ABSTRACTS

Med-e-Tel 2016

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Complex INSPECTLIFE Platform for Imaging Patients with Lymphatic and Dermatology Problems

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InspectLife is complex, extensible and still upgrading platform for providing telehealth, telecare and assistive living. InspectLife provides several services including Telemonitoring of glycaemia, Telemonitoring of blood pressure, Telemonitoring of ECG, Assistance surveillance of elderly people etc.

New service for imaging patients with lymphatic and dermatology problems was developed and tested. With the help of smartphone or tablet and special application a nurse is able to capture images during visits at patient’s home, share them instantly with doctor in hospital through internet and consult in real time. Images and notes are stored in system which is important for evaluation of treatment in long-term point of view. This concept is very helpful for patients because in general they have difficulties to leave their homes. During the pilot project one nurse was visiting up to 5 patients at home per day. 9 patients were monitored and 87 photographs were captured from which 92% were acceptable good-quality. The bad quality pictures were mostly not focused. Doctor was alerted by email when a new collection of images was stored at InspectLife system where he could browse and study captured images in big resolution.

The result of pilot project was that the doctor confirmed the advantage of regular distant consultation when he could see and compare condition of patient’s legs and remotely prevent possible complication. We conclude that InspectLife Imaging service is useful telemedicine tool focused on patients with lymphatic and dermatology problems.

Keywords: telecare, telehealth, telemonitoring, teleconsultation, dermatology

Flexible System Architecture of PHR to Support Sharing Health Data for Chronic Disease Self-Management

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Health data sharing can benefit patients to self-manage the challenging chronic diseases out of hospital. The patient controlled electronic Personal Health Record (PHR), as a tool manages comprehensive health data, is absolutely a good entry point to share health data with multiple parties for mutual benefits in the long-term. However, sharing health data from PHR remains challenges. The sharing of health data has to be considered holistically together with the key issues such as privacy, compatibility, evolvement and so on. A PHR system should be flexible to aggregate health
data of a patient from various sources to make it comprehensive and up-to-date, should be flexible to share different categories and levels of health data for various utilizations, should be flexible to embed emerging access control mechanisms to ensure privacy and security under different sceneries. Therefore, the flexibility of system architecture on the integration of existed and future diversifications is crucial for PHR’s practical long-term usability.

This paper discussed the necessity and some advice of possible solution, by the reviewed literatures and the experience from a previous study, of flexible PHR system architecture on the mentioned aspects.

Keywords: flexibility, PHR, sharing, architecture, self-management

GeneAnalyst – A New Approach to the Gene Expression Patterns Analysis in order to Confirm Disease Diagnoses / Diagnostics
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Gene sequencing and gene-of-interest (GOI) identification using primase chain reaction (PCR) principle and quantitative primase chain reaction (QPCR) and some of the more recent techniques are promising methods in identifying various gene-related diseases. The analyses can also be used to predict possible reaction or sensitivity of an organism to exposition to certain diseases. In this paper methods and approaches to quantitative GOI analysis in patients with different diseases, like cancer and diabetes will be discussed.

Keywords: gene of interest, cancer, diabetes

An Open and Interoperable Platform for the Follow-Up of Diabetic Riders
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During the 2015 mHealth Grand Tour (MHT), the follow-up of diabetic riders required medical data collection and was facilitated by implementing API interfaces in the platform, providing a secure interoperable solution.

The MHT is a cycling event which took place from Sept 3rd to 12th, with 9 riding days in 3 stages, from Brussels to Geneva, via Paris, for 1500 km and 22 000 m climb. 23 diabetic riders have done the whole tour. The tour goal was to help improve the lives of people with diabetes, showing what is possible, offering a constant follow-up and allowing a clinical study, and rising awareness. To do that a remote monitoring solution was set up around a medical data collection platform (Orange’s Connected Health Center) in which different kinds of observations were collected, and made available to partner applications. The data were collected either manually through forms filled by the
riders, or from medical devices through PC (for Dexcom’s continuous blood glucose monitor) and mobile phone for automatic transmission of other data like heart rate and RR interval, and, with Tapcheck devices, weight scale, blood glucose meter and blood pressure. Then, those data were made available to third party applications: graphical display for riders or the tour physician, wellness app Medwhat, or Clininfo for post Tour medical study. To allow all this with a global security, APIs are implemented on the platform to collect data and make them available. OAuth2 is used to grant access to riders’ data and a consent policy is implemented to define the access rights to each rider’s medical data. To offer a global and interoperable solution, the HL7 (Health Level 7) data format, FHIR (Fast Healthcare Interoperability Resources) was implemented for the data storage. Each collected data and form is stored with this format in a JSON object. A nomenclature was also defined to simplify the understanding of the measurements. All that made it possible to develop a solution adapted to the specific needs of the event, that also proved flexible enough to adapt to the unavoidable project changes, and paves the way to use it for other pathologies with limited adaptation effort.

Keywords: diabetes, interoperability, telemonitoring, mHealth, APIs

The Road to Smarter Data: INTEGR8 Study Embeds Wearables in Digital Health Data Workflow

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Mobile health solutions and wearables are emerging as a solution for creating a more adept and effective clinical trial process. Although the technology is in an early phase, there are clear benefits of using wearables in the clinical trial setting such as enabling a volume increase of the collected data, and improving workflow processes and analytics, which ultimately may lead to decreased health care costs while achieving faster times to market. The healthcare industry is looking for ways to integrate data coming from wearable devices or smartphones into electronic data capture (EDC) systems.

Genae, a digital contract research organization (CRO) with focus on medical devices, launched the INTEGR8 study in July 2015 to demonstrate the integration of a wearable device (Microsoft Band) in their EDC (edc2go). The INTEGR8 program combined: - daily quality of life related questions - sent from edc2go, and answers transmitted to a smart-phone (Bluetooth) and encrypted (3G/WIFI) to edc2go - from 19 subjects across 4 countries - with a follow-up of 1 month.

The study illustrated the possibility of storing and processing real-time patient data. Not only did the study design demonstrate a 2-way communication between wearable and EDC; it also achieved a next level of intelligence by correlating data entries. Genae has already initiated two follow-up studies for 2016 to optimize the workflows and to expand data collection with tracked quantifiable and objective metrics. This novel technology is an important step towards simplifying the clinical study and routine follow-up workflow. Involving the subjects on a daily basis will ultimately increase their engagement during clinical trials and provide bigger and smarter data. From an investigator’s perspective, the integration of this wearable technology in data collection workflows may have a positive impact on compliance and on medical costs. It enables physician to closely monitor subject’s activity and/or drug intake, without waiting for the next scheduled follow-up visit at the hospital.
This technology may truly enable remote monitoring and ultimately improve patient outcome [http://www.genae.com/en/about/innovation](http://www.genae.com/en/about/innovation).

Keywords: wearable, mHealth, innovation, integration, monitoring

**Acquiring Innovation: Preconditions, Requirements and Indicators for Sustainable Models in Integrated Care**

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We are developing a toolkit, made of three Handbooks and a White Book, to assist the policy makers in introducing innovative models of Integrated Care in a locality. This activity is part of the STOPandGO project, to promote a critical mass of local tenders across Europe on technology-enhanced care and cure services.

Handbook #1 describes the vision towards Integrated Care implied in the IPICT scheme (Med-e-Tel 2015), involving a progressive deployment at scale of several harmonized local initiatives according to a long-term regional plan and a national/European vision. It works out a list of potential structural measures that could yield the building blocks of any local initiative, together with the traditional care and cure services, to catalyse the innovation in the models of integrated health management.

Handbook #2 provides for each measure a systematic description of the actors, their roles, the technological opportunities, and the metrics to monitor deployment, audit and governance. Then it looks at the key factors of Integrated Care (Collaboration among the professionals, Activation of patient and caregiver, integrated Governance) to work out the enabling Preconditions to be faced by a collaborative effort of public and private stakeholders (e.g. within the European Innovation Partnership on Active and Healthy Ageing) and a set of functional requirements about the appropriate care and cure services. It also deals with the Infostructure, i.e. the data standard to support the care processes and to feed the Open Data applications.

A Green Book has been published in December 2015, to raise a debate in Italy about the proposed set of preconditions.

Handbook #3 provides a systematic description of the major technological components that can satisfy the above requirements.

The toolkit builds a bridge from the policies to the needs of classes of citizens, to the potential scenarios and then to the potential tenders, supporting a stepwise approach to plan a local initiative: work out local requirements, identify the measures that reify the innovation, decide for the care and cure services to be acquired, select the suitable indicators to evaluate the deployment.

Keywords: innovation, procurement, EIPonAHA, integrated care

**Patient Adherence: What Does It Mean and Implications for Digital Health Systems**


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The paper discusses patient adherence in the context of digitally supported behavioural change interventions for long-term conditions and the implications for digital health systems. Some examples from obesity and diabetes are used to illustrate points. Common definitions of adherence are briefly reviewed. Several challenges are noted in these for digital and behavioural change interventions: in many cases, the level of adherence needed for successful outcome is not known; often multiple elements make up the total intervention, resulting in the likelihood that patients will pragmatically adopt some and not all of the intervention, meaning adherence may have multiple independent contributions; also the relative benefit to be obtained from the latter elements are not known either, making it problematic to judge ‘total’ benefit from adherence in combined interventions. More recent definitions of adherence say it should be couched in terms of the specific patient-practitioner agreed intervention instead of just a fixed practitioner based one.

In health devices and systems patient specific analyses of multiple intervention elements therefore need to be recorded, analysed and presented to each professional or patient user appropriately. It is noted that when digital systems are added to an intervention its ease and appropriateness of use is always important, and that standard ICT user centred design should result in reduced (ideally minimum) user difficulties in using the technology – provided prototypes are evaluated over suitable periods of time and in appropriate user-contexts. Nonetheless it is noted that intervention adherence is likely to be reduced for those that still have problems.

In conclusion, whether a patient by themselves (as in self-monitoring) or a patient with a health care provider together are trying to judge how well the patient has been doing from visualisation of the data acquired, currently more information is needed to form evidence based sufficient definitions of adherence and hence inform appropriate patient/user health feedback.

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Evaluating the Economic Impact of Telehealth as a Routine Activity
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The Brazilian Constitution determines that everyone has the right to public health care and the municipalities are responsible for it. However, in many situations, specialized health care is not available in small municipalities and the patient has to be referred. Referral costs for small and poor municipalities may represent up to 30% of its health budget.

The Telehealth Center of University Hospital of Federal University of Minas Gerais provides teleconsultation and telediagnosis services for more than 1,000 sites in the public health system having performed more than 2.3 million activities since 2006.

Economical studies previously developed since 2008 showed that the telehealth service promotes substantial savings for the municipalities reducing the number of referrals but also revealed a complex cost structure making difficult routine evaluations. As consequence, a simplified model was developed in order to allow each municipal manager to evaluate the savings resulting from the use of the system as an additional motivation to increase utilization of the services. Educational material and an online saving calculator will be available as support tools in the website to promote a telehealth economical culture between municipal managers.

Keywords: telediagnosis, teleconsultation, referral, cost model

Economic Impact Assessment in the Case of ICT Solutions for Managing Cognitive Impairment among Senior Citizens
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Information, communication technology (ICT) is understood to have a key role to play in supporting independent living for seniors with cognitive impairment. Inter alia, ICT can support those with cognitive impairment in daily household tasks, travel, communication, social activity, mobility and health monitoring. The benefits from such interventions are predicted to accrue not only to the individuals concerned in terms of improved quality of life outcomes, but also to countries in terms of reduced health care costs and lower rates of institutionalisation. Given the relative newness of this field, there is little in the way of tools or models to assess the cost-benefits of these ICT interventions.

Thus, the purpose of this paper is to outline the challenges associated with developing an economic impact assessment model for bespoke ICT solutions for dealing with cognitive impairment. As part of this process, a review of the existing literature on impact assessment models in healthcare will be undertaken. Overall, the paper makes its contribution by beginning
to answer the question of how we can and should assess the impact of ICT interventions on senior citizens suffering some type of cognitive impairment. It has direct relevance not only for academic debate in the area of e-healthcare but equally for policy makers, industry, medical professionals, and other public healthcare stakeholders.

Keywords: ICT, cognitive impairment, impact assessment,

Applicability and Economic Assessment of Teleophthalmology Screening for Diabetic Retinopathy in South-eastern Brazil
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Background: Prevalence of diabetes mellitus (DM) has been increasing globally, reaching up to 8% of the Brazilian population between 40 and 69 years old and 20% of those over 70. Diabetic retinopathy (DR) is a major microvascular complication of DM, being disclosed in 50% of diabetic individuals in their lifetime. Early diagnosis and prompt therapy of DR are essential to prevent visual loss, but access of the diabetic population to regular fundus examination by an ophthalmologist remains a challenge.

Purpose: To assess applicability and economic viability of teleophthalmology screening for DR in the state of Minas Gerais (MG), South-eastern Brazil.

Methods: Prospective comparative study including two referral health centers in MG. Teleophthalmology screening for DR was performed using a fundus camera at each site, with images being transmitted online to our university hospital-based telemedicine center for subsequent remote analysis/report by trained ophthalmologists. Economic analysis calculated variable cost difference of teleophthalmology screening with that of an ordinary ophthalmology visit to an available reference clinic/hospital.

Results: A total of 936 eyes of 468 patients were examined so far at the two health centers. Mean age was 56 years, with 289 (61.8%) females. Quality of fundus photographs was acceptable for 868 eyes (92.7%) of 423 patients (90.4%). Presence of DR was disclosed in 316 eyes (33.8%) of 173 patients (37%), with 37 eyes (3.9%) of 21 patients (4.5%) having evidence of advanced disease (severe nonproliferative or proliferative DR). Overall variable cost difference of teleophthalmology was nearly 25% of that of an ordinary ophthalmology examination (R$28 versus R$113 R$ per patient). In addition, teleophthalmology allowed resolution of repressed demand for fundus examination of diabetic patients locally at the two sites, with early DR diagnoses and referrals, and possible impact on cost of treatment.

Conclusion: Teleophthalmology was a viable, effective and significantly cheaper strategy for the screening of DR.

Keywords: teleophthalmology, telediagnosis, diabetic-retinopathy, screening, cost
Strategic and Economic Considerations for the Implementation of Telehealth/Telemedicine for Remote/Underdeveloped/Poor Areas of Developing Countries
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The development and advancement of technology for telehealth/telemedicine have shown rapid phase in many developed countries. Its uses and applications, however, are considered relatively slow especially in remote/underdeveloped/poor areas in developing countries. Several key factors in the implementation of telehealth/telemedicine will be presented and discussed. Technical and cost considerations appear to be the main challenges in developing strategic implementation of telehealth/telemedicine in the poor regions. Telehealth/telemedicine is one of the most effective, and practical healthcare applications in the remote, underdeveloped, or poor areas, in which doctor or healthcare provider are not available. The challenges in the implementation of telehealth/telemedicine in these areas or villages in developing countries are many including, among others: availability of broadband signal, lack of funding (i.e. limited budget), limited availability of skilled labour, and even power sources. These challenges require strategic planning and consideration for practicality, efficiency, and cost effectiveness. Implementation of telemedicine typically requires the acquisition of system devices and software. The software, in most cases, needs to be purchased as subscription and paid in regular basis. The current costs of these equipment and software, for the poor areas, are relatively very expensive— in the range of about $30K to $40K plus software subscription. Lowering the cost of equipment and software subscription (preferably none) is necessary in order to be economically feasible. Illustrative study and evaluation for a relatively poor area in a developing country in Asia will be presented. Some suggestions on how to lower the cost will be discussed.

Keywords: telemedicine eHealth economic implementation strategy

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Economical Evaluation of Eclair’Age Geriatric Hot Line
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Population ageing and medical desertification raise economic concerns regarding elderly healthcare. As a solution, e-Health and telemedicine in particular are explored to support elderly suffering from chronic diseases and/or multopathology. But before promoting ICT implementation and expansion throughout the health care system, it is important to assess their economic viability and feasibility.

The aim of this short paper is to evaluate the tele-expertise service named Eclair’Age before its departmental deployment. It is the first geriatric hot line for elderly impaired residents living in nursing homes (called EHPADs). For this purpose, an “in situ” and “in vivo” non-randomized
trial has been carried out in 5 EHPADs situated in Essonne department, Ile de France region, for one year (August 2014- August 2015).

To develop a more comprehensive method of evaluation, we mobilize a detailed impact analysis approach, adding contextual factors and a social dimension to the analysis of stakeholders’ involvement (based on a preliminary functional analysis of the system studied). We collect data for the experimental period from: EHPADs annual reports, SAMU (Emergency Services System) of Essonne data base, and Eclair’Age dashboard of geriatric calls. We have also conducted semi-structured interviews and questionnaires and actively participated in working groups and medical staff meetings. The preliminary results of the detailed impact analysis show that the new tele expertise service is accepted and accessible from the EHPADs nurses’ point of view. Furthermore, the performance of Eclair’Age’s interventions is considered fully relevant by medical experts. By integrating contextual factors into our analysis, we shed light on the use and the relevance of the new tele expertise service. Finally, by classifying the experimental EHPADs according to their specific features, we identify which type of EHPAD is more likely to use Eclair’Age and give some further recommendations for its departmental deployment in all 100 EHPADs of Essonne.

Keywords: evaluation, tele-expertise, elderly impaired patients

Measuring the Long-run Effect of Telecare on Chronic Diseases: An Application of DID-PSM
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This study aims to present how to measure the long-term effect of telecare on chronic diseases by taking medical expenditures and days of treatment as outcome variables based on author’s surveys. The survey was conducted in March 2012 in Nishi-aizu, a town located in Fukushima Prefecture, Japan and aims to demonstrate that telecare reduces not only medical expenditure but also days of treatment. Two sets of data were used for statistical analysis, namely receipt data of medical treatment and survey data to residents including their personal characteristics. This research covers the period from 2002 to 2010, that is, nine years. The number of samples is 90 telecare users and 118 non-users. The most serious problem of evaluation is avoiding biases between the two groups, which is referred to as sample selection bias. In order to avoid biases, DID-PSM is employed. It is a combination of DID (Difference in Difference) and PSM (Propensity Score Matching). The former is comparing the average change over time in the outcome variable between the treatment and control groups. The latter is a method to select subjects from the samples of each group for them to have exactly the same characteristics and the only difference is whether they use telecare or not. PSM is thus a rigorous method for avoiding biases caused by differences among subjects or samples.

The results obtained by DID-PSM are summarized as follows: (1) treatment days of users with 10 years’ use (p<0.1); (2) medical expenditures of users with 10 years’ use (p<0.1); and (3) medical expenditures of all users (p<0.1). Moreover, after using more than 10 years, those users
reduce treatment days by 2.9 days, and medical expenditures by 41,975 yen per year per user, respectively. These are remarkable results obtained ever before. Some remarks of the results must be particularly mentioned. As noted, telecare does not contribute to a reduction in treatment days and medical expenditures for all diseases significantly, but it affects only to patients of chronic diseases, especially for those who have longer usage, namely users over 10 years.

Keywords: evaluation, DID-PSM, chronic diseases

Cardiac Telerehabilitation Reduces Healthcare Costs by Decreasing Cardiovascular Re-Hospitalization Rate
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Background: Notwithstanding the cardiovascular disease epidemic, current budgetary constraints do not allow for budget expansion of conventional cardiac rehabilitation (CR) programs. Thus, there is an increasing need for cost-effectiveness studies of alternative strategies such as telerehabilitation; the results of one of such studies are presented here.

Methods: This multi-centre randomized controlled trial comprised 140 cardiac patients, randomized (1:1) to a 24-week telerehabilitation program in addition to conventional CR (intervention group) or to conventional CR alone (control group). The costs evaluation took into account both intervention and health care resource costs. Intervention costs were those associated with delivering the centre-based CR and telerehabilitation program. INAMI/RIZIV’s nomenclature-based tariffs were employed to quantify the centre-based CR costs. Expenditure records were used to determine the equipment and consumable resources for telerehabilitation. Health care costs were the aggregated costs of the cardiovascular rehospitalisation and also specialist visits and associated diagnostics. The cardiovascular rehospitalisations’ related costs were derived from invoices retrieved from the recruiting hospitals’ financial departments. INAMI/RIZIV’s nomenclature-based tariffs defined specialist visits and diagnostics denominations.

Results: The total average cost per patient (intervention plus health care costs) was significantly lower in the intervention group (2156 ± 126 €) than in the control group (2720 ± 276 €, p = 0.01). The number of days lost due to cardiovascular rehospitalisations in the intervention group (0.33 ± 0.15) was significantly lower than in the control group (0.79 ± 0.20) (p = 0.037).

Conclusions: This paper shows that overall; the addition of the telerehabilitation program to centre-based CR was cost-saving by reducing cardiovascular rehospitalisation rate. These results are useful for policy makers charged with deciding how limited health care resources should best be allocated in the era of exploding need.

Keywords: eHealth economics, telerehabilitation
Ontology Based Platforms and Econometric Disease Models the Case of Predictive Asthma Models
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Asthma and COPD complications are an important case study to analyse the impact of insurance on disease severity. Asthmatic patients badly covered by health insurance, may not be well treated for acute conditions of asthma and if they become chronic, they can easily get complications such as COPD. Most patients with both diseases (Asthma and COPD) are more severe patients partly because they did not get the proper insurance in time. Asthma is a disease with an increasing epidemic since 20 years. It affects around 300 Million worldwide and over 25 million in the US. There are still very under researched issues on potential confounding between patients’ socioeconomic status and disease severity.
Professor C Huttin developed a predictive disease model on asthma from an analytical dataset of CDC (National Ambulatory Care Survey) and will show its relationships with critical decision points for ontology based platforms.

Keywords: ontology platforms, disease econometrics, asthma
Sharing Biology Coded Results Using LOINC Nomenclature: Results, Lessons Learned and Perspective of the ALBIOM Project
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ALBIOM project started in December 2013 with the main objective of initiating and promoting the usage of structured biology reports in a pilot region. This project, conducted by Alsace eSanté, with the support of ARS Alsace and ASIP Santé, relies on the French National EHR (DMP) as the infrastructure for results sharing. It relies also on the specifications of the interoperability framework defined by ASIP Santé, especially those required to manage biology domain's specificities of the project (CDA R2 structured reporting for biology’s specifications and French LOINC value set for France – BIOLOINC).

The project addresses the need to share laboratory results and to allow the comparison of results coming from different laboratories, in an efficient way. As most laboratories are using their own local coding systems, the main challenge of ALBIOM project was to find a solution to address the problematic of transcoding local biological codes used by laboratories with LOINC codes provided by BIOLOINC to allow this comparison. 46554 LOINC codes are available in BIOLOINC, and finding the right code for a specific test may be difficult as a lot of possibilities may be available. With the help of a biologists’ workgroup, we adopt a pragmatic approach to rapidly propose a first set of LOINC codes covering the most commonly prescribed laboratory tests (less than 200 laboratory tests were identified). We also provide a mapping table, and a methodology to help biologists finding the right LOINC code to map with their local codes. With the support of ASIP Santé, all these results are now part of the French Interoperability Framework (Jeux d’amorçage). With the cooperation of IT systems providers, the project is now live for more than 6 months and it demonstrates the possibility to deploy a CDA / LOINC approach in an easy way if some prerequisite are already defined.

The objective of this presentation will be to present the detail of the defined methodology, the lessons learned from the project, and new perspectives offered.

Keywords: Biology, LOINC, CDA, structured report
The implementation and integration of telemedicine is no longer merely an option or an appealing idea. In the current U.S. healthcare environment, it is an imperative whose time has clearly arrived.

Whether one labels these times as a “strategic inflection point” (Andrew Grove) or refer to it as a “tipping point” (Malcolm Gladwell), the compelling and multifaceted value of implementing a telehealth platform WITHIN various healthcare delivery models cannot be ignored any longer. After a decade of wrestling and wrangling with several telemedicine implementation concepts, this presentation will focus on the current adoption and roll out of a telehealth initiative in an onsite, primary care clinic of a large corporate employer. This telemedicine initiative will be a “complementary component” within a broader primary care delivery environment and infrastructure.

Most importantly, given the current U.S. trends in corporate self-insured healthcare, is the acceptance by a Fortune 100 financial services company, that deploying a well-executed telemedicine initiative will strengthen their workplace wellness mission, enhance the delivery of acute care and expand and strengthen employee “reach”.

This is an innovative approach to the delivery of primary care. It required a change of focus and language- away from narrow, stand-alone conceptions of telemedicine implementations. The confluence of integrative medicine, a large employer’s on-site primary care clinic, and telemedicine is a natural one. The synergistic potential has untold possibilities, including tremendous cost savings as well as the imminent changing and altering the course of how primary care will be handled within various healthcare delivery models.

The United States is in the midst of a healthcare paradigm shift. The current healthcare delivery system is designed to manage acute and chronic disease with little attention paid to cost-saving prevention and wellness. US healthcare is roughly 17.4% of the GDP; 2.5 times more than most developed countries. Healthcare GDP is expected to increase to 19.6% by 2024. In the midst of a growing and aging population- 43.1 million 65 and over in 2012, projected 83.7 million (nearly double) in 2050 – this current healthcare cost trajectory is economically unsustainable. The current shortage of primary care physicians- projected to worsen over the next decade- adds to the escalation of this healthcare crisis.

The U.S. government has attempted to address this crisis through the passage of The Affordable Healthcare for America Act of 2010. Its revenue model incentivizes prevention and maintaining wellness for large populations. It also broadens coverage and access to care. However, over 30 million Americans remain uninsured.

The occupational setting is a natural access point to reach a large percentage of working Americans. Nearly 30% of companies with more than 5,000 employees have onsite or near site clinics offering some type of primary care; an increase by 24% since 2013.

This presentation will explore the utilization of telemedicine as a transformative tool in the delivery of a blended healthcare model, leveraging the use of midlevel practitioners. This model provides a potential solution to the primary care physician shortage and contributes to healthcare cost reduction by increasing access to holistic, preventive care in the occupational setting.

Keywords: United States, occupational health, telemedicine
Econsultation: What Is the Impact on the Referring Provider?
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Background: Mayo Clinic offers econsultations with specialty providers. Unlike a traditional face to face consultation, the work of conveying recommendations to the patient as well as ordering and interpreting any tests that are recommended during an econsultation is the responsibility of the referring provider.

Methods: We obtained all econsults from January 1, 2013 through June 30 2013 and randomized 360 to review for the following content: whether the clinical question was clear, whether the patient was notified of recommendations and the method of communication used to convey recommendations. We reviewed tests ordered and whether the econsultation provided clear recommendations on how to follow up on results of any tests recommended.

Results: There were 3,008 econsults performed between January 1, 2013 and June 30, 2013. The specialties of Hematology 349 (11.6%), Gastroenterology 343 (11.4%), Endocrinology 301 (10%), Neurology 194 (6.4%), Nephrology 246 (8.2%) and Cardiology 238 (7.9%) were the specialties with the highest number of econsults. Upon review of the 360 randomized econsults we found that 98% of the time the clinical question was clear. The econsultant provided clear recommendations in regards to test, medication and visit recommendations 98% of the time. Specific tests were recommended in 193 (54%) of econsultations, however in 27 (14%) of these the econsultant did not provide clear recommendations to the referring provider on how to proceed in regards to results. A face to face visit with the econsultant was recommended 30% of the time. No documentation that the patient was notified of econsult recommendations was found in 11% of econsultations. For the remaining we found notifications occurred with a face to face visit with the referring provider (20%), by telephone (34%), by letter (22%), via a patient portal (7.8%), and by sending recommendations to an outside referring provider by letter (4%).

Conclusions: Econsultations require significant work for the referring provider in the form of notifying patients of recommendations, ordering recommended tests and following up on test results.

