: Chronic kidney disease, Child, Internet

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Implementation and Assessment of Tele dermatology Strategy for Identification and Treatment of Skin Lesions in Elderly Persons

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Introduction: The world population has lived longer which is heading to a higher incidence of pressure ulcers. Objectives: (1) To describe the implementation of a tele dermatology strategy to identify and treat skin lesions in institutionalized elderly; (2) To evaluate the established tele dermatology strategy. Method: This study was carried out in a geriatric house (AMP), Pelotas-RS, Brazil; and included: (1) Implementation of a tele dermatology method; and (2) Evaluation of the strategy through: a) professional knowledge assessment via pre and post-test, b) professional satisfaction using the CARDIOSATIS Scale (adapted), and c) clinical aspects evaluation through BRADEN Scale (risk of lesion), PUSH 3.0 Scale (healing process). Results: (1) Tele dermatology strategy composition: remote consulting team, local care team, a dermatologist and an infectologist. Physical area for wound dressing changes, image recording, professional training and clinical case discussion was established. Digital records of skin lesions and weekly monitoring was implemented. Ulcers images were standardized using the iPhone 5s camera coupled with a dermatoscope in cases of minor lesions. Data was stored in the cloud using FotoFinder Hub. (2) Professionals' knowledge (n=24): age 34.6 ± 7.3 years; 16 responded to the post-test and there was no difference between the 2 tests (86.8 ± 7.1 and 84.5 ± 9.5 , $P=0.38$). Professional satisfaction (n=17): 16 (94.2) showed interest in indicating this type of assistance modality to another professional and 15 (88.2) demonstrated interest in ongoing training through the distance mode. Clinical aspects evaluation: Systemic arterial hypertension had the highest prevalence, 9 (50). Pressure ulcers were identified in 18 patients (83.3), the heels - 7 cases - were the most affected area (39). Healing Process: 4 lesions (22.2) took over 3 months to complete the re-epithelialization, 3 (16.7) in a 3 month interval and 5 (27.8) in up to 2 months. 6 patients (33.3) died before the end of treatment. Conclusion: The proposed tele dermatology strategy has resulted in better assistance of elderly patients, a valuable initiative in a world that is getting older.

Keywords: ageing, telenursing, dermatology

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A Web-Based Clinical Decision Support System for Osteoporosis in Brazil, an Ageing Country

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Introduction: As the population ages, the prevalence of osteoporosis and of fragility fractures increases, generating an important impact on mortality and on public health costs. Brazil is a multi-ethnic country with continental dimensions making population studies on osteoporosis a difficult task. Some of them, such as the Brazilian Osteoporosis Study, showed that the prevalence of the disease ranges from 6 to 33% and of fragility fractures is about 15.1% and that in the country 15% to 30% of patients with hip fractures die in the first year after the event. In 2010 there were more than 20 million Brazilians over 65 years of age, and the projection is to exceed 50 million by 2050. In 2015 more than 540.000 spinal bone densitometry exams were approved but without any reference about results of these tests. **Objectives:** To present a low cost clinical decision support system for osteoporosis which also seeks to collect data on the patients attended and results of bone densitometry performed in the public health system. **Methods:** A responsive web application that can be accessed by computers, tablets and smartphones was developed with open source technologies. A structured form saves into a database the clinical data of patients and bone densitometry results informed by health professionals. **Results:** The system presents definitions about the disease, explanations about each risk factor and about the bone densitometry interpretation. According to the patient profile informed in the evaluation form the system issues a personalized report based on the prevention guidelines of the Ministry of Health. It also calculates the patient's risk classification as low, medium or high according to the Osteorisk tool validated for Latin America. If the patient has undergone bone densitometry the system offers the diagnosis of the exam based on the WHO classification. **Conclusion:** The dissemination of information and communication technologies may facilitate the identification of cases of osteoporosis, its distribution by sex, age, geographical location and relation with risk factors allowing a more accurate statistical analysis for a better planning of public health actions.

Keywords: ageing, Brazil, ehealth, osteoporosis, telemedicine
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Implementing and Monitoring the Teleconsulting Service of National Network of Specialists in Cervical Cancer

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Cervical cancer is the second worldwide malignant neoplasia incidence in women. In Brazil, it is the third most frequent tumour. Failure in prevention results in diagnoses of cervical cancer in advanced stages, which causes an average mortality of 50% of the cases, with enormous expenses for the systems and lost lifetime. The prevention involves the screening of its precursor lesions, it allows detecting women already affected by cancer, but in its initial stages, asymptomatic, when the prognosis is still very good. This research in the field of planning and

management of health services seeks to find ways so that the exchange of knowledge among professionals of different levels of care favours the rational use of resources and contributes to the effectiveness of the actions of the Cervical Cancer Control Program. The project aims at the constitution of a window of access for information to primary care health professionals, discussing the new Brazilian guidelines with the implementation of a teleconsulting system for the screening of cervical cancer. It is therefore a cross-sectional prospective descriptive evaluative study in which, during the creation of a teleconsultation system through the HealthNet Telehealth Platform, the leader of specialists will carries out a deployment analysis with the basic health units and reference services for cervical cancer prevention in the city of Rio de Janeiro, Brazil.

Keywords: telehealth, cervical cancer, education

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Implementation of the eHealth Strategy of the Finnish Nurses Association

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Tele-Education in Nursing Continuing Education Programs: A Literature Review (poster)

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Continuing education is a strategy for training nursing professionals which can be used for constructing technical and scientific, ethical, socio-cultural and relational knowledge, involving the day-to-day operations of institutions where professionals work, in order to ensure proper implementation and execution of nursing actions in an organized and systematic manner. This is a bibliographic review on the use of tele-education as a tool for implementing Continuing Education Programs, based on a survey of the LILACS and PubMed databases, covering articles published from 2000 to 2015. The following keywords were used: “Educação Continuada”, “Enfermagem”, “Telemedicina” and MeSH terms: “Continuing Education”, “Nurses,” and “Telemedicine”. Our results show that the first publication on tele-education in Continuing Education Programs occurred in 2001 in London; followed by 2003 and 2006 in the United States; then in 2012 in Australia; and in 2013 in Brazil. The services covered by Continuing Education Programs in nursing were: primary care, emergency, and mental health. The use of tele-education in continuing education for different types of services suggests that this type of education can be applied to all levels of nursing professionals (such RNs or LPNs in the US,

etc.), for the entire nursing staff. In all the articles surveyed, this new mode of implementing continuing education had significant positive effects, participants rating the educational experience as rewarding. Success factors included not being dependent on the size of a group or the time available for study, because distance learning allows professionals to set up their own study schedules. Our findings suggest that tele-education may be a powerful support tool for implementing Continuing Education Programs, particularly in the nursing field, because the characteristics of this career allow for less time available for taking new courses and spending time studying, impacting the number of professionals who can attend continuing education activities.

Keywords: continuing education, telemedicine, nurse, teleducation

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