Keywords: econsultation, tele-consultation, e-referral, virtual consultation

ADAMILO—Automated Diet and Activity Monitoring for Intelligent Lifestyle Optimization
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User compliance and adherence with current diet and exercise management apps is generally poor, as these apps require an extensive deal of thorough manual inputting, logging and (often inaccurate/incomplete) estimation of daily food and drink intake and physical activity/exercise types/duration undertaken by users. In ADAMILO, we are proposing a one-stop, comprehensive
P4 (predictive, preventive, personalised and participatory [person-centred]) solution, integrating novel, almost fully automated (but still very reliable and accurate) monitoring and logging of:

- Calorie composition and intake (ingested foods and drinks, triangulating NIR spectroscopy and other methods), and
- Calorie expenditure (physical activity/exercise segmentation, calibrated by indirect calorimetry, the gold standard in energy expenditure estimation), with intelligent, cloud-based decision support (DSS) for lifestyle (diet and exercise) optimisation, that can be used by a layperson on his/her own and is tailored per individual needs, age, comorbidity, etc.

The DSS acts on real-time user data, covering lifestyle, diet, activity, body weight, blood pressure, self-efficacy, and other parameters. The DSS will use the best existing, validated, computer/digital clinical cardio-metabolic predictive risks models and algorithms and will continuously update the user's risk levels based on the person's real-time data and any preventive active lifestyle modification actions s/he is undertaking based on ADAMILO's tailored recommendations. ADAMILO's recommendations will be flexible and user-negotiable (using clinically-validated methods such as the Dynamic Diet software algorithms), thus further enhancing user's compliance and adherence. Extensive use will be made of captology and gamification techniques, including the use of social networked games/exergames and of an optional novel sociable, mini-robot coach interface to ensure adherence and sustainable positive lifestyle changes without relapse. A diagram showing ADAMILO's main components is available at [http://healthcybermap.org/ADAMILO.png](http://healthcybermap.org/ADAMILO.png)

Keywords: mHealth, obesity, overweight, lifestyle, diet

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**How to Improve Large Scale Emergency Management by Introducing Modern ICT**

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The EU project “BRIDGE” intended to build a system to support interoperability – both technical and social – in large-scale emergency management. The system should serve as a bridge between multiple First Responder organisations in Europe, contributing to an effective and efficient response to natural catastrophes, technological disasters, and large-scale terrorist attacks. The project has demonstrated this by creating a platform providing technical support for multi-agency collaboration in large-scale emergency relief efforts. The key to this was to ensure interoperability, harmonization and cooperation among stakeholders on the technical and organisational level. The vision of the BRIDGE project was to allow the creation of a common, comprehensive, and reliable operational picture of the incident site; enable integration of resources and technologies into workflow management. Benefits for First Responder: The BRIDGE EU project developed support in rapid decision making during a large-scale, multinational crisis response. The intention was to enable more efficient performance, reduce
workload, improve quality and efficiency of situation assessment, decision making, and timeliness and effectiveness of communications and coordination, optimize the use of resources. Several concept cases were developed, i.e.: Adaptive Logistics, Advanced Situation Awareness (incl. octocopter), Dynamic Tagging of the Environment, Federated Control Room Support First Responders, Integrated Training System, Information Intelligence, Robust and Resilient Communication, and Situation Aware Resource Management, Master table and E-triage. The BRIDGE consortium consisted of a well balanced mix of cross-disciplinary academics, technology developers, domain experts and end-user representatives. Regional Centre for Medical Emergency Research and Development, Stavanger University Hospital, Norway had the chairman for End-User Advisory Board.

Conclusion: The project demonstrated that it’s possible, by introducing modern ICT, to increase safety of citizens by developing technical and organisational solutions that significantly improve crisis and emergency management.

Keywords: ICT large scale emergency management

Using Quality Indicators to Improve Emergency Medical Services Systems Efficiency
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Measuring quality in Emergency Medical Services systems is challenging because emergency medicine is all about juggling tasks. The complexity of the task is increased by the fact that the emergency care system is only one of components of the larger health care delivery system. As such, it is subject to many forces far beyond its direct control.

This paper, a product of the starting stage of collaboration project between Medical University Sofia and Technical University of Sofia, explores some preliminary results and selected direction to investigate quality indicators to improve emergency medical services systems efficiency.

Keywords: emergency services, quality improvement indicators

Analysing Functionality of Most Useable Emergency Medical Services Software Products
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The development of a new generation of software systems for medicine requires a critical assessment of the advantages and disadvantages of existing systems. The first major goal of these studies is to determine their critical functionality, characteristics, and constraints. This paper is a result of the starting stage of a collaboration project between Medical University Sofia and Technical University of Sofia, exploring our preliminary results of analysing basic functionality and characteristics of upper-level software systems oriented to emergency medical services.

Keywords: emergency services, functionality analysis indicators
Do Standards for Telehealth Respond to the Needs of Service Users?
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This paper considers the use of surveillance technologies in care settings and the way in which they can help to protect older people. Such technologies are considered as falling within the wider range of assistive technologies of which telehealth forms an element. An ethical way forward is signalled for the use of such technologies and the way in which the use of visual or audio information that is gathered can be legitimized.

An important intention of the paper is to defuse some of the heightened rhetoric associated with cameras and related concerns about personal privacy. A number of principles are put forward by which, with appropriate controls, it becomes more readily possible to consider the use of surveillance technologies by which appropriate balances between privacy and people’s safety and autonomy can be achieved. Part of the key to this is in the way that information is gathered and stored and the way that related consents, etc. are agreed around access to the same.

Towards a Telehealth Service Planning and Implementation: A Research about the Requirements, Barriers, Benefits and Risks
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The implementation of telehealth service is a complex task with many requirements and issues to accomplish. The global opinion is that it can provide many benefits.

The objective of this paper is to identify the main requirements that must be accomplish to implement a telehealth service in order to increase the healthcare services quality and economic sustainability. The dimensions have different aspects including citizens themselves, social, healthcare providers, politics makers, academic institutions, normalization organizations and industry. To narrow the study, these dimensions were merged to the following domains:

- Quality of the processes of the healthcare organization;
- Economic and financial resources;
- Workforce planning, healthcare planning, and responsibilities;
- Infrastructure and facilities resources for telehealth services;
- Adoption of new Information Architectures capable to share information and knowledge;
- Adoption of new technology resources to permit the telehealth services;
- Education and training.

The study was conducted in Portugal and the used methodology was a systematic literature review about published norms, guidelines and technical reports, followed by the gathering of secondary data and interviews to the decision makers. The existent education and training courses across Europe were also considered.

The conclusions are a set of requirements considering healthcare processes and workforce planning, infrastructures facilities, education and training of the professionals, adoption of normalized information architectures, implementation of different processes of quality management and the expected outcomes are improvements quality and on health economy. Some potential and possible metrics are also proposed.

Keywords: telehealth, telemedicine, healthcare, information architecture

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**Telehealth Standards of Practice: a Nursing Exemplar**

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Standards of practice are concepts or principles agreed to and used as models to compare quality or performance, organized by specialty or practice level or both. Health care standards use meta-concepts to organize standards.

The purpose of this paper is to describe a framework for telehealth nursing standards development and to discuss how these nursing standards can apply to other telehealth specialties. For telehealth nursing, and most likely for other telehealth care specialties, the conceptual expectations reflect the clinical practice role and the professional performance role. Standards for the clinical practice role include the responsibility to perform assessments; make diagnoses; identify outcomes; plan for the care; implement the plan to conclude care coordination; health teaching and health promotion, and consultation; and care and outcome evaluation. For example, the standard for assessment would be ‘Telehealth registered nurses systematically collect comprehensive and focused data relating to health needs and concerns of a patient, group or population.’

Standards that articulate and shape the professional performance role include application of the profession’s code of ethics; education to competence; research evidence application to practice; performance improvement; effective communication; appropriate leadership behaviours; collaboration with clients, families, and other health care professionals; performance evaluation; resource management; and assuring a safe practice environment. For example, a standard for education would be ‘telehealth registered nurses actively attain nursing knowledge and competency in order to reflect current nursing practice.’ Standards of practice inform competency development. Competencies are sets of related knowledge and abilities that enable one to act effectively in a situation. Knowledge areas include critical thinking, human caring, knowledge integration and decision-making. Other health care specialties could use these or similar standards to reflect their clinical practice roles and professional performance roles.
Terminology Requirements of Telehealth Nursing
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Telehealth nursing is considered a tool to support nursing practice using health information and communication technology (health ICT). With the advancement of health ICT, a variety of devices, applications, and systems are available in practice, including synchronous videoconferencing, web-based patient portals, mobile applications, and home-based patient monitoring systems. These technologies facilitate not only the delivery of person-centered care in remote locations but also the collection of massive amounts of provider- and patient-generated health related data. It is essential to integrate the various types of telehealth data with other health information, for example within electronic health records, in order to create an accurate and rich longitudinal view of an individual’s health status.

The current healthcare environment presents challenges that hinder integration and exchange of telehealth data across settings. Our understanding of telehealth nursing practice remains limited, and there is little documented evidence describing what telehealth nursing practice consists of and how much those nursing activities cost. As the field of telehealth nursing continues to grow and mature, additional efforts are required to define and quantify the types of nursing activities that constitute telehealth nursing in order to ensure the delivery of cost-effective person-centered care. This makes the adoption of standardized terminologies that supports coherent and consistent communication and documentation across settings and specialties a priority.

The purpose of this presentation is to examine terminology requirements (e.g., content coverage, interoperability) of telehealth nursing as presented in published literature, and discuss the extent to which existing nursing and multi-disciplinary terminologies meet those requirements. This presentation will focus specifically on the utility in telehealth nursing of the International Classification for Nursing Practice (ICNP) and the Systematized Nomenclature of Medicine – Clinical Terms (SNOMED CT).

Keywords: telehealth, nursing, terminology, ICNP, SNOMED-CT
With increasing concerns about standards of care and different kinds of abuse that can occur in care settings, more attention is being given to the use technologies to monitor the well-being of care recipients. Depending on the way their usage is regulated, the different technologies (ranging from cameras to activity monitoring systems), have the potential to be intrusive and, as a consequence, to impact adversely on people's privacy. This paper takes a look at the 'privacy dilemma' and considers how technologies can be harnessed in a way that enables the issue of privacy to be balanced with the responsibility to provide care and protection.

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Interoperability in the Healthcare Domain in context of the European Digital Single Market Strategy
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The European Commission has set up the priority: “Digital Single Market” addressing the many barriers that hinder European citizens fully benefiting from digital tools and access to goods and services on a European scale. These barriers do not only limit availability of digital services for citizens but also puts up barriers for market opportunities and innovations for European SMEs. In the domain of health care this is even more complicated due to the different health systems and the high demand in respect to security and privacy in this domain. The topic of interoperability has been addressed for decades in health IT on various levels and in various contexts. Due to the large number of potential standards, the situation is not only unclear, but also gives rise to disparities. The global initiative “Integrating the Healthcare Enterprise (IHE)” is doing valuable work in this area through the definition of profiles. The EU project epSOS has released an open source reference implementation for National Contact Points (NCPs). After the closure of epSOS, work is continued in the openNCP community. In the US the project CONNECT, an open source software and community, provides software for secure health information exchange. The purpose of the Trillium Bridge project is to provide interoperability between EU and US patient records. Another candidate for health data interoperability is openEHR, which has an increasing number of adopters and contributors on a global scale. It is evident that there is no one-size-fits-all solution.

In this paper a division of the health landscape in three domains is proposed: a) National Infrastructures; b) Professional Health IT and c) Consumer Health IT. This division serves as a practical means to arrange the field of health IT into more homogeneous manageable domains. For each domain a short characterization is given as well as some practical examples and implementations.

Keywords: digital single market, standards, health-IT

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Secure Group Key Management Protocol in an Open Healthcare Environment
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Open healthcare environment is an electronic domain in which healthcare entities need to interact with each other to share files and send instant messages to any peer who is a member of an appropriate group or role but do not necessarily have complete knowledge of each other. Introduction of Healthcare is increasingly becoming a distributed service involving stakeholders and resources to members who may be physically far from each other. However in Open Healthcare Environment (OHE) strangers may need to join a group collaboration where the entities are diverse and autonomous. It is vital that OHE provides secure data sharing, access to data (or other resources) and the transmission of data. It required efficient delivery of data from one or more sender(s) to a group of receivers. Since sensitive information in the OHE will be distributed it requires provisions for secure data transmission and membership management. This paper propose the Group Key Management Protocol in a multicast group communication that will provides an efficient, best-effort data delivery and also control over who can participate in a OHE group.

Keywords: OHE, multicast, group-key management, communication

Constrained Data Transmission with Critical Services in Healthcare (Poster)
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Transmission of constrained data is a major issue in industrial systems. Today, we find more and more sensitive data in circulation. Regarding the transmission channel, questions of security, confidentiality, but also end-to-end integrity and traceability are hot research topics.
It is of course a major concern in healthcare, especially in telemedicine where telecommunications are used to enable tele-expertise or tele-monitoring services.
This is why constrained data can only be correctly handled by critical services.
With the Internet of Things, the world is becoming a connected place, which is why it is important as of now to understand and anticipate the risks that come along with this transformation.

Keywords: quality-of-service, end-to-end, healthcare, constrained data, critical service.
Session 1

Distance Education as a Training Tool for Health Professionals: Systematic Review and Meta-Analysis of Randomized Trials
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Background: Because of the difficulties that remote healthcare professionals face in order to remain current in their training, it can be challenging for managers to create effective strategies to offset the high costs and provide easy access to specialized services. In this context, distance education seems to be a viable option for these professionals; however, the degree of knowledge that this system provides is not yet fully clarified in the literature.

Objective: To evaluate if the level of knowledge acquired from distance education is similar to the knowledge acquired from face-to-face education for healthcare professionals.

Materials and Methods: Systematic review and meta-analysis reported in accordance with the PRISMA (Preferred Reporting Items for Systematic Review and Meta-Analyses) and registered in the Prospero (International Prospective Register of Systematic Reviews) database (CRD42014015106). Searched databases: PubMed, Embase, Web of Science, Lilacs, Cochrane Central Register of Controlled Trials and BDENF. Eligibility criteria: (1) randomized controlled trials (RCTs); (2) health professionals; (3) comparison of face-to-face and distance education. The assessment of titles and abstracts, full texts, risk of bias and data extraction was performed by two revisers. Meta-analysis was conducted using the software Review Manager.

Results: Of the 959 citations retrieved, 12 RCTs were included. Most studies demonstrated high risk of bias or did not have clear descriptions of the evaluated items. The population was predominantly composed by doctors and nurses; training time range varied from 1.5 hours to 56 days. We compared the results of post-test knowledge between the control and the experimental groups. There was no statistical difference of acquired knowledge between the groups (SMD=0.23; 95\% CI 0.74 to 0.29; p <0.0001).

Conclusion: Distance education is a strategy that should be considered since there was no difference in acquired knowledge when compared to face-to-face education. It is necessary to evaluate which method of remote teaching is most effective and how all healthcare professionals can benefit from this system.

Keywords: distance educations, health professionals, knowledge
New Master’s Program in Medical Informatics, eHealth and Telemedicine at the European Campus of Deggendorf Institute of Technology in Germany
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Healthcare is one of the largest industries worldwide. Healthcare and all involved processes are in a transformation process to digitization. Digitization in healthcare varies widely over countries. Further development of that field will require sufficient workforce, which can be created by educational programs giving graduates necessary knowledge and skills to foster application of Information and Communication Technologies (ICT) in healthcare and medicine. International case studies and best practices in different domains of Healthcare ICT train the students to lead and manage the digital transformation in healthcare. Deggendorf Institute of Technology (DIT; German: Technische Hochschule Deggendorf, THD) is a university of applied science located in Eastern Bavaria, Germany. The university has for a number of years featured a 210 ECTS bachelor program “Informatik in der Gesundheitswirtschaft” (Informatics in Healthcare Management), with German as a language of tuition. In the year of 2015 a new international European Campus was established in Pfarrkirchen, Bavaria, featuring among others a new master’s program in medical informatics taught in English (MMI – Master’s in Medical Informatics). The program will run for three semesters to a total of 90 ECTS. It includes the following study courses: Introduction to Medical Informatics with Case Study; International Healthcare Management; International Healthcare Law; eHealth and Telemedicine with Case Study; Standards, Terminology and Classifications in Medicine with Case study; Evidence Based Medicine with Case Study; Medical Documentation Systems with Case Study in Hospital Information Systems; eHealth Application Systems with Case Study; Collaborative Systems in Medicine with Case Study International Project Management; Health Economics and Health Statistics; Data Security and Data Protection with Case Study; as well as Intercultural and Interdisciplinary Communication and other general skills. The students are also expected to elaborate and present a master’s thesis in the last, third semester. The MMI program launched in October 2015, and is expected to become an important platform for international Healthcare ICT education in Europe.

Keywords: medical informatics, education, telemedicine, eHealth
The course aimed to promote the updating of knowledge regarding interactive educational technologies, and the use of information and communication technologies applied to the teaching-learning and tele-assistance process in dentistry. The target audience of the course were the professors of dental schools interested in creating Teledentistry and Telehealth Centers, integrating the network and starting expanding the Brazilian Teledentistry network applied to teleducation and teleassistance.

The total course was 48 hours, divided into an introductory and then three thematic modules lasting 12 hours each. The modules were: 1. Ambiance Moodle; 2. Guidelines for the Implementation of the Teledentistry Center; 3. Teleconsulting and Second Opinion Formative; 4. Open access to educational and learning objects. Two moments were performed where the participants were face to face at the course, i.e. the first at the beginning for the presentation of the course, its pedagogical objectives, working methodology and assessment, lasting four hours. Additional four hours were given to the three international participants. The second time was at the lasting eight hours, when they presented the work of completing the course in the form of implementing projects of Teledentistry and Telehealth Centers at their Schools of Dentistry. The course had participants from 32 universities all over the country, one from Colombia and two from México. It was supported by the Center of Teledentistry and Telehealth Project / FOUSP with PAHO / Ministry of Health and the Brazilian Association of Dental Education (ABENO).

The course includes a series of initiatives aimed at expansion and consolidation of the National Network Teledentistry.

Keywords: Teledentistry; telehealth; e-learning; dental education

**Tele-Education as a Support Tool in Combating Abuse of Psychoactive Drugs: A Literature Review (Poster)**

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Since the emergence of the internet, online information flow has increased considerably around the world. Concurrent with the increased use of social networking over the internet, the number of people using psychoactive drugs has also increased throughout society. In view of these facts, this study aimed to evaluate the use of tele-education as a support tool to combat the use of psychoactive drugs.

This is a descriptive literature survey, in which it was decided to search for articles in national and international journals from 2000 to 2014, available in the PubMed database, using the following MESH terms: “Telehealth”; “Drug addiction”; “Social networks””. All articles were selected involving drug users and data collection through social networks over the internet or by phone. Eight articles were found; of which six fit the criteria.
The results showed that the first publications on the subject were in the United States in 2006. None of the articles used data collection based on social networks over the internet, such as Facebook. Regarding the type of drug, three articles were about alcohol abuse, two about tobacco use and one about opioid use. In five articles, data collection was done by phone, and only one did data collection via internet (e-mail). In the studies analysed, intervention by phone achieved improved treatment for most patients with alcohol dependence. Only one of the articles showed no specific positive effect identified from intervention via social networks. In articles on tobacco use, intervention was successful for a 24-week period on average. Meanwhile, intervention with opioid users showed positive results when followed by medication. Our findings suggest that tele-education can be a powerful mechanism to support reduction or cessation of use of psychoactive drugs, especially if used in conjunction with conventional therapy. Since the internet has become the biggest vehicle available for information dissemination, this favours online social networks becoming established a powerful means of dissemination, and being used as mechanisms for tele-education in health.

Keywords: telemedicine, tele-education, psychoactive drugs, social

Yang Analysis Applicability in Bioethics Learning on Electronic Forums (Poster)
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In the field of Education electronic means are increasingly present, with all its potentialities. Teaching through technological means is a reality offered internationally and in every educational field. These new means of the learning process in the web offer teaching strategies centered on the student. Simultaneously and in parallel, due to several factors, a final result appeared: the development of a new science, Bioethics.

The learning process in Bioethics identifies itself with the acquisition of competencies which goes beyond the knowledge of the content, the theoretical knowledge. Includes cognitive abilities of reflection and insight, judgement and decision, which lead to the knowledge of how to present oneself, which posture and attitude is more adequate. Therefore the elements of the learning process identify themselves not only with acquired knowledge of the contents but also with the abilities which determine the operative capacity of the student in the sphere of Bioethics. Specifically it becomes necessary to develop evaluation methodologies suitable to the digital technologies and to the objective of the teaching-learning process in this sphere of knowledge. This study proposes de Yang qualitative analysis of content (2008) as a methodology to identify the competences specific to the learning of Bioethics in answers given by the students in electronic forums. The analysis methodology contemplates cognitive learning indicators acquired through the electronic forums, which include content competences and cognitive abilities. The Yang qualitative analysis of content was efficient to evaluate the learning in the sphere of Bioethics, indicating the capacities and depth of personal reflection; it was also adequate to evaluate the registry of cognitive abilities which correspond to the learning of Bioethics, as well as a valuable tool to elaborate questions to the forums in the direction of the sought competences.
Using Online Social Networks as a Support Tool to Reduce Psychoactive Drug Abuse (Poster)
D. J. Barbos, N. C. P. Rodrigues, L. T. Cavalini
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The number of people using the Internet around the world is increasing, especially online social networks where interpersonal relationships previously requiring personal contact can now occur in the virtual environment. The number of users of psychoactive drugs is also increasing, in particular alcohol and crack.

In Brazil, users of psychoactive drugs can receive free healthcare services at the Psychosocial Care Centers for Alcohol and Drugs (CAPS-ad) [Centros de Atenção Psicossocial Álcool e Drogas] of Brazil’s Unified Health System (SUS) [Sistema Único de Saúde]. However, many psychoactive drug users do not know about this institution and the types of treatment it offers.

The objectives of this study were: to create a page called “Getting Free from Drugs” (FLD) [Ficar Livre das Drogas] on an online social network where users of psychoactive drugs can sign up for treatment, and to evaluate the efficiency of drug users signing up via online social networks. This is a qualitative and descriptive study approved by the Research Ethics Committee, where the sample consisted of psychoactive drug users in the city of Rio de Janeiro, having Internet access, and voluntarily seeking help by accessing the FLD page.

The setting for the study was a group created on Facebook. Data was collected via an online form on the page. From July to September 2015, there were 25 visits to the page, of which 16 visited the CAPS-ad to initiate treatment after receiving information on this page. The most visits occurred in the evening and in August 2015. Of the 25 group members, 19 were females, 3 males and 3 not reporting. Three types of drugs were predominant: alcohol, tobacco and unspecified, with the highest incidence being exclusive alcohol use. Four subjects had used a previous treatment to the CAPS-ad and 12 had never been treated before.

Our findings suggest that online social networks may serve as a support tool in tele-education for combating psychoactive drug abuse and can attract patients, since 64% of FLD Facebook page visitors visited the CAPS-ad and began treatment for drug dependency, helping to reduce harm and ensure the well-being of the individual.

Keywords: telemedicine, tele-education, psychoactive drugs, social

Synchronous Seminars Telephysiotherapy Rio de Janeiro: Education Instrument for Physiotherapists (Poster)
The telehealth is a management tool and strategy on health and education. This mode enables the reduction in area of professional isolation by teleconference and videoconferencing. The use of technology enhances the creation of new knowledge and opening strategic, regional and social development in various educational fields. The use of information and communication technology amplifies the learning spaces and educational transformation. The telehealth comes as a device for mediation and transformation of these work processes in the health field, allowing results and multidisciplinary support. Physical therapy is a science that seeks to develop new learning tools and the emergence of these strategic lifelong learning.

Objective: To analyse the use of the synchronous Telephysiotherapy seminars by users of the Center for Telehealth-Rio de Janeiro.

Methodology: A retrospective study to assess the inclusion of physiotherapy practices of health by the Center for Telehealth Rio de Janeiro-based programs in the Pedro Ernesto University Hospital, State University of Rio de Janeiro. Records coming from telehealth database of Rio de Janeiro Nucleus for the years 2010 to 2014. The data collected resulted in analyses that were divided into workshop mode, number of participants and the access points for this were used.

Results: The Telephysiotherapy presented of 1551 participants of web conferences over the years, being held 40 seminars in real time (synchronous) and 593 access points.

Conclusion: The analysis presented show the impact of using the Telephysiotherapy by users of telehealth Rio de Janeiro, featuring a continuous learning unit for students and physiotherapy professionals.

Keywords: synchronous seminars, telephysiotherapy, education
Brazil, UNA-SUS works with the support of the Federal University of this state (UFMA), and together they are always looking for improvements in its educational and learning processes. This paper aims to present the electronic game Quiz UNA-SUS, developed by UNA-SUS/UFMA to engage and encourage students to learn more and self-assess their progress during the courses. The game emerged from an effort to make the learning process more attractive to adult learners. To enable its use a support structure has been designed with four systems, namely: Access Portal, SigU Game Center and Quiz Editor. The mechanics of Quiz UNA-SUS comprises a series of multiple-choice questions with five different levels of difficulty. The game focuses on strategies such as time limit to answer the questions, score and ranking to stimulate competition and to keep students' attention. Engine Unity 3D, used for game programming, was chosen to develop Quiz UNA-SUS. The game was exported to the model Web player, which runs on any current web browser by simply installing the plugin tool, thereby decreasing any barrier of access to the game.

Keywords: gamification, health education, e-Learning, quiz

APS GAME: Educational Game for Simulation of Clinical Cases Applied to Continuing Health Education in Brazil (Poster)
UNA-SUS/UFMA, São Luís, Maranhão, Brazil

Primary Health Care (PHC) is the gateway to Brazilian National Health System (SUS) and the first element of a continuing process that prioritizes universal access to comprehensive and coordinated care. For the development and improvement of health care, Brazilian government invested in the Open University of SUS (UNA-SUS), in order to provide Continuing Education in Health as a way to enhance health professionals’ performance, enabling them to intervene effectively in reality. UNA-SUS uses e-Learning to provide specializations, training and qualifications to these professionals. Within this context, Information and Communication Technology (ICT) becomes essential for the development of this modality. Digital educational games excel among these technologies, because they work as a facilitator of learning process. Based on this idea, Brazilian universities UFMA and UFCSPA established a partnership and created the APS GAME as a strategy to provide knowledge through real situations experienced by health professionals and caregivers in PHC. The content of this game is based on Ministry of Health protocols and is aimed at academics and physicians working in Family Health Strategy. This theoretical preparation is a key factor to ensure the success of health assistance, however simple it may be, because when it comes to health every detail can be decisive for patients' welfare.

The objective of this paper is to present the APS GAME, an educational game proposed to consolidate theoretical concepts by simulating clinical cases, enabling students to perform health assistance to a virtual patient, in a playful way. The game is divided into three investigative steps - anamnesis, physical examination and complementary examination - and a solution step, in which the case is settled. When the player finishes all of them, comments are presented focusing
Assessment of the Module “Communicable Diseases” of an E-Learning Course Using SIGU Questionnaire (Poster)

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Communicable diseases are still a global public health issue in the 21st century. According to the Ministry of Health, in Brazil, the poor living conditions are responsible for numerous cases of these diseases. To detect and treat these types of pathology is necessary that, in addition to public surveillance and policy actions, the country also disposes of a group of qualified and updated health professionals. For this purpose, the Brazilian government created the Open University of Brazilian National Health System (UNA-SUS), which offers courses of specialization, improvement, extension and training for health professionals through e-Learning. To ensure the continuous enhancement of this proposal, some actions are required to assess the effectiveness of the courses offered in e-Learning in order to improve teaching methods and improve the Brazilian Health System reality.

This study aims to assess the didactic and pedagogical aspects of the content and activities developed in courses offered by UNA-SUS from the perspective of students and tutors involved. The analysed sample engaged 409 students (Brazilian Health System professionals) who completed the communicable disease module and responded to evaluative questions through the SigU Questionnaire – an assisting system for the processing and interpretation of data collected for the assessment of e-Learning courses modules offered by UNA-SUS/UFMA. For statistical analysis, the assessment variables will be dichotomized into Positive Outcome (excellent and good) and the Negative Outcome (bad and insufficient). Data were analysed using SPSS statistical software (version 18) and the significance level was 5% (p <0.05).

After data analysis, it was observed that 99% of students evaluated the module, in general terms, as a positive outcome. The results represent a positive feedback for UNA-SUS, contributing to the monitoring and improvement of distance education courses offered by the institution and the improvement of public health offered in Brazil.

Keywords: E-learning, communicable diseases, health education

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Latin American Journal of Telehealth: Challenges to Creating and Maintaining a Regular Telehealth Journal (Poster)
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Introduction: The Latin American Journal of Telehealth is a publication of Medical School of Federal University of Minas Gerais, Belo Horizonte City Department of Health and Laboratory of Excellence and Innovation in Telehealth. The goal of this partnership is to publish technical and scientific papers on telehealth by authors from different countries especially but not exclusively Latin America.

Methodology: The journal publishes the results of original articles, reviews, short communications and case reports of successful experiences in telehealth, telemedicine and e-learning. The Journal accepts submission of articles in Portuguese, Spanish and English and it is published on a quarterly basis. Each issue has about 5-6 complete articles, one short communication and one report. The editorial board is composed by experts in telehealth from many Latin American and Europe countries. The platform used is the OJS – Open Journal Systems, open source software for management and publication of scientific journals on the web. All articles published undergo a review process by specialist (peer review). Each article submitted for appreciation is sent to editors and then sent to two experts from different institutions. The journal has funding from the Belo Horizonte City Department of Health.

Results: The first publication occurred in 2009 and until now the journal published seven editions, one of them a special edition for the VII Brazilian Congress on Telehealth and Telemedicine. So far, there were 59 articles from 23 different countries most of them from Brazil (33.8%) followed by Spain (11.5%), Ecuador (6.7%), Mexico, Colombia and El Salvador (5.7% each one), France, Peru and Panama (3.3%) and others countries (23.7%).

Discussion and conclusion: After six years of structuring and consolidating, the journal became an important tool for exchanging experiences and for disseminating knowledge on telehealth. However, critical success factors such as access and visibility need to be improved.

Keywords: telemedicine, telehealth, publication, article, midia

Session 2

Effectiveness of Facilitator-Led E-Learning Strategies for Building Capacity of 148 Program Managers in India
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Classroom-based educational training is insufficient to deal with real-life workplace challenges. In several low and middle income countries (LMIC) such as India, the public health sector needs systematic capacity building to improve planning, management and monitoring of health services. Face-to-face teaching programmes for building these competencies need to operate at a very large scale and are a challenge in many LMICs. In these situations, e-learning has shown great potential, but widespread adoption has been slow. In collaboration with the government of Karnataka (in southern India), we designed and implemented a course to improve public health management capacity through work-based learning for rural health service managers in the state. In this abstract, we describe the role of facilitator-led e-learning strategies in enhancing the effectiveness of such a work-based learning programme and discuss its implications for the application of e-learning based strategies for improving human resources for health in LMICs. We invited 148 health managers across 30 districts of Karnataka to participate in this programme. In this work, we describe the structure, content of this e-learning programme and discuss the challenges faced during its design, development and implementation. We used a learning management system (LMS) platform based on Moodle. Using LMS data from Moodle, we assessed correlations between facilitation, student engagement and student performance. The dropout rate in e-learning training programs is comparatively high to Face-to-Face courses, especially if there are a large number of students and it has been reported between 20% and 80%. In our e-learning training program, 148 managers participated into the course and 87% of them completed the course. The students had an overall course score above 50%. Only 13% of the students dropped out during our e-learning course. This work lists various factors that affect the dropout of the students in an e-learning environment. We also evaluate the effectiveness of using e-learning in work based learning and analyse the student’s motivation and performance based on various factors (digital literacy, age group, connectivity, location). This presentation outlines the key issues for developing successful models for facilitator lead e-learning programmes for public health education.

Keywords: e-learning, student’s performance, facilitator-led e-learning, public health

Are Clinical Physiotherapy Students in Nigeria Aware and Knowledgeable about Tele-Physiotherapy?

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Background: The integration of tele-health into physiotherapy practice in Nigeria appears low. Its uptake can be enhanced when potential graduate physiotherapists are knowledgeable and have positive perception towards its utilization. Aim: This study (a pilot study) was designed to investigate clinical physiotherapy students’ awareness, knowledge and perception of tele-physiotherapy.
Materials and Methods: The study was a cross-sectional survey. It was a population study. Participants were selected from the oldest and best-rated training institution in Nigeria (University of Ibadan) through a sampling technique of convenience. Data on awareness, knowledge and perception of students about tele-physiotherapy was collected using an existing structured, self-administered validated questionnaire. Data were analysed using descriptive statistics of frequency, means, percentages, pie charts, bar charts, and Chi-square test, with level of significance set at \( \alpha = 0.05 \).

Results: Participants (37 females; 24 males) were aged 21.36 ±1.54 years. They constituted 26, 20 and 15 students at the 3, 4 and 5 level of study. Participants constituted 90% of the total student population. Thirty-nine (64%) participants (24 females; 15 males) were aware of the term tele-physiotherapy and their source of information was majorly (56.4%) from web journals. More than half of the participants (23 females; 11 males) reported negative perception of tele-physiotherapy. Twenty-four (39.3%) participants (11 females; 13 males) reported good knowledge of tele-physiotherapy while fifteen (24.6%) participants (10 females; 5 males) reported poor knowledge of tele-physiotherapy. Male and female students were comparable in their awareness (p=0.53), perception (p=0.37) and knowledge (p=0.33) of tele-physiotherapy. Level of study was not associated with participants’ awareness (p=0.78), perception (p=0.29) and knowledge (p=0.43) of tele-physiotherapy. There was a significant association between participants’ perception and awareness (p=0.02) and no significant association exists between perception and knowledge (p=0.18) of tele-physiotherapy.

Conclusion: Clinical physiotherapy students from University of Ibadan, Nigeria are fairly knowledgeable about tele-physiotherapy and more than half of them appear to have negative perception of the integration of information and communication technology into the Nigerian physiotherapy clinical practice. A qualitative study will be necessary to further explore students’ perception and knowledge of tele-physiotherapy. Courses on tele-physiotherapy should be included in the curriculum of undergraduate physiotherapy training programme in Nigeria in order to further improve their knowledge and enhance the integration of tele-physiotherapy in the Nigerian clinical practice.

New Joint Master’s Program in Biomedical Engineering (with Topics on Health ICT) in Armenia Developed through TEMPUS Project BME-ENA
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Biomedical Engineering (BME) is a dynamic specialty at the interface between medicine and technology. BME today is rapidly developing due to increasing penetration of technological processes and devices into the medical practice, education and research. Training programs in
BME are important for provision of skilled workforce able to support functioning of healthcare systems and growth of medical industry. Tempus IV funded project BME-ENA (“Biomedical Education Tempus Initiative in Eastern Neighbouring Area”) is a curriculum development project initiated and coordinated by a group of BME specialists from University of Patras, Greece, and implemented by an international consortium of 17 institutions from 7 EU countries, as well as from 4 ENA countries: Armenia, Georgia, Moldova and Ukraine. The aim of the project is development of a joint interdisciplinary master’s study program in BME in accordance with EU and international standards, to be implemented at participating universities in ENA countries. Armenia is represented by two leading universities – National Polytechnic University of Armenia (NPUA) and Russian-Armenian (Slavonic) University (RAU), and NGO working in the field of medical technologies, Armenian Association of Telemedicine (AATM). The project was started in December 2013, and is running until November 2016. The New Joint Master’s Program in BME was launched in October 2015, simultaneously at two universities. It is a 120-credit master’s program, with a number of core and elective modules offered, such as basic subjects in biological and medical sciences, engineering and computer science, Biomedical Data and Signal Processing, Biomedical Instrumentation and Sensors, Medical Imaging, Biomaterials, Information and Communication Technologies in Healthcare, Clinical Engineering, Telemedicine and Telehealth, Nanotechnologies, among others. Some subjects will be taught by the staff from EU partner countries, and select students will do some courses at European universities within mobility programs. The new program provides a platform for modernizing BME education in Armenia and bringing it in accordance with current European and international standards.

Keywords: biomedical engineering MSc Tempus BME-ENA

WhatsApp Telemedicine a Growing Field: A Literature Review
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Several spontaneous telemedicine services using WhatsApp Messenger have started in South Africa. Issues regarding confidentiality, data security during transmission, data storage, record keeping and reporting have arisen. The aim of this study was to review the literature on the use of WhatsApp for telemedicine to determine its range of use and if and how these issues have been addressed.

Methods: Pubmed, Scopus, Science Direct and IEE Expert databases were searched using the search term WhatsApp and Google Scholar using the terms WhatsApp Telemedicine and WhatsApp mHealth.

Results: Thirty-two papers covering 17 disciplines were relevant with the most papers, 12 from India. Seventeen papers reported the use of WhatsApp Groups within departments, 14 of which were surgery related disciplines. Groups were reported from three developed nations, the UK,
Spain and Italy and four developing nations with six reports from India. Groups were seen as beneficial as they improved communication and advice given on patient management and served as a form of trainee education. Confidentiality was mentioned in five papers, gaining consent for sharing of patient information in two and no paper mentioned deletion of patient information from users’ smartphones. Data security was partially addressed through password protection of smartphones in three papers. One paper reported that the saved messages constituted a form of record keeping. Telemedicine services outside of departmental groups were reported in seven papers and covered emergency triage in maxillofacial, plastic, neuro and general surgery, and cardiology and telestroke.

Conclusions: WhatsApp is seen to be a simple, cheap and effective means of communication within the clinical health sector and its use will grow. Users have paid little attention to confidentiality, consent and data security. Guidelines for using WhatsApp for telemedicine are required including downloading. WhatsApp messages to computer for integration with electronic medical records.

Keywords: WhatsApp, telemedicine, mHealth, literature review
Med-e-Tel 2016

Session: Home Healthcare & Remote Patient Monitoring

Young Population in Megacity; Self-Monitoring of Health Risks and Wellness Education
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Introduction: Living in megacities creates additional load that may be considered as separate and independent risk factors for dis-adaptation. We also know that many diseases are precipitously become “younger”. In the Russian space medicine, alongside the clinical diagnostic procedures at the selection and medical monitoring of cosmonauts, health is considered as the ability to adapt. This concept is successfully used in different fields of Earth medicine.

Materials and methods: Within the project "Mars-500", that took place in 2010-2011 in IBMP, a number of satellite studies have been conducted. Within 1,5 year period 64 healthy individuals aged 19-49 years has been surveyed on a monthly basis, 776 investigations with "Ecosan- 2007" device. Based on the results of this research it has developed a new telemedicine system "Ecosan-TM2", which passed approbation in the survey of some groups in Moscow and one of the small cities of Russia (No. subjects = 215 persons, age 17-80 years).

The level of adaptation can be assessed using a simple non-invasive method - the heart rate variability analysis. In our studies, this method has been complemented by a questionnaire measuring of blood pressure, height and weight.

Results: The results of our study revealed some alarming trends.

- In Moscow, more than half of persons under 20 years old were in states, associated with stress of adaptation mechanisms. The results of questioning revealed that young people combine their learning with work in the evening and night time, constantly experiencing overloads, irregular eating, etc.
- Values of main functional parameters in examined groups are the same, despite the more young age of Emergency staff in Moscow (28-40 years). Main risk factors identified in this group were physical inactivity, diet, stress and unhealthy habits.

Conclusion: Each person must find its way to health. Unfortunately, most people don’t reflect about it, because they don’t have information about their health and how they can manage it. Telemedicine technologies can essentially expand possibilities of wellness education in different populations, especially of young people, providing self-monitoring, access to information and feedback.

Keywords: wellness, life style, education, health

Reducing Hospitalisation Providing Telemedicine Support to CHF Patients at Home in Slovenia
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Establishing a reimbursement system for telemedicine services is still a challenge to most of the European healthcare systems. Hospital admissions and number of hospital days are often considered as direct indicators that could demonstrate economic benefits of telemedicine services.

A telemedicine support service to patients with Congestive Heart Failure (CHF) at home was set up within the United4Health European project (www.united4health.eu) in Slovenia. The service in Slovenia is provided by a regional hospital of Slovenj Gradec since April 2014 within Carinthia region. In the observed two-year period 134 CHF patients (intervention group) were using the TM support service in average 402 days (16 patients less than 280 days). When needed the patients receive an advice or a change in therapy based on daily measurements of blood pressure, heart rate, weight and oxygenation. The comparator group was the observed group itself, but in the period of one year prior to inclusion into the service. Beside the TM the patients in both groups received equal standardised diabetic treatment in the observed period.

Number of admissions (readmissions) to the hospital related to decompensated heart failure and duration of hospitalisation (hospital days) was the primary clinical outcome observed. In the period of two years (one year prior to enrolment into TM support service and one year of using TM service) the cohort was hospitalised for 390.5 days with CHF as the primary diagnose, of which 316.7 were in the control period and only 73.8 days in the intervention period. Number of admissions was 46 in the control and 13 in the intervention period.

The results demonstrate a substantial reduction in number of admissions (readmissions) to the hospital (from 0.34 per year per patient to 0.1 (p<0.001)) and a reduction in duration of hospitalisation for the patients in the intervention period (from 2.36 days/year/patient to 0.55 days (p<0.001)). Results of the other 3 TM centres participating in the United4Health project will be published elsewhere.

Keywords: CHF, home telemedicine, hospitalisation

The Design and Implementation of an Online Home Exercise Program That Fits the Needs of Patients with Mild Cognitive Impairments
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Objective: An important wish of most elderly nowadays is to live independently in their home for as long as possible. New technologies can support this and in recent years, ICT supported services for older adults have become more widely available. However, they often do not meet the unique needs of people with cognitive impairments who live alone. Further improvements in meeting the needs of people with mild cognitive impairments (MCI) who live alone may improve their quality of life and reduce overall health care costs.

Methods: As a starting point for the development, an existing home-based exercise service was used that is already in practice for pre-frail older adults. In order to come to a set of (non) functional and technical requirements that align with the needs of patients with MCI, several steps have been taken. These steps are in line with typical user-centered design approaches for (eHealth) technology, which is characterized by involving all the end-users in the design process to improve adoption of these
users and the chance of successful implementation. For this, we follow the PACT (People, Activities, Context, Technology) framework which puts the user at the center of the design process. Requirements for the service were established during focus groups with patients with MCI and their (in)formal carers. In addition, (health) carers were asked how this can best be implemented in the care of patients with MCI.

Results: Two workshops were held with patients and their (in)formal carers (n=48). Requirements have been elicited from these workshops and a home-based exercise program has been developed in line with these requirements. The program will be implemented in the care setting where patients can start using the service under supervision and continue using it in their home environment when they feel familiar enough with the program. In the upcoming months, it will be tested whether the program fits the needs of the users and it may be updated according to new requirements.

Conclusion: In January, the program will be implemented. In April, first conclusions can be presented about the home-based exercise program and its implementation.

Keywords: eHealth, user centered design, MCI

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Telemonitoring Home Program in Patients with Cystic Fibrosis: Our 15 Years’ Experience

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The natural history of Cystic Fibrosis (CF) is characterized by recurrent episodes of respiratory infection that causes a progressive pulmonary damage, with decay of long-term lung function leading to death. In CF patients, spirometry shows a 2% reduction every year of Forced Expiratory Volume in the first second (FEV1) over time. In case of pulmonary infection, an early antibiotic treatment helps to prevent more serious complications, limiting consequently the long-term pulmonary damage. Since 2001, in CF Centre of the Pediatric Hospital Bambino Gesù in Rome, it was tested the possibility of using telemedicine in order to facilitate the home follow-up of patients with CF. Fev1 was monitored at home, in the aim to early recognize the relapses of pulmonary infections. The study has involved 55 patients (35 f, 20 m) affected by CF, followed at our Unit with THC in addition to the usual therapeutic protocol, for a total period of 15 years.

The balance of enrolment showed a drop-out of 44.23%, whose main cause was poor adherence (60.87%). We used various and different equipment in this period, also following the progress of technology in this field. The trend of both quantitative and qualitative parameters of our work has been positive for all the equipment.

The data are encouraging with regard to the possible role of Telemedicine in the organization of homecare of chronic diseases. In the current state, however, reliable data on the long-term direct effectiveness of the use of Telehomecare in CF are lacking. The major benefits of using telemedicine would seem to be indirect effects as a stronger and better doctor-patient relationship and an increase in the quality of life for the patient, which could ultimately contribute to an increase in life expectancy.

Keywords: telemedicine, telehomecare, cystic fibrosis
A Diabetic Patients Remote Monitoring System in a Rural Community of Brazil: A Report of the Technological Implementation

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Introduction: Diabetes is one of the main causes of death nowadays. Considering this negative statistic, the Centro de Saude da Reserva Hospital - CSR, located in the city of Sao Lourenco do Sul, RS, Brazil, is implementing a new model of health assistance among the inhabitants. A TeleDiabetes monitoring method is part of this initiative.

Objectives: 1) To implement the technical infrastructure of the TeleDiabetes network in the CSR, 2) To ensure that health care professionals of the Institution can analyze the clinical data of patients in the CSR server database.

Method: The method includes the acquisition and implementation of a software license for the management of diabetic patients, developed by Mediinspect©, from the Czech Republic. The project offers immediate analysis of patients’ glucose level, through homecare TeleDiabetes strategy. For this study, 10 diabetic patients, living in the rural region, were selected after some technical evaluation, such as: 1) Internet coverage, 2) Basic skills for managing new technologies. Each patient received 2 devices: A digital glucose meter with strips and lancets, and a smartphone. Twice a day, the patient sends the glucose data to the TeleDiabetes Center in the CSR, where a nurse is receiving and analyzing, in real time, the patients’ data. The CSR TeleDiabetes Center is equipped with the following items: Server, Desktop, 5 MB Internet Connection, a 60” LCD TV, Printer.

Results: The clinical data of the diabetic patients, as well as comorbidities, are available to the nursing and medical staff of the CSR.

Discussion: Telemedicine strategies can highly contribute to the achievement of remote specialized medical advice in order to improve patients’ care. The contribution of qualified multicentre professionals, including advice from IT professionals towards the implementation of Telemedicine projects, can play a major role for the success of the rural eHealth project.

Conclusion: This innovative project is a starting point with a premise of a new concept of health prevention and assistance, which includes TeleDiabetes as a key component of some new eHealth strategies.

Keywords: eHealth, rural telemedicine, diabetes, telediabetes

Telemedical Monitoring of People with Sleep Apnea by High Signal Resolution Pulse Wave Method

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The paper presents High Signal Resolution Pulse Wave (HSR–PW) method, an innovative diagnostic tool used for telemonitoring of people with sleep apnea. Sleep apnea is a sleep disorder characterized by pauses in breathing during sleep. Each pause can last for several seconds to several minutes and may occur, by definition, at least 5 times in an hour. Sleep apnea is often diagnosed with an overnight sleep test called a polysomnogram. HSR–PW method 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 individual peaks, computer calculates values of some parameters defining the state of the cardiovascular system. The pulse waves were recorded using a standard wireless electronic pulsoximeter NONIN Wrist Ox2, which allows measurement of oxygen saturation and pulse rate. Measurements were performed on the index finger of the left hand. The input data, which come from standard pulse oximeter, were collected from ten patients staying at hospital through a system of telemedicine network MONTE. They were monitored during a sleep. In recorded pulse waves the number of incidents related to arrhythmia, the oxygenation deteriorated and pathological changes of HSR–PW were observed. To interpret the obtained results they were compared to results obtained from standard test method which is the polysomnography.

Keywords: pulse wave, sleep apnea, polysomnogram

An Evaluation of the Use of the COPD Monitor: An Interactive Voice Response (IVR) System for the Remote Management of COPD Patients
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This presentation will presents the findings from an evaluation of an Interactive Voice Response system which uses Message Dynamics Long Term Conditions (LTC) Monitor technology known throughout this report as the Chronic Obstructive Pulmonary Disease (COPD) Monitor. The Monitor technology was implemented by the COPD team who offer an Early Discharge and Admission Avoidance Service provided by Berkshire Health care Foundation Trust (BHFT). These findings will be used to inform future COPD clinical management. The evaluation found that the COPD Monitor system was well received by both patients and healthcare professionals. It contributed to patients’ self-management, therefore improving treatment adherence, resulting in decreased visits to hospital and to the patient’s GP. The system expanded the clinical capacity of staff, by allowing them to focus on the most at risk COPD patients, helping to improve the quality of life of these patients, as well as preventing the development of complications. The use of the COPD Monitor delivered estimated savings at £ 47,177 per annum. This figure is based on the analysis of cost data from 30 patients (£ 1,572 per patient per annum). The marginal costs of the COPD Monitor once the system has been set up are estimated to be £ 780 per year (£ 26 per patient per year). The main savings were in the following areas:
  • Admission avoidance;
• Fewer patient visits to Accident and Emergency departments;
• Fewer patient visits to GP surgeries;
• Time saved on home visits by clinical staff;
• Savings on clinical staff travelling time and mileage costs.

Staff indicated that the COPD Monitor contributed to:
• Patient self-management and empowerment of their own condition, through education and better understanding of their condition;
• Reduction in the numbers of calls made to the COPD Team;
• But that the system could be misused by patients seeking social support.

Patients clearly indicated that: The COPD monitor is an appropriate method to communicate with healthcare professionals to monitor their condition. The system is easy to use, but some patients indicated that more training is needed to enhance the use of the technology to help them to improve their management of their condition.

Keywords: telehealth, long term conditions, COPD, remote management

Reducing Hb1Ac Marker by Providing Telemedicine Support to Patients with Diabetes Type 2 at Home
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Complications of type 2 diabetes (DM2) are strongly correlated with elevated glycosylated haemoglobin (HbA1c) marker. The study focuses on a potential change of HbA1c in DM 2 patients receiving telemedicine (TM) support service at home.

A TM service network to support DM2 patients was set-up in Slovenia within the United4Health European project (www.united4health.eu). The service has been provided by a regional hospital of Slovenj Gradec since April 2014. In the observed two-year period 321 DM2 patients (intervention group) used the TM service 360 days in average (17 patients less than 180 days). When needed the patients receive an advice or a change in therapy based on blood sugar measurements (one day per week whole profile). The control group (401 patients in total) was the intervention group itself (321 patients) one year prior to inclusion into the service, and 80 patients in the same period who were not supported by TM.

The primary clinical outcome observed was the level of HbA1c marker. It was measured in a clinical laboratory at the beginning of the control period (all patients), at the end of the control period (all) and at the end of the observation period (intervention group only). Beside the TM service, the patients in both groups received equal standard diabetic treatment in the observed period. In the control group the level of HbA1c marker changed from 7.8% (at the beginning) to 7.9% (at the end) in the one year control period. This change was statistically insignificant (p<0.2). In the intervention group the level of HbA1c marker was reduced from 7.9% (at the beginning) to 7.4% (at the end) during the one year of TM support. This change was statistically significant (p<0.001). We investigated further a subgroup of 140 TM supported patients having HbA1c > 8%. In this subgroup
the HbA1c changed from 9.2% (at the beginning) to 8.0% (at the end) in one year of TM support (p < 0.001).

The results in the intervention group demonstrate a substantial reduction in the HbA1c level which was attributed to the efficient TM service model. Results of the other 8 TM centres participating in the United4Health will be published elsewhere.

Keywords: diabetes mellitus, home telemedicine, HbA1c
IN LIFE is a H2020 project, targeting to offer ICT based services, with the aim to lengthen the independent living for elderly with cognitive impairments, through ICT services that support all type of needed activities. Support is also foreseen for their caregivers. Existing knowledge and tested AAL services are used, based on which IN LIFE builds its further developments.

The paper presents the methodology followed and its outcomes in order to identify the most urgent needs in autonomous living, socialisation and mobility of older adults with cognitive impairments and match the IN LIFE project proposed tools and services to them through the extraction of relevant, cost-efficient and inclusive use cases (UCs). The methodology is based on review of related project results, as well as articles and local workshops.

In detail, 14 relevant projects were reviewed focusing on people with cognitive impairments (mainly MCI people) and healthy older people, all covering people living alone. The analysis of the reported projects results that priority should be given to elderly needs for social networking and communication. In addition, 24 publications were studied, giving insight on age-related problems which influence daily difficulties and ICT interaction, with emphasis on design challenges, technologies and technical requirements. Finally, 6 local workshops were held at the pilot sites of IN LIFE, which provided users’ and experts’ feedback. An initial set of use cases descriptions was prepared by the partners that lead the development/adaptation of a specific module/system, which was used as a starting discussion point for the local project workshops. In total 47 detailed UCs were derived. The UCs are based upon the aim and objectives of IN LIFE, where innovative developments are to be carried out regarding four main categories: independent living support, travel support, socialisation and carers support. The UCs cover all types of care for the elderly, i.e. living at home, hospital, elderly home.

The final use cases reassure the initial project plans, detail the intended developments in a UCD fashion and provide a strong link to the user/carer community at the sites.
ICT solutions have proved to be very important for the independent living of elderly people with cognitive disabilities. However, a major challenge is in providing a holistic service that can address all aspects of a person’s life and the challenges posed by cognitive impairments. This paper presents a cloud platform that is being developed in the context of the IN LIFE H2020 EU project and aims at supporting the independent living of seniors with cognitive impairments through interoperable, open, personalised and seamless ICT solutions. This platform is based on the OSGi modular architecture and its main goal is twofold: on the one hand to allow service providers to easily register and integrate their products in the IN LIFE platform, and on the other hand to enable easy, transparent, personalised and contextualised access to all the supported services to the elderly cognitive impaired end-users and their care givers.

A web application has been developed to allow registration of users with different roles (i.e. service providers, elderly end-users, care givers) to the IN LIFE platform. During registration, a user profile is created and stored in the so-called user ontology. The semantic definition of user profiles for the elderly users follows the International Classification of Functioning, Disability and Health (ICF). The same web application enables also service providers to register and easily describe their products. The corresponding information is stored in a semantic manner within the so-called service ontology following the OWL-S standard. A sample OSGi application then enables the actual integration of a new service to the IN LIFE platform. Finally, when an elderly user or a care giver uses the platform, the most appropriate service (or set of services) is selected based on semantic matchmaking applied on user needs on the one hand and the specifications of the supported services on the other hand, taking also into account user’s current activity and health status.

Future work will include the analysis of statistical approaches towards implementing a hybrid matchmaker that will be based not only on semantic similarities but also on statistical data.

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Reliable Information on Accessibility-Related Standards: IN LIFE Contribution to Facilitate the Application of Standards
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All EU Member States have signed the United Nations Convention on the Rights of Persons with Disabilities (CRPD), and the EU itself concluded the CRPD on 22 January 2011 in its capacity as a regional integration organization. Several EU Directives and national laws have been formulated to implement the CRPD in 2016, to which parties to the Convention are obliged. The standards to which these laws frequently refer in fact become part of the law. Needless to say that agreements concluded by the EU are binding on its institutions and its Member States. Therefore, a sufficient knowledge about accessibility-related standards is important for organizations and individuals developing devices and pertinent software (incl. apps and web services), or rendering services to PwD. Not least in view of the fast emerging legal situation there is a great need for reliable and up-to-date information on accessibility-related standards. An analysis carried out in the EU-Project IN LIFE (INdependent LIving support Functions for the Elderly) revealed that the access to information on accessibility-related standards is not easy.
There are many compilations of information on standards all done following a certain purpose and, therefore, both overlapping and incomplete. Besides, the classifications used are not harmonized. The different degree of authoritativeness of various standardization frameworks only adds to the challenge of applying accessibility-related standards – not to mention interoperability issues of all sorts. In IN LIFE the most important compilations were merged and updated in a database under a harmonized format. Sharing the database and its underlying methodology could serve as a tool to raise awareness in the community, collect evaluations and comments from applications, and identify needs for standardization efforts. It could also contribute to a joint initiative for its sustainability by providing a useful service to the community.

Keywords: CRPD, law-relevance, standards, IN-LIFE, interoperability

Measuring the Impact of ICT for People Living with Cognitive Impairment
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Most elderly people with cognitive impairments want to live independently for as long as possible. New technologies can support living independently at home and overcome any related problems occurring on a daily basis and are related to significant activities of daily life. To understand these needs, first of all it is crucial to explore the acceptance of technical systems by these groups as users within service delivery employing an experimental protocol and as customers within the European and international market.

The IN LIFE EU Project (http://www.inlife-project.eu/) will offer interoperable services that will be integrated into an open, cloud-based, reference architecture to be tested in 6 Europe-wide pilots in Greece, Netherlands, Slovenia, Spain, Sweden, and UK, with over 1200 elderly with cognitive impairments, 600 formal and informal caregivers, and 60 other stakeholders.

An evaluation framework is developed for a long-term evaluation of using ICT solutions targeting daily activities (performing daily activities at home, travelling, cognitive exercises, communication with others, etc.); including an 8-months baseline condition (capturing their current experiences) followed by 6 months of using the services available through the IN LIFE platform.

The framework borrows aspects from traditional usability and user experience testing protocols for ICT solutions, focussing on variety in provision of services and applications integrated in one platform. However, apart from standardised user experience, Quality of Life (QoL) indicators, level of independent functioning, specific success criteria are already set for testing. Existing metrics and techniques are adapted and specified according to each pilot site’s objectives.

Finally, services’ data (logfiles) will be recorded in order to evaluate the actual tools’ usage and their correlation with subjective assessment.
A Driving Assistant to Help People with Mild Cognitive Impairment or Early Stages of Dementia
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Sudden or gradual loss of ability to drive a car - such as with sight loss and/or cognitive decline - can have significant impact on people’s wellbeing and mental health. In the INLIFE project there is a desire to provide an integrated suite of assistive technologies to particularly support people with dementia or mild cognitive impairment. This paper presents a possible wearable technology to facilitate driving and monitor decline in driving capacity. The way we perform common daily activities is influenced by our cognitive abilities. Driving is one example of significant importance since the way we drive may have a potential impact in our safety. This paper proposes a framework to monitor and track the driving efficiency of a particular user in terms of energy consumption and perceived stress as a way to assess the user’s cognitive abilities. A smartphone based personal recommender system is proposed to help the driver to drive better in high cognitive demanding situations as measured by the perceived stress by providing in advance information to help the driver better manage those situations. The perceived stress is estimated from the heart rate variability (HRV) signal from a wearable device. In the long term, the evolution in detected patterns in personal time series of perceived stress when driving in similar conditions could be used as an indicator of the severity and progress in mild cognitive impairment or early stages of dementia for particular patients.
A Pan European Benchmark on the Stage of Development of Telemedicine in EU Member Countries
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Paris, France

A short questionnaire has been sent to a panel of ISfTeH experts in each EU country, to assess their level of development of various types of telemedicine activities. Once it is fully completed, this benchmark will constitute a unique source of information on where we are in each country, what are the activities that have emerged or consolidated, what are the financing problems on each type of activities.... The presentation will provide detailed results of the benchmark.

Keywords: Europe, benchmark, telemedicine

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Teleconsultation Program for French Expatriates Living in Houston, TX
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French expatriates’ population in Houston stands above 10,000 individuals, including families. Besides, Houston is the largest hospital and medical concentration in the world. In this context, why setting up a program of teleconsultation, with physicians in France?

- Because there is a demand for such a service: medicine is a highly sensitive, culturally-influenced sector and actual access to care providers can be difficult in different ways: distances, eligibility of physicians under proprietary health insurance systems, costs of deductibles and co-payments, etc. But the major challenges remain the language barrier and the fracture represented by the loss of contact with his/her «own» French General Practitioner, Pediatrician or OBGyn;
- Because teleconsultation has come of age and now works efficiently.

Our presentation will focus on technical, ethical, deontological, legal aspects and on the issue of pharmaceutical prescriptions and procurement. An economical model will be presented and the importance of a government-sponsored personal health record is emphasized.
Improving Cross-Border European ePrescription and Patient Summary Services through e-SENS Cross-Sectorial Building Block

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The cross-border healthcare service is now largely regulated by Directive 2011/24 EU on the application of patients’ rights. ePrescription and Patient Summary services are expected to be the first cross-border healthcare services to become operational in real life by some countries, starting 2017, with the support of the Connecting Europe Facility.

The Electronic Simple European Networked Services (e-SENS) project develops infrastructure for interoperability, adaptable to various EU public service domains (including e-Justice, e-Procurement, and Business Lifecycle), using the results of previous large scale pilot projects, such as e-CODEX, SPOCS, STORK, PEPPOL and the more specific to eHealth, epSOS.

The proposed solution improves on the technical solutions supporting the data protection, privacy and security process initiated in epSOS, through the use of technologies enabling stronger identification and authentication of the patient and improving on the usability of the technical solutions.

Therefore e-SENS eHealth Domain pilot has adopted the use of cross sectorial Building Blocks - Evidence Emitter, Electronic Identification, Service Location, and Capability Lookup - and has started incorporating them under the OpenNCP reference implementation framework for a National Contact Point for eHealth (NCPeH). Participating Member States - Austria, Greece, Italy, Luxembourg, Portugal and Spain – tested the conformance of this reference implementation in by their NCPeH in IHE Connectathon (April 2015) and later in EXPANDATHON (December 2015).

E-SENS results will be handed over to the Connecting Europe Facility to increase the value of the cross-border health services offer to citizens and health professionals with fast, secure and seamless electronic access to medical information in the appropriate language. While cross sectorial Building Blocks usage reduces cost of maintenance and further developments.

e-SENS is an EU co-funded project under the ICT Policy Support Programme.

Keywords: patient-summary, ePrescription, eHealth, cross-border, sustainability

Teleconsultation in VPH: Fighting Zoonoses and Maintaining Public Health through Veterinary Care on Sao Vicente, Cape Verde

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Introduction: The lack of local veterinarians to help with the treatment and the assistance of spayed/neutered dogs and cats has made necessary to employ lay staff for the management of these patients. A vet nurse with no specific education takes care of the spayed/neutered animals with the support of protocols prepared by the staff of the chief veterinary surgeon in Italy and the staff themselves, when needed for difficult cases.

Objective: To enable lay staff to take care of spayed/neutered and microchipped dogs with remote support in three main areas: post-operative care, deworming, emergency care. This activity was part of the project "Fighting stray dogs on Sao Vicente – A pilot project for the Cape Verdean Islands" co-financed by the European Union until 31.1.16 as a way to contribute to public health. The project provides for the castration, microchipping, deworming and aftercare of 10,000 dogs with the aim to control the canine population of the island, to make them more adoptable by the local families, and to make them safer as playing companions for the children. The project opened and ended with a survey of the canine population made by experts of the University in Turin, with data collected in CV and analysed in real time in Europe.

Materials and Methods: The lay staff rely on: 1) a very limited list of drugs that allow to treat the most common conditions, such as internal/external parasite infestations (mainly round worms, tapeworms, fleas and ticks), erlichiosis, piodermitis, mycosis, mange, infections, traumas and tumors, especially Sticker's tumor; 2) a protocol for the treatment of each condition based on the principle "primum non nocere" (first, do not harm), that excludes for instance the use of steroids, cardio drugs, diuretics, antipyretics, if not explicitly recommended for the treatment of very specific conditions or after the tele-consultation; 3) teleconsultations with the chief surgeon or her staff for difficult cases. A standard form containing all the animal data and vital parameters is filled up by the lay staff and sent per email to the central clinic in Italy together with pictures if required. Two cases per week are handled in average, including eye conditions, skin problems, systemic diseases and lesions caused by traumas.

Results: Since the beginning of the project, there has been a remarkable improvement in the health conditions of the canine population of the island, together with a heightened awareness of the importance of veterinary public health and a reduction in the canine population by 25%. Due to the very low mortality rate of the operated animals and the very high recovery rate of the patients treated, most of whom arriving to the clinic in very bad conditions, the free treatment offered by the project in conjunction with the neutering/spaying is high in demand. This allows keeping alive and in good health the spayed/neutered animals as a way to control canine population of the island and to ensure a higher level of public health.

Keywords: tele-consultation, veterinarian medicine, lay staff, public health
Introduction: Twitter, a microblogging tool, is becoming increasingly popular at medical conferences, being used for both storytelling and online discussions.

Objectives: To analyse the use of the specific hashtags in the WONCA* Europe Conferences in the last 3 years and report on its potential as a networking and potential educational tool.

Methods: Through Symplur, a pioneered social media analytics tool that promotes a deep understanding of the healthcare conversations with real-time access to insights, we analysed the use of conference hashtags during the last three years - since it was registered for the very first time in the Healthcare Hashtag project.

The timeframe selected was a week before and after the congresses: #WONCA2013 (25-29 June 2013): From 18th June until 6th July. #WONCA2014 (2-5 July 2014): From 25th June until 12th July. #WONCA2015 (21-25 October): From 14th October until 1st November.

Results: In 2013 the number of impressions was higher than the others, probably because it was a World Congress (7,141,287), compared with the following years (2014: 2,719,585 and 2015: 6,694,294), but the number of the tweets was similar the first two years (2013: 2,246 and 2014: 2,218), while it increased dramatically this year when 6,228 tweets were posted, doubling both the average of tweets per hour and participant. Delegates tweeted to disseminate the knowledge and the discussions that were taking place inside the conferences. They also used the medium to raise questions to the Twitter audience and the colleagues around the world interested in the topic. In the last congress (2015), this improved through the inclusion of tweet conversations in two panels where the speakers answered the questions that were asked there directly, thus enriching the discussion. Consequently, from the Twitter interactions, the level of networking was improved, many family doctors took advantage of the medium for sharing their views during various sessions, and quite a few new users joined the network wishing to explore its possibilities.

*World Organization of National Colleges, Academies and Academic Associations of General Practitioners/Family Physicians

Keywords: social media, Twitter, hashtag, Symplur

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**CREDENTIAL - Secure Cloud Identity Wallet a Horizon2020 Project**

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With increasing mobility and Internet usage, the demand for digital services increases and has reached critical and high assurance domains like e-Government, e-Health and e-Business. Those domains have high security and privacy requirements and hence will be harnessed with various novel mechanisms for secure access. Approaches to handle the resulting multitude of
authentication and authorisation mechanisms are digital identity and access management systems (IAM). Like other technologies IAMs follow the trend of using cloud services. This allows abstracting over used resources and ubiquitous access of identity data which is stored and processed in the cloud, but also results in an additional degree of complexity for securely operating IAMs.

The goal of CREDENTIAL is to develop, test and showcase innovative cloud based services for storing, managing, and sharing digital identity information and other critical personal data. The security of these services relies on the combination of strong hardware-based multi-factor authentication with end-to-end encryption representing a significant advantage over current password-based authentication schemes. The use of sophisticated proxy cryptography schemes will enable a secure and privacy preserving information sharing network for cloud-based identity information in which even the identity provider cannot access the data in plain-text and hence protect access to identity data. We focus not only on evaluating and applying novel crypto-approaches for IAMs but also on implementing them in an easy-to-use way to motivate secure handling of identity data.

In order to also address security, privacy and trust issues related to the used cloud platforms and services we will investigate assurance and resilience approaches for enhancing underlying cloud services. To empirically evaluate our work and to produce outputs of a high technical readiness we will consider use cases from all three domains mentioned above.

SATeS to Support Telemedicine Development in Algeria
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The increasing interest in telemedicine and e-health in Algeria within the scientific and medical communities and among authorities has given rise to a governmental project of setting up a national e-health system and the recent creation of an Algerian Society of Telemedicine and e-Health (Societe Algerienne de Telemedecine et e-Sante SATeS).

SATeS positions itself as a national scientific and non-profit association with a mission to contribute to the promotion of, and development of competencies in telemedicine and e-health in Algeria within a national legal and regulatory framework. It aims to achieve these goals through the design and implementation of practical projects and the organization of local and regional seminars such the one that took place in the Algerian city of Bejaia in December 2015. As a society, it aims to assemble around these goals the medical human resources and competencies within Algeria that are motivated by this innovative medical discipline as a means to meet the increasing and specific health challenges in the vast national geographic territory. Taking into account the scientific, industrial, socioeconomic and cultural contexts of Algeria, SATeS approach also centers on promoting the adoption of telemedicine and e-health systems as a means to attain the government sought-after efficiencies in using the health infrastructure and human resource capacities that the state has devoted significant budgets to develop. One initial
focus will be put on aiding the general practitioners at the fore front of medical coverage by providing them with distance- or e- training as well as a remote medical expertise.

Keywords: Telemedicine, SATeS, Algeria

Telemedical Network with Ukraine, Belarus and Kyrgyzstan
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Audiology centers which starts the objective methods like ABR and otoacoustic emission (OAE) as a part of diagnostic procedures for comprehensive hearing evaluation, encounter some problems with the testing procedures. Specific characteristic of the electrophysiological brain stem response ABR, requires following very strict procedures. In such situation very important is the experts advice which can help in finding the right way to solve the problems. This was the main reason of introducing objective methods of hearing assessment and advanced methodology in telerehabilitation in to 3 clinics abroad – in Ukraine, Belarus and Kyrgyzstan newly added to the National Network of Audiology.

This presentation shows the results of the pilot studies of application of Vivosonic Integrity System in telediagnostic procedure of hearing problems with application of ABR and OAE and possible telerehabilitation procedures based on the objective results of hearing tests. First group of patients consists of 5 people. Additional were added gradually. The group of experts from the WHC of the Institute of Physiology and Pathology of Hearing performed ABR and OAE registration in the Clinics in Ukraine, Belarus and Kyrgyzstan, next the registration were done again but this time via Internet from the WHC in Poland. An effect of the remote mode on the quality of measurements and impact of the Internet transmission time duration on the final test results were evaluated (assessed). At the same time the rehabilitation procedures were introduce to the qualified patients.

All the results show the reliability of the objective tests performed in a distant mode. Also the rehabilitation procedures were assessed as crucial to the future results of long time rehabilitation process which will not be possible without engagement of specialist from the Institute due to the lack of qualified and experienced therapists in the clinics abroad. The results of the pilot study shows the advantages of introduced telemedical procedures. The outcomes of the tests and rehabilitation procedures are promising for future development of these 3 clinics in to fully integrated units of the National Network.

Keywords: objective methods, teleaudiology, network, telerehabilitation
Hearing Screening in Children in East Africa
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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 yr.) and Tanzania (200 children, average age 7,9 yr.). All children had videotoscopy 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, audiometry, children, videootoscopy
Tele-Operated System or Vocal Guidance for Remote-Echography through Internet on 340 Isolated Patients
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Objective: To evaluate the performance of tele-echography in isolated medical centers.
Method: Three tele-echography systems were used for deep (abdomen, pelvis, fetus organs) and peripheral (carotid arteries, leg vasculature, muscle) organs. The tele-echography was performed using (a) a robotic arm holding an echographic probe, (b) an echograph with a motorized probe, both controlled from the expert center via internet, or (c) vocal remote guidance where the operator at the patient site performed the examination while guided by an expert sonographer using Internet video conference.

Results: These methods were tested in the same medical center 60 km away from the University hospital. During an 18 month period, 340 remote echography examinations were performed (41% tele-operated, 59% vocal guidance). The average examination time (15 to 25 min) depended on the method used, anatomy of the patient, and the ability of the patient to move or perform breath holds. The tele-echographies with the motorized probe and the robotic arm provided diagnoses in 97% of cases. These remote systems provided the full control of the probe orientation necessary for obtaining correct organ views. The use of vocal guidance was sufficient for superficial vessels examination and provided diagnoses in 98% of cases.

Discussion: Both tele-operated systems provided greater control for obtaining appropriate views of the deep organs but the motorized probe (430 g; 400 cm3) was much more ergonomic than the robotic arm (3.5 kg; 40x35x40 cm). In all cases, the ability of the expert to tele-operated the echograph functions and settings made the remote echography quicker and more accurate.

Keywords: remote echography, vocal guidance, isolated

A Mobile Application for Individual Health Monitoring Within the Home Medicine
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Introduction: Recently there has been a trend to develop medical devices, adapted for use by patients at home. Many personal telemedicine systems, based on the heart rate variability analysis, and, in fact, on the stress assessment, are becoming more and more popular. This report is devoted to a simple and convenient for home use system for individual prenosological control, based on smartphone - the "Health Traffic Lights".
Materials and methods: The main method of assessing the personal functional state in the system is the HRV (heart rate variability) analysis. The signals of the heart are obtained from the finger photoplethysmogram by using the smartphone camera. The smartphone microcomputer recognizes and measures the duration of cardio intervals and calculates a number of statistical HRV indices. Our report includes the results of studies on personal monitoring with the use of this system in 5 volunteers, about 120 records for each.

Results: We have developed a unique system for data personalization, allowing to consider specific features of autonomic regulation for each specific user. The vector of the functional state changes is determined in the course of dynamic observation on the basis of stress assessment and data personalization. The application makes recommendation about necessary preventive measures or immediate consultation with doctor. The results of the test can be sent to the specified e-mail address or in a special analytical center. We have checked the accuracy of cardio intervals by simultaneous registration of heart rate with a smartphone and the use of the electrocardiograph. HRV indicators HR, pNN50, SDNN and AMo were selected and used for conclusion about functional status. The personalization function became active after accumulating the first 20 results in personal database.

Conclusions: Systems for operational control of health status allow monitoring constantly the functional state of the organism that gives the individual a chance to detect the signs of stress with subsequent managing of lifestyle.

Keywords: mobile health care, personalization, stress

Inpatients’ Medical Records Installed on Mobile Interfaces: A Natural Evolution of the Mongolian Tele-Assistance Medical Network

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Since 2007, a new telemedicine network (MnCardio) has been developed for the Cardiovascular project. New functionalities were developed each year under the fundamental principles to stick to the constraints of the terrain and to facilitate the work of the users. The major initial steps were to help the physicians care for their patients though a tele-assistance network, and to web-base the system to make it available wherever the patient is located.

The purpose of this new step was to adapt the telemedicine system to the hospital environment and to develop appropriate mobile interfaces to provide quality real time information to every level of caretaker, from nurses to hospital management staff, when the patient is hospitalized. Interviews and a workshop were held beforehand to collect the users’ requirements and each step of development was proof-tested with them. Technically, ReactJS over Voozanoo was used to make the system mobile compliant and easily supported, meanwhile, being Open source, the whole project can be mastered by the local MnCardio team. Specific interfaces on mobile devices allow doctors “ePrescribe” with automatic assistance on dosage, mode of administration, and interactions of drugs, meanwhile the nurses have a clear view over the treatment implementation. Synthetic views facilitate adjustments and can produce daily lists of drugs to be supplied by the pharmacy. Costs can be easily calculated. These basic management features are meant to be further extended and interfaced with the
hospital management system. The global architecture allows developing ultimately similar modules for other specialties.

Keywords: telemedicine, open source

mHealth: The Role of Technology in the Workplace
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As we move towards the future of work, our technology undergoes significant and fundamental transformation, two worlds are gradually, but inevitably, coming together: the World of Work, which is increasingly challenged by financial, fiscal and forward-looking considerations, and the World of Technology, whose transformational potential, authority, and omnipresence is no longer questioned. Technology in the workplace is an ever-growing force; it is about facing, and understanding, today’s challenges to mental health and stress-related absence, and working together to use technology as solution, not a hindrance, to make “the future of work”.

Keywords: mHealth, technology, mental health, stress

TE.M.S - App with real-time Average Waiting Times on the Portuguese Health Services
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In the Portuguese public institutions the patients only had knowledge of the average waiting times when they were already at the emergency room. By providing a way to share this data, it is expected that the peaks of demand of emergency services are avoided and that the patients can weigh, in a sustainable way, the visit to the emergency room of a Hospital, and instead go to a Primary Care Facility. To share this data, a group of Emergency settings specialists from the National Commission for Accompaniment of Clinical Informatisation was created. This group has various experts on the field, which were selected by various health institutions. These experts defined the functional requirements, the process, the methodology of calculation of the average waiting times, and all the specificities on the clinical specialists on the emergency settings. With this kind of information, it was possible to standardize the ways the times were presented and calculated across the Portuguese health institutions. Several designs were tested and the final was translated to a mobile application (App). The App, initially, provide the average waiting times on the emergency rooms organized by the Manchester triage. The waiting times are updated periodically, but are near real-time. The Apps was made available in all major mobile platforms, and on the first month it was download more than 1500 times. The integration of the app with the institutions that share the data is a work in progress. Right now the information’s is shared by 4 hospitals. It is expected by the end of the 1st
quarter of 2016, that 15 institutions will be connected. The TE.MS provides an integration platform, through a Web API, that allows all the institutions that want to integrate waiting times, to develop that integration with its own internal system. The institutions that use the clinical software - SClínico - the software developed internally by the Ministry of Health - already have the integration with this app developed. The app was prepared to be used not only on public institutions and emergency settings, but also in private institutions and on other health settings, like consultation appointments.

Keywords: waiting-times, emergency-settings, hospitals, Manchester-triage, mobile-applications

A Mobile Ultrasound E-Learning System
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Background: Ultrasound diagnosis is an important skill for gynecologists. However, there is no routing ultrasound course for medical students during pre-clinical stage, and no enough chances to practice ultrasound diagnosis during clinical stage for interns at the department of gynecology in Taiwan. 
Objective: This objective of this study is to develop an ultrasound diagnosis e-learning system for medical students and interns to enhance the skills of ultrasound diagnosis.
Methods: The medical images of an ultrasound device were captured in real time with refreshed rate 25 pictures/sec, and the images were synchronized with a real-time ultrasound manipulation video recorded by a mobile phone when an experienced gynecologist was performing an ultrasound examination. The two videos were then streamed into a video stream server and delivered to the mobile phones of interns or medical students.
Results: When an experienced gynecologist performs an ultrasound examination, the synchronized videos, including: ultrasound images and operational procedures of ultrasound, are shown on mobile phones of medical students with less delay. This real time e-learning system provides interns with comprehensive learning scenes, including continuous operational procedures of ultrasound, and corresponding changes of images.
Conclusions: This system provides interns with more chances and more flexible ways to practice ultrasound diagnosis while patients refuse to allow the interns be present in the ultrasound examination room.

Keywords: ultrasound, mobile e-learning, gynecologist
Telehealth for 60,000 eVillages in India: The Beginning of the CSC Story
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The Government of India (GoI) promoted Common Service Centres (CSC) project is an entrepreneur driven model for empowering rural India. A key pillar of the National e-Governance Plan 135,000 ICT enabled Information Centers on a Public-Private Partnership (PPP) are now providing insurance, education, veterinary, agriculture and financial sciences. On August 25th 2015, GoI announced the launch of SEHAT (Social Endeavour for Health and Telemedicine) the world’s largest PPP programme in Telehealth. Apollo Tele Health Services (ATHS) had been entrusted the difficult task of providing health care through 60,000 CSC’s in a socially relevant, self-sustaining manner. 8625 centres have since been activated, 516 VLE’s have been trained virtually (http://health.csc.gov.in/trainings/) and 27 physically. A help desk (health@csc.gov.in) ensures that all queries are addressed. 2256 teleconsults have originated from 363 CSC’s, 73% of these were from three states. The VLE retains 45% of the 1.4 Euro currently charged, 15% is for the CSC organisation and only 0.56 € per consult to ATHS. All teleconsults are scheduled electronically with a ePersonal Health Record. The trained VLE connects the patient to the expert Medical Response Centres of Apollo Hospitals. Villagers assemble at CSC’s for Health Literacy programmes delivered through multi point VC. This knowledge empowerment will hopefully promote concept of wellness and improve health care outcomes. ‘Community Connect’ activities will include tele health screening camps. Tele Laboratory Services are also being introduced. Columbia University has included the CSC telehealth programme as part of the case study demonstrating ATHS in “Global Best Practices in eHealth”. Technical challenges include power outages and low bandwidth. Financial viability presupposes an eventual goal of at least 1000 teleconsults daily. Urban teleconsultants need to be sensitised to rural requirements. When functional the GoI “Jan Aushadhi” scheme will make available quality affordable generic medicines at CSC’s. This preliminary presentation will outline the initial clinical experience, the operational challenges and how they are being addressed.

Asynchronous Teleconsultations Applied to Reduce Patient Waiting-List to Specialized Care in Minas Gerais, Brazil

Telehealth Center, University Hospital, UFMG, Telehealth Network of Minas Gerais, Belo Horizonte, Brazil
The Telehealth Network of Minas Gerais (TNMG) provides telehealth services to more than 700 cities from a total of 853 cities in the state of Minas Gerais, Brazil. The services include telediagnosis and asynchronous teleconsultation. Telediagnosis (electrocardiogram, Holter, retinography and ambulatory blood pressure monitoring) is very well incorporated in public health system, but teleconsultation is still under-used. From March to October/2015 it was implemented a project in Montes Claros (a city with 400.000 inhabitants and 137 Family Health Teams - FHT) with the aim to reduce the waiting-list for face-to-face specialist consultation in endocrinology, dermatology and gynecology. All FHT were trained during four workshops. A new workflow, composed of four steps, was proposed to attend these patients:

(i) Preparation of a new waiting-list for each FHT and specialty;
(ii) Patient home visit by the Community Health Agent (CHA) for program participation invitation and re-evaluation of real necessity;
(iii) A new face-to-face consultation with FHT doctor and
(iv) Teleconsultation when necessary.

As preliminary result, the waiting-list for endocrinology and dermatology was reduced in 90%: 27% in step (ii), 27% during step (iii) and 36% due to step (iv). It is important to observe the high potential of teleconsultation in reduce the waiting-list: 88% of teleconsultations done avoided the referral of patients to specialists. Gynecology seems to be not sensitive to this new process as most of patients are waiting for a surgery. These preliminary results showed the potential of the new workflow, incorporating teleconsultation use, to reduce endocrinology and dermatology waiting-lists. New specialties will be incorporated as demanded from the municipal management and FHTs.

Keywords: teleconsultation, telehealth, teledermatology, tele-endocrinology
the RCH. The population chosen to be analysed in this model were patients from 12 Victorian rural and regionally centers who attended the RCH in 2014 for specialist paediatric or orthodontic consultation and assessment under the Medicare Cleft Lip and Palate (CL&P) scheme. Timely appointments were chosen as the outcome measurement for this study. The potential clinic time saved at the RCH by introducing TD was also calculated with the assumption that each consultation was 45 minutes.

Results: Of the 1439 consultations at the RCH under the CL&P Scheme in 2014, 673 were for rural and regional patients. Of those, 367 were considered TD appropriate appointments, representing 54.5% of all appointments in the RCH’s rural and regional patient population. A timely appointment rate of 65.7% was observed. A total of 275.3 clinic hours, or an extra 5.3 clinic hours per week, would potentially be freed up under a TD model.

Conclusion: One of the notable benefits of TD is that it can increase the capacity of the RCH Dental Department without adding additional dental chairs. 5.3 hours per week of additional clinic time would be available to see patients is noteworthy especially when demand for services are increasing and government resources are scarce. This time could be available for use at the RCH Dental Department to effectively increasing the capacity for service provision with the implementation of TD at the RCH.

Keywords: teledentistry, paediatric dentistry, orthodontic

An Update on eHealth in China
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China's eHealth is changing rapidly. The country is launching a national telemedicine network and has issued guidelines for telemedicine procedures. Besides public strong initiatives, the private sector has heavily invested in Mobile health and international ventures are surged over the last years. Even if the eHealth market is still emerging in China, the size of the country, the unmatched and increasing demand for healthcare, and the major shortages of Healthcare Providers in rural areas make a major player in eHealth in the near future. The presentation will provide a comprehensive vision of the state of development of eHealth in China, its major shortfalls and issues but also the opportunities for what is expected to be the 2nd largest eHealth market in the world.

Keywords: China, telemedicine, eHealth, mobility, interoperability

An Ethnographic Study on Implementation of Technology in Medical Practice in Mongolia
The Cardiovascular Diseases Project MON/005 aims to improve quality of cardiologic care, especially for the population living in remote rural areas. The fundamental strategic choice made was to create a center disseminating knowledge and providing assistance to province doctors through a tele-expertise network. This qualitative research aims to understand how the project has changed doctors’ practice to highlight factors related to implementation and appropriation.

We aim to contribute to promote the development of telemedicine in capitalizing on the experience of the Mongolian Cardiovascular Diseases Project. Therefore, we gathered physicians’ insights through participant observation and in-depth interviews of 19 physicians of the project, added to focus group interviews of 9 physicians from remote provinces. Our findings defend that satisfying and motivating doctors at work are key elements to successful implementation of the Cardiovascular Diseases Project MON/005 through greater autonomy, development of a sense of belonging and ownership, and improvement of efficiency of care. Efficiency and quality of care has benefited from standardization as well as improved professional capacities and a strong collaborating system that fostered autonomy. In addition, the project has participated in creating incentives for doctors to stay in public hospitals and supports a great sense of belonging and ownership. Indeed, doctors are involved in the project as well as in their local setting as knowledgeable and autonomous physicians, and decision makers. Moreover, the project has led structuration of the cardiologic profession that played an important role in fostering a strong sense of belonging. Yet, we highlight challenges related to financial constraints and organization of services that may impede sustainable integration in professional practice. To scale up project activities, a strong integration into the public health system is essential as well as a good coordination with it.

Keywords: telemedicine, qualitative research, standardization, cardiology

Challenges and Opportunities for Telemedicine in Morocco

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Telemedicine refers to health and medical services performed using Information and Communication Technologies. Telemedicine in Morocco presents opportunities for the national health systems but faces number of technical, legal, societal and cultural obstacles. If telemedicine is not well developed, the awareness of health professionals and policy makers is growing. Numbers of telemedicine initiatives have been launched. They concern various fields such as eLearning, teleoncology, teleradiology, telecardiology, and teleechography. The latest was one of the most concluding telemedicine experience and consists of Mobile health ultrasound patrol pilot project for diagnosis of pregnancies with risks in the region of Fes,
Funded by Qualcomm Wireless Reach™. The goal of this mHealth project was to validate how advanced wireless technologies and connected portable ultrasound devices can provide access to state-of-the-art imaging diagnostics in places it has never been available before. This Mobile Ultrasound Patrol project enabled physicians located in different cities to quickly review the same data and collaborate on patient care. The use of wireless technologies slashed time delivery of medical data for review, cut diagnostic review or second opinion time and reduced costs per patient.

Other recent telemedicine initiative concerns mobile health Tuberculosis in the city of Sala by the Korean Cooperation. Earlier, in 2007, a teleoncology pilot Project between the Oncology Institutes of Rabat and Brussels has been conducted. In addition, Health Information Management System is being implemented in a growing number of hospitals throughout the country. However, Electronic Medical Records are not yet an essential cornerstone for supporting health care services. In 2007, an international tele education network for paediatrics has been established between the child hospitals of Washington, Rabat and Marrakech to improve community and healthcare provider knowledge and practice related to children’s healthcare issues. US Physicians could provide clinical information, share medical advancements and conduct training sessions with healthcare professionals in both Moroccan cities. This project resulted in the installation of a telemedicine station in Rabat and training of 40 physicians and staff. The Telecardiology project component with Marrakech University hospital helped to identify barriers for sustainable implementation that include reliable technology, consistent bandwidth, satellite time, time zone, and language. Numbers of international telemedicine events have been organized in the country.

The Moroccan society for Telemedicine and eHealth (MsfTeH) has been founded after the 2010 Casablanca international conference on eHealth, thanks to the support from the International Society for Telemedicine and eHealth and WHO directorate of knowledge management and sharing. The MSfTeH is promoting eHealth and telemedicine in the country and organized the 9th Euro Mediterranean conference for Telemedicine and Medical Informatics in 2013 in partnership with the Euro Mediterranean Association for Telemedicine and Medical Informatics. This resulted in the preparation of the eMedMed proposal for training in telemedicine for North African countries in partnership with the Italian based NGO, The Observatory for Cultural and Audio-visual Communication (OCCAM) and the International Institute for Telemedicine. The MSfTeH have also been participating in the annual international video conference by the French Telemedicine Network, CATEL, since 2014. Earlier, representative from Morocco participated in the foundation of The Arab Telemedicine Society under the umbrella of the Arab Medical Union in October 1999. Recently, Morocco hosted the first exploratory seminar where initial conclusions confirmed that there is significant interest in, and potential for, cooperation in the area of eHealth policy and its implementation between EU and Southern Mediterranean countries.

However, number of challenges remain to be overcome including the lack of a national eHealth strategy and legal framework, lack of awareness of potential e-health benefits; privacy concerns; weakness of information infrastructure in the hospitals; and lack of skilled personnel. The mission of IT departments in the ministry of health also needs to be well defined. In term of infrastructure, Morocco retains one of the most advanced telecommunications infrastructure in Africa, with three fixed and mobile network operators. Morocco also has one of the highest mobile penetration rates in the region. This demonstrates the opportunities for telemedicine development in the country.
Keywords: Telemedicine, challenges, opportunities, eHealth, mHealth, Morocco, developing countries

Bridging the Gap towards Efficient Collaborative Digital Pathology: A Pioneer Initiative of the FlexMIm Project
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Nowadays, most of the pathologists are still using traditional glass slides and optical microscope for daily diagnosis. Due to highly efficient slide scanners, emerging smart digital algorithms are able to facilitate pathologists’ work, while opening the way towards Digital Pathology and distant expertise on virtual slides (e.g. for 2nd opinion in difficult cases). Anticipating this trend, the FlexMIm cooperative research project addresses the technological issues enabling to face this challenge.
We present here the major results of this pioneer initiative. FlexMIm consortium includes 27 pathology laboratories in the Paris region (coordinated by Assistance Publique-Hôpitaux de Paris), research laboratories from Universities Paris 6 and Paris 7, as 3 companies: TRIBVN, PERTIMM and Orange (project coordinator). Based on cloud architecture, the project embeds a dedicated Whole Slide Image (WSI) database and visualisation support. Each partner or subset of partners developed dedicated algorithms tested separately, then integrated into the online platform. Algorithms were thus built for the WSI blur detection, as mitosis detection. The pathologists used a test bed in order to evaluate compression algorithms on several visualisation devices. Dedicated semantics and research engine are now included in the platform, supporting the Region of Interest collaborative annotation in the targeted pathologies: inflammatory bowel disease (IBD), prostate cancer. The ontology used is generated by an operational contextual graph produced and validated for IBD diagnosis, consolidated by a semantic template linked to the annotations of IBD WSI. Pathologists from the consortium can finally evaluate, online, the semantic framework, the image collections and the image analysis algorithms developed during the project. Within 3 years, FlexMIm partners have thus built a platform which now integrates a whole set of powerful algorithms to foster digital pathology adoption by a large cluster of laboratories in the Paris region. The last phase of the project, the experimentation one, recently started and is fully devoted to digital pathology assessment by the cluster.
Teledentistry Network at Paraná, Brazil (Poster)
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The use of Information and Communication Technologies (ICT) applied to health, either in education (distance learning) or health care (telecare) allowed the emergence of telemedicine and telehealth. The Teledentistry is one of the branches of telehealth. Centers of Teledentistry are being structured in educational institutions who attended the course of "Teledentistry: Training and support to Professors for the Use of ICT, social network and collaborative research in the health field". A partnership between the Dental School of Universidade de São Paulo (FOUSP) and Brazilian Dental Education Association (Associação Brasileira de Ensino Odontológico – ABENO) was established. Among the Teledentistry Centers action plans, 6 dental schools in Paraná State, located in the Southern region of Brazil with 9 million inhabitants, 399 cities and 1199 oral health teams in the Family Health Program, came together to develop the "Paraná Teledentistry Network". The purpose of the network is to implement Teledentistry Centers at 6 partners’ universities, on which each dental school contributes with its thematic expertise. The key issues to be addressed, both in tele education and in telecare (second opinion) are: Humanization of dental care, imaging diagnosis, diagnosis of occlusal problems and temporal mandibular dysfunction, cariology, dental trauma and oral cancer. It is expected that the Paraná Teledentistry network, by a collective and synergistic work, contribute to build and improve the oral health care network in Parana.

Keywords: Information technology, teledentistry

Development of the National Network of Teleaudiology
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Keywords: digital-pathology, telepathology, whole-slide-image, semantics, high-content-image-analysis
In a telefitting method an experienced audiologist from the cochlear implant clinic provides fitting service for the patient in distant, cooperating policlinic. 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. We are planning to expand expert model and introduce it to the rest of the less advanced clinics in the Network. We are adding also 3 new clinics from abroad to the National Network of Teleaudiology – in Ukraine, Belarus and Kyrgyzstan.

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. The study group consisted of randomly selected patients: 6 children (age 7-16 yr, mean 11.2) and 7 adults (age 17-64 yr, mean 44.7) with CI experience ranging from 18 months to 16 yr. The control group consisted of randomly selected patients: 9 children (age 3-14 yr, mean 8.8) and 5 adults (age 21 - 36 yr, mean 27.2) with CI experience ranging from 6 months to 8 yr. Each patient in the study group underwent expert telefitting procedure: local ENT, structured interview, free field audiometry, local objective and psychophysical measurements. Remote Expert interpreted the results and created a new map. The controls underwent standard telefitting consultation. 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. These complement benefits of the standard telefitting mode: saving of time, money and effort for the patient, better access to specialists, educational value for less advanced staff. These results encourage us to introduce the expert model to all satellite clinics in the National Network of Teleaudiology.

Keywords: teleaudiology, telefitting, network
Session: Open Source Software in Healthcare - Benefits and Issues (1) (2)

Session 1

An Update on Free/Libre and Open Source Software (FLOSS) in Healthcare
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Introduction: The uptake of FLOSS in healthcare on a global scale has been slow but steady in the last 15 years. From a global viewpoint the adoption and use of FLOSS principles in healthcare is very different in the different regions of the world. However, there have been remarkable developments in the last couple of years on almost all continents and in various different contexts. One of the very promising developments is the emergence of FLOSS ecosystems in a technical sense but also in an organizational/economic sense.

In this brief review the authors will highlight some selected projects, tools, platforms and ecosystem in the domain of FLOSS in healthcare from different parts of the world. It is evident, that this selection is subjective but attention has been given to form a cross sectional overview spanning different application domains, different regions as well as low-, middle- and high-income countries.

One impressive topic is the ASEAN countries trial to adopt FLOSS, in order to achieve universal health care. Another important topic is open data. In the age of cloud software and Software as a service (SaaS), this is becoming increasingly important.

Methods: The listed projects were identified through web-searches during the process of manually curating the MedFLOSS database during the year 2015. MEDLINE was parsed with a keyword list and specialized blogs and websites dedicated to FLOSS in healthcare were regularly inspected.

Results: Besides an increase in publications reporting about FLOSS in healthcare systems there is especially an increase in platforms and ecosystems that have been developed over the last couple of years. There has also been an increased adoption by authorities on a national or regional level.

Keywords: FLOSS, open source

Cytomine: An Open-Source Software for Collaborative Analysis of Large Biomedical Images
R. Marée
University of Liege, Liege, Belgium
Cytomine ([http://www.cytomine.be](http://www.cytomine.be)) is an open-source rich internet application to enable highly collaborative and multidisciplinary analysis of multi-gigapixel imaging data such as whole-slide images in digital pathology. Build at University of Liège with state-of-the-art web and databases technologies; it supports both remote visualization, collaborative semantic annotation, and semi-automated analysis through the web, making it an ideal tool for collaborative research, teaching and diagnosis in every large-image related topics. Its design was driven by biomedical and bioimage informatics research needs: software versatility, interoperability, modularity and extensibility, image recognition tailored via machine learning from ground-truth data and proofreading tools, reproducible research, and data accessibility and reusability. It is being used for years by our collaborators working with large sets of histology and cytology images in numerous domains including cancer research, development, and toxicology, and is now adapted for pedagogical purposes. Related publication: "Collaborative analysis of multi-gigapixel imaging data using Cytomine" Raphaël Marée, Loïc Rollus, Benjamin Stévens, Renaud Hoyoux, Gilles Louppe, Rémy Vandaele, Jean-Michel Begon, Philipp Kainz, Pierre Geurts and Louis Wehenkel. Bioinformatics, DOI: 10.1093/bioinformatics/btw013, 2016.

Keywords: open source, digital pathology, web

Fifty Shades of Orthanc
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Osimis, Angleur, Belgium

Orthanc aims at providing a simple, yet powerful standalone DICOM server. It is designed to improve the DICOM flows in hospitals and to support research about the automated analysis of medical images. Orthanc lets its users focus on the content of the DICOM files, hiding the complexity of the DICOM format and of the DICOM protocol. Orthanc can turn any computer running Windows, Linux or OS X into a DICOM store (in other words, a mini-PACS system). Its architecture is lightweight and standalone, meaning that no complex database administration is required, nor the installation of third-party dependencies. What makes Orthanc unique is the fact that it provides a RESTful API. Thanks to this major feature, it is possible to drive Orthanc from any computer language. The DICOM tags of the stored medical images can be downloaded in the JSON file format. Furthermore, standard PNG images can be generated on-the-fly from the DICOM instances by Orthanc. Orthanc also features a plugin mechanism to add new modules that extends the core capabilities of its REST API. A Web viewer, a PostgreSQL database back-end, and a reference implementation of DICOM web are currently freely available as plugins. Our mission is to re-wire the medical imaging space through the use of open source software. Osimis was created alongside Orthanc (orthanc-server.com, FSF 2015 Award for Advancement in FOSS winner) to help it reach a wider market. Besides providing consulting, custom developments and training services around Orthanc, we also develop a SaaS product, smendr.com, that enables storage, viewing, processing and sharing of medical imaging on local devices as well as in the cloud.
The presentation will be about this business model and the different implementations that we've done so far with Osimis, highlighting how open source is the new way of doing business.

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**Data Security, Privacy and Patient Safety in the 21st Century**

H. Raad

OpenNovations, Voorburg, The Netherlands

According to a recent Gartner study the majority of CIO's in healthcare/medical and pharma are convinced that their organizations are not optimally protected to cybercrime and other digital incidents. These incidents can originate from a broad spectrum of causes, some not even related to malpractice but i.e. to natural disasters like flooding. Organizations have traditionally placed the responsibility for physical and digital security in the hands of staff organizations like facility management and ICT departments. Especially in the EU where academic environments are commonly directly connected to hospitals the urgency for improving operational security has risen. And security is just one side of the proverbial coin, the other is privacy, where especially in the EU there has been great political interest in this subject, which is resembled in the new EU privacy directive and the guidelines for data-breaches implemented by the different member states. But data-security isn't a static item, it requires a continuous process of quality monitoring and improvement. And this goes for both development and the deployment and management of computerized systems. Luckily, there are quite a lot of battle tested methodologies and tools available.

In this talk we will look at the following:

- Open source security testing methodology manual. This is a standardized approach for risk management by identifying objects (people, systems, processes) and their interactions in their environments. The focus lays on optimally securing these interactions thereby reducing the impact of the failure of one object in its functional context. Other than most other, quite abstract, methodologies OSSTMM delivers a very thorough framework of concepts and guidelines which ensures reproducibility of the risk analysis results.
- Open Web Application Security Project offers a standard library of common best practices in ICT security and secure development of computerized systems. Although the name of the project implies web development only, these practices are very valid all across the functional field of ICT application development.

Keywords: eHealth security privacy risk analysis, risk management

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**Open Source Adoption Factors**

E. Saliez
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The benefits of Open Source approaches are assumed here to be already well known. In a few words the 4 freedoms are: to use software, to study how it works, to distribute, to modify. The objective of this paper is to discuss strategies to improve the adoption of Open Source. Support: The availability of support is essential for the exploitation in order to avoid that users would be blocked by any basic technical problem. The question is how to improve the support of Open Source software packages. Support activities are services, i.e. a kind of traditional business which must become autonomous from an economic point of view. While many developers dream of marvellous intellectual challenges, the question is here to promote more service oriented organizations. Coordination: Many Open Source software projects are already available. However the collaboration between projects remains limited. The question is to achieve better integration and reuse of software components. Software developments: Since many medical centres have similar needs, the essential issue is to share development efforts. The question is here how to develop more collaboration. A key factor is to share documentation and source code in the public domain. Soon or later active maintenance or continued developments will be required and must be planned. Up to now much has been achieved by volunteers, but more resources are necessary. The question is how to let welfare organizations and sponsors understand that the support of Open Source projects multiply the impact of their contributions. Indeed the results are easily made available to many medical centres, i.e. of societal common interest. Moreover the results of projects funded by tax payer money should normally become public. Quality control: Of course a critical requirement with liability consequences. In the Open Source world everything is transparent. Quality control is mainly based on peer reviews. The question is how to improve the coordination of these reviews by independent experts. Legal issues: Discussion about the choice of licenses. Advertising: Not waste of money, but how to distribute information by word of mouth?

Keywords: open-source

Session 2

Medical Record Logic as a Graph, Available on Internet in Open Source
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This is a visual presentation of the relations between the main components of the patient record.
  • A dash board of the patient record, intended as a coordination point between all care providers in charge of a common patient.
Focus on the logic of relationships between the components of the patient record: which observations suggest which problems. Which problems suggest which actions.

A graph is a very natural way of thinking. Indeed the human mind can associate any information to any other, no more column nor rows.

Nodes: The content of a node can be any kind of document for example messages of a few words, the result of a lab test, a long report, radiology images, and even a window in another computer system across Internet.

Relationships: Relationships are independent objects linking 2 nodes. Any node may be linked to any other node in a space of several millions of nodes. Relationships have a "type". For example a logic as "(a)-[SUGGEST]->(b)", "(b)-[RECOMMAND]->(c)", "(d)-[IS_CMPLICATION_OF]->(b)", presented in a very intuitive graphical way. Relationships may be qualified, for example by a degree of belief, intensity, responsible author, etc...

Navigation: Start with a one screen overview of the patient record, showing the relation between the main facts, the identified Health Issues and the current Actions. Click on any node in order to get more details about its content and relations with other nodes. New software tools available as Open Source can support this natural logic (neo4j, d3.js, popoto.js).

Telemedicine: Graphs can be made available anywhere on Internet using a standard browser without any specific installation.

Keywords: open source, graphs, problems, education

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Keeping Your Employees Knowledge Up To Date and Qualification Management

H. Raad
OpenNovations, Voorburg, The Netherlands

e-Learning has become ubiquitous in all areas of the educational system and for in-company training facilities. However, pharma and healthcare organizations often still rely on very static “SOPs” (standard operating procedure documents) and work instructions, often on paper. These often need to be manually signed by a QA manager and an employee for proof of training, the qualification. This practice is incredibly time consuming and is an almost guarantee to mismatch knowledge demand and supply on the workplace because validation, distribution and training of validated documents in physical form is a tedious and time consuming process. There are quite a lot of very mature and user friendly open source solutions for this problem.

In this presentation we will take a look at a fully SCORM 2004 compliant tool called OpignoLMS, which is built on the extremely successful and robust Drupal content management framework. This system includes features like: Course catalogue with public/private courses; Possibility to group courses into classes for a global cursus management; Course prerequisites: make trainees finish one course before getting access to the next one, or use entrance test for courses; Automatic PDF certificates generation for each class or course; Quizzes (true/false questions, multiple choice questions, matching questions, long text question, grouping question, fill-in blanks question) with centralised questions database; Video gallery; Events, announcements, etc. Because of a strong adherence to open standards the system can be integrated into an existing ICT architecture.
First Experience in Implementing an Open Source Health Information System for a City Hospital in a Developing Country
J. E. Quesada
Asia Pacific College, Manila, Philippines

The challenges in implementing Information Technology Systems for a Health Organization are many and are not limited only to technical challenges. There are even more challenges that need to be faced when the Health Organization is a Local Government Unit (City) in a Developing Country such as the Philippines. These challenges can be generalized into the following categories: Organization (People), Process, Technology and Sustainability.
This paper will present the experiences of a small I.T. consulting company in engaging with a Local City Government to implement the whole I.T. infrastructure using Free and Open Source Software (FOSS) for a newly built 50 bed hospital to serve the healthcare needs of the local population of 250 thousand inhabitants.

Keywords: open source, healthcare, government, developing

Swarm Technology and Health Applications
B. Salgues
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Introducing swarm technology in health is a way to develop new algorithms and digital applications. Swarm technology is defined as «any attempt to design algorithms or distributed problem-solving devices inspired by the collective behaviour of social insect colonies and other animal societies” (Bonabeau, Dorigo, Theraulaz: Swarm Intelligence). Stigmergy is a mechanism of indirect coordination between agents or actions. Stigmergy is the foundation of new algorithms like Bird Oids (BOIDS) also name Birds like (Reynold) or Particle Swarm Optimisation (PSO).
We will introduce the swarm technology, describe some basic algorithms and explain its application in health, in the use of sensor, home biological analysis, cancer treatment, and rehabilitation program.

Keywords: swarm technology, algorithm, sensor, cancer
ScatterWeb Tele-Health Platform Acting As a Proposed Solution for e-Health Strategy Implementation in South Africa
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Challenges that face the health sector in South Africa currently are a shortage of health professionals, inefficient health record management, lack cooperation between various groups, there are no enough standards for interoperability, poor disease control and surveillance. In addition, a lack of cooperation between various groups resulting from lack of a clear understanding that e-Health includes all Information Communication Technologies (ICTs) for health such as mobile technologies, telemedicine and electronic patient records. This lack of cooperation prevents urgently needed progress in using e-Health as an enabler. In contrast to these systems, ScatterWeb Tele-Health platform will be tested and deployed with the aim of providing a flexible system based on enhanced sensor wireless technology that combines robustness and high reliability with low-cost hardware. For easy integration of wireless networks into different environments like, health sectors, higher education institutions, industrial sectors and etc., this research is focused on implementing a ScatterWeb Tele-Health solution that can offer Ethernet gateways with the aim of addressing some of the ten strategic priorities of e-Health strategy implementation in South Africa.

Keywords: wireless sensor networks, ScatterWeb, e-Health

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24/7 Telehealth in the Himalayas: Operational and Clinical Challenges: A Preliminary Report
Krishnan Ganapathy
Director, Apollo TeleHealth Services (India)
(Co-authors: J. Chandralekha, S. Premanand, Arunabh Sharma, K. Yogesh Kumar, Vikram Thaploo)

This innovative Public Private Partnership is providing 24/7, quality, affordable, remote health care, to 34,000 citizens of Lahaul and Spiti (14,000 feet) in Himachal Pradesh. People were commuting 20 to 50 km for primary and 250 km for secondary health care services in this mountainous isolated, sparsely populated region. Following a need assessment study a MoU was signed with the National Health Mission. Government paid for CAPEX and OPEX. Non compliance to auditable weekly, monthly program MIS would result in penalties. Apollo Telehealth Services took the onerous responsibility of customizing a Turnkey Solution, end to end, on a Program Management approach with measurable milestones and monthly reports.

Key health issues in the region were identified. Nothing was available. Everything was a challenge. Acquiring, installing and testing VSATs, facing landslides and subzero temperatures, making executives work as labourers and effecting a major cultural transformation, became routine. Staff from the local government and recruited from community were trained in Chennai. Urban teleconsultants were sensitized, for community interaction, while deploying cutting edge technology. An online appointment booking system facilitated patient friendly interaction.

The patient CEPHIS was updated in real time. Personal interaction by telemedicine coordinators on both sides ensured that traditional human touch continued. In addition scheduled tele camps (virtual OP’s) were organised in 15 different specialities and super specialities. Case records were audited ensuring meticulous scientific impact analysis. Feedback was obtained and audio recordings made available.

In the first 35 weeks, 1964 teleconsults were provided including 153 emergencies. Tele laboratory services, TeleHealth Education tele cervical cancer screening programmes have been added. Preliminary evaluation confirms that delivering remote health care in inhospitable terrains in a PPP mode is doable, socially relevant, financially sustainable and scalable incorporating cost effective clinical and services excellence. This illustrated presentation will demonstrate that the impossible is possible.

Keywords: telehealth in Himalayas, emergency telehealth
United4Health is a recently-ended European large-scale telehealth deployment project. It successfully implemented innovative healthcare services for remote monitoring of patients with chronic conditions, and assessed their impact. Its patients were those with some of Europe’s most common diseases: chronic heart failure, chronic obstructive pulmonary disease, and Type II diabetes.

Involved in United4Health were 14 regions in 10 European countries: they deployed 19 different service models. A comprehensive evaluation, based on the Model for Assessment of Telemedicine (MAST) methodology, helped to assess a wide variety of their deployment aspects. This presentation will:

- Select from United4Health’s wide variety of experiences to describe how three specific deployment sites embedded their telehealth technology solution(s) into their care pathways.
- Examine how United4Health itself learned lessons from its experiences. It will extrapolate from these to show how other initiatives can also build on these experiences.
- Summarise the policy messages that United4Health felt confident to pass at both its final conference and a Science and Technology Options Assessment (STOA) session, with policy-makers, in the European Parliament buildings.

Looking ahead, the convergence in technologies and initiatives experienced in recent years is likely to gather pace. Healthcare systems will probably tend towards embracing “bring your own device” solutions in the growing awareness that telehealth is a critical component of the transformation of Europe’s healthcare. In conclusion, when telehealth is integrated into mainstream service provision, it can offer more accessible, equitable and sustainable services for the benefit of people in Europe.

United4Health’s deploying regions are committed to continue scaling-up and expanding the use of telehealth in Europe: they believe that this is a journey worthwhile – and worth – for other European, and international, service providers to explore too.
**Med-e-Tel 2016**

**Session: Pharmacy and m/eHealth**

**m/eHealth in the Pharmacy – Recent Policy Developments**

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Pharmaceutical Group of the European Union (PGEU), PGEU/GPUE, Brussel, Belgium

The Pharmaceutical Group of the European Union (PGEU) represents over 400,000 pharmacists from 34 European countries and aims to advance the contribution of community pharmacists to European health systems, society and individual patients. In this dedicated pharmacy / pharmacist session, now in its second year, this presentation aims to present the PGEU’s position on m/eHealth and provide a brief overview of recent EU policy developments relevant to m/eHealth. This dedicated session is also intended to encourage speakers to present their experiences related to pharmacy / pharmacists and foster collaboration between pharmacists, industry and patients. The presentation outlines the key findings from the PGEU’s response to the European Commission’s Green Paper on mHealth published in 2014 in that (when concerning m/eHealth); data protection is paramount, regulation of big data is necessary, a guidelines-based approach should be used to enable users and healthcare professionals distinguish between lifestyle apps and bona-fide medical apps, a certified review process demonstrating safety and efficacy for medical apps is needed and the use of m/eHealth initiatives should not replace face-to-face consultations but should complement them. Additionally, the findings call for the need for community pharmacists to be consulted during development of such apps and initiatives. The presentation also outlines several recent EU policy initiatives in the domain of m/eHealth which have the potential to impact the development and use of m/eHealth services. Finally, the author calls for collaboration between pharmacists, industry and patients.  

Keywords: pharmacy, pharmacist, mHealth, eHealth, PGEU

**m-Health Tools Supporting Pharmacists in Providing High-Quality Services to the Communities**

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Pharmacists have a long history of early endorsing or developing new tools and technologies that support their different roles expected by the society. With the evolving technologies, pharmacists increasingly use M-health tools to support their commitment to provide high-quality services to the communities, adopted to their needs in different parts of the world. Growing use of M-Health tools is also reflecting the expanded roles of pharmacists and services they provide, with the ultimate result being improved patient safety, care and health.
The International Pharmaceutical Federation (FIP) represents over three million pharmacists and pharmaceutical scientists worldwide. Via its membership of pharmacists’ associations (including its 132 national membership organisations worldwide), FIP is collecting and sharing best practices, and encouraging pharmacists to use mobile technologies and tools, to support the key roles of pharmacists in responding to people’s needs of optimal, evidence-based care.

This presentation will provide overview of selected M-health tools that support pharmacists to contribute to health promotion and well-being, health improvement and to help patients with health problems to make the best use of their medicines.

Keywords: pharmacists, pharmacy services, patient safety

Adoption of Telehealth in England: Have We Learned from Past Experiences?
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Background: Although various trials has shown telehealth to be beneficial in terms of reducing hospital admissions, length of hospital stay and mortality rates, yet the adoption of telehealth is still poor in the UK. There are different factors affecting the adoption of telehealth. The aim of this study was to explore healthcare professionals’ (HCPs) experiences with telehealth and their views on the barriers for its wide adoption. The study also examined some of the existing telehealth patients’ information material and its role in promoting telehealth adoption among patients.

Materials and methods: qualitative semi-structured interviews were conducted with 36 HCPs in Greater London. The interviews were analysed thematically using the NVIVO 10 software. In addition, a discourse analysis was done to evaluate 12 patient telehealth leaflets against established criteria in the literature.

Results: Analysis of the interviews highlighted several barriers to telehealth adoption including cost and lack of funding and resources; reliability of the service; fear of losing face-to face contact with patients and vice versa; patients’ lack of confidence in using technology and concerns about confidentiality. Interestingly, the discourse analysis showed that not all leaflets addressed the barriers identified. Some leaflets lacked important pieces of information that could facilitate telehealth adoption such as reassurance of patients about the ease of use of devices (5/12), confidentiality (10/12) and costs (6/12). Furthermore, only 4 leaflets mentioned that patients can still have the choice in the form of consultation as they emphasised that telehealth is not a substitute to the traditional consultation.

Conclusion: To promote telehealth adoption on a large scale in the UK, there needs to be a wide national strategy to tackle the above barriers carefully and systematically. Barriers identified in this study were similar to those previously reported in the literature, thus indicating that there is still reluctance in policy and adoption strategy for this form of care despite the increased demand for such an accessible healthcare delivery by an ageing population.

Keywords: telehealth, healthcare-professionals, implementation, adoption, barriers
The French Pharmaceutical Record: Securing Drug Dispensing and Improving Coordination of Care
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The French Pharmaceutical record (DP) is a shared electronic patient record aimed at securing drug dispensing, by reducing drug interactions and redundancies, but also at improving coordination, continuity and quality of care. The DP includes all prescription and non-prescription medicines dispensed to the patient in any community pharmacy located in France in the previous 4 months (a period extended to 21 years for vaccines and 3 years for biological medicines). From this initial service dedicated to community pharmacists, the use of this network was gradually extended to hospitals and new services are being developed to allow the broadcast of health alerts/alarms, batch recalls and drug shortage notifications. The law puts the French Chamber of pharmacists in charge of the development of this network. For community pharmacies, implementation started in 2007. 99.8% of French community pharmacies are now connected to the system (which represents 22,274 community pharmacies, as of 30st November 2015). 32 million patient records are currently active, which makes the DP one of the largest patient records in Europe after the «summary care record» (SCR) in the UK (55 million patients). In terms of activity, the DP in community pharmacies is the most widely used health record in Europe with more than 1 million patient data shared among French pharmacists every day (a total of 330 million patient data for year 2014). Pursuant to data protection laws, all data are anonymized and the DP data host meets very strict security and confidentiality requirements. Besides, 216 hospitals are now connected. Since October 2012, hospital pharmacists can access the DP. Since the spring of 2013, a pilot is ongoing to extend DP access to hospital physicians working in emergency, anaesthetic and geriatric departments. The first assessments show a major benefit regarding reconciliation (when a patient enters a hospital, the DP allows the identification of 90% of the medicines he is taking at home), thus reducing the number of patients being re-hospitalized because of drug problems. This pilot should be extended to all hospitals and hospital services in 2016.

Keywords: medication record reconciliation, iatrogenic pharmacy

Electronic Prescription – Pharmacy Involvement in Portuguese’s Solution
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Portuguese Government made the decision to implement an electronic prescription solution in collaboration with Portuguese Pharmacies allowing incorporating Pharmacies vision. A Pilot of the solution was done on field allowing to collect users experience on real use and identify system improvements to be made. Project roll-out, politically approved in 2014, occurred in two fronts: on one side, SPMS-EPE (government institution) was pushing Electronic Prescription Software for doctor use (public and private use); on the other side, Pharmacies representatives were pushing Electronic Prescription dispensing associated with electronic billing of Reimbursement. Time to make full National deployment of the solution was short (about 6 months). To reach this high goal the main advantages and weakness were identified and investment was high to allow this change to happen. In the end, Pharmacies achieved more than 65% of electronic prescription dispensed and this figure is still rising. The benefits achieved by the Pharmacy played an important role in this change.

Keywords: electronic prescription, pharmacy, EPD SYSTEMS

Provider Independent Upgrade to IHE E-Prescription by Using Existing Paper Printing Features
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E-prescribing, e-prescription, and e-dispensation are topics of high relevance. In most countries e-prescribing (selection of appropriate medication) is a well-known feature of practice and hospital information systems. Contrary, e-prescription (structured document and its e-transmission) is not widely supported and may require software adaptations of hundreds of systems. Instead printing the receipt on paper, information of the receipt needs to be encoded, for example into an XML structure defined by IHE PRE (scription). In 2015 the German gematic postponed the topic e-prescription. One reason might be that each software system, which prints paper receipts, has to be adapted accordingly.

In this paper we show how to create e-prescriptions fulfilling IHE PRE by complementing a system independent adaptation. Our prototype runs as process in background and catches paper prints of receipts before they are printed onto paper templates. The process extracts every necessary information independent of, and without any modification of the original systems. In tests we have used systems of three different software providers. Those IT systems print prescriptions compliant with a specific form, the German paper form “Muster 16” for statutorily insured patients. Instead of printing the receipt onto paper, it is now printed into a XPS file, which is input for our process. The XPS file contains the textual information of the prescription and—as meta information—the coordinates, where the information is located in the paper layout. By comparing the coordinates of the extracted textual information with the paper template “Muster 16” we know the semantics of every text-coordinate pair. This allows the generation of e-prescriptions according to IHE PRE. An adaptation to other countries’ paper forms is possible because of the generic approach. In general any system with a template printing feature can serve
to generate structured electronic documents by combining the extracted text-coordinate pairs with the known semantics of the template. For e-prescription the approach shifts implementation work from many system providers to a single, cost-effective post-processing unit.

Keywords: e-prescription, e-prescribing, e-dispensation

European Pharmaceutical Students' Association Perspective on mHealth
M. Sercic
European Pharmaceutical Students' Association, Brussels, Belgium

The presentation will cover the students’ perspective on the topic, in regards of both education and professional use. We will present the results of our latest survey and position paper on mHealth.

The European Pharmaceutical Students’ Association has identified the importance of the topic of mHealth already several years ago, and since than mHealth has been brought higher on our agenda. The recent milestones were the panel discussion on this topic arranged during EPSA Annual Reception 2014, the survey to EPSA members on the topic and the response to the European Commission Green paper which previous actions have led to.

The European Pharmaceutical Students’ Association is an independent, non-profit European organization 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 41 member associations. EPSA operates according to the motto “Bringing Pharmacy, Knowledge and Students together”.

Receita sem Papel (Paperless Prescription) in Portugal: Experience, Results and Challenges
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SPMS - Portuguese Ministry of Health Shared Services, Lisboa, Portugal

Paperless Prescription in Portugal aimed to achieve the dematerialization of the prescription-dispensation-invoicing cycle. Is an ecosystem that connects several programs, as the national patient registration; patients portal, e-prescription, invoice verification center, health institutions management system, among others. It is a patient centered model that allows delivering a more efficient and safe health care. The main benefits to the patient are the possibility to access to the prescription trough a digital channel using electronic devices, to have an alternative backup of the prescription information, allowing an unequivocal identification of the patient with no signatures, the possibility of discharge prescriptions partially and the possibility to receive drugs
from the same prescription more than once. The main advantages to the professionals are a stronger security in the authentication process (reducing the improper appropriation of identity), the end of physical limitations of the drugs number per prescription, less costs related to printers and paper, and the possibility of following the adherence of the medication prescribed. For the pharmacies the main advantages are related with the reduction of fraud and inventory control, the possibility of providing information that allows verifying drugs adherence and the possibility to discharge several drugs from the same prescription, more than once.

During 2015 the technical, theoretical and legal framework was developed and since September we already have 8764 paperless prescriptions, prescribed by a 286 doctors, which corresponds to 7407 patients with paperless prescriptions and a 50200 drug package prescribed. We also found that 2535 prescriptions were discharged and 2538 partially discharged, corresponding to 13908 drug packages. Although the success of the implementation, some questions remain to solve such as the identification process in mobile devices, the interoperability and the permission of offline discharges.

This presentation intends to update the Portuguese numbers and promote a constructive discussion around our challenging areas.

Keywords: paperless prescription, e-prescription, drugs

mHealth Examples in Spain: Two Mobile Applications that Provide Information on Medicines to Pharmacists and Patients
I. Madurga
General Pharmaceutical Council of Spain, Madrid, Spain

The General Pharmaceutical Council of Spain represents over 68,000 pharmacists working in Spain, providing them with medicines information tools, among other activities. In the early 80s, the General Council designed a medicines database that has evolved during these years along with IT improvements and has been adapted to pharmacists’ needs; that database, Bot PLUS, became 30 years old in 2015.

In 2014, the General Council launched two mobile applications that provide information on medicines. This presentation will describe these mHealth tools, which have two different targets: healthcare professionals, "Bot PLUS 2.0 App", and general population, "Medicamento Accesible PLUS". "Bot PLUS 2.0 App", designed for pharmacists, enables professionals make fast and simple enquiries without the need of an internet connection. It has information on requirements for dispensing, pricing and reimbursement for medicines; it also provides information on indications, dose, contraindications, interactions, adverse reactions and filters for safe use in renal/hepatic impairment and pregnancy/lactation, for example. "Medicamento Accesible PLUS" is a mobile app that enables access to information on medicines for patients and carers. Having access to Patient Information Leaflets (PILs) is a problem for some groups of population such as the elderly, those visually impaired and those who have mobility difficulties. This app was designed so that users just take a picture of the box of a particular medicine with their smartphone. The PIL for that medicine is then shown in a clear and concise way. Furthermore,
the app was designed so that a visually impaired user will hear the PIL read by their mobile, for example; or a person with mobility difficulties will find it easier to take a picture and read the leaflet on their mobile, than to open a folded PIL; least but not last, the elderly will have both solutions at their reach.

The author would share the experience with these two mHealth examples in case it could be of interest for the audience.

Keywords: pharmacy, pharmacist, mHealth, mobile application

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A Shared Pharmaceutical Record in a Belgian eHealth Environment: An Overview
M. Buyl, M. Buckens, C. Ronlez, J. Saevels, T. Henkens
Algemene Pharmaceutische Bond / Association Pharmaceutique Belge (APB), Brussels, Belgium

Belgian eHealth services (eHs) are quickly evolving. The Belgian eH platform is a public authority that facilitates the organization, information-exchange and electronic services between different actors in Belgian healthcare. Since 2013, the pharmacists’ professional organizations developed and financed the patient’s “Shared Pharmaceutical Record” (SPR).

The goal of the SPR project is to make available to pharmacists relevant, correct and high quality information on a patient’s medication history, in order to assist the pharmacist in making suitable decisions when dispensing medication. SPR was the first service for pharmacists on the Belgian eH platform to enhance pharmaceutical care. In Belgian community pharmacies, 6 eHs are operational at this moment. Most of them facilitate administration. 2 eHs aim to enhance pharmaceutical care: multidisciplinary sharing of a medication plan and the SPR project. Both services are only accessible when a patient has given an informed consent (opt-in) following a procedure managed by eH. In addition, access to a patient’s SPR is restricted to community pharmacists who have a therapeutic relationship with the patient. Since 2014, Belgian community pharmacists can consult a patient’s SPR within their pharmacy dispensing software. Pharmacist’s participation to the SPR project is voluntary. They need to sign up with a contract to delegate responsibility for correct and secure data treatment. When a drug is dispensed, the information is sent in near real-time to the “Trusted Intermediate for Pharmacists” who validates, encrypts and sends for storage to the “Pharmaceutical Care Data Hub” where data is stored for 1 year.

On December 1st 2015, 58% of all Belgian Community Pharmacies showed interest in the project by signing the contract. More than 70% of them have already started making registrations in the patient’s SPR. 37% of the Belgian citizens have data available for consultation in the SPR. As an authentic source of a patient’s dispensed medication, the SPR will be an indispensable tool to assist pharmacist in delivering pharmaceutical care. The major challenge to deal with is to increase the pharmacist’s subscription rate.

Keywords: shared pharmaceutical record Belgian eHealth
A Pilot to Review Patients with Long Term Conditions in the Community Pharmacy via Remote Access to GP Patient Records

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Introduction: In December 2011, the then chief executive of the Health and Social Care Board (HSCB) published ‘Transforming Your Care; A Review of Health and Social Care in Northern Ireland’. This set out the challenges and rationale for the need to restructure healthcare delivery in Northern Ireland. The review pointed the way to a more integrated future model of care. In line with the ethos of ‘Transforming Your Care’, a pilot of community pharmacy based review clinics of patients with specific long-term conditions (LTC) was established.

Method: A number of community pharmacy based LTC [asthma/hypertension/at risk of developing cardiovascular disease (CVD)] review clinics were organised in collaboration with three GP practices. The clinics were facilitated by remotely accessing the GP server, thereby providing the pharmacist with the ability to perform a full clinical review with the patient. This included: recording relevant diagnostic results; conducting a medication review; noting advice given to patients; and recording outcomes.

Results: Eleven clinics were held from January to March 2015. Eight were for hypertension patients or those at risk of developing CVD and three were for asthmatic patients. In total, 74 consultations were completed and 70 patients reviewed. Thirty-two medicine interventions were made, fifty-five patients received lifestyle advice and two patients presented with undiagnosed elevated blood pressure. A confidential patient survey at the end of each consultation highlighted the patients’ satisfaction with this service, with 97% indicating they were very satisfied with the care they received and 99% of patients stating they had received the same level of care as expected from a consultation within the GP practice.

Conclusion: The results demonstrated remote access community pharmacy clinics improved patient access to long term condition review clinics. Pharmacist independent prescribers can safely manage these patients and meet their expectations within this setting.

Keywords: community-pharmacist, prescriber, long-term-conditions, remote access

The eHealth Agenda: Finishing Unfinished Business

R. Price
European Association of Hospital Pharmacists (EAHP), Belgium

The health policy arena buzzes with new possibilities for improvement offered by the heady technological developments of the last five to ten years. History gives instruction about how such dreams can be turned into reality, but it can also provide stories of missed chances caused by a
failure of customers, providers and regulatory authorities to act in unison towards a shared goal. The unfinished business of achieving bedside scanning in hospitals due to deficient medicines barcoding practices provides not only wider lessons for the eHealth and mHealth agenda, but a clarion call for renewed action on a patient safety boon that remains within grasp. Attendees will gain an understanding of the advance of bedside scanning practices in order to prevent medication error at the point of administration of medicines to the patient, the current situation in Europe, and the requirements to be met to make this advance in patient safety more prevalent throughout European health systems. Further background to the topic is available here: www.eahp.eu/practice-and-policy/bar-coding-medicines-to-the-single-unit#

Keywords: patients; safety; barcoding; scanning; error prevention

Mobile Pharmacy App in Austria – Health & Medicines Information
M. Wellan
Austrian Chamber of Pharmacists, Vienna, Austria

Our free mobile pharmacy app includes all of these great features, right at your fingertip:
Pharmacy locator - Quickly find the nearest open pharmacy with direct dialling number and contact data;
Medication Guide - You can search for products based on brand names or view the entire list; Includes also barcode scanning to help patients simply scan the package; selecting a specific medication will reveal a detail screen highlighting the benefit of information also with health clips and photos of medicines which allows patients a better understanding of their usage, i.e.
• Risks for specific types of patients (like pregnancy warnings);
• Warnings & Precautions (Doping, diabetics);
• Contraindications: Further Information you can find in the package leaflet:
• Indications & Usage
• Dosage & Administration
• Adverse reactions
Medication Organiser/Diary:
• Setting alarms/reminders for when to take medication;
• Keeps track of your medications, allergies, medical conditions;
• Determining compatibility between current, or newly prescribed medication;
• The app enables you to set reminders for multiple medications;
Vaccine Schedules & Reminder:
• Electronic vaccination certificate;
• Designed to help you save the date of vaccination;
• Has all basic tools needed for a point-of-care vaccine reference;
• Information on recommended minimum age to receive the vaccination, routine vaccination, brief catch up recommendations.
The Interface is clean and easy to follow, even on smaller smartphone screens. It’s a new pharmacy service in the field of m-Health in Austria. This application provides patients with medication information organizer and reminder and helps you to find pharmacies around you. It’s free of charge for Android and iOS Already more than 400,000 downloads, rated top in the field of health; handicapped accessible and includes automatic updates.

Conclusions: Designed to help patients in organising their medication.

PSGH PREVENT Initiative Using M-Health Technologies to Combat Counterfeit Medicines

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Evidence shows that once a sub-standard, spurious, falsely-labelled, falsified or counterfeit (SSFFC) medicine slips through the supply chain and protective regulatory systems and enter a pharmacy, the harm has already been done. Prevalence of SSFFC in the region is estimated 20-40%, with some isolated studies recording even 80%. To address this problem, The Pharmaceutical Society of Ghana (PSGH) has collaborated with government institutions and regulatory agencies, insurers and data vendors. PSGH in collaboration with mPedigree, launched the PREVENT INITIATIVE, a M-health tool designed as a comprehensive response to the problem of medicinal counterfeiting and its associated detriments in Ghana. The initiative seeks to prevent SSFFC medicines from entering the Ghanaian supply chain in the first place, by improving vigilance, empowering patients, equipping regulators, and educating the public through mobile technologies. Eight of Ghana's largest pharmaceutical companies were the 'launch partners' of PREVENT. Each product participating at the PREVENT initiative bears a unique code that a customer can check with a toll-free SMS hotline and a response is given as to it genuineness or otherwise. Because the scheme rests on a bed of mass serialisation, companies are required to alter certain industrial aspects of their packaging and record keeping systems. One of mPedigree's essential roles is steady retooling of legacy data management systems to enable compliance with the more stringent mass serialisation requirements on a continuous, high-fidelity basis. Participating companies are motivated to be part due to visibility, loss of market share, public concern about SSFFCs and enhanced confidence in the medicines.

The presentation will show the details of this deepest and broadest electronic surveillance system in the region, which is now aiming to go further by integrating its data with the response mechanisms of the regulatory agencies.

Keywords: sub-standard; counterfeit; fake, genuine,
Cost Effectiveness Analysis of Implementing Teledentistry for Rural Paediatric Patients in Victoria, Australia
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²Royal Children’s Hospital, Melbourne, Australia

Background: Teledentistry (TD) could be an innovative way to improve access to specialist dental care for Victorians by reducing travel time to specialist services and removing distance as a barrier to access care.

Objective: We aim to assess and evaluate current utilisation of specialist dental services at the RCH for rural and regional patients and conduct an economic evaluation by building a decision model to estimate the costs and effectiveness of Teledental consultations compared with standard consultations at the Royal Children’s Hospital (RCH).

Methods: A model-based analysis was conducted to determine the potential costs of implementing TD at the Dental Department at the RCH. This model was based on the structure of a pilot study of TD done previously at the RCH. The outcome measure was timely consultations, defined if the patient presented within an appropriate time of the recommended schedule. Our dataset was obtained from dental records at the RCH and assessed those who presented for specialist orthodontic or paediatric dental consultation. A Cost-Effectiveness Analysis was done comparing TD with the traditional method of consultation. One-way sensitivity analysis was performed to test the robustness of the results.

Results: 367 TD appropriate consultations were found in the dataset, of which 241 were timely (65.7%). The average cost of a RCH consultation was $431.29, with a TD consult costing $294.35. This represents a cost saving of $136.95. Total societal cost savings were $50,258.92. The CEA found TD to be a dominant option, with cost savings of $3160.81 for every additional timely consult conducted. TD was more cost effective for those travelling greater distances. 36.7 days of clinic time may be freed up in the RCH clinic to treat other patients and expand capacity. These results were robust when performing one-way sensitivity analysis.

Conclusion: When taking a societal perspective, the implementation of TD is likely to be a cost-effective alternative compared with the standard practice of face-to-face consultation at the RCH.

Keywords: Teledentistry, oral health, economic evaluation

Distance Education as an Implementation Strategy for the National Policy of Integral Health LGBT
J. M. R. Mercês, M. M. P. Rendeiro, P. R. V. Dias
The National Policy of Integral Health of LGBT (2011) aims to promote the overall health of this population, eliminating discrimination and institutional bias, contributing to the reduction of inequalities and the consolidation of SUS as a universal system, integral and equal. Among the Ministry of Health's responsibilities, it highlights the inclusion of LGBT health-related content at the teaching materials used on permanent education processes for health workers and the implementation of actions and educational practices at SUS services. In this context, the Ministry has released the National Policy of Integral Health LGBT course, in partnership with the Executive Secretariat of the Open University of SUS (SE / UNA-SUS) and the UNA-SUS of Rio de Janeiro State University. It was organized to contribute to health professionals, especially SUS workers to complete their care actions, promotion and prevention with quality and equitable manner, ensuring the LGBT population access to integral health. It was developed in the modality of distance education, open to the public interested in the subject and structured from real situations of professional and LGBT population in the use of services.

We have analysed in the two course offers, the students' profile, the level of satisfaction related to the methodology and the acquired knowledge level. In addition, it was investigated the reach of the course in the country. Based on the data, we concluded that the Distance Education and the free offer for any professional is an excellent strategy to overcome geographical barriers, disseminate ideas and implement such policy. In addition, the educational choice has obtained positive assessment by providing a reflection about the circumstances and difficulties on the routine of the professionals and LGBT population, allowing comprehension of service and the life of this population.

Keywords: eLearning, permanent education, LGBT, health

Innovative Parameters for Smart-Cities – How to Promote Active Mobility and Citizen Participation
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Some innovative cities are calling themselves “smart”. Most of them focus on high-tech and connected ICT equipment, such as intelligent street lighting, smart-grid, data collection for smart environment management or an optimized transportation network. Only few have chosen to focus on people’s mobility and almost none has oriented actions towards health and active participation of individuals as living components of the city life itself. However, well-being in city resides in the motivation offered to the citizens by the city environment and services. Everyone dream of an adaptable city that could be profiled to each individual and where mobility would be an extension of life at home, with personalized and affective characteristics. This is
particular relevance for people with physical or cognitive disabilities who need to be materially and psychologically assisted in real-time.

Our goal here is to help people with cognitive, physical or sensory troubles to recover the envy to go outside their home though a participative approach.

Our method consists in bringing community at the forefront with a communication process between the users and the connected city services. The aim is to get users’ feed-back to evaluate and adapt the facilities offered in a win/win method.

The technical solution is based on a global connected network with a smart-GPS technique. Through a smartphone application, people will be accompanied when moving inside the city and inside buildings with adapted itinerary and services. In comparison to a classical GPS system, the city equipment itself will be part of the indicators to guide the users within the city streets. When using services, users will be invited to make a feedback and to earn city points that will freely offer new services. The application will provide real-time assistance when the user gets into troubles for health reasons or because he has a question on the city context. The underlying challenge is also to link people between each other to emphasise and activate social life in the city. The system will help the users to get information in real time and to be an effective actor with a more effective impact.

Keywords: mobility, active participation, GPS, feedback

Software-Based Diagnostic Tools: Facilitating Quality Healthcare Delivery in Low Income Countries
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Quality healthcare delivery is very expensive. It requires huge investment in state-of-the-art medical infrastructures as well as sophisticated healthcare personnel. These are the major challenges faced by low income countries. Low income countries often rely on grants and loans from their developed counterparts and donor organisations in order to meet the socioeconomic as well as healthcare needs of the citizens. However, in the face of the continuing global financial recession, many donors and contributing countries are scaling back on their supports for the low income countries. Hence, the need for low-cost solutions and systems that will ameliorate the healthcare needs of these countries without compromising global best practices and standards is crucial and pertinent.

In this paper, the author intends to show the inherent capability of software-based diagnostics tool to facilitate effective and efficient healthcare delivery. Leveraging on the advancements in medical electronics and sensors technologies, several algorithms could be developed in areas such as bio-medical signals and image processing and analysis, telemedicine and e-health.

Keywords: healthcare, telemedicine, diagnosis, software, low-income
The Propensity of Using E-Health to Drive Access to Health Information and Services in Young People in Ilorin, Nigeria

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Introduction: E-health is the transfer of health resources and health care by electronic means. It encompasses three main areas: the delivery of health information, for health professionals and health consumers, through the Internet and telecommunications; using the power of information technology (IT) and e-commerce to improve public health services. Globally, there are more young people between the ages of 10 and 24 today than at any other time in human history, accounting for 28% of the world’s population in 2010. In Nigeria, in 2010, 31% of Nigeria’s population of 158.4 million consisted of young people between 10 and 24 years of age.

Statement of the problem: About nine out of 10 people between the ages 10 and 24 live in less developed countries. The causes of adolescent death include communicable diseases (HIV/AIDS, tuberculosis, and lower respiratory-tract infection) and non-communicable diseases related to problem behaviours (motor vehicle fatalities, violence, self-harm, alcohol, tobacco, and other drugs, and risky sex leading to early or unintended pregnancy). According to WHO, most causes of death in young people are preventable and treatable.

E-Health and telemedicine in Nigeria is still in its infancy period. In a study carried out amongst health workers in a Teaching Hospital in Nigeria, 34.1% had a good knowledge of what eHealth and telemedicine entail and only 13% of the respondents had attended any relevant workshop, however, as many as 91.6% were in support of introduction of eHealth practice in Nigeria. Several factors have been linked to the drawback of its application in Nigeria. They include but are not limited to: financial implication, illiteracy, inconsistent power supply, erratic internet services. In 2014, it was reported by Youth line that a Colmar Brunton youth survey found 64% of the 400 young people surveyed turned to Google and other websites to access information about sex, drugs, alcohol, depression, health and other issues before friends, family and professionals. There is therefore a need for an online informative space that can address their various health concerns. This study intends to provide one of such models in Nigeria.

Keywords: eHealth, Nigeria, youths, health services
Social Media as a Tool for Mass Patient Information
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Introduction: As health information is becoming widely accessible and growingly reliable, patients are increasingly interested in learning about their conditions, their prevention and treatments, and sharing their experiences. They seek online health information, connect and collaborate with the others and take advantage of the Internet not only for decision-making and management of their own condition, but also for education and advocacy purposes. As patients face the overwhelming and often conflicting body of available information, it is becoming a common practice for them to bring such information to consultations to analyse and comprehend it. Patients in fact, are increasingly relying on their physicians for the interpretation of the online information. It is therefore becoming increasingly essential that not only should healthcare professionals embrace this need and accept this behaviour, but they should also guide their patients and refer them to reliable online resources.

Social media are an effective means of communication, but the healthcare sector has only recently tried to catch up and employ them meaningfully. The potential is enormous, as practices, hospitals, scientific associations and other medical entities have now immediate access to a set of powerful channels of communication and can make a significant impact on the lives of the patients and their caregivers by providing high-quality and thorough information.

Objective: The aim of this presentation is to offer a panorama of the uses of social media in healthcare as a means of providing mass health-related information.

Methods: Practical examples of how social media are employed will be presented and short demonstrations of successful showcases on different platform, such as Twitter, Facebook and LinkedIn, will be provided. A panorama of the applied strategies that practices, hospitals, scientific associations and other healthcare entities will also be discussed.

Keywords: social media, public health
Spurred by e-Health (the use of Information and Communication Technologies for health) there has been a global movement towards decentralised healthcare, for both clinical diagnosis and management of patients and for performance of routine clinical laboratory testing (Point of Care Testing, POCT). Using Uganda as a case study, insight can be gained about typical hierarchical primary healthcare provision, including numbers of Village Healthcare Teams, remote clinics, and hospitals country-wide. Using specified assumptions, projections are made related to the number of smartphone, Point of Care, and Personal Computer (PC) devices used for e-Health for all of sub-Saharan Africa (SSA) over a 10 year period.

It is estimated that for clinical healthcare alone (not administrative, surveillance, or e-record purposes) over a 10 year period the following e-Health devices will be used: About 185,000 PCs; 783,000 POCT devices; and 33.5 million Smartphones.

What are the environmental impacts? An Environmental e-Health Impact Model has been described. Impacts begin with resource depletion, manufacture, and distribution (upstream), continue during the use and maintenance period (midstream), and are compounded by poor e-waste management at the end of life (downstream). In addition, potentially harmful medical waste is created during POCT, which contributes to environmental and public health risks, and must also be considered in balancing the equation.

Exponential growth in the decentralised application of e-health can be anticipated in the immediate future in SSA. Many initiatives will occur in rural and remote communities and clinics – transferring the responsibility for proper disposal to these unprepared practitioners, and making untenable the already poor or non-existent handling of healthcare related waste, both clinical (medical waste) and technological (e-waste). The time to act is now. Education and training in proper medical and e-waste disposal, facilitation and support of proper disposal through practical and policy avenues, and environmentally sensitive design of devices is urgently required.

Keywords: Environmental Impact, e-Health, Point-of-Care Testing, sub-Saharan Africa

**Treatment and Rehabilitation of Drug Addictive Patients through Telemedicine in Punjab, Pakistan**

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The department of Psychiatric and Behavioural Sciences KEMU/Mayo hospital is providing their expertise to the department of telemedicine Mayo hospital since 2008. Hundreds of Psychological disordered patients were successfully treated through the system from 8 districts of Punjab. Drug abuse is a major and continuously growing problem of Pakistan which is affecting every social and economic group. Punjab, the most populous province of Pakistan is most affected by this menace. Causes behind increase in use of different types of drugs in the last 10 years are, abundant availability of numerous types of drugs for cheap prices, lawlessness,
deteriorating social norms, spread of drugs for money so that it can be used for extremism and terrorism and ill religious practices in which use of drugs is encouraged at shrines. A comprehensive program was launched by the department of telemedicine Mayo hospital and department of Psychiatric and behavioural sciences for the treatment and rehabilitation of drug addictive patients from Rajanpur, Attock, Gujrat, Jhang, Khushab, D.G. Khan and Sahiwal. Data was gathered and analysed for the causes, effects, types of drugs used, socioeconomic condition of users and its impact on their families were studied. More than 300 drug abused patients were treated and rehabilitated in the above mentioned districts of Punjab. More over online educational programs were initiated through the system which helped in acceptance of drug abuse patients by society after treatment and increased awareness against use and spread of this curse in their vicinity.

Keywords: telemedicine, drug abuse, treatment, rehabilitation

The Use of ICT in Postoperative Handover Communication at Rwanda Military Hospital
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Introduction: Postoperative handover communication is defined as “transfer of professional responsibility and accountability for some or all aspects of care for a patient, or groups of patients, to another person or professional group on a temporary or permanent basis”. However Poor clinical handover creates discontinuities in care leading to patient harm. Furthermore, Information and communication technology (ICT) provides a broad set of tools to support communication and effective team interaction.

Aim: The aim of this study is to assess the current state of handover practices and identify key areas for future improvement by usage of ICT tools in postoperative handover practices.

Methodology: We conducted a prospective, cross-sectional observation study using taxonomy for handover behaviours. The study focused on postoperative handovers between the team of anaesthesia providers in the operating room and the one of recovery room caregivers. A pilot of five handover observations was conducted to assess the suitability of the data collection tool in the local context. Permission to conduct the study was sought from the ethics committee of Rwanda Military Hospital.

The collected data was coded and processed using SPSS 20. To describe the study sample characteristics, frequency and mean were presented. To address main research question a correlation analysis was applied and completed by a multiple linear regression. The significance of the slopes in the regression analyses was tested with a two-sided test, using an alpha level of 0.05.

Results: On postoperative handover practice, the quality indicators were in many cases partially done or not done at all. Example … On the aspect of the quality communication package, none of them achieved 50% of the required quality communication handover. With factors associated to
quality of handover, time of the day was negatively associated while handover circumstance and teamwork were positively associated. No use of ICT tools.

Conclusion: This study documented that postoperative handover quality is still at developmental stage and most of the gaps identified are probably due to lack of clear guideline on the way forward during handover.

Keywords: ICT, postoperative handover, communication

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Technological Integration for Telehealth Platform
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From the signal to the platform, we develop a comprehensive approach. We explain the mono-dimensional physiological signals (Physical quantities varying over time spontaneously or evoked), two-dimensional (Medical Images), and three-dimensional (Movies revealing inside or outside the human body) that can be collected on it to unveil its pathophysiological condition as well as systems able of capturing these signals.

The hardware and software implementation of technical platforms dedicated to the practice of e-health (in particular of Telemedicine) by making contributions of these signals and systems is developed in detail. Some augmentative devices deficient physiological organs integrated in Tele medical systems are also subject of interest. Medical and surgical practice (diagnosis, treatment, monitoring) involves the use of a variety of technical platforms. The current power of information and communication technology allows us to think today in the progressive integration of this multitude of technical platforms as a human interface device (HID) versatile, adaptive and scalable that would turn a computer terminal into a real station of local or remote medico-surgical practice and that would lead finally to the materialization of the concept of PC–Hospital, smart home health, home hospitalization etc.

The aim of this presentation is to give the scientific and technical tools to design and build these systems.

Keywords: platform, telehealth, integration, sensor, interface

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Telemedicine: A Tool for Investigation, Research and Treatment of Eczema at Remote Beneficiary in Punjab
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The Department of Dermatology, King Edward Medical University Mayo Hospital Lahore is engaged with Telemedicine since 2009 and has the highest consultancy rate among other specialties. When someone asks a doctor what is eczema, the answer generally points towards any intensively itchy problem with oozing of fluid from that skin and propensity of patient to itch more and more. Eczema is a general but broad term which clinically encompasses a variety of different Endogenous and Exogenous types. Endogenous ones are mostly caused by genetic background, induced/aggravated by environmental factors importantly infections, drug allergies and hypersensitivity to environmental allergens, whereas Exogenous ones are mostly environment related among which there may be person to person variation in having genetically increased sensitivity towards environmental allergens. During consultations Acute, Subacute and Chronic clinical varieties were observed among which worth mentioning were Atopic eczema, Seborrheic eczema, Pityriasis Alba, Gravitational/eczema craquele’, Pompholyx and Prurigo being endogenous ones where as Contact Dermatitis, Dermatitis Artefacta, Infective and infected eczemas being exogenous ones from all eight districts of Punjab attached with telemedicine department at Mayo hospital. People of every age, gender and social group were affected. More than 2000 patients reported were affected with the mentioned above types. Treatments were provided free of cost and regular follow-ups were maintained. Unavailability of qualified dermatologist at remote hospitals, quackery and self-medication contributed in spread, deterioration of disease and detrimental effects on society. Separate case study was made for each patient and their respective treatment program was initiated accordingly. Referrals were made only for those patients who were complicated and required admission in nearby hospital. The telemedicine system provides fruitful opportunity and conducive environment to connect physicians and patients belonging to different remote areas and socioeconomic groups. The system is even more helpful in conducting postgraduate medical research.

Keywords: telemedicine, dermatology, eczema, treatment, research
Session 1:

Context Understanding for Medico-Social Assistance with an Interactive Robot
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In the context of increased chronic diseases and aging population, the concept of «home integrated care» is focused on the patient by providing all possible care and services where he lives. Current IT systems implementing this concept provide better professionals’ coordination and prevent patient's health condition degradation. However they lack of intelligence and interactivity to customize the relationship with the patient.

In this abstract, we present the SAMII system we developed to allow assistance robots to perform interactive medico-social monitoring, by understanding the patients’ situation and determining the adequate robot behaviour. Our system is positioned as being a skill to be acquired by an assistive robot. Its contribution lies in the use of a combination of several context dimensions to understand a person’s situation. SAMII is endowed with recognition system of voice, shapes (facial, object), and location (room), but also of emotion, age, sex, position and activity of the patient. It is designed as a state machine operated in a sequential manner in which each state corresponds to a specific recognition algorithm. The combination of recognition steps allows deducing the robot behaviours. In order to achieve an efficient system, we have improved existing recognition algorithms by optimizing the treatment cost and the effectiveness of the recognition, thanks to the addition of confidence thresholds. An application example is to determine the adequate situation to make a patient pass a symptoms questionnaire that represents a painful daily task. An illustrative use case is: if the patient is stressed, the robot will not ask the questionnaire, even if his activity and location are conducive to this.

To assess our system, we integrated it into the NAO robot that has a "human-friendly" interface. Comparing with the initial recognition algorithms, we observed an average global system’s precision of 76.8%, giving an improvement of 18.2%. As further work, we intend to exploit semantic web technologies to improve understanding of situations thanks to a personalized Information Retrieval that provides better assistance to persons.

Keywords: Integrated care, Situation awareness, Semantic

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Assistive Technologies in Integrated Care
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During 2015 we performed (as members of an expert team) a detailed study on possibilities of utilization of assistive technologies in the systems of social, health and informal care. The motivation for the study was the fact that no proper survey of assistive technologies existed in the Czech Republic. The Ministry of Labour and Social Affairs realized a long-term project “Process Support in Social Services”. It is an important system project that focuses on social services and financing. The main aim is to support availability of social services to their users. As a special activity of the project the sub-project “Support of Assistive Technologies” was initiated in November 2014. Its aim was to evaluate current situation in development and utilization of assistive technologies and set mechanisms for their utilization in favour of persons with health and social handicaps. The output is supposed to serve as one of the supporting documents for legislative, methodological and economical adjustments of the social care system in the Czech Republic. The goal is to stabilize the whole system, simplify and ensure the best targeted distribution of required services to their users. The study provided a systematic and detailed overview of existing technologies, including their classification, namely to compensation aids, medical devices and other technologies. The work was also focused on analysis of existing legal framework. We identified several tens of legal regulations that are in certain relation with development, use and financing assistive technologies. The crucial issue is that there is no single and unified legal framework for assistive technologies both in the Czech Republic, and in European Union. There are also unclear relations between health and social care and services although these services are frequently provided to the same clients. Thus the processes should be described in standard way. In addition, technical norms and standards must be considered as well.

In the paper we will present an overview of the most important findings that might be useful in similar cases in other countries.

Keywords: assistive technology, integrated care, legislation

Assistant Technology and Prevention Evaluation of Learning Disability Telecare Study
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People with a learning disability are now living for much longer due to improved medical care and an improvement in opportunities, leading to a better quality of life. In the UK, it is estimated that 1.75 million people have mild learning disabilities and 350,000 people have severe learning disabilities. Combined NHS and Local Authority expenditure on children and adults with learning disabilities is approximately £4.6 billion a year (MENCAP, 2007).

This presentation will address the finding of the study which raised the awareness of using Assistive Technology to support clients with leaning difficulties. The findings indicate that supporting people with learning difficulties in community settings is unique to Buckinghamshire.
The findings support the use of Assistive Technology, which can enhance and develop self-confidence, self-esteem, motivation and independence in completing the activities of daily living. The findings of the project point out that there is family satisfaction in incorporating Assistive Technology in the care of their relations with learning difficulties, as they were able to establish the benefit of using such technology in making their relatives more engaged with the activities of daily living. This project indicates that there were financial savings in the cost of care for clients who completed the project.

This study presents a series of recommendations that should be considered for future implementation and development of using Assisted Living Technology in supporting clients with learning difficulties.

- Further clients should be encouraged to use Assistive Technology to increase their confidence and feel empowered.
- There is a need to complete a further study with larger samples to explore the full impact of using Assisted Living in supporting clients with a learning disability and to provide a comprehensive view of addressing the immediate needs of implementing Assisted Living Technology.
- There is a need to ensure successful referring processes and engagement between staff and clients in order to benefit from the system usage.
- Family focus groups should be promoted to explore the immediate needs of their relatives and how this could be facilitated in any future expansion of the use of technology.
- There is a need for the manufacturer of the software to facilitate focus groups with clients, families and staff to address their specific issues in order to develop a product that becomes fit for purpose and fit for practice.

Key words: Learning disability, telecare, telehealth, remote management

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Needs and Preferences of Older Workers for Stress Management through Advanced Technology Apps: StayActive Project Update

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As a common fact of our everyday life, stress, if chronically undergone and not properly managed, usually affects our health, productivity at work and the quality of our relationships with family and community. At the same time, stress level detection and the appropriate methods and instruments selected for supporting people to manage the action of stressors are true challenges, particularly in older workers, in real life, and through advanced technologies apps.
The StayActive project deals with these matters while aiming to develop a concept and a personalized, adaptable system able to detect and manage stress “just-in-time”, grace to an intelligent app installed on a smart phone and a clouding component. The first, key step in the development of the system was the detection of the needs and preferences related to the services that the StayActive platform may provide, expressed by the voluntary older workers and managers involved in the project.

The results we obtained are presented, together with the methodology of end-users’ enrolment and motivation, as well as with the methodology of collecting and analysing their opinions, suggestions and preferences able to orient the design of the system. The content of selected support services is also described, together with the technical and conceptual challenges faced while tackling critical aspects such as the comfortableness of long term borne biosensors, or the personalization of the provided stress management methods and instruments. As the development of StayActive app will face soon its first field trial with the end users, a short description of the methodology designed to obtain important insights in terms of usage and usefulness is also done. The enhancement of the awareness of older workers about stress is also discussed.

The impact of the StayActive project lies on the aimed enhancement of life quality and productivity of older employees at work, as well as on providing managers with support for better handling these items. This aim also relates to the European and international initiatives and programmatic documents dealing with healthy and active ageing.

Keywords: stress, management, advanced technology apps

Empowering Seniors’ Self-Care at Home through Advanced Technology Apps. The Senior TV Project

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In the context of population aging, keeping the seniors at home, with their family, and delaying their institutionalization are goals that face critical challenges: the still scarce formal care giving workforce, the change of the traditional informal care models due to the incorporation of women into the labour force and the decrease in the birth rate, affordability matters especially for seniors living alone etc. Advanced technology-based apps for seniors evolve as valuable solutions able
to equally empower seniors’ self-care at home and support the development of the second, non-human, cost-saving ICT-based component of health-care systems.

The recently started EU-AAL funded Senior TV project aims at developing a widespread access, adaptable platform, installed on TV, smartphones and tablets as main interfaces, able to provide seniors living in their own homes with a set of social and health services that may facilitate their self-care, prevent physical and cognitive deterioration, improve their access to formal and informal caregiving services, and enhance their family and community insertion.

We are presenting the key scientific, medico-social and technical aspects that Senior TV approach lies on. The envisaged methodology for accomplishing project’s tasks is also pointed out and covers key actions such as the voluntary end-users’ enrolment, the detection of their needs and preferences, the collection and analysis of their opinions and suggestions issued during the evaluation of the platform’s prototype versions in real settings, and the compliance with the specific ethical provisions. The project takes into account the cultural and administrative diversity of Southeast Europe, in terms of seniors’ care systems.

The impact of Senior TV project lies on the aimed enhancement of life quality and social insertion of seniors living alone at home, in urban or rural areas. Its aim also relates to the European and international initiatives and programmatic documents dealing with healthy and active ageing.

Smart Safety Light (Poster)
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Our SSL concept (Smart Safety Light) modernizes and takes a fresh look at safety emergency lightning. It can be used, for example, in public buildings such as hospitals, private hospitals, or even, commercial buildings. It makes evacuation and rescue work easier and more intuitive during emergency interventions. SSL’s system works thanks to communication between its different parts, which are controlled by information treatment algorithms, capable of adapting to any situation. The system we have developed is composed of low-energy screens (to replace current AELU Autonomous Emergency Lighting Unit), smoke and temperature detectors and LED ribbons on skirting boards and surrounding doors, all of which guide people to the most appropriate exit. Sensors detect incidents and pass information onto the computer decision center which can then vary the lighting. The new AELU indicates whether the exits are available or not. Thanks to the interaction between the different parts of the system, some emergency exits are favoured, depending on the flow of people and the location of the incident in the building. In effect, this principle is based on an intuitive colour code to ensure a quick and easier understanding for users. The LED’s surrounding the doors flash on and off in green if the exit is passable and continuous red if the exit is impassable. In a normal configuration, the new AELU, while conforming to safety standards, can show any type of useful information such as bedroom numbers in a long hospital corridor, or advertising in commercial buildings. Our product's
applications do not focus exclusively on people safety. Technological advances today are moving towards sound systems to guide partially-sighted people or even towards to guide visitors in museums or elderly people in retirement homes.

Keywords: emergency, lighting, safety, smart system

**Industrialization of Health, a New Management Approach**
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The paper *Industrialization of health* will present the manufacturing processes of the health service with techniques and technologies for which are expected at the same time, more performance of work productivity and more quality of the services of health. The telemedicine and telehealth, as well as medical robotics, implantable medical devices, medical imagery are some examples of these technologies. The industrialization of health gathers actors of which some are new in infrastructures of the care answering regulations, rules, uses and protocols. The organizations of health pass from single surgical operation and the singular conference patient-doctor to forms of mass production of health associated at institutions which it will be a question of describing. Which will be the hospital of tomorrow is one of the asked questions. Before this new reality, we have to manage hospital or patient, after, we manage health.

Keywords: management, economics, infrastructure, production, quality

**Session 2:**

**Vers’O: A Support Device to Promote Hydration for Elderly People**
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At any age, drinking the right quantity of water is essential for the human body. The dangers of dehydration for young children have been known for a long time, but we had to wait until the 2003 heat wave to become aware of the dangers for the elderly population. The dehydration of elderly people is a major issue, which can have serious health impacts, and significant socioeconomic repercussions. The physiological changes linked with aging increase the risk of dehydration. Other obstacles can increase this risk or reduce elderly people’s abilities to hydrate properly: the weakening of some motor or cognitive abilities, as well as pathological, environmental or iatrogenic factors. The issue of dehydration for the elderly is not restricted to...
critical situations, such as during heat waves, but must be a daily concern, whether for people living at home or in institutions. Some recommendations do exist, but only as advice, which that involve education of this persons, caregivers and informal caregivers. Unless the actual water intake is evaluated these recommendations are bound to be inefficient.

But how could a prevention scheme be set up for people who are not aware of these risks, drink little or cannot drink on their own. To address these issues we designed a device which is meant to be easily used by each and every one, while offering prevention, education, and autonomy. Its name is Vers'O. Vers'O encourages people to hydrate themselves independently while changing their habits as little as possible. The person will be able to keep on pouring water into a glass with his/her usual water bottle. It quantifies the daily water intake and proposes different possibilities of reminders. Impairments associated with aging were taken into account in the design, in order to minimize the resulting disabilities as far as possible. The device is also customizable and adjusts to environmental factors in order to meet of the real needs of the user.

Keywords: dehydration, assistance, connected device, customization

Smart-Home Intelligent System Based Upon Counting Process and Habits Modelling for Non-Intrusive Daily Home Support
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Activities of daily living are approximately the same for everyone every day. Very often a pattern can be seen in the performing of these activities: one person tends to wake up at the same time every morning, takes a shower every evening for about 10 minutes, etc. Everybody does the same things, but in a different way, making every one of us unique. Even when a loss of autonomy occurs (due to ageing or accidents), we can still find patterns in the persons’ habits. Those patterns will be detected by analysing frequency, duration and time of an activity, and thus being able to recognize patterns in a person’s daily life. Exploiting those patterns could help assist people in their daily life while respecting their privacy. When implemented at home, this habits recognition system would lead to the creation of a smart home environment tailored to the persons’ habits and issues.

We propose here a personalized smart home environment that can compensate the loss of autonomy of its inhabitants by interacting intelligently with them. The system will first discover the person’s scheme and then try to understand it to finally be able to map the different daily parts in accordance with the individual. For instance, the system could automatically open a door when it knows where the person is heading to in the house, offering some additional comfort. We will accomplish this intelligent interaction by metering three parameters. First of all, we will meter the electricity usage room by room. This will allow the home to know which device is used and when, such as an oven or a TV. Secondly, we will meter the water consumption, still room by room. Water consumption will help the home to ensure that the user’s hygiene and health are not deteriorating. If the person uses the toilet more often than usually, it could signal
such an issue as diabetes. Finally, we will monitor the person’s movements, in order to know where he/she is in the home, and offer the best support available with the smart home. The combination of these three parameters will help us to identify a person’s habits, and thus learn from these to offer a tailored comfort in his/her own house.

Keywords: counting, home support, intelligent system

The “Digital Pathologies” Concept: New Methodologies and Approaches for Future Digital Applications and Resources
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Digital technology is now present everywhere and has created huge opportunities for communication, sharing information, e-commerce, etc. However, whereas the “high-tech” approach should lead to provide comfort, well-being, reassurance and security, a lot of people cannot access digital technologies due to loss of autonomy and this has finally created new fears and obstacles for elderly and disabled people. Some solutions exist through additional application layer for internet browsers for example. The aim of such top layer applications is to make websites accessible by adjusting to physical, sensory, and/or cognitive pathologies. But, even without being disabled, everyone regardless of age and health condition can be confronted to a critical situation that prevents from effectively interacting with digital applications. Each of us now have multiple online accounts, passwords and logins and remembering all of this data becomes a quite hard task. All this leads up to get into trouble and introduces a new concept of “digital pathologies” through which everyone can become disabled. All of these aspects constitute today the major obstacle to digital technology development and uses, and prevent the users from reaping the benefits that technologies and services should offer. It is then essential to rethink ergonomics and objectives of assistive technologies to ensure the most efficient uses today and tomorrow for everyone, everywhere and in every situation.

Our purpose is to propose, on the one hand, to improve the design of digital objects by making them more adapted, and on the second hand, to refine user-friendly applications to be more flexible in use so the design can accommodate more opportunities of individual preferences and abilities, by providing choice in methods of use, and also by being, for example conform to right- or left-handed users. Being more simple and intuitive, these tools will use a design easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level by offering a wide range of language, arranging information consistency in relation with its importance, thus avoiding unnecessary complexity.

Keywords: digital, pathologies, troubles, future applications
Results: Smart Technology as an Alternative for Physical Restraint
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Within healthcare the use of physical restraint is still a controversial theme. Exact numbers of use in residential care homes in Flanders aren’t available, but thanks to research in 2002 (Talloen, Milisen, & Evers, 2002) there are numbers that give an indication. In the past years many efforts have been done to reduce the use, such as using alternatives. An example is bed-exit alarm systems that sent out an alarm when someone leaves his bed, attempts to leave his bed or hasn’t returned to his bed on time.

The STAFF-project investigates if smart technology, more specific bed-exit alarm systems, can be an alternative for physical restraint. The project consists of 2 parts, (1) a survey that examines the vision of care professionals on physical restraints and smart technology as an alternative for this, and (2) an intervention study were 8 different bed-exit alarm systems were implemented in 9 Flemish residential care homes.

In the 15 minutes pitch we would like to expose some results, among other things new numbers indicating the use of physical restraints in Flemish residential care homes, the reasons why residential care homes doesn’t use smart technology yet, but also the impact of bed-exit technologies on the care process and the quality of life of residents.

Keywords: smart-technology, bed-exit technology, physical restraint

Smart Technologies in Mental Health: The MHEN Project
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The Mental Health Engagement Network (MHEN) project introduced, delivered and evaluated the use of web and mobile based technologies in the delivery of mental health care services to individuals living in the community with either a mood or psychotic disorder.

We recruited 400 (245 men and 155 women) research participants from the case loads of 54 mental health care providers. Care providers were recruited from the London hospital out-patient programs, WOTCH Community Mental Health Care Services and the Canadian Mental Health Association, London – Middlesex Branch. Each client participant was randomly assigned into
Group 1 (early intervention) or Group 2 (later intervention). Group 1 participants received an iPhone 4S, a TELUS health space™ account, and version 1.0 of the Lawson SMART record (a web-based application that provides individuals with a personal health record and tools to help them manage their health) in July, 2012. Participants in Group 2 initially acted as a control group, and received the intervention in March, 2013. At the 6 months post-intervention, both groups showed a reduction in the number of psychiatric hospitalizations, arrests, outpatient visits, and an increase in the community integration score. These benefits were all maintained at the 18 month mark.

As hypothesized, the use of web and mobile based technologies in mental health care can improve the lives of those living in the community with mental illness and reduce health care costs as a result. An issue in the longer term sustainability of this intervention is the overage in data costs. Each month approximately 2% of the group incurred overages, but this could be by hundreds, and in one case thousands of dollars. Strategies to better prevent and manage these costs need to be developed. In an effort to address these issues, future research will investigate the use of a cost-effective text message base prompt and reminder system that does not require the use of a data plan. As the MHEN project demonstrated, using smart technologies to enhance the provision of mental health services is promising.

Keywords: web based technology, mental health,
The study showed that the smart tools supported better communication with the client. Differences between baseline and end of project on measures indicated a dramatic increase in community integration scores.

Conclusions: The pilot study data has shown that smart technologies can successfully provide an enhanced type of community care.

Keywords: smart technology, mental health, rehabilitation

Challenges in Design of Digital Care Systems that Support People with Dementia
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The paper reports some of the many challenges that have to be faced in inclusive designs of digital services for healthcare for people living with dementia. Dementia is a major global health challenge prevalent in developed and increasingly in developing countries. There is a need for affordable treatments but also services and technologies that increase independence of people living with dementia. Technology services should not primarily focus on safety and security but address independence, autonomy and living well.

In trying to develop any health digital technology – anything from infrastructure systems to personal portable products – that are intended to serve any population group, people living with dementia should be an important consideration. It should be noted they are as likely to have other co-morbidities as their peers who do not have dementia.

When designs imply they are suitable for people living with dementia in general, there are many factors to be addressed. Variability of expectations, functional capacities and motivations across individuals with dementia (both between one person and another and over time for an individual) are fundamental. Other relevant factors include: inability to use/comprehend some text/language; memory problems; limits in seeing/perceiving colours and depths; reduced capacity to reason/abstract/learn; and, fear of technology’s impact on them and their impact on technology. In addition, associated issues with these functional impairments could potentially include: losing devices; inability to use passwords or PINs; a need for fewer menu choices; impaired control of capacitive touchscreen technology; availability of Wi-Fi Internet access; and, how much support is needed for set up and maintenance of use (e.g. charging devices).

It is further noted that those providing care for people living with dementia also have variable expectations, capacities and motivation.

It is concluded that generic services that include people living with dementia as potential users have to be highly adaptable; working for individuals over time as their condition changes and across individuals with quite different expectations, functional capacities and motivations.
Experimental Smart GSM Based Control System Acting As a Proposed Solution for South Africa Smart Home Deployments
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Technology has advanced so much in the last decade or two that it has made life even more efficient and comfortable. The comfort of being able to take control of devices from one particular location has become imperative as it saves a lot of time and effort. This paper presents the development of GSM-based home appliance control for smart home system. The main objective was to develop a GSM smart system that allow users to remotely control and monitor multiple home appliances using a simple cellular phone or current network infrastructure as a resource.

The proposed solution is flexible as a result it offers and addresses the issue of availability and reliability with the constraints of the technologies being applied (GSM network-set up in this case). Possible target appliances include, but not limited to, climate control system, security systems, sensors, anything with an electrical interfaces. The information was gathered through literature assessment and this was conducted through the use of case studies like white papers, conference papers, journals and peer-reviewed articles with the aim of investigating and accepting various GSM methods and tools that are currently available. Therefore an experimental scientific research approach with GSM Open Source tools were conducted and applied in the study in order to address the main research objectives. Evaluation and validation of the developed GSM system was conducted from the lab environment and simulated by following further tests and reviews.

Keywords: smart-grid, GSM network, smart home

Session 3:

Promoting Caregiver Engagement Using Interactive Voice Response Technology
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We shall present preliminary findings from an informal caregiver program. This program encompasses disease-specific elder-caregiver education and action planning, coupled with ongoing disease-specific, technology-based caregiver networking and peer support. Interactive voice response (IVR) technology is being used as a periodic monitoring/support strategy to examine the caregiver experience. If a caregiver’s stress/burden appears increasing, health providers are poised to intervene early. Caregiver contacts also may enable program staff to
identify and intervene with patients whose caregivers report early signs and symptoms of symptom exacerbation, which can result in fewer emergency department visits, hospital admissions/readmissions, and help elders remain in their chosen residence.

The project is distinctive to other caregiver programs. It engages both the caregiver and the chronically ill elder in partnership, to learn how to more effectively manage the patient’s specific chronic disease. It moves beyond current caregiver self-management strategies to provide caregivers with the practical knowledge and skills they need to be aware of and proactively address their loved one’s disease-specific health issues. It is intended to enable caregivers to feel more aware and confident, contributing to potentially reduced caregiver stress and enhanced quality of life. As the emotional well-being of caregivers is associated with patient well-being, educating and creating a patient+caregiver partnership can positively affect both the elder and the caregiver. Disease-specific elder+caregiver education, monitoring and support networks may offer an opportunity to help create disease-customized and transferable approaches to chronic disease caregiving.

At the conclusion of our project, we shall share lessons learned, and best practices for the design, implementation, and dissemination of effective, caregiver-centered wellness programs. This project will provide a "tool-kit" for hospitals, community-based organizations, patients, caregivers, health providers, and others to help them make informed decisions about how best to meet the needs of these elder+caregiver partnerships in the context of their own communities.

Keywords: caregivers, elders, engagement, IVR, chronic diseases

Multi-Level Integration for Patients in Lower Silesia
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To ensure a better quality of life for people aged 65+ with chronic diseases, it is needed to bear the economic burden of chronic diseases (that makes 46% of the global burden caused by all diseases) by health care system. Senior patients suffering from chronic diseases may be supported by information- communication technologies, mainly mobile ones, and that is a subject of an area called m-Health. So far, Polish patients are provided with medical care within the current state health care system, mainly without any ICT support in delivery of care and share of information. To achieve the objectives of the Care Well project (grant agreement no: 6209 83) there have been implemented necessary scenarios and business model processes. The main aim and subject of the Project is "Multi-Level Integration for Patients with Complex Needs". Therefore, the system design involves the integration of three subsystems: Educational - Information Platform (Mobile/Social), Integration Platform (Service Buss) and Monitoring Platform. All the integrated subsystems are able to meet and cover specific requirements, which are put for the health care system in the region (country). At the stage of preparation for implementation there have been identified requirements, which were then transferred into the BPM process model. This model was consulted with specialists and then their approval was
followed by the implementation of telecare process. The Integration Platform is mainly supposed to take care of the implementation of telecare in accordance with the modelled procedures and allow for an adequate response in any situation. It was done using the API (Application Programming Interface) to give applications access to connect and essentially communicate with other programs. Another task of the integration platform is storing, processing and sharing of electronic medical data as well as the results of quality of life questionnaires.

Keywords: integration, telecare, mHealth

Biz4Age: The Vital Living Environment
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³HZ University of Applied Sciences, The Netherlands

With the growing older population in both Belgium and The Netherlands, the government urges people to stay at home for an extended independent period of time. To be able to accomplish this, adaptations in their life need to be made. There is already a lot of information on which adaptations can be implemented in their house, but not about what is needed in the neighbourhood, whether this includes technology or not, this is also an important aspect that needs to be looked in to.

The main objective in this research is to map the vital living environment of the elderly in Rilland, a small village in Zeeland, The Netherlands. This was established in cooperation with the Zeelandic Living Room by performing around 36 in-depth interviews with both the elderly, key figures and organisations in Rilland.

While analysing these interviews, it became apparent that the neighbourhood could still be improved to achieve an extended independent period of time. Six important topics could be derived: contacts & information, care, living environment, safety, self-reliance, solidarity & acceptance. Overall, Rilland seemed to be a social village where some improvements could still be made. Further research is still needed to see if these results are similar in other dwellings such as cities.

Keywords: community building, vital living environment

Usefulness of a Telemedicine Program in Refractory Congestive Heart Failure Patients
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Chronic congestive heart failure (CHF) patients undergo frequently to hospital readmission due to a worsening of haemodynamic conditions, poor adherence of therapy and incomplete clinical follow-up after discharge.

Objective: To evaluate the efficacy and costs of our model of telemedicine in a high risk CHF population monitored by programmed home visit contacts aimed to discover alarm parameters and adherence of medical therapy.

Methods: High risk CHF patients (age>70 yr, lvef <30%, BNP>250pg/ml, NYHA class ≥III, diastolic filling pattern grade≥2 and hospital admission ≥2 per year (≥2 criteria) were included after discharge. They were monitored with an home visit within one-week, then every two months or before according to the clinical conditions. The home-visit, performed by a specialized nurse, consisted into a complete check of therapy adherence, blood pressure, control of body weight, oxygen saturation and finally 12-leads ECG. All these data, inserted into a net platform are read by the cardiologist. Five alarm parameters were scheduled: worsening of NYHA ≥one class; heart frequency<40/min or >110/min or in case of complete arrhythmic frequency; angina pectoris or syncope; increase of body weight>2-3Kg; peripheral oedema and oliguria (<500ml/day). In case of alarm parameter's presence, the cardiologist decided to inform the emergency, the patients’ GPs or to programme a clinical control.

Results: Forty-four CHF patients (25 males), mean age 81 years old entered this clinical experience. All patients were visited at home (155 visits). In (39%) patients almost one alarm parameter developed: a clinical control was planned into 24-hour in (18%) patients, only (14%) patients were admitted in ED or hospital for acute decompensation (18%). During the follow-up 11 (25%) patients died a cardiac death and (2%) subjects dropped out from the counselling. Hospital admissions for HF 1 yr before enrolment (35),1 yr after (12). The economic expenditure in our 44 CHF patients reduced from 116.856 Euros to 40.065/y. The quality questionnaire, compiled by 24 patients demonstrated an high degree of satisfaction in 23/24 cases.

Conclusion: telemedicine saves frequent hospital readmission and costs.

Keywords: telecardiology, heart failure, cost-analysis, satisfaction

The Use of Occupational Therapy to Increase Compliance with Tele-health
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Effective participation in tele-health requires both physical and emotional comfort. The skills necessary to embrace tele-health can be enhanced by occupational therapy. The introduction of either acute interactive services or chronic monitoring can have increased success in persons with fine motor abilities and cognitive capacity. These attributes can be enabled in a patient when concomitant occupational therapy is included in the care plan. Occupational therapy is
included to increase patient ability in these areas is a matter of course in rehabilitation and facilitates increased independence in activities of daily living. It is a natural extension to incorporate occupational therapy early in a case which is a potential for tele-health support to move back toward independence and medical stability.

Keywords: occupational therapy, cognition, independence

Non-Contact Sensing of Vital Signs, Physiological Perspective on Current Research and Future Research Directions
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\textsuperscript{2}Xerox Innovation Group, Bangalore, India

With rise of chronic disease and elderly population, continuous healthcare monitoring away from hospital managed by individuals is going to be mainstay of sustainable healthcare delivery in future. Though ubiquitous smartphone penetration helps in a gateway to remote healthcare, quality of remote healthcare is going to depend on comprehensive health data collection in user friendly and cost effective way. Sensors that are not affordable, clumsy to operate and not of medical grade are a big impediment to mass scale role out of remote healthcare services. Usable, integrated sensing is a dream and if that too if could happen from affordable off the self-sensors like cameras, it going to be disruptive in remote healthcare services adoption.

The current paper highlights and analyses the availability and its maturity of non-contact integrated usable sensing as an important component of remote healthcare services.
Implementing a Telecardiology Strategy in a Geriatric Institution in Pelotas - Brazil

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Introduction: Life expectancy has grown exponentially all around the world. Therefore, there is a burden of chronic diseases that impose, on governments and health policy makers, the urgent adoption of new standards concerning assistance of the elderly, in general. Within this context, telecardiology services can help diagnosing and monitoring elderly people living in geriatric institutions.

Objectives: Implementing a Telecardiology Strategy - through tele-ECG and specialized second opinion – for the monitoring and identification of potential cardiovascular diseases in institutionalized elderly people.

Methods: The project was implemented at the Beggars Asylum of Pelotas (AMP), RS State - Brazil, a century-old geriatric institution, currently home to 88 elderly people. As a routine, digital ECGs are recorded every 6 months and transmitted to the cardiologists, who analyse and send the interpretation back, through a tele-ECG online platform, via both Android® equipped smart-phones and conventional computers. Cardiology advice is provided to selected cases.

Results: The mean age of the elderly residents at the AMP is 80 years. The main diagnoses of tele-ECGs showed: 57.3% (51) of normal diagnosis or nonspecific repolarization changes; 20.2% (18) heart chamber enlargements; 9% (8) right or left bundle branch block; 6.7% (6) atrial fibrillation or flutter; 2.2% (2) ischemic changes.

Discussion: Implementing a tele-ECG method at the AMP was quite an easy process, demanding two training sessions in January 2015. The AMP’s nursing and medical staff take advantage of a 24/7 service, allowing to diagnose cardiac events and to have immediate specialized counselling. Moreover, the availability of onsite ECG facilities brings comfort and fast access to a clinical decision as patients do not need to go out for recording ECGs.

Conclusion: Elderly people represent a large segment of the world population that, for obvious reasons, demand continuous attention and monitoring of vital parameters and exams. The Telecardiology network established at the AMP in southern Brazil addresses one of the most prevalent challenges in health care: the timely assistance of cardiac diseases.

Keywords: aged, telemedicine, electrocardiography, geriatrics

A Successful Telecardiology Experience in Rural Communities of Rio Grande do Sul

L. Rehnberg¹, L. Rickard¹, A. Chang¹, L. Ashby¹, L. Majkowski¹, A. Wilson¹, T. Russomano²
Introduction: The practice of telecardiology, and the use of tele-ECG, has been shown in numerous projects worldwide as being effective for the diagnosis, rehabilitation and prevention of many cardiovascular diseases. In partnership with the Telehealth Laboratory of the Microgravity Centre, PUCRS, we conducted a telecardiology service to rural areas in Rio Grande do Sul, Brazil.

Methods: Phase 1: Training. 6 UK medical students attended the Telehealth Lab for training with previously validated software and equipment for use in the mission. Phase 2: Mission: The group travelled to several rural locations within Rio Grande do Sul. The consultation process involved 3 stages:
- Triage,
- 12-lead ECG recording,
- Entry of clinical data into the software.

‘Store-and-forward’ technique was used for secure data transfer to the remotely located cardiologist.

Phase 3: Data Analysis. Clinical data was reviewed by the cardiologist, via secure servers, and a second opinion and management plan given. This was sent to the health professionals of the remote health centres.

Results: 34 cardiology consultations were carried out, 15 female and 19 male, with patient ages ranging from 24 to 87 yr (mean ± SD; 52.1 ± 15.6 yr). There were 14 ECG abnormalities detected that needed intervention or further investigation.

Conclusion: The mission demonstrated that it is feasible to deliver an effective telecardiology service to remote Brazilian communities. The team showed that clinicians with some technical training are capable of providing an effective telecardiology service. This mission suggests that telecardiology should not just be a one-off service, but should become a regular healthcare assistance for rural communities. The findings of this telemedicine mission support those obtained in other similar projects, indicating that telemedicine could be a useful tool for the delivery of healthcare to remote areas.

Keywords: telemedicine, telecardiology, ECG
activity (electrocardiogram ECG), mechanical ventilatory activity (the pneumotachogram, PTG) and respiratory activity of lung exchanger (the photoplethysmogram, PPG), and then send these signals to a local computer station. The configuration of this interface comprises:

- Sensors with their formatting circuits take charge on the patient the different signals.
- A acquisition card built around a microcontroller, responsible for digitizing the signals and transferring them to a local computer terminal.
- A graphical interface developed in Visual Basic environment and responsible for steering the acquisition, the temporal and spatial processing and archiving of data.

Keywords: Electrocardiograms, pneumotachogramme, respiratory activity, photopléthysmogramme

Integrated Telemedical System for Non-Invasive Early Diagnostics of Peripheral Perfusion with Therapy Adherence Support
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²Private, Czech Republic
³Rays of Hope, Switzerland

The presentation will provide an overview of telemedical projects operated in the Czech Republic focused on diabetic patients, elderly population and other patient groups with indicated cardiovascular risk factors. It will contain the following parts: 1) Patient definition, Case studies and patient benefits; 2) Methodologies and technologies applied; 3) Results from clinical and economic perspectives.

Keywords: telecardiology, vascular disease, non-invasive diagnostics

Do Cardiac Patients Like and Use An e-Learning Platform as Part of Their Secondary Prevention Program?
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Background: Novel care delivery strategies for secondary prevention of cardiac patients such as cardiac teletrehabilitation are becoming more and more common place. In its ideal format, cardiac telerehabilitation encompasses a comprehensive approach including not only telemonitoring, but also telecoaching and E-Learning. E-Learning means that the tele-intervention teaches patients using medically and scientifically sound interactive didactic
material, with the aim of enabling the patients to gain a better understanding of the etiology, pathophysiology and clinical presentation of their condition and ways of preventing recurrences and deteriorations.

We designed and developed a web-based E-Learning platform, including educational video material (with both patients, cardiologists and paramedics) and interactive quizzes. The feasibility and usage of this platform will be assessed prospectively.

Methods: We will conduct a multi-center randomized controlled trial (n = 1000) starting in November 2015 in Belgium. Patients will be randomized to the control group (receiving only standard educational brochures) or to the intervention group (receiving brochures and access to the E-Learning platform). The primary objective is to assess feasibility and acceptance of the platform by completion of the validated User Experience Questionnaire at the end of study period. The secondary objective is to assess usage of the platform by registration of: 1) % of patients accessing the platform; 2) number of videos viewed/patient; 3) cumulative time of platform usage.

Results: The E-Learning platform will be presented and explained at the conference. The results on both the feasibility and usage of the platform from the preliminary analysis of the clinical trial (after inclusion of the first 500 patients) will also be presented.

Conclusion: Cardiac telerehabilitation programs preferably have a comprehensive approach, including also E-Learning. The clinical trial, of which will be presented at the conference. This is one of the first large randomized controlled trials assessing the possible value of an E-Learning platform.

Keywords: E-Learning, telecardiology, cardiac telerehabilitation

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Artificial Intelligence Joins the Fight against Cardiovascular Diseases: Empowering Tele-ECG Interpretation Services

Y. Fleureau
Cardiologs, France

ECG interpretation services need to optimize their efficiency without compromising the quality of service and their ability to adapt their organization to market demand.

CardioLogs Technologies leverages expertises in cardiology, machine learning and web services to help physicians better diagnose and manage patients with cardiac disorders.

CardioLogs have trained an artificial intelligence (AI) to ECG analysis over hundreds of thousands of ECG cases and aims to make it available to Tele-ECG interpretation services to bring them agility and scalability.

CardioLogs AI can be used to stratify incoming ECG data flow, manage its distribution to interpreters, as well as monitor the quality and improve the interpretation process, enabling Tele-ECG interpretation centers to save costs and address new opportunities.
Connected Nursing Care in Telemedicine
M. Cigliuti
TeleNurse Network, New Jersey, USA

According to the Association of American Medical Colleges, it anticipates an insufficient number of specialty physicians by 2025. Per the National Sample Survey of Nurse Practitioners, 48,000 Advanced NPs will provide specialty care, with an expected growth of 141% by 2025, compared by physician growth, estimated at 21%. With this growing field, the nurse practitioner work force will respond to the changing needs in the healthcare market and be the growing source of specialty care clinicians in the future. Increased use of Nurse Practitioners could alleviate the projected primary care physician shortage if they effectively integrate into the health care delivery system.

Telehealth can improve quality of life and overcome geographic barriers to health care access. Most current, Telemedicine sites focus on physician services only - not nursing specialty care. Nurses play a key role in Telemedicine by monitoring a patient’s condition, vital signs, blood pressure, weight, oxygen saturation, wound care, rehabilitation, and education. Nurse Practitioners, Clinical Nurse Specialists, and Midwives provide a variety of services (i.e. women’s health services, pre-natal care/education, mental health counselling, community health, etc.) with the same quality as physicians. Through the use of state-of-the-art cameras, monitors and software, nurses can reach and be reached by millions of people in ways never possible. Presently, there is no Mobile Application that provides a multi-faceted approach to patient services inclusive of not only Telehealth specialty providers but preventative care utilizing nursing services.

Keywords: chronic care management

Ensuring Safety and Avoiding Catastrophe in Telephone Nursing
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Objectives:
- Discuss the role of nurse in the delivery of care over the telephone;
- Identify the standards of practice that guide the delivery of care over the telephone;
- Describe the risks associated with the practice of nursing over the telephone;
- Identify strategies to reduce the risks in the delivery of care over the telephone.
The telephone is a commonly used tool in healthcare. Nurses use the telephone to triage patients, discuss test results, coordinate care, follow-up after a procedure or hospital discharge, and much more. The telephone offers such a convenient way to deliver care that both the complexity of this practice and the inherent risks are easy to overlook. Indeed, patient care over the telephone is among the most sophisticated and high risk practices nurses engage in today.

If you interact with patients over the telephone, this presentation is for you. In it we will review the role of the nurse, identify the basic standards used to guide the practice, explore common pitfalls to highlight the risks associated with this practice, and discuss strategies to reduce the risks and enhance the safety and quality of care provided over the telephone.

Nurses Using EHRs in Mental Health Settings
G. Strudwick
University of Toronto, Canada

Healthcare organizations have accelerated in their adoption of electronic health record systems in the last decade. As such, health care professionals around the world have had to learn how to integrate and best use the technology in their practice. Variability exists in how these systems have permeated and contributed both positively and negatively to practice. This presentation will focus on the experience of one group of health professionals, nurses, in using an electronic health record system in a mental health inpatient setting. Published literature will be drawn upon and examples provided. The presentation will conclude with strategies identified from the literature as to how best to support the integration of the technology into nursing practice for optimal uptake.

The Value of Nurse Blogging
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The internet has provided an unprecedented opportunity for the sharing of experiences and information. A phenomenon known as “blogging” (web log) has emerged and there are hundreds of nursing and healthcare professional blogs that can be found on the internet with ease. Many of these are chronologically rolling entries recounting an individual’s unique perspective in their delivery of care. Others are more sophisticated offering well considered and researched summaries on a multitude of topical interests. Sites such as Twitter and Facebook offer opportunities for nursing groups to micro-blog in short statements. Although peer-reviewed publications still remain the gold standard in scientific publishing, the collection of blogs...
available may present a significant source of data for the inquisitive audience seeking answers to specific questions. Through an exploration of the most popular blog sites, the value can be better described.

Given the sensitive nature of healthcare data, strengths, weaknesses, opportunities, and threats of blogging activity will be analysed and described. The hidden value of nurse blogging efforts deserve to be better expounded upon.
Session: Women, eHealth and Telemedicine within the UN Sustainable Development Goals 2015-2030: From a Global Framework to Local Innovative Programs

The Women Observatory for eHealth within the Global UN Framework of the Sustainable Development Goals by 2030
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On September 2015, the United Nations General Assembly announced a new Sustainable Development Agenda: 17 Sustainable Development Goals (SDGs) were identified to realize basic human rights for all, including access to quality healthcare (SDG 5) and achieving gender equality (SDG 3) by 2030. The Agenda’s goals are not new, nor is it recognizing the role of information and communication technologies (ICT) in accelerating progress towards achieving such goals. Since 2008, the digital community of the Millennia2025 Foundation, with its 10,500 members in 140 countries, has been stimulating action in areas of critical importance to and for women to assure gender equality, women’s empowerment, autonomy, and progress.

The Millennia2025 Foundation is a programme of the European Research Institute Jules Destree, an NGO Official Partner of UNESCO (consultative status) and in Special Consultative Status with the UN ECOSOC since 2012.

The WeObservatory, one of the Foundation’s initiatives, highlights and supports innovative eHealth projects, 17 in 14 countries to date. This presentation will showcase some of the contributions that the WeObservatory’s eHealth and telemedicine projects have made so far by leveraging ICTs’ potential to improve women’s healthcare worldwide, while tackling language, gender and social barriers. The responsibilities of healthcare professionals in international collaborations and local projects are also underscored, emphasizing in particular that of nurses and midwives, who play a key role in this process. The presentation also addresses the topic of multilingualism, as 80% of the WeObservatory’s online content is available in 10 languages.

Keywords: eHealth, telemedicine, women, empowerment, SDGs

Improving Women's Health in Rural Areas with Telemedicine
A. E. Schmaus-Klughammer
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The most important elements in medicine are knowledge and experience in diagnosis and therapy. Modern information- and communication technologies are crucial for facilitating
worldwide access to medical knowledge and progress. By using a web-based telemedicine platform for videoconferencing, transmission of still images and remote monitoring of vital signs women in rural areas have access to better healthcare services. Doctor-to-doctors platforms allow the exchange of diagnoses between primary or secondary healthcare facilities and tertiary healthcare facilities.

Importance of cervical cancer screening: Telemedicine makes the health care system for women more efficient and it improves quality of care. The shortage of doctors, nurses, midwives and other health personnel can be overcome with telemedicine. Women don't have to travel for procedures, such as cervical or breast cancer screening. Cervical cancer kills about 270,000 women every year. Most (85%) of these deaths occur in Low and Middle Income Countries (LMICs). The main issue about cancer screening in rural areas is the lack of experts' doctors. Therefore it is important to build-up a network of national physicians and health worker who will work within the screening project. Training health personal by using telemedicine in a blended learning environment allows to implement sustainable healthcare in LMICs. Blended learning is a formal education program in which people learn one part through eLearning and the other part through face-to-face classroom methods. Both methods are combined with computer-mediated activities. While doing blended learning, synchronous (live) teaching and asynchronous teaching (stored lectures) is important combined with face-to-face training.

During the presentation the necessity and the improvement of women's healthcare using telemedicine will be explained.

Keywords: telemedicine, eLearning, cancer screening, a-synchronous,

Online Toolkit: Improving Transfer of Learning into Practice from Training Courses on Violence against Women

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Training in Gender Violence (GBV) is essential to raise awareness among professionals to detect and care for victims with a comprehensive approach. This was one of the objectives of the European Project: “A health sector toolkit for implementing learning from violence against women trainings”, record number: 2013-1-DE2-LEO04-16120 from Leonardo da Vinci Program, financed with European funds, that have been developed for an association of organizers from four countries, Germany (SIGNAL), Austria (Innsbruck’s University), Spain (SACYL) and United Kingdom (HAVEN’S).

We worked with different roles in the struggle against Gender Violence from different organizations, and have shared a common goal: improving health care for victims of gender
violence through training of the professionals in this field. One of the objectives has been the
development of a set of tools to facilitate gender violence training of health professionals and
learned to transfer the clinical practice.
The content of this website is a part of the result of this project. It is designed in a very easy and
friendly way, containing the 28 tools that were agreed between the 4 countries to apply in
different contexts, providing certain homogeneity, but with the potential to be adapted and used
independently by different organizations. The toolkit (Toolkit) has been published in an online
resource (Toolkit) for trainers, organizations and individuals interested in improving their
Teaching skills in GV. They are divided into the 5 phases of the training depending on which they
belong to: preparatory, developing, implementation, post-training and assessment, covering the
whole process to prepare the best training.
Conclusions: We believe that training in GV is the first step in changing attitudes and train health
professionals in managing the problem. It is necessary to motivate professionals and adapt
content and methodology and assess the impact of it. The creation of this website is a fantastic
tool to improve the training and to bring the medical education into the land of blended learning.

Keywords: gender violence, medical education, training

Health Workers Use of ICT for Maternal and Child Health Care: A Review of Seven E-
health Projects in Nigeria
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This paper is a review of seven e-health projects for maternal and child health care in four states
in Nigeria.
The aim of these projects was to deliver health information and services to mothers using
information and communication technology (ICT); to improve maternal and child health
outcomes in Nigeria. The author examined each of these projects to explore the impact of the use
of ICT for health information dissemination on maternal and child health practices and outcomes
in Nigeria. The study was also carried out with the view to provide current updates, emerging
issues, lessons learnt and outcomes in the deployment of information and communication
technology for maternal and child health care in Nigeria. The author revealed some crucial
factors that can reduce the barriers encountered in accessing quality health information and
services by pregnant women. The review provides vital information for future deployment of
ICT for the delivery of maternal and child health information and services in the country

Keywords: e-health, Nigeria, health worker, ICT
Complex Telemedical Solution for Foetal Health Monitoring
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Nearly 60 years ago, Orvan Hess and Edward Hon developed the first device for monitoring of the heart rate of the fetus. Cardiotocography (CTG), consisting of monitoring of fetal heartbeat and recording of uterine contractions, is one of the most important examinations carried out in obstetrics (after 25 weeks of pregnancy). Since then, CTG equipment has undergone a number of upgrades. Now is the time for a breakthrough. Nothing can replace the experience and knowledge of professional medical staff.

Pregnabit is a telemedical device, designed to support the work of doctors and midwives. It is not a consumer product, it is not a gadget. Pregnabit is a mobile medical device that combines a telemedical cardiotocography (teleCTG) with expert remote analysis of CTG readouts by qualified medical personnel (teleCTG Monitoring Centre). It enables CTG monitoring of pregnant women at anytime and anywhere, especially when an extra visit to the doctor’s office is not possible or necessary. Pregnabit combines well-known and proven features of professional stationary CTG device, which is used in hospitals worldwide, with the features of modern mobile devices. Pregnabit sets a new trend in the monitoring of well-being of the fetal. It significantly raises the level of prenatal prevention. Pregnabit is a telemedical device for safe and reliable monitoring the fetal and maternal heart rate, and recording uterine contractions. Collected data is transmitted via a wireless network to the teleCTG Monitoring Center, supported by a qualified medical staff. Therefore, Pregnabit is a combination of a CTG medical device with an innovative telemedical service - complex telemedical solution for fetal health monitoring. Pregnabit was developed for pregnant women for whom prevention is very important. Ongoing monitoring of fetal health can significantly reduce future mom’s stress level and has a positive impact on her overall wellbeing. Early detection of threats, including through CTG measurements, may have a real impact on quicker response, thus gives a chance to implement a relevant medical procedure.

Keywords: eHealth; mHealth; telemonitoring, telemedicine, cardiotocography
The purpose of this paper is to describe an array of education content and processes for nurses who use telehealth technology and applications. Beginning with nursing education at the pre-entry level, the need for integration of telehealth content in the curriculum is increasingly recognized. Nursing students who use telehealth embedded in simulation training labs are introduced to using and evaluating the technology for its usefulness in care delivery. Those teaching about telehealth recognize the need for defining and describing telehealth nursing, reducing barriers to telehealth and increasing students’ and practicing nurses’ motivation to use telehealth. Nurses working in underserved regions learn formally or informally to use mobile phones including mobile Apps that are useful for teaching clients or patients and for relaying data to the tertiary care facility for analysis and care interventions.

Advanced practice nurses can learn to educate clients and manage chronic diseases using telehealth. They can also leverage social media communication technologies for more timely and beneficial interactions with their clients. Nurses working in the eICU environment receive continuing education for their specialty. Nurse researchers have evaluated online telehealth courses and compared tele-teaching with face-to-face teaching. All nurses must comply with their professional standards, scopes of practice and regulations; these are basic tenets for education at any level.

Keywords: telehealth nursing, education, teaching, learning

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**e-Mobile for Women in the Rural Area (Poster)**

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The ubiquity and affordability of mobile presents us with an unparalleled opportunity to improve social and economic development and positively impact lives. However, to realise these benefits, women must not be left behind in the mobile revolution. Mobile technology is a powerful tool. It transcends geographies, cultures and socio-economic status and offers wide-ranging benefits to women and society. Mobile phones help women feel safer and more connected, save time and enable access to key services such mobile money and health information. Mobile phones are important tools for enhancing the lives of women in low- and middle-income countries. Mobile phones help women feel safer and more connected, save time and money, and access life enhancing services such as mobile money, or potential education and employment opportunities.

Keywords: mobile, women, Latin America, prevention

